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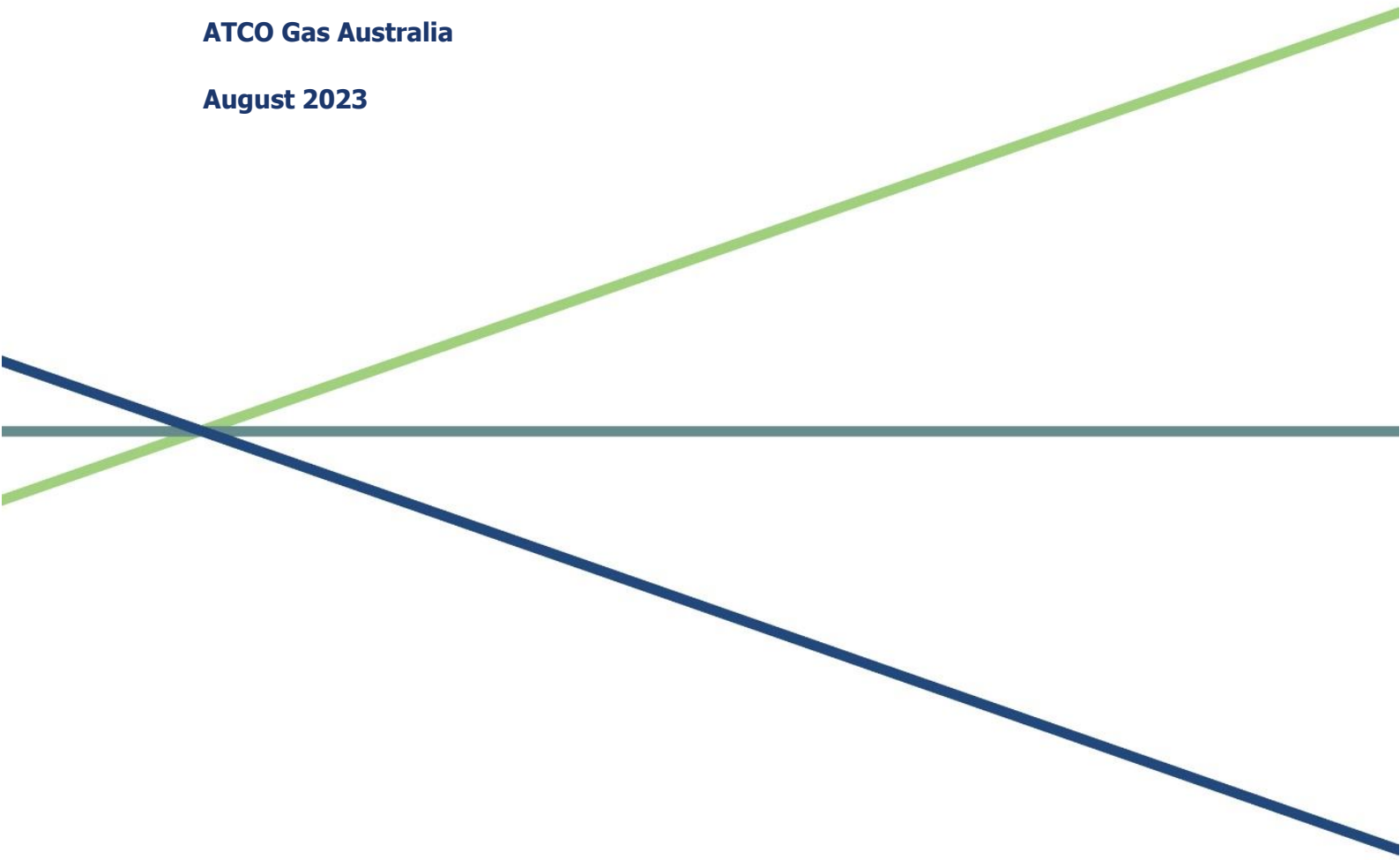

INCENTA
ECONOMIC CONSULTING

Contact us:

Incenta Economic Consulting
Unit 1, 19-35 Gertrude Street
Fitzroy, Victoria, 3065
Telephone: +61 3 8514 5119
Website: www.incenta.com.au

Disclaimer:

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1. Introduction and overview

1.1 Context and ATCO Gas Australia's proposal

1. We have been asked to advise as to the appropriate depreciation method for the AA6 period, in the context of the challenges facing the ATCO Gas Australia (ATCO) gas distribution business and the requirements for depreciation under the gas regulatory regime.[1]

2. ATCO has received assistance from ACIL Allen (ACIL), which has:

   a. developed long term gas forecasts (spanning the period from 2024 to 2074) reflecting four different scenarios as to how the energy sector may evolve in the future[2]

   b. prepared forecasts of the regulated revenue requirement over the same period in a manner that is consistent with the relevant scenario,[3] and that otherwise is consistent with current approaches,[4] and

   c. derived the distribution prices that were consistent with the demand and revenue requirement forecasts summarised above.

3. ACIL observed that the projected long term price paths for all four scenarios under current approaches varied materially over time, and specifically that real prices:

   a. were projected to increase modestly over time under the Energy Hybrid and Gas Retained scenarios

   b. were projected to increase materially over time under the Electricity Dominance scenario, and

   c. were projected initially to increase materially, but then fall again more in line with AA6 levels in the longer term, under the "Hydrogen Future" scenario.

4. ACIL concluded that it would be more appropriate for prices to remain constant in real terms over time ("levelised"). It derived the levelised prices for each scenario, and then derived the changes to depreciation over time that would be required to generate the levelised price paths by scenario. It calculated that levelised prices required an advancement of depreciation for AA6 by scenario of: $78 million (Gas Retained);

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1 The most relevant components of the gas regulatory regime are national gas objective and revenue and pricing principles that comprise sections 23 and 24 of the National Gas Law, and the specific guidance for depreciation contained in rule 89 of the National Gas Rules.

2 The scenarios were labelled "Energy Hybrid", "Gas Retained", "Hydrogen Future" and "Electricity Dominance".

3 For example, the Hydrogen Future scenario assumed a substantial capital expenditure spend to upgrade the network to make it capable of reticulating hydrogen, and the "Electricity Dominance" scenario had a sharp contraction in ongoing expenditure as use of the network declined.

4 Specifically, straight line depreciation and the AA6 WACC were assumed to continue.

$104 million (Energy Hybrid); $161 million (Electricity Dominance); and $340 million (Hydrogen Future).

5. ACIL noted that it was not possible simply to weight the four scenarios as there is too much uncertainty as to the future to assign weights. It ultimately recommended advancing depreciation by approximately $120 million, which was based on:

   a. placing the Hydrogen Future results to one side on the grounds that it appeared an outlier, and

   b. averaging the high and low value of the remaining scenarios (i.e., Gas Retained and Electricity Dominance).

1.2 Summary of advice

1.2.1 Implications of Depreciation Method on the gas access regime

6. Our review of the underlying economic principles and guidance from the gas regulatory regime (comprising the national gas objective, the revenue and pricing principles and rule 89(1)) suggests that the principal outcomes sought by the choice of depreciation method are:

   a. creating a reasonable opportunity to recover cost, including the sunk investment in network assets, noting that this is a central element in encouraging efficient gas network investment and creating a fair balance of interests in relation to charges

   b. encouraging the efficient use of the gas network, and

   c. encouraging stability in prices over time.

7. Our summary of the requirements of the regulatory framework is materially the same as that presented by the AER in its recent information paper on this topic,[5] which in our view provides a material contribution to the debate on how depreciation should be considered in light of the uncertainty facing gas networks.

1.2.2 Application to ATCO's depreciation for AA6

Support for a levelised price

8. We endorse ACIL's views that targeting a levelised price is appropriate, and one that is consistent with the requirements of the gas regulatory regime. In particular, we note that:

[5] AER (2021), Information Paper, November: Regulating gas pipelines under uncertainty. We discuss the AER's key conclusions that are relevant to this report in section 2.3.1, where we also identify a small number of issues where we would place a different emphasis, or reach a different view, to the AER.

a. levelising prices for the Electricity Dominance scenario is likely to provide ATCO with a reasonable opportunity to recover its costs (and, absent a change to regulatory depreciation, ATCO will face substantial stranded asset risk), and

b. under all scenarios including the Electricity Dominance scenario, levelising prices is likely to promote the efficient utilisation of the gas networks over time.[6]

Approach to levelising

9. One different perspective that we have is the technical matter of how prices should be levelised.

   a. The objective of ACIL's calculations was to produce an overall average price for all of ATCO's customers that is constant in per gigajoule (GJ) terms over time (i.e., combining residential, commercial and industrial customers).

   b. However, we think it would be more appropriate to target a levelised price for each customer class (i.e., Residential B3, Commercial B2, Commercial B1, Industrial A2 and Industrial A1).[7] Where the mix of customer demand is forecast to change (as is the case for three of the four scenarios) these objectives produce different outcomes.

10. When we apply this alternative objective for levelisation, we find that ACIL's finding – that advancing depreciation is justified – is substantiated. However, we find that the requirement for advancing depreciation is reduced for three of the four scenarios, the advancement we calculate for AA6 being $41 million (Gas Retained), $73 million (Energy Hybrid), $168 million (Electricity Dominance) and $269 million (Hydrogen Future).

Treatment of the Hydrogen Future scenario

11. We agree with ACIL that it is appropriate not to factor the Hydrogen Future scenario into the derivation of depreciation for the AA6 period. We reach this view because our analysis suggests that deferring action under this scenario (i.e., waiting for more information before factoring this possibility into pricing plans) has only a modest risk in terms of the efficiency of use of the network.

