frontier economics

Economic life for the purposes of setting the regulatory depreciation allowance

A report prepared for Sydney Desalination Plant | 9 September 2022

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1 Introduction

1.1 Background

1. Sydney Desalination Plant (SDP) is regulated by the Independent Pricing and Regulatory Tribunal (IPART). IPART determines the maximum revenue that SDP is allowed to earn over a regulatory period (the 'revenue requirement') using a building blocks approach.
2. The building blocks approach involves summing up estimates of SDP's efficient costs in each year of the regulatory period. One of these categories of costs is the 'return of capital', which is also referred to as 'regulatory depreciation.' IPART explains that regulatory depreciation:

> *is intended to ensure that the capital invested in the regulatory assets is returned over the useful life of each asset.* [1]

3. That is, regulatory depreciation is the means by which investors in the regulated assets recover the cost of their original investment.
4. A key input to the calculation of the depreciation allowance is the asset life assumption. The assumed asset life represents the period over which the value of the original investment in the regulated asset—as reflected in the Regulatory Asset Base (RAB)—is to be recouped. For instance, using the straight line depreciation method, an asset with a RAB value of $1,000 million would require an annual depreciation allowance of $20 million if the assumed asset life were 50 years.[2]
5. The Standing Terms of Reference (TOR) for referral of SDP to IPART under Section 52 of the Water Industry Competition Act includes a set of pricing principles that each of IPART's pricing decisions for SDP must be consistent with. The third pricing principle in the TOR states that:

> *Return of assets (depreciation) is to reflect the economic lives of the assets.* [3]

6. SDP is preparing its pricing proposal to IPART for the 2022-27 regulatory period, and has sought advice from us in relation to asset lives. This report is a response to SDP's request for that advice.

[1] IPART, Sydney Desalination Plant Pty Ltd – Review of prices from 1 July 2017 to 30 June 2022, Final Report, June 2017, p. 126.

[2] $20 million = $1,000 million / 50 years.

[3] Terms of Reference for Referral of Sydney Desalination Plant Pty Ltd to IPART under Section 52 of the Water Industry Competition Act, 16 February 2012, p. 1.

1.2 Our instructions

7. SDP has asked us to:

   a. Explain the concept of 'economic life' as it is used for the purposes of setting the regulatory depreciation allowance;

   b. Provide recent examples of Australian regulatory decisions in which economic life has been used to determine the regulatory depreciation allowance;

   c. Provide an opinion on whether IPART set SDP's regulatory depreciation allowance for pipeline, intake and outlet assets ('pipeline assets'), for the 2017-22 regulatory period, in line with economic life; and

   d. Advise what action IPART should take, when setting the regulatory depreciation allowance, if the economic life of SDP's assets is shorter than the design life of SDP's assets—and the likely consequences of IPART delaying such action.

1.3 Authors of this report

8. This report has been prepared by Professor Stephen Gray and Dinesh Kumareswaran, with assistance from Dr James Key.

   a. Professor Stephen Gray is the Malcolm Broomhead Chair in Finance at the University of Queensland and Chairman of Frontier Economics. Stephen advises on issues relating to valuation, cost of capital, corporate financial strategy, and pricing issues. He has advised nearly all regulated businesses in Australia (across industries and jurisdictions) on rate of return matters. Stephen's work on empirical finance, asset-pricing and corporate finance has been published in leading academic and practitioner journals. At UQ Business School, Stephen teaches a range of award and executive education courses in financial management, asset valuation, and corporate finance. He has Honours degrees in commerce and law from The University of Queensland and a PhD in financial economics from Stanford University. He has received a number of academic awards including the Prime Minister's Award for University Teacher of the Year in the Economics and Business field in 2002.

   b. Dinesh Kumareswaran is a Director at Frontier Economics and an economist with nearly 20 years of experience in competition and regulatory economics. Dinesh advises regulators and regulated businesses on the different forms of economic regulation, the principles of best practice regulation, asset valuation, regulatory depreciation, the allowed rate of return, forecasts of efficient costs, incentive mechanisms and economic benchmarking. Before joining Frontier Economics, Dinesh was a Senior Economist at New Zealand's competition authority and economic regulator, the New Zealand Commerce Commission. Dinesh holds Master's and Honours degrees in economics from Victoria University of Wellington, New Zealand.

   c. Dr James Key specialises in the analysis of quantitative data and in the application of econometrics and statistical techniques. Formerly an Assistant Professor at the University of Western Australia. James advises clients on the application of econometrics to competition matters, and advises clients on regulatory issues in a range of industries, including the water industry. James holds a PhD in Economics from the Pennsylvania State University and an Honours degree in economics from Victoria University of Wellington.