Drawing the remaining scenarios together

12. In our view, when interpreting the advice from the scenarios for AA6 depreciation, the priority should be to minimise the risk of asset stranding, which is a particular issue under the Electricity Dominance scenario. We say this because reducing stranded asset

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6 We explain the economic reasoning underpinning the proposition that levelised prices are likely to promote the efficient utilisation of gas networks in Appendix A; however, in essence, the extent to which the efficient use of a gas network is depressed when price exceeds marginal cost gets proportionately larger (i.e., non-linear) with the size of the gap between price and marginal cost (for example, if the price is increased by $10 per GJ, and then by a further $10 per GJ, the second price increment will depress demand to a much greater extent than the first). Thus, if large fluctuations in prices are avoided, lifetime use of the gas network is increased, and the lifetime average price to customers is thereby reduced.

7 ATCO Gas Australia existing haulage reference tariff classes.

risk relies upon early action because (that is, if action to address stranded asset is excessively delayed, then the scope to recover cost may already have passed) and because providing a reasonable opportunity to recover efficient cost has been a central element in how utilities have been regulated in Australia.[8] In contrast to our views in relation to the Hydrogen Future scenario, there is much less scope to defer action if substantial stranded asset risk is to be avoided under the Electricity Dominance scenario.

13. We note, however, that there are a range of other factors that will result in prices for AA6 increasing materially compared to previous regulatory periods, most notably the increase in the WACC as government interest rates revert to levels more consistent with historical averages, which is not likely to be present at the next review.[9] Given this backdrop, it would be prudent to moderate some of the advancement of depreciation, at least where this did not add substantially to the risk of asset stranding.

14. Whilst this is a matter where judgement is required, we observe that advancing depreciation by approximately half of the amount that is suggested by the Electricity Dominance scenario would most likely keep stranded asset risk at a modest level, and also improve the efficiency in the use of the asset under this scenario. Moreover, this degree of advancement would also be approximately consistent with maximising the efficiency of the utilisation of the asset if the "Energy Hybrid" scenario came to pass, and not unduly affect the efficiency of use of the asset if the Gas Retained scenario came to pass.[10]

Other issues

How can customers benefit from advancing depreciation if prices are already increasing?

15. A key driver for advancing depreciation is to promote the efficient utilisation of the network by creating a more level and stable long term price path, as noted above. Promoting the efficient utilisation of the network means that the lifetime demand on the gas network will be higher than would have been the case if prices were permitted to fluctuate materially, which in turn will mean that lifetime prices to customers will be lower than if prices were allowed to fluctuate materially.

16. A further driver is to provide a reasonable opportunity to recover efficient cost, which will provide the incentive and capacity for ATCO to continue to invest in the network (noting that, even under the Electricity Dominance scenario, over $1.5 billion in capital expenditure over the next 50 years is forecast to be required by ATCO, and substantially more is forecast if the other scenarios come to pass).

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8 A further component of how utilities have been regulated in Australia is that compensation has not been provided for stranded asset risk, rather the assumption has been made that the regulatory settings (including the depreciation method) would be calibrated to make this risk sufficiently immaterial to ignore.

9 That is, a further increase in interest rates of the same magnitude is not expected.

10 Under this scenario, the projected real long term price path would change from being slightly increasing over time to one that is slightly decreasing.

How can it be prudent to continue to make discretionary investments in a world where there is a risk of asset stranding?

17. Continued investment to connect new customers can reduce the risk of asset stranding by reducing the average cost per customer, and therefore improves the competitiveness of gas relative to other fuels (at least in the absence of direct regulation about the choice of fuel sources). This occurs where the incremental revenue expected from customers exceeds the incremental cost incurred in connecting those customers.

18. In addition, a substantial risk of asset stranding would only appear to exist under the Electricity Dominance scenario, and continuing to connect customers will also be beneficial if the other scenarios come to pass (i.e., Energy Hybrid, Gas Retained or Hydrogen Future). In particular, continuing to connect customers may have a material effect on whether conversion to hydrogen or use of renewable gas is commercially viable in the long term, as well as the price in the future under this scenario and the other two scenarios that envisage an enduring role for gas networks.

2. Deriving regulatory depreciation under the national access regime

2.1 Economic principles and depreciation

19. There are a number of outcomes for regulatory depreciation that have been accepted as desirable or applied in Australian regulatory matters, these include that:[11]

    a. there should be a high degree of confidence that costs will be recovered over the economic life of the assets such that financial capital maintenance is achieved, and

    b. subject to this first objective being achieved, the recovery of costs should be spread over time in a manner that encourages the efficient use of the assets.

20. The proposition that regulated prices should provide an expectation that they permit the recovery of costs incurred by regulated businesses, including a reasonable ("commercial", "competitive" or "normal") rate of return,[12] is a central plank of cost-based regulation as conventionally applied. There are a number of reasons for this.

    a. First, where firms do not expect to recover costs, and so earn a normal return on investment, investing in the regulated activity will yield poorer returns than available in other activities when adjusted for relative risk.[13] Consequently, the firm would no longer have a financial incentive to invest in the regulated activity. Instead, it would have the incentive to invest elsewhere and reduce its investment in regulated activities as much as possible.[14] This could lead to a number of undesirable outcomes, including:

        i. Cessation or deferral of discretionary projects

        ii. A substitution from capital expenditure to operating expenditure where this is possible, which may come at higher cost to customers

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11 A further factor that is influenced by the depreciation method is the timing of cash flow to a regulated business, which may affect its financeability. As the Victorian Networks' proposals do not rely upon any financeability effects, we do not discuss this issue further.

12 At least where those costs pass reasonable hurdles for prudence and efficiency.

13 To be clear, firms in competitive markets would only be expected to invest only where economic costs are able to be recovered (this is the implication of the standard NPV ≥ 0 rule for investment). Where there may be a difference between regulated and unregulated activities is the level of risk of recovery that is then accepted: in competitive markets, firms often bear a lot of subsequent recovery risk, but as a consequence expect to recover their costs over a sufficiently short period (and therefore with a possibility of earning a windfall if supply continues past this point) so that there is an "upside" to balance off the "downside" risk. However, long term contracts can also be used in a competitive market to reduce the extent of cost-recovery risk faced by an investor, which are quite common in activities that are capital-intensive and specific to a particular customer.

14 It is important to recognise that the fact a regulated firm may continue to invest even in these circumstances cannot be taken as implying that it expects to make a normal return (and by implication, that there is no stranded asset risk) given that a substantial share of investment is either compelled by various regulations or would be done even at a loss in order to minimise a much greater loss.

iii. A deferral of asset replacement where possible, and a possible increase in the risks of outages, and

iv. A general reduced preparedness to investigate or explore new initiatives that may require investment.

b. Secondly, providing an expectation of cost recovery represents a fair balancing of the interests between regulated businesses and their customers. That is, utility businesses agree to undertake irreversible investments for the benefit of customers, as well as submit to ongoing service obligations, and to recover the cost of those investments over an extended period. In return they are provided with a reasonable assurance that they will recover those costs. As noted in footnote 13, the period over which costs are recovered in regulated sectors is typically much longer than in competitive markets (and even in competitive markets where service provision is undertaken under a long term contract), and this longer recovery period acts to reduce prices and so is of benefit to customers.

21. In the context of depreciation, giving this objective effect requires ensuring that funds that are invested are recovered at a sufficiently fast rate so that there is an expectation that all costs will be able to be recovered in the context of possible future risks, such as from technological change in substitutes or government policy changes. By implication, where a future constraint to cost recovery is expected, confidence for cost recovery is achieved by recovering a greater proportion of cost while the capacity to recover is higher (and so the amount left to recover in the future is consistent with the expected future capacity to recover). It is relevant in this context to draw on one of the earliest applications of incentive regulation in Australia as a guide to the regulatory approach for depreciation. While consulting on its approach to regulatory depreciation as part of its first review of prices for electricity distribution networks, the Office of the Regulator-General (ORG) highlighted the primacy of a cost recovery objective, and the importance of adhering, where possible, to past commitments:[15]

The regulatory asset base represents the regulator's view of the market value of the regulated business at any point in time. Accordingly, the regulator can be interpreted as making an implicit commitment to ensure that the market value of those assets does not fall below the regulatory asset base over time. The objectives of encouraging efficient investment will only be met if this remains a credible commitment.

This has important implications for the design of the regulatory depreciation profile. In particular, ***in order to ensure that the regulatory asset base remains at or below the market value of the assets, the regulatory regime must permit each distribution licensee to have their capital returned at a rate that keeps pace with the decline in the economic value of their assets. This in turn implies that regulatory depreciation must at least keep pace with economic depreciation. This will ensure that the value of the distribution licensee should not be placed in a position in the future where it is not able***

[15] ORG, '2001 Electricity Distribution Price Review, Cost of Capital Financing, Consultation Paper No. 4', May 1999, p. 15.

to set tariffs that are expected to recover the benchmark revenue requirement. *[Emphasis added]*

22. In terms of the promotion of efficient utilisation, an efficient price is one that reflects the cost of supplying an additional unit of output (i.e., the marginal cost), as this will signal to customers the societal cost of their consumption actions. However, for gas pipelines – in common with the infrastructure sector more generally, where economies of scale and scope are typical – pricing in this manner will leave a substantial share of cost unrecovered and so not achieve the cost recovery objective referred to earlier (we refer to the costs that would not be recovered under marginal cost pricing as the "residual cost"). The aim for efficient pricing, therefore, is to recover this residual cost in a way that has the least impact on the efficient use of the service at any point in time, noting that regulatory depreciation is the tool to alter how the recovery of the residual cost is spread over time.

23. We address in Chapter 3 and Appendix A the form of residual cost recovery that is most likely to be consistent with advancing the efficient utilisation of assets.

2.2 Guidance from the Gas Regulatory Regime

2.2.1 Introduction

24. In this section we describe the formal guidance and requirements of the regulatory framework for gas pipelines that are relevant to regulatory depreciation. This section draws upon the discussion of the economic principles in the previous section and demonstrates where these principles are reflected in the formal guidance for the selection of depreciation.

25. We first consider the objectives and overarching principles for gas pipeline regulation in the National Gas Law. We then consider the specific requirements of the Rules.

2.2.2 National Gas Objective

26. The objective of the NGL is:[16]

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

27. Three separate components of the objective can be usefully distinguished, namely:

a. the requirement to promote economic efficiency with respect to investment, operation and use

b. the reference to the long-term interests of consumers, and

[16] Section 23 of the National Gas Law.

c. the requirement that the above instruction be focused on the price, quality, safety, reliability and security of supply of natural gas.

28. The objective makes an explicit reference to efficient investment. In the discussion above we identified that the capacity and incentive for efficient investment is influenced by the extent that a service provider can expect to recover at least the efficient costs of supply, and so earn a normal return on investment. The implication is that the objective for efficient investment is maintained through a commitment to the recovery of cost for past investments, such that there is an expectation that this commitment will be upheld for any future investments, to the extent it is reasonable to do so.[17] Consequently, in circumstances where there may be a future threat to cost recovery, the profile of depreciation should be one that supports the recovery of cost.

29. Similarly, the objective also refers to promoting the efficient use of gas, which was also discussed above. This aspect of the objective would suggest that depreciation be applied in a way that spreads out the recovery of residual costs (i.e., those costs that would not be recovered under efficient marginal cost pricing) in a manner that least distorts the pattern consumption. It was observed that this argues for targeting a long-term price path that is approximately level in real terms, and especially where the price sensitivity of demand for gas is expected to increase in the future (as may be expected in view of the projected narrowing of the gap between electricity and gas prices).[18]

30. In terms of the long-term interests of consumers, whilst this is not an economic concept, it is observed that consumers have an interest in both minimising price / maximising the service offering, but also ensuring that the service is offered – the discussion earlier concluded that this trade-off is optimised by setting prices based upon cost (i.e., the minimum price that is also able to attract investment). Furthermore, the goal of encouraging the efficient use of the asset is quite tangible for customers – the intention is to spread the recovery of fixed cost over time in a manner that increases the total use of the asset. If achieved, this would imply a reduction in the average price for the regulated services over the life of the asset, and also lead to additional customers being served by the network over the network's life. These outcomes should be consistent with the long-term interests of customers.

31. Having said that, there are other dimensions to the interests of consumers that may be relevant. One such interest that regulators have placed with on recently is the avoidance of price shocks. We return to this below.

17 We discuss the concept of 'reasonable' in section 2.3 below.

18 More specifically, if gas demand is expected to become materially more price sensitive in the future, then a time path for prices that is declining in real terms may be optimal. However, whilst an increasing price sensitivity of demand may be expected for ATCO, we do not have the information to judge the extent of the change in price sensitivity, and so we endorse targeting a levelised price noting that this will improve the efficiency of use of the gas networks, even if it may not cause the most efficient use.

2.2.3 Revenue and pricing principles

32. The Revenue and Pricing Principles (RPP) are set out for gas networks in section 24 of the NGL. The RPP provide additional guidance to the AER (and AEMC) when considering matters relating to economic regulation and pricing.

33. The RPP are particularly relevant to the approach taken to depreciation and the management of future cost recovery risks. This is because they provide a direct instruction that regulated businesses be provided with a reasonable opportunity for cost recovery. We interpret this as meaning that action should be taken to provide a reasonable assurance that costs are returned to investors sufficiently fast that this principle can be met.

34. The other provisions in the RPP that are particularly relevant to the considering how to act where there is a future prospect of asset stranding are summarised as follows:

    a. A price or charge for the provision of services should allow "*for a return commensurate with the regulatory and commercial risk involved".*[19] If the regulatory approach does not permit that capital invested is returned to investors, it is clearly not possible for a service provider to earn a return commensurate with the regulatory and commercial risks involved. This would also be true where the business is required to retain stranded asset risk but without explicit compensation being provided.

    b. *"Regard should be had to the economic costs and risks of the potential for under and over investment"* by the regulated service provider.[20] Returning capital to a service provider earlier than otherwise does not mean that it earns a higher return. The reason for this is that altering depreciation is NPV neutral. Therefore, there is limited reason to be concerned that returning capital earlier than first expected would lead to over-investment by a service provider. Conversely, as identified above, if recovery is sufficiently delayed that asset stranding is expected this is likely to harm the incentive for investment and so increase the prospects of under-investment.

2.2.4 National Gas Rules

35. The Rules for gas pipelines related to depreciation are drafted in a way that provides flexibility to the service provider to propose, and the regulator to accept, a change to depreciation where necessary to ensure cost recovery, generate efficient prices and pursue other dimensions of the long-term interests of customers.

36. Rule 89(1) is as follows:

    The depreciation schedule should be designed:

    (a) so that reference tariffs will vary, over time, in a way that promotes efficient growth in the market for reference services; and

[19] Section 24(5) of the NGL.
[20] Section 24(6) of the NGL.

> *(b) so that each asset or group of assets is depreciated over the economic life of that asset or group of assets; and*
>
> *(c) so as to allow, as far as reasonably practicable, for adjustment reflecting changes in the expected economic life of a particular asset, or a particular group of assets; and*
>
> *(d) so that (subject to the rules about capital redundancy), and asset is depreciated only once (i.e., that the amount by which the asset is depreciated over its economic life does not exceed the value of the asset at the time of its inclusion in the capital base (adjusted, if the accounting method approved by the AER permits, for inflation); and*
>
> *(e) so as to allow for the service provider's reasonable needs for cash flow to meet financing, non-capital and other costs.*

37. The rules most relevant to this matter are Rules 89(1)(a), (b) and (c) and so are the focus of the discussion here.

38. Rule 89(1)(a), which directs that a depreciation method be designed to encourage a time-path for reference tariffs that are consistent with the efficient growth in the market for services, has two interlinked objectives:

    a. First, it guides the regulator to use depreciation to target a time-path for prices that are expected to result in an (allocatively) efficient price over time, and in particular, the efficient spreading of what we referred to as "residual costs".

    b. Secondly, a key contributor to the efficient growth for the market for services is that the incentive exists for regulated businesses to make the investments that are necessary to support growth. Therefore, this is again related to the cost recovery objective given an expectation for cost recovery is needed to motivate efficient investment.

39. We note that these two objectives need not work in opposite directions.

    a. First, there may be a circumstance where asset stranding is possible and so the "cost recovery" objective may necessitate advancing depreciation. However, allocative efficiency may also be improved by bringing forward the recovery of capital. That is, avoiding a future increase in prices that is caused as customers switch from the gas network would maintain use for a longer period (and so promote efficient use and thereby lower lifetime prices to customers).[21] This is especially the case where the stranding risk was caused by the increased competitiveness of electricity relative to

[21] Advancing depreciation in a context where a share of customers is expected to disconnect from the gas network in the future may also be seen as more equitable (and so relevant to the long-term interests of customers) as this would avoid the remaining customers in the future having to, in effect, pick up the share of the fixed costs that previously were being recovered from the disconnecting customers.

gas, so that degree of price sensitivity of gas demand would be much higher in the future.[22]

b. Secondly, in circumstances where an alternative use of the pipeline for hydrogen is possible, a key contributor to efficient growth will be to maintain an incentive for investment related to the conversion to proceed. Providing a fair treatment of existing investment is more likely to create an environment within which this investment is able to occur.

40. Rule 89(1)(b) and (c) work in tandem. Rule 89(1)(b) requires assets to be depreciated over their economic lives, and Rule 89(1)(c) then envisages that the remaining lives of the assets would be adjusted over time so that they continue to track their economic lives as new information becomes available. As such, these rules require a holistic assessment of the factors that are likely to affect an asset's economic life and the associated depreciation method.

2.3 Recent regulatory consideration

2.3.1 AER Information Paper

41. The AER has recently released an Information Paper about regulating gas networks under the emerging uncertainties for sector in light of technological change and local and international efforts to pursue net zero carbon emissions.[23] In our view, that paper makes a very important contribution to understanding the challenges posed by these emerging risks, and how best that regulation may respond. Whilst the scope of the AER paper is much wider than this report – addressing matters like the contribution of regulatory tools other than regulatory depreciation to manage stranded asset risk, as well as whether aspects of the current regime should be refined – there is substantial commonality between the views expressed by the AER and those presented herein.

42. In particular, we note the following views of the AER:

a. The recognition of the importance of providing a reasonable expectation of cost-recovery for efficient investment to be encouraged, mimicking how investment incentives are created in competitive markets, including the following comment:[24]

In competitive markets, firms take on the risk of the price and quantity of sales. Where there is a material stranded asset risk, firms would defer entry into the market until prices have risen to a level that provides an acceptable rate of return after accounting for the stranded asset risk (i.e. a risk premium). Alternatively, firms mitigate stranding risk by entering into long-term contracts with customers.

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22 We note, however, that in cases where there is an expectation of increased price sensitivity in the future, regulated businesses will be motivated to ensure that bringing forward cost recovery does not lead to prices that motivate early departure by customers. This is because early departure of customers would make cost recovery even more challenging.

23 AER (2021), Information Paper: Regulating gas pipelines under uncertainty, November.

24 AER (2021), Information Paper: Regulating gas pipelines under uncertainty, November, p.28.

Economic regulation is designed to provide a functional proxy for competitive markets. The regulatory settings are designed to provide appropriate incentives for regulated businesses to invest by preserving the expectation of recovering the efficient costs of their investments, including a normal return.