1.4 Summary of key findings

What is the economic life of a regulated asset?

9. Economic life represents the period of time over which a regulated asset is expected to generate economic returns.

10. Economic life can be equal to, or shorter than, the design life of the asset. Design life represents the period of time over which a regulated asset may be expected to be physically operational.

11. When assessing the economic life of regulated assets, IPART should consider whether there are pressures that would mean that the period over which the assets are able to generate economic returns is shorter than the design life of the assets. These factors could include:

    a. the relative cost of the next best alternative to the asset (e.g., competition from rival technologies), and the point at which the next best alternative is likely to become a more economic way to satisfy demand;

    b. the term over which the owner of the asset has the right to supply (which may be governed by contractual, legal and/or political constraints);

    c. the period over which demand for the service exists at prices necessary to generate economic returns; and

    d. the period over which the regulated asset is recognised within the business's RAB.

12. There are many examples of regulators in Australia (including IPART) that have set regulatory depreciation allowances using an economic life that is shorter than the design life of the assets, in order to avoid a situation where the full economic cost of the regulated assets cannot be recovered by investors.

Did IPART set SDP's regulatory depreciation allowance for pipeline assets, for the 2017-22 regulatory period, in line with economic life?

13. IPART stated in its final decision for the 2017-22 regulatory period that it had set the regulatory depreciation allowance on the basis of the economic life, rather than the design life, of SDP's assets.

14. It appears that IPART considered that the economic life of SDP's pipeline assets (i.e., the period over which the assets could potentially generate economic returns) *exceeded* the design life specified by the designers of the asset.

15. IPART's conclusion on this issue was informed by advice from Atkins Cardno. That advice presented no evidence to suggest that SDP's pipeline assets could continue to generate economic returns beyond the design life specified by the designers of the asset. Atkins Cardno appears to have reached this conclusion by benchmarking the design life of SDP's pipeline assets to the design life of Sydney Water's water mains of similar diameter to the pipeline.

16. Atkins Cardno's advice to IPART was based entirely on an engineering assessment of design life. It did not consider whether the economic life of SDP's pipeline assets might be shorter than design life due to government policies, competition from other technologies, or expected future demand. These are the normal considerations that regulators have regard to when assessing economic life.

17. Atkins Cardno assumed, without presenting any evidence for doing so, that there would be perpetual demand for desalination or technically equivalent services that would generate economic returns. This seems to be based on the view that similar to Sydney Water's water supply services to customers across Greater Sydney, SDP is currently, and would continue to be, a

monopoly provider of water security services to Sydney Water (or other new customer) for the entirety of the design life of the assets.

What action should IPART take, when setting the regulatory depreciation allowance, if the economic life of SDP's assets is shorter than the design life of SDP's assets? What are the likely consequences of IPART delaying such action?

18. SDP would be unable to recover the full efficient cost of its regulated assets if the economic life of those assets is shorter than the asset life assumed by IPART when setting the regulatory depreciation allowance. In those circumstances, part of SDP's investment in the regulated assets would become stranded.

19. A regulatory framework that allows the stranding of regulated assets is likely to:

    a. Deter efficient investment in the regulated assets used to deliver regulated services. This could result in a deterioration in service quality to consumers; and/or

    b. Increase the return required by investors to compensate for the risk of their investments in regulated assets becoming stranded. This would raise the cost of supplying services, and would ultimately result in consumers paying more than they would if stranding were prevented by the regulator.

    Both of these outcomes would harm consumers, rather than promote their long-term interests.