If stranded asset risk is demonstrated to be material, there are two primary ways to restore a reasonable expectation of cost recovery:

1. remove, or substantially reduce, the prospect of under-recovery of costs, or

2. compensate the regulated business for carrying this risk.

The AER proceeded to discuss[25] the merits (in incentive terms) of leaving some stranded asset risk with regulated businesses. However, this discussion was conducted in the context where the AER had already concluded that if material stranded asset risk was left with a regulated business then this would need to be accompanied with compensation.

b. That there is the potential for (allocative) efficiency to be increased from advancing the recovery of capital if this produces prices in the future that are lower in view of the effect of technological change on substitutes for the price sensitivity of customers, commenting as follows:[26]

   When gas consumption per customer is declining and the competitiveness of electricity as a substitute for gas is increasing, a price path that declines rather than increase could promote efficient use of the pipeline assets. The increasing price sensitivity of gas over time would suggest that a front loaded profile, which allows a higher portion of costs to be recovered earlier (while price sensitivity is lower compared to later), would mitigate the potential price increased in the future, thereby encouraging fewer customers to leave the gas networks overall.

c. That stability in gas prices is important to encouraging the efficient use of gas networks, as this will affect the confidence of customers to make investments in gas appliances.[27]

   Gas appliances typically last for 10-15 years. Consumer expectations of gas prices over that 10-15 year period are a factor in their investment decision. If future gas demand is expected to fall substantially or is highly uncertain, with corresponding expectations of price increases or price uncertainty, consumers may perceive a higher risk or cost associated with their investment in gas appliances.

d. That advancing regulatory depreciation is the most appropriate regulatory tool for responding to emerging stranded asset risks (subject to being supported by

25 AER (2021), Information Paper: Regulating gas pipelines under uncertainty, November, p.28.
26 AER (2021), Information Paper: Regulating gas pipelines under uncertainty, November, p.31.
27 AER (2021), Information Paper: Regulating gas pipelines under uncertainty, November, p.26.

appropriate evidence),[28] and that it is preferable to act earlier in response to an emerging issue – when greater options exist to respond to an issue – which included the following observations:[29]

We have not provided any compensation to regulated businesses for stranded asset risk via the return on capital. This is because stranded asset risk is generally considered non-systematic. In addition, it has not been considered material to date. We consider that adjusting regulatory depreciation (return of capital), one of the building blocks we use to determine gas access prices, would be more appropriate to manage stranded asset risk under the regulatory regime.

…

Regulatory depreciation can be reviewed at each access arrangement review and it can be adjusted as circumstances change in the future. It can be calibrated at later time intervals to address any material estimation errors made previously. Apart from the risk of discouraging gas consumption with a price increase (or lack of price reduction), which depends on how much accelerated depreciation we consider reasonable with respect to price affordability, there is little downside in accelerating depreciation to effectively create a price buffer for the future.

It may be an opportune time to accelerate depreciation now given interest rates (and rate of return) are relatively low, which may offset some price impact of accelerated depreciation. Also, with an expectation that interest rates may increase in the future, there is an argument that accelerating depreciation would help smooth prices across access arrangement periods and result in greater price stability.

Increasing regulatory depreciation to recover more of the sunk costs when there are more customers to share the costs can help maintain intergenerational equity by ensuring future customers are not subject to unreasonably high gas access prices if demand does fall substantially. As such, accelerating depreciation may not only increase certainty in cost recovery for regulated businesses, but also in future price paths for consumers.

Another scenario for consideration is where incurring expenditure to make regulated gas pipelines capable of carrying hydrogen is assessed as efficient under the regulatory framework. In this instance, increasing regulatory depreciation now may provide for reduced price impacts associated with a transition to hydrogen.

…

[28] We agree with the AER that it may be appropriate to apply other regulatory tools in tandem – or to refine existing regulatory tools – in parallel with adjusting regulatory depreciation as a means of responding to emerging risks. For example, these risks may imply that more sophistication is required when assessing the relative merits of new investment, and that reviewing other measures – like the level of customer (capital) contributions from new connections – may be warranted. Moreover, if it becomes likely that a network may have a finite (and short) remaining life, then existing incentive schemes may need to be recalibrated or restructured to reflect the changed period over which benefits may flow from an improvement in efficiency.

[29] AER (2021), Information Paper: Regulating gas pipelines under uncertainty, November, pp.28, 31, 40.

> *Our ability to adjust prices as a means to reduce price uncertainty and stranded asset risk will diminish over time and there is a window of opportunity, ie. a period of time, within which we can make decisions that will produce a desired outcome.*

43. One new element in the AER's discussion related to how the "reasonable" element in "reasonable opportunity to recover … efficient cost" that is the first of the revenue pricing principles should be applied. The AER's discussion suggested that prices need only be designed to provide the opportunity to recover cost where this was "reasonable". The AER's principal statement was as follows:[30]

> *In our view, the NGL guiding revenue and pricing principle that regulated businesses should be provided with a reasonable opportunity to recover at least the efficient costs they incurred in providing services does not mean gas consumers must guarantee that the regulated businesses recover their costs under any circumstances. That is, regulatory depreciation or risk compensation cannot be adjusted without constraint to guarantee cost recovery for the regulated businesses. We must have regard to consumers' interest in having affordable and stable or reasonably predictable gas access prices to encourage their use of the gas infrastructure. Having said that, it is fair to note that regulated businesses also have an interest to maintain price affordability to avoid further decline in gas customer numbers.*
>
> *We must carefully consider what regulatory actions may be appropriate to promote the efficient investment in, operation and use of the gas networks while maintaining reasonably affordable and predictable gas access prices, both of which are in the long-term interests of gas consumers, in light of the uncertainty in future gas demand we face now. We will do so with regard to the specific circumstances of the regulated business and the scale of price adjustments that can be reasonably made without creating price shocks. We discuss the potential options in this section. These are not mutually exclusive (i.e. we may use a combination of these options) and not all of them would be warranted at the same time or now. [Emphasis added]*

44. In our previous discussion we noted that the concept that investors should be provided with an opportunity to recover costs is fundamental to the incentive for investment. This reflects the reality that most investment in gas pipelines is irreversible and so will not proceed unless there is confidence that an opportunity will be provided for costs to be recovered (or there is compensation for any downside risks that are held). Moreover, as we discuss further in paragraph 46 below, the decisions in relation to gas networks are likely to affect investment incentives in other regulated sectors.

    a. It follows that it would be inconsistent with the underlying economic principles for the "reasonable" qualifier to permit the opportunity for cost recovery only in limited circumstances, including for example, only if price increases are not the result.

[30] AER (2021), Information Paper: Regulating gas pipelines under uncertainty, November, p.29.

b. However, it is clear from the AER's discussion that this is not its intent, and that a more substantial effect on prices would be required before it was deemed unreasonable.[31]

c. We also agree with the AER's observation (present in the quoted passage above) that where stranding risk arises from emerging competition, then this competition itself will provide a strong degree of protection to many customers.[32]

2.3.2 ERA decision in relation to the DBNGP

45. In its 2021 decision in relation to the DBNGP, the ERA determined that the revenue and pricing principles directed it to provide the opportunity to recover costs provided this was reasonable. The ERA did not set out any particular test as to how reasonableness would be judged, but has left this as an area for the exercise of discretion. We would emphasise our comments from paragraph 44 that it would inappropriate for the "reasonableness" rider to place a material constraint on the ability for a regulated business to recover its costs, given the central role that cost recovery has in the method of regulation that has been applied to energy networks. We address the issue of what may be a reasonable recovery of efficient cost in the context of ATCO in section 3.2.3.

46. In this decision, however, the ERA also questioned whether advancing the recovery of capital is something that would be in the long-term interests of customers if all that this did was to permit the recovery of sunk costs (i.e., assets that could not be redeployed elsewhere). In our view, there are three reasons as to why providing an opportunity to recover sunk costs may advance the long-term interests of consumers.

a. First, even where reticulated gas was expected to cease as a consequence of measures to reach net zero, material capital expenditure may nonetheless be required to ensure that consumers receive the services they seek over the intervening period.[33] Whether commitments are maintained in relation to the recovery of *existing* sunk costs is likely to condition the risks that investors perceive over the recovery of new investment that will also be sunk once committed, and hence their incentive to invest.

b. Secondly, where a transition to reticulated hydrogen is a possibility, material expenditure may be required to ensure that this option is retained. Similarly, whether commitments are maintained in relation to the recovery of *existing* sunk costs is likely to affect the incentives for this new investment.

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31 In its recent decision in relation to the Victorian gas distributors, the AER limited the extent of the advancement of depreciation to the amount that would cause an incremental real price increase of 1.5 per cent per annum (see AER (2023), Multinet final decision, June, Attachment 4, pp.8-9). However, the AER did not explain its reasoning behind this figure, and so it is not possible to calibrate the AER's decision to the context of ATCO. We note that the recent dynamics in the east coast gas markets – and most notably the substantial increase in the cost of the commodity component – may well have factored into the AER's views on this matter, which are not relevant to ATCO.

32 We observe that some customers could not switch energy supply (or do this in the most efficient way), such as renters.

33 Under the Electricity Dominance scenario – which we outline in Chapter 3 – over $1.5 billion of capital expenditure is forecast over the next 50 years.

c. Thirdly, the treatment of sunk costs in the gas sector is also likely to condition how investors perceive the risks to the recovery of sunk investments in other sectors – such as electricity – and hence the incentive for investment in those other sectors.[34] To this end, it is noted that the less important that new investment in gas infrastructure becomes, the more important that investment in electricity infrastructure is likely to become.