20. IPART could mitigate stranding risk by either increasing the allowed rate of return (to compensate SDP's investors for the risk of stranding) or accelerating the recovery of the cost of the regulated assets (by setting the regulatory depreciation allowance in line with the expected economic life of the assets). Most regulators in Australia, including IPART, have adopted the latter approach.

21. Delaying action (for instance, by accelerating depreciation) until there is certainty that the economic life is shorter than the design life can result in large price increases being imposed on future generations of consumers, in order to ensure the full cost of the regulated assets is recovered before the asset becomes stranded. This would cause intergenerational equity problems—understating (overstating) the economic cost and prices needed to provide water security services today (in future). Acting early would result in only modest price increases being borne by all generations of consumers, and would avoid the detriment to consumers that would arise as a consequence of regulated assets becoming stranded.

22. In our view, regulators should not wait until they have certainty that economic life is shorter than design life before they act to accelerate recovery of the investment in regulated assets. As noted by the Economic Regulatory Authority (ERA) in Western Australia: "Uncertainty does not prohibit the possibility of a change in economic life, nor does uncertainty remove the need to update forecasts to reflect the best available information. The standard of evidence for changing the outlook is not certainty."[4] Delayed action can result in future generations of consumers facing disproportionately large price increases in order to allow full recovery of efficient costs.

1.5 Structure of this report

23. The remainder of this report is organised as follows:

[4] ERA, Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025, 1 April 2021, para. 1512.

a. Section 2 explains the concept of 'economic life' in the regulatory context, and provides several recent examples of Australian regulatory decisions in which economic life has been used to determine the regulatory depreciation allowance;

b. Section 3 provides an opinion on whether IPART set SDP's regulatory depreciation allowance for the 2017-22 regulatory period in line with economic life; and

c. Section 4 explains what action IPART should take, when setting the regulatory depreciation allowance, if the economic life of SDP's assets is shorter than the design life of SDP's assets—and the likely consequences of IPART delaying such action.

2 Economic life in a regulatory context

2.1 Economic life versus design life

24. Economic regulators in Australia distinguish between two asset life concepts:

    a. **Design life** – which represents the period of time over which a regulated asset may be expected to be physically operational. Design life is governed by the physical characteristics of the assets, the nature of use and environment in which it operates—all of which impact the rate at which the asset is likely to deteriorate and fail over time.

    b. **Economic life** – which represents the period of time over which a regulated asset is expected to generate economic returns. The economic life of an asset may be determined by a range of different factors, including:

        i. the relative cost of the next best alternative to the asset (e.g., competition from rival technologies);

        ii. the term over which the owner of the asset has the right to supply (which may be governed by contractual, legal and/or political constraints);

        iii. the period over which demand for the service exists at prices necessary to generate economic returns; and

        iv. the period over which the regulated asset is recognised within the business's RAB. For instance, if the asset is 'optimised' out of the RAB, then the regulated business would have no means by which to recover the cost of that asset.

25. The distinction between design life (sometimes also referred to as 'technical life') and economic life has been recognised in Australian legal precedent. For instance, in a case considering whether a proposal for access to rail infrastructure was valid within the Railways (Access) Code 2000 (WA), Edelman J explained the concepts of economic and technical asset lives as follows:

> *The concept of economic life is therefore an estimate of the period over which assets are productive, in the sense of delivering access services and earning access revenues...*[5]
>
> *... Technical life involves an estimate of how long the assets will be physically capable of doing the task for which they were intended. Naturally, the economic life of assets cannot exceed their*

[5] *Pilbara Infrastructure Pty Ltd v ERA* [2014] WASC 346, [75].

> *technical life because an asset that is physically incapable of doing its intended task will not be economically productive…*[6]

26. The economic life of a regulated asset may be equivalent to its design life if, for instance, there is perpetual demand for the regulated services, there are no constraints on supply, it is unlikely that there will be any viable alternative source of supply that would compete effectively with the asset, and if the asset is recognised in the RAB until it is depreciated fully. In those circumstances, the asset would continue to generate economic returns to the owner until the asset fails or is replaced by new assets.