47. Lastly, we note more generally that in relation to gas pipeline assets, no arguments have been raised that the investments made in the past would not have been made even if there had been perfect foresight about the current risks facing the sector. Rather, if regulators in the past had had perfect foresight, the only change would have been that assets would have been depreciated more quickly and prices in the past would have been higher. This context is relevant to the broader question about whether the long-term interests of consumers have been promoted over time, and how best the overall balance of interests between the parties could be achieved from this point forward.

[34] Noting in particular that the "revenue and pricing principles" are materially the same between the gas and electricity sectors.

3. ATCO's depreciation allowance for AA6

3.1 Overview of ACIL Allen modelling and advice

3.1.1 Demand forecasts

48. As part of its assessment of the appropriate level of regulatory depreciation for the current regulatory period, ATCO commissioned work from ACIL Allen Consulting (ACIL).[35] The principal focus of ACIL's work was to forecast demand for ATCO's gas distribution services over the long term, comprising the five-year AA6 period and the 45 subsequent years (i.e., 50 years in total). Given the uncertainty over future gas demand, ACIL developed – in conjunction with stakeholders – four scenarios as to how the future may develop, and derived demand forecasts consistent with each of these scenarios. The four scenarios were as follows:[36]

    a. *Energy Hybrid* – where technical learning rates for electricity and renewable gases developed simultaneously, resulting in some households electrifying and others remaining on the gas distribution network.

    b. *Gas Retained* – global and local factors result in natural gas continuing to be used by households and distributed via the ATCO network.

    c. *Hydrogen Future* – rapid learning rates for green hydrogen and renewable gas enable these gases to displace natural gas domestically and internationally.

    d. *Electricity Dominance* – renewable electricity generation and storage experience a rapid reduction in cost, and governments provide support for households to electrify loads.

49. ACIL's forecasts of demand were based on a model of appliance choice by customers, given the relative cost of electricity and gas appliances, and the forecast relative (delivered) prices of electricity and gas. The forecasts of future gas and electricity prices, in turn, were based on ACIL's modelling of future energy market outcomes given the assumptions in the scenario in question.[37] ACIL's overall forecasts of gas distribution volumes for the four scenarios are shown in Figure 1 below. This table also shows the forecasts of demand by residential customers, from whom ATCO recovers approximately 80 per cent of its revenue requirement.

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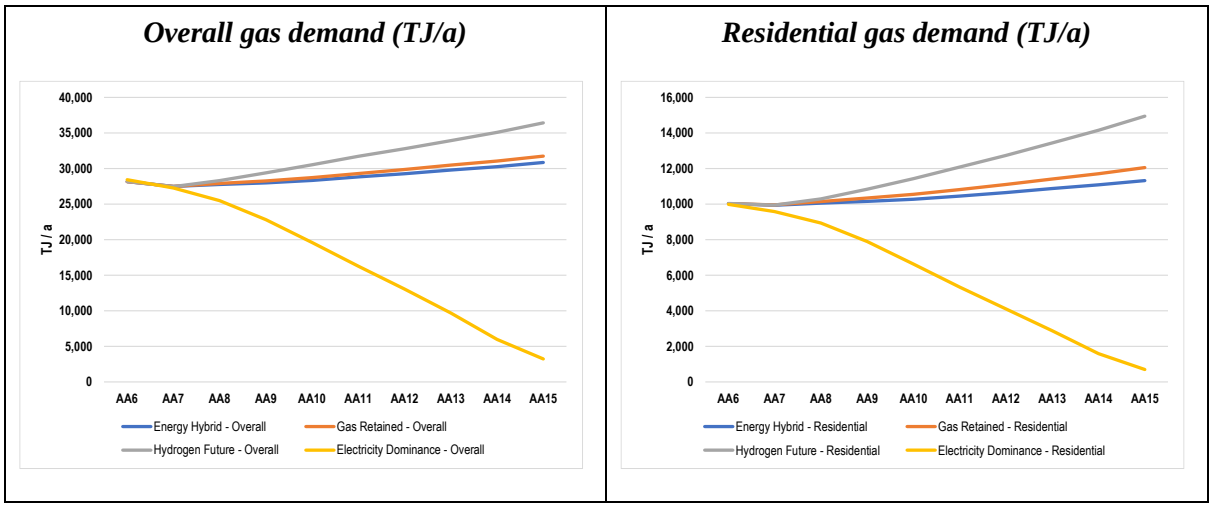
35 ACIL Allen (2023), Future of gas: scenario development and modelling for the ATCO gas distribution system, Report for ATCO, June.

36 ACIL Allen, p.vii.

37 ACIL's forecasts of future gas demand assumed, however, that current gas distribution prices continued into the future, rather than reflecting the particular distribution price outcome (i.e., with gas demand and distribution prices being determined simultaneously). I discuss the implications of this below.

Figure 1 – ACIL gas demand forecasts, by AA period



Note: the figures show the average annual gas demand over the access arrangement periods indicated.

50. The trend in both series is similar, in that:

    a. a reduction in gas demand is expected in AA7 compared to AA6, followed by

    b. a continued – and indeed, steepening – reduction in demand thereafter in the "electricity dominance" scenario

    c. a modest increase in demand in the energy hybrid and gas retained scenarios, and

    d. a material growth in demand in the "hydrogen future" scenario.

3.1.2 Forecasts of regulated revenue

51. In addition, ACIL projected out the regulated revenue under each of these scenarios, given the demand forecasts summarised above and applying expenditure forecasts supplied by ATCO that were relevant for each scenario. The trend in expenditure requirements differed materially between the scenarios, most notably:

    a. under the gas retained scenario, future expenditure requirements were largely consistent with historical operations

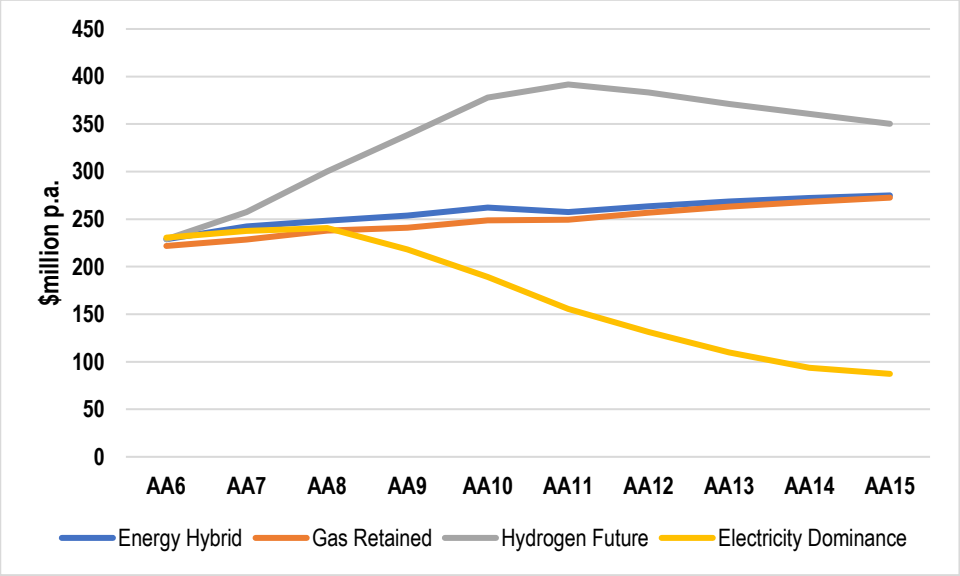
    b. under the energy hybrid scenario, additional expenditure (mainly in the form of operating expenditure) would be required to prepare for the use of renewable gases

    c. under the hydrogen future scenario, a step-up in operating expenditure would occur to prepare for hydrogen, and substantial capital expenditure would be required to make the networks hydrogen-ready, and

    d. under the "electricity dominance" scenario, a substantial reduction in expenditure is assumed to be achievable as the network winds down.

52. The trend in regulated revenue – in real terms – that is implied by these expenditure assumptions, the current RAB, the current approach to depreciation, and assuming the AA6 WACC continues – is shown in Figure 2.

Figure 2 – ACIL projections of real annual regulated revenue by scenario[38]



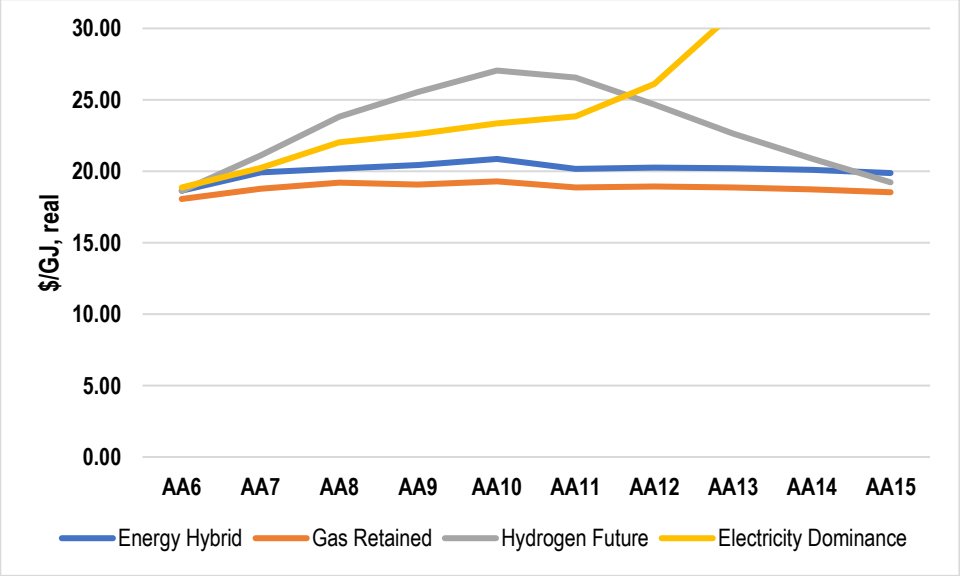
Note: the figures show the average real annual revenue requirement over the access arrangement periods indicated.

3.1.3 Implications for prices

53. ACIL then combined the projections of demand with the projected revenue requirements to derive the regulated distribution prices that would be implied. As noted above, the most important segment of demand is the residential demand (from which ATCO recovers approximately 80 per cent of the revenue requirement). The trend in real prices for this segment is shown in Figure 3 below.

[38] The figures shown are those calculated by ACIL except that we have corrected an immaterial error in the revenue requirement calculation.

Figure 3 – Forecast real distribution prices for residential customers under the current depreciation method



Note: a single price is shown for each access arrangement period, which assumes the price is fixed in each period in constant, real terms (and NPV=0).

54. Both the Gas Retained and Energy Hybrid scenarios show a modest real increase in prices over the forecast period (albeit slightly higher for the latter), although there is some reversion back towards the starting prices towards the end of the forecast horizon. In contrast, substantial changes in real prices are forecast for the other two scenarios, and in particular:

    a. for the Hydrogen Future scenario, a substantial increase is price is forecast in the short term as demand growth is low (and negative into AA7) but the expenditure required to convert the network to hydrogen is undertaken, but prices then increase once the hump in capital expenditure has been undertaken and demand growth returns, and

    b. for the Electricity Dominance scenario, the regulated distribution price would continue to increase over the forecast horizon as demand declines at a much faster rate than costs are able to be reduced.

3.1.4 Implications for depreciation

55. ACIL advised that a preferable approach to pricing would be to aim for prices that are approximately level (constant) in real terms, and derived prices that are consistent with this. More specifically, ACIL derived the real, constant weighted average price (in $/GJ terms) across ATCO's whole customer base that would deliver the same revenue in present value terms as the revenue requirement. ACIL then calculated the additional revenue in AA6 that would be required to achieve the constant overall weighted average price, and from this calculated the additional depreciation in AA6 that would be required, as well as the projected change in depreciation in the remaining years of the forecast horizon. ACIL's results are shown in Table 1.

Table 1 – ACIL calculation of the depreciation changes required to generate levelised prices

Access arrangement period	AA6	AA7	AA8	AA9	AA10	AA11	AA12	AA13	AA14	AA15	Total
Levelise overall average tafiff											
Energy Hybrid	103.82	22.17	7.23	-9.65	-40.77	-3.26	-15.59	-21.50	-24.44	-18.01	**0.00**
Gas Retained	78.36	29.06	2.09	4.13	-17.32	0.85	-13.45	-23.31	-30.29	-30.12	**0.00**
Hydrogen future	340.37	229.44	99.52	-24.84	-182.61	-240.15	-196.46	-113.41	-19.20	107.34	**0.00**
Electricity dominance	160.62	104.03	22.50	16.15	18.21	42.28	25.20	-18.14	-119.28	-251.57	**0.00**

Note: the figures shown are the sum of the depreciation changes over the access arrangement period shown that are required to generate the levelised price. The total over all access arrangement periods is zero, reflecting the fact that depreciation is only shifted between access arrangement periods, but does not change in total. All values are in real terms.

56. For three of the scenarios, the outcome is simply an advancement of depreciation, so that depreciation is higher in the access arrangement periods in the near term, and lower in the more distant access arrangement periods. The difference between the scenarios is the extent of advancement, with the Electricity Dominance scenario requiring a much greater advancement of depreciation to deliver levelised prices than the other scenarios. The Hydrogen Future scenario is quite different, in that levelised prices would require:

    a. a much higher amount of depreciation early, in advance of the major capital works required to convert the networks, so that more of the existing cost is recovered prior to that conversion, and then

    b. a deferral of depreciation once substantial new capital expenditure has been incurred, so that the recovery of the new capital expenditure is more back-ended than would occur under straight line depreciation.

57. ACIL observed that it was not possible to assign probabilities to each of the scenarios given current uncertainty, and so advised against simply applying a weighted average (including a simple average, where equal weights are assigned). Instead, ACIL opined that:

    a. the Hydrogen future scenario is an outlier, and so was put to one side, and

    b. of the remaining scenarios, its advice was to take a simple average of the highest ("Electricity Dominance") and lowest ("Gas Retained").

58. Consistent with this, it advised advancing approximately $120 million into AA6 from future regulatory periods. Note that ACIL argued against simply applying an alternative depreciation method given the unusual pattern of depreciation that is required to generate levelised prices.

3.2 Our analysis

3.2.1 Economic arguments for levelised pricing

59. The patterns of projected future real distribution prices raise, in our view, two issues that are relevant to the depreciation method, according to the principles discussed in Chapter 2.

a. First, the trajectory of prices for the "Electricity Dominance" scenario indicates that, under this scenario, ATCO is unlikely to recover its costs if the existing depreciation method is maintained.

    i. This reflects the fact that, to achieve cost recovery, the distribution price that would need to be charged over time would increase, and eventually to an extremely high level.

    ii. At some time during this period, the price would reach a level that could not be charged given substitutes open to customers. Whilst ATCO would be expected to reduce its prices to "meet the market" at that stage, those lower prices would not enable full cost recovery (i.e., including the RAB), and asset stranding would occur.

b. Secondly, in the Gas Retained and Energy Hybrid scenarios, the fact that a real increase in price is forecast over time under the current depreciation method means the efficient utilisation of the network is unlikely to be promoted. Similarly, the expected outcome in the Electricity Dominance scenario – whereby distribution prices increase until they reach what the market will bear – similarly is unlikely to result in the most efficient utilisation of the asset.

    i. Rather, economic principles would suggest that – in a world where the nature of gas demand was not expected to change in the future – the efficient use of networks would most likely be promoted by a price that is constant in real terms.

    ii. Moreover, the fact that electricity is expected to become a greater substitute to gas in all scenarios means that a price that declines in real terms may be preferable still, although it is difficult to make a more definitive statement about the real rate of decline in prices that may be optimal. Our reasons underpinning this conclusion are set out in Appendix A.

60. Thus, we agree with ACIL's principal conclusion that deriving depreciation in a manner that is intended to deliver a price path that is constant in real terms would be preferable, given that this would (depending on the scenario):

a. increase the confidence that costs will be able to be recovered over the lives of the relevant assets (i.e., reduce the risk of asset stranding), and

b. increase the efficient utilisation of the asset.

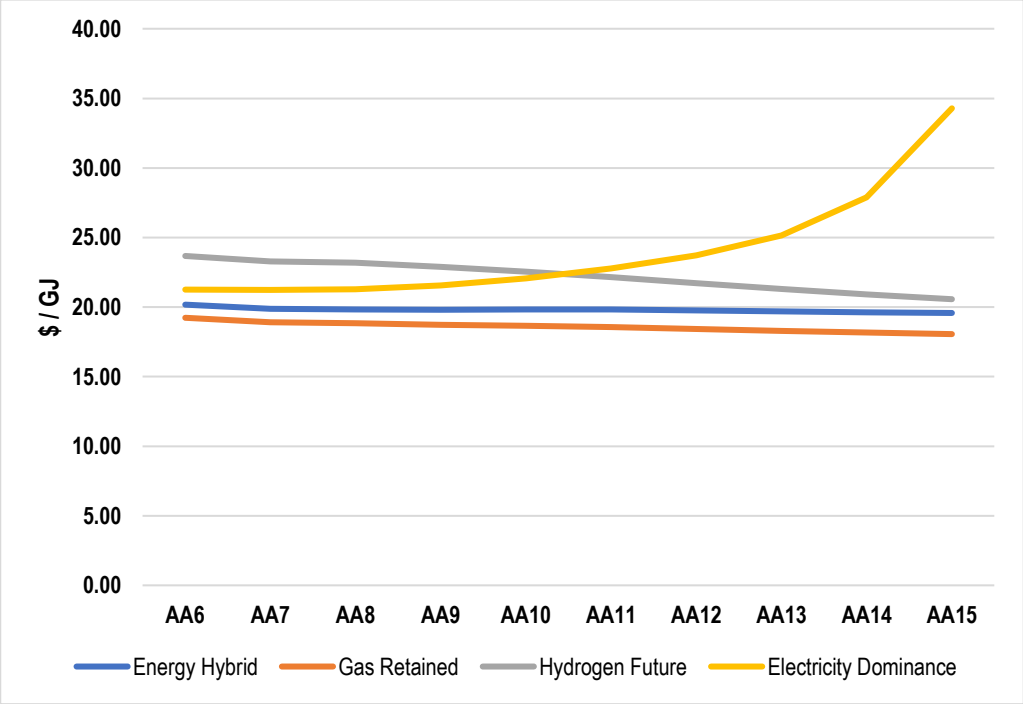
61. Against this, however, we also noted in Chapter 2 that a consideration of other aspects of the interests of customers is required, with the potential for "price shock" the most relevant concern for the current matter. We return to this matter below in section 3.2.3.

3.2.2 How should prices be levelised?

62. One technical area where we would offer a different perspective to ACIL is how the levelised prices should be computed. We note that ACIL's method has involved deriving

depreciation such that the *overall* weighted average price is projected to be constant in real terms. One shortcoming with levelising the overall weighted average price, however, is that the price for the different customer classes will not be level if the mix of demand is forecast to change.[39] To this end, we project – on the assumption that ATCO continues allocating the same shares of cost to the different customer classes as it does currently – that the forecast change in mix of demand means that the prices for residential customers may not be level, with material departures for some scenarios. This is shown in Figure 4.