27. However, economic life can be shorter than design life if any of the conditions described above are not met. For instance, consider a railway line servicing a group of mines. Suppose that the only source of revenue generated by the railway infrastructure are payments from the mines to transport the raw minerals produced by the mine; the railway assets have no alternative use. Suppose also that railway infrastructure has a technical life of 50 years, but that the mines are expected to be economically productive for 20 years. Although the design life of the railway infrastructure is 50 years, its economic life will only be 20 years. The economic life of railway infrastructure can never exceed the design life of railway infrastructure, but it might be less.

28. The expression of economic life reflected in the judgment by Edelman J is consistent with the common regulatory understanding of the term 'economic life'. For example, a standard Australian text on economic regulation explains that:

> *… the amount included in the building block model for depreciation will depend on the value of the asset base and the economic life of the assets used in the provision of regulated services. The economic life of the assets in question will depend on how long they are expected to deliver services, which in some cases may be 50 years or more…*[7]

29. In summary:

    a. The economic life and design life of a regulated asset are determined by different factors; and

    b. The economic life of a regulated asset can never exceed—but can be shorter than—its design life.

2.2 Regulatory precedent

30. This section considers how various regulators have adopted and interpreted the concept of economic life in a number of recent decisions. These decisions include:

    a. The ERA's April 2021 decision for the Dampier to Bunbury Pipeline;

[6] *Pilbara Infrastructure Pty Ltd v ERA* [2014] WASC 346, [76].

[7] Peterson, G., Bull, M., Dermody, C. (2016), Access regulation in Australia, Thomson Reuters (Professional): Rozelle, NSW, para [5.110].

b. The AER's April 2021 decision for Evoenergy's gas distribution business;

c. The QCA's March 2021 decision for the Dalrymple Bay Coal Terminal; and

d. IPART's July 2019 decision on the useful life of the Hunter Valley Coal Network.

2.2.1 ERA decision for the Dampier to Bunbury Pipeline

31. As noted in section 1, the TOR requires IPART to set SDP's depreciation allowance reflecting the economic lives of the assets.

32. The National Gas Rules (NGR) require the Australian Energy Regulator (AER) and the Economic Regulation Authority (ERA) of Western Australia to set the regulatory depreciation allowance for regulated gas networks according to depreciation schedules that are designed:

> *(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*[8]

33. Hence, the requirements under the NER and NGR for the AER and ERA to set the regulatory depreciation allowance in line with economic life is similar to the requirement on IPART to set SDP's regulatory depreciation allowance reflecting the economic life of the assets.

34. In its final decision on the 2021-25 access arrangement period for the Dampier to Bunbury Pipeline (DBP), the ERA concluded that DBP's depreciation allowance should be determined using the economic life of the pipeline. The ERA explained that:

> *Consistency with the national gas objective implies that an appropriate interpretation of economic life, for the purpose of depreciation under the NGR, includes the actual or expected retirement of the asset from productive use at the end of its economic life. An asset may be retired due to technical, economic or other obsolescence.*[9]

35. The ERA explained further that:

[8] NGR, rule 89(1).

[9] ERA, Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025, 1 April 2021, para. 1382.

The economic life need not match the technical life of the asset. A pipeline that is technically sound may have no economic worth if no one demands its services at a price that covers its operating costs, or if upstream supply of gas is no longer available.[10]

36. In the previous (i.e., 2016-2020) regulatory period, the ERA had determined that DBP's pipeline assets should be fully depreciated between 2077 and 2081. However, for the 2021-25 regulatory period, the ERA accepted DBP's proposal to cap the economic life of pipeline assets to 2063 on the grounds that there is likely to be a diminishing market for gas transmission in future, due to technological and government policy changes, that may limit DBP to recover the full efficient cost of its existing pipeline assets.

Based on the current evidence available to it, the ERA considers that there is a likelihood that the usage of the DBNGP transmission pipeline will decline over time due to technological change and policy change.[11]

37. The ERA found explicitly that DBP now faces a greater likelihood that the economic life of the pipeline will be shorter than its technical life due to the combination of technological change and environmental policies curtailing natural gas use. Specifically, the ERA determined that:[12]

    a. The Western Australian Government has published its climate policy which supports a low-carbon future and includes commitments to move towards an aspiration of net zero