Figure 4 – Projected residential distribution prices if the overall distribution price is levelised



Note: the figures show the distribution price that would be calculated in each access arrangement period if the overall weighted average price is levelised. The price in each period has been calculated as the constant real price that generates the same present value as the revenue requirement.

63. In our view, a more relevant levelised price would be one that is based on creating a level price for each customer class, as this will provide a better indicator of the likely demand response (i.e., a better indicator of whether assets may be stranded and whether utilisation is likely to be optimised). We have calculated such the levelised prices at the customer class level, and calculated the advancement in depreciation that would be consistent with this. These results are shown in Table 2.

[39] ATCO has five different tariff classes, being: Residential B3, Commercial B2, Commercial B1, Industrial B2 and Industrial B1.

Table 2 – Depreciation required to levelise prices, level overall average vs. level customer class average

Access arrangement period	AA6	AA7	AA8	AA9	AA10	AA11	AA12	AA13	AA14	AA15	Total
Levelise overall average tafiff											
Energy Hybrid	103.82	22.17	7.23	-9.65	-40.77	-3.26	-15.59	-21.50	-24.44	-18.01	**0.00**
Gas Retained	78.36	29.06	2.09	4.13	-17.32	0.85	-13.45	-23.31	-30.29	-30.12	**0.00**
Hydrogen Future	340.37	229.44	99.52	-24.84	-182.61	-240.15	-196.46	-113.41	-19.20	107.34	**0.00**
Electricity Dominance	160.62	104.03	22.50	16.15	18.21	42.28	25.20	-18.14	-119.28	-251.57	**0.00**
Levelise average tariff by class											
Energy Hybrid	73.43	5.70	-7.56	-21.02	-51.05	-9.53	-13.69	-8.09	3.49	28.33	**0.00**
Gas Retained	41.35	3.56	-22.45	-15.72	-33.06	-7.56	-9.87	-3.45	10.34	36.88	**0.00**
Hydrogen Future	269.39	167.64	30.34	-88.74	-233.46	-268.70	-191.66	-64.07	88.64	290.63	**0.00**
Electricity Dominance	168.48	113.98	33.54	25.26	22.89	41.74	19.52	-28.25	-131.93	-265.23	**0.00**

64. We observe first and foremost that this alternative calculation of levelised prices broadly supports the findings of ACIL, in particular that advancing depreciation is expected to reduce stranding risk and improve the utilisation of assets. However, the alternative calculation also suggests that the aims of ACIL (which we endorse) could be achieved with a lower advancement of depreciation (aside for the Electricity Dominance scenario, where the results are very similar). We recommend targeting the depreciation advancement that is consistent with levelising the average distribution price for each tariff class.

3.2.3 Forming an opinion about the advancement to depreciation from the scenarios

Introduction

65. As noted above, ACIL counselled against applying a mechanistic weighing of the outcomes for depreciation under the different scenarios given that there is too much uncertainty over the future development of energy markets to assign weights to each. We accept this advice and provide our views in this section as to how the depreciation allowance should be determined.

Hydrogen Future scenario

66. ACIL referred to the Hydrogen Future scenario as an outlier and did not include it in its derivation of the depreciation allowance. We agree with ACIL's decision in this regard.

67. As discussed above, the particular feature of the Hydrogen Future scenario is that, for prices to be levelised, it would be necessary to advance depreciation for a period (AA6 to AA8), and then to defer depreciation (AA9 to AA13 if levelisation occurs by tariff class), which raises the question of how important the initial advancement of depreciation actually is. This question is explored in Table 3. Specifically, the results in the table show how the time path of prices would evolve over the access arrangement periods if the decision to levelise prices was deferred (and with standard depreciation applying over the intervening period).

Table 3 – Effect of deferring the tariff levelisation for the Hydrogen Future scenario

Access Arrangement Period	AA6	AA7	AA8	AA9	AA10	AA11	AA12	AA13	AA14	AA15
	Distribution price for residential customers ($/GJ)									
No levelising	18.62	21.11	23.82	25.56	27.05	26.56	24.68	22.64	20.89	19.23
Levelising starts in AA6	22.71	22.71	22.71	22.71	22.71	22.71	22.71	22.71	22.71	22.71
Levelising starts in AA7	18.62	23.75	23.75	23.75	23.75	23.75	23.75	23.75	23.75	23.75
Levelising starts in AA8	18.62	21.11	24.43	24.43	24.43	24.43	24.43	24.43	24.43	24.43
Levelising starts in AA9	18.62	21.11	23.82	24.59	24.59	24.59	24.59	24.59	24.59	24.59
Levelising starts in AA10	18.62	21.11	23.82	25.56	24.31	24.31	24.31	24.31	24.31	24.31

68. We would conclude from the table that there is some scope to "wait and see" how the prospects for hydrogen evolve before factoring this scenario into the decision on depreciation. In particular, we note that:[40]

    a. if the decision to levelise was deferred until AA7, then the ultimate price would be approximately 4.6 per cent higher than if levelisation occurred from AA6 ($23.75 per GJ compared to $22.71 per GJ)

    b. if the decision to levelise was deferred until AA8, then the ultimate price would be approximately 7.6 per cent higher than if levelisation occurred from AA6 ($24.43 per GJ compared to $22.71 per GJ), and

    c. if the decision to levelise was deferred until AA9, then the ultimate price would be approximately 8.3 per cent higher than if levelisation occurred from AA6 ($24.59 per GJ compared to $22.71 per GJ), and by that time levelisation would require a deferral of depreciation rather than an advancement.

69. Thus, we support ACIL's advice to put to one side the potential conversion of networks to hydrogen when determining the depreciation allowance for AA6.

Remaining scenarios

70. In our discussion of the economic principles behind regulatory depreciation in Chapter 2, we noted our view that taking action to avoid asset stranding should be given most prominence, given the asymmetries involved.

    a. That is, avoiding asset stranding depends on acting early so that costs are allowed to be recovered whilst the capacity to recover those costs exist. Thus, if action is delayed, then the capacity to recover costs will be lost and assets will be stranded.

    b. In contrast, if action to avoid asset stranding is taken too early (or, alternatively, too much action is taken early), then no windfalls to the regulated business will occur,

[40] Our discussion here is premised on the assumption that, under the Hydrogen Future scenario, reticulated gas maintains a buffer of cost competitiveness against electricity, and so modest price increases like those cited here would not be expected to cause a material change in demand. The same degree of cost competitiveness is unlikely to exist in the Electricity Dominance scenario, however, as we discuss further below.

rather prices for future customers will simply be lower than they otherwise would have been.

c. In addition, as we discussed earlier, re-profiling revenue in a way that avoids price increases as demand declines is also likely to improve the efficiency of use of the pipeline, which is of direct benefit to customers.

71. Like with the Hydrogen Future scenario, we have examined the consequences of delaying action to advance depreciation to the next or subsequent access arrangement periods. Our results are shown in Table 4. Unlike the Hydrogen Future scenario, we think there is much less scope to defer action. In particular, we note that

a. if the decision to levelise was deferred until AA7, then the ultimate price would be approximately 5.4 per cent higher than if levelisation occurred from AA6 ($22.85 per GJ compared to $21.68 per GJ), although this would occur in a context where gas was substantially less competitive against electricity than in the past, and

b. if the decision to levelise was deferred until AA8, then the ultimate price would be approximately 11.1 per cent higher than if levelisation occurred from AA6 ($24.08 per GJ compared to $21.68 per GJ), which may expose the business to a substantial risk of asset stranding.

Table 4 – Effect of deferring the tariff levelisation for the Electricity Dominance scenario

Access Arrangement Period	AA6	AA7	AA8	AA9	AA10	AA11	AA12	AA13	AA14	AA15
	Distribution price for residential customers ($/GJ)									
No levelising	18.87	20.25	22.03	22.61	23.36	23.84	26.12	31.10	47.48	100.73
Levelising starts in AA6	21.68	21.68	21.68	21.68	21.68	21.68	21.68	21.68	21.68	21.68
Levelising starts in AA7	18.87	22.85	22.85	22.85	22.85	22.85	22.85	22.85	22.85	22.85
Levelising starts in AA8	18.87	20.25	24.08	24.08	24.08	24.08	24.08	24.08	24.08	24.08
Levelising starts in AA9	18.87	20.25	22.03	25.19	25.19	25.19	25.19	25.19	25.19	25.19
Levelising starts in AA10	18.87	20.25	22.03	22.61	26.79	26.79	26.79	26.79	26.79	26.79

72. We note, however, that there are a range of other factors that will result in prices for AA6 increasing materially compared to previous regulatory periods, most notably the increase in the WACC as government interest rates revert to levels more consistent with historical averages. We further note that it would be expected that this particular pressure on prices is likely to have disappeared at the next access arrangement review. Given this backdrop, it would be prudent to moderate some of the advancement of depreciation, at least where this did not add substantially to the risk of asset stranding.

73. Whilst this is a matter where judgement is required, we observe that advancing depreciation by approximately half of the amount that is suggested by the Electricity Dominance scenario would most likely keep stranded asset risk at a modest level, and also improve the efficiency in the use of the asset. Moreover, this degree of advancement would also be approximately consistent with maximising the efficiency of the utilisation

of the asset if the "Energy Hybrid" scenario came to pass, and not unduly affect the efficiency of use of the asset if the Gas Retained scenario came to pass.[41]

3.3 Other specific issues

3.3.1 Advancing depreciation when other cost pressures are already causing an increase in prices

74. We have also been asked to explain as a matter of principle if and why it may advance the long-term interests of customers to advance depreciation at a time when other cost pressures are causing gas distribution prices to increase.

75. One of the key motivations for advancing depreciation that flows from ACIL's work is that this advancing of depreciation is likely to improve the efficiency of use of the gas distribution network in the future. That is, whilst raising prices now may cause customers to pay more and potentially depress pipeline usage, avoiding future price rises is likely to maintain a much higher level of demand for gas distribution services in the future than otherwise would have been experienced. By maintaining higher levels of demand, prices to customers will be lower, and so customers in the future will benefit by more than the cost incurred by current customers.

76. A second key motivation is to provide ATCO with a reasonable opportunity to recover its efficient cost (i.e., avoiding a substantial risk of asset stranding). We note that ATCO will be required to invest substantial amounts even under the Electricity Dominance scenario (i.e., where the life of gas networks is finite). In addition, the treatment of ATCO now at a time when the Electricity Dominance scenario is a possibility may also affect ATCO's incentive and capacity to invest if one of the other scenarios come to pass, and in which case gas networks would be expected to have an important, enduring role, and substantial investment is required. Providing an environment conducive to this investment is critical to ensuring that the services customers may seek will be available with the quality and reliability they desire in the future, and so is to the benefit of customers.

77. We are mindful, however, that costs to customers will increase in AA6 from AA5, largely due to interest rates reverting to levels more in line with historical averages. For this reason, we have considered whether the future benefits expected from levelising prices may nonetheless be maintained by phasing in the levelisation of prices.

3.3.2 Continuing to invest in a world where there is a risk of asset stranding

78. We were also asked to comment, as a matter of principle, whether the continued connection of new customers could be a prudent activity for a gas network in view of the future risks facing the sector.

[41] Under this scenario, the projected real long term price path would change from being slightly increasing over time to one that is slightly decreasing.

79. In our view, the continued connection of new customers could, if undertaken appropriately, have two effects that would be consistent with prudent investment.

a. First, where the incremental cost to the network of connecting new customers is below the average cost of supply, then connecting those customers will *reduce* the cost-based price compared to the situation where those connections were not made. This reduction in the price would be expected to reduce the risk of future asset stranding, and also promote the efficient use of the networks.

b. Secondly, connecting more new customers now will also increase the scale and geographic reach of the gas network at the time that a conversion to hydrogen may take place,[42] and so may also raise the viability of a shift to hydrogen by increasing the scale at which hydrogen could be supplied. This increased scale is likely to raise the likelihood that a conversion to hydrogen is commercially viable, and so act to preserve this option for customers. Increasing the scale and reach of the network is also likely to reduce the average cost (and hence price) if the Energy Hybrid or Gas Retained scenarios came to pass.

[42] Importantly, it is far cheaper to install gas networks at the time that new subdivisions are created than to attempt to back-fit networks to already developed areas. Thus, it is likely that if gas networks are not installed in a new subdivision at the same time as other utilities, then reticulated hydrogen or renewable gas will not be available in the area if a reticulated hydrogen or renewable gas service subsequently develops.

A. Levelised pricing and the efficient utilisation of assets

80. An efficient price from the perspective of promoting efficient use is a price that reflects the cost of supplying an additional unit of output (i.e., the marginal cost), as this will signal to customers the societal cost of their consumption actions. However, for gas pipelines – in common with the infrastructure sector more generally, where economies of scale and scope are typical – pricing in this manner will leave a substantial share of cost unrecovered and so not achieve the cost recovery objective referred to earlier (we refer to the costs that would not be recovered under marginal cost pricing as the "residual cost"). The aim for efficient pricing, therefore, is to recover this residual cost in a way that has the least impact on the efficient use of the service at any point in time, noting that regulatory depreciation is the tool to alter how the recovery of the residual cost is spread over time.

81. The standard response in infrastructure sectors for recovering the residual cost, while minimising distortions to efficient use, is to have regard to demand sensitivity across classes of customers at a particular point in time when determining prices. The demand sensitivity of classes of customers used to guide the structure charges (noting, for example, that the demand response to a change in a fixed charge is usually much less than to a variable consumption charge) and relativities across different customer types (subject to other considerations, like equity).

82. It is apparent that these same economic principles are also relevant to how the recovery of residual cost should be spread over time (i.e., as well as how that cost should be recovered at any point in time), which is given effect through the choice of depreciation method. These economic principles imply that allocative efficiency would be promoted by choosing a depreciation method that spreads the recovery of the residual cost over time in a manner that least affects the pattern of usage compared to what would occur if prices were set at marginal cost.

83. When deciding how to spread cost recovery over time in order to minimise the distortions to the efficient use of an asset, the key economic principles are as follows.

    a. The recovery of a residual cost in any period inevitably will cause some users to reduce their use of the regulated infrastructure even though that use would have been efficient (recognising consumption is efficient whenever it is valued by the consumer more than the marginal cost, i.e., the cost to provide those extra units). This recognises that, while techniques for minimising this inefficiency exist – such as setting fixed charges and other forms of multi-part pricing – these techniques are imperfect and thus some inefficiency (reduction of output below that which would emerge under marginal cost pricing) will remain.

    b. The inefficiency that is caused in any period from the recovery, via a mark-up, of fixed costs increases more than proportionally with the extent of fixed costs that are recovered through this mark-up. In fact, it is a well-known outcome in economics that the inefficiency from pricing at a mark-up over marginal costs rises with the square of

that mark-up.[43] The inefficiency that is caused in any period will also vary with the sensitivity of demand to price in that period.

c. The non-linear relationship between the inefficiency caused in any period and the increment over marginal cost means that the aggregate of inefficiencies over time will be minimised by setting prices that cause a mark-up over marginal cost that is proportional to the sensitivity of demand to price in each period. This is the inter-temporal analogue of the well-known Ramsey rule for applying mark-ups across different products/customers at a point in time.[44]

84. In terms of the implications of such an intertemporal Ramsey pricing rule for efficient pricing, the following observations could be made.

85. The simplest case for applying this intertemporal Ramsey pricing rule is one where the marginal cost is expected to be approximately constant over time,[45] and the price sensitivity of demand also is not expected to change in a material way. Under these assumptions, choosing a depreciation method that generates a price that is approximately constant in real terms would maximise allocative efficiency. These assumptions are what justifies the objective of targeting a levelised real price as discussed in Chapter 3.

86. However, under different assumptions, a different time path of prices may be appropriate. Most relevant here, the projected decrease in the cost of electricity relative to gas for the key gas appliances may imply an increased sensitivity of gas demand to price. The implication of this increased sensitivity is that the recovery of residual costs in the future may lead to larger distortions to efficient use, assuming it is possible to even recover this cost. This, in turn, may imply that allocative efficiency would increase by targeting a real price path that declines in real terms.

a. To see why the narrowing of the gap between electricity and gas prices may raise the price sensitivity of gas demand, consider an example where the gas distribution price is currently $10, and the equivalent electricity price (i.e., the electricity price net of the other gas supply chain costs) was $15 dollars.

b. Raising the gas distribution price by $1 by allocating more residual cost would not be expected to have a material effect on demand.

c. However, if the equivalent electricity price falls to $10 in the future, then raising the gas distribution price by $1 to $11 would be expected to have a substantial effect on demand. Indeed, if customers were indifferent between fuels and could switch

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43 One of the seminal papers in this area is Harberger, A., The measurement of waste, American Economic Review, May 1964a, 54(3), 58-76. A paper reviewing Harberger noted, in the context of the similar issue of excise taxes: "[h]e went on to make [the] trenchant observation that the area of [the] welfare loss triangle is generally a function of the square of the tax rate." Hines, J., "Three sides of Harberger Triangles", http://www.nber.org/papers/w6852.pdf.

44 Ramsey pricing minimises demand distortions by applying mark-ups to product prices in inverse proportion to each product's demand elasticity.

45 This would occur where the asset was never expected to be constrained, or where a succession of local constraints were expected over time at approximately equally-spaced time intervals.

instantaneously, all customers would switch to electricity, and so all of the gas demand would be lost.[46]

87. However, determining the optimal decline in real prices requires information about the likely change in the future price responsiveness of demand, which we do not currently have in relation to the ATCO gas network. Accordingly, in this report, we endorse targeting a long-term price path that is level in real terms as this is likely to increase the efficient utilisation of networks (compared to the expectation that real prices would increase in the future if the depreciation settings remained unchanged) even if it may not be the most efficient.

88. One further factor that is relevant to the efficient use of gas pipelines is the stability and predictability of pricing.[47] Like infrastructure owners, customers also make investment decisions when deciding to consume gas through the decision about whether to purchase a gas appliance, and then what type of gas appliance is purchased. When making this decision, customers would be expected to evaluate the "all-up" cost of using the energy service via gas or electricity, as well as their own preferences in relation to service potential / quality. A key input to this decision is likely to be the expected future (delivered) price of gas relative to the alternative (i.e., principally electricity). To the extent that there is substantial uncertainty over the future price of gas relative to the alternative, then customers may be expected to apply a risk premium to the choice of a gas service, thus depressing the demand for gas. Thus, to the extent that the recovery of the residual cost over time can reduce the perceived uncertainty in future gas prices, the demand for gas services – and allocative efficiency – is likely to be promoted.

46 In practice, as switching involves an investment by customers, the switching is likely to occur with a lag, and may not be complete even in the longer term (for example, some customers may apply a higher value to the gas-provided energy service).

47 This argument has been set out more comprehensively by Darryl Biggar: see https://www.degruyter.com/document/doi/10.2202/1446-9022.1173/html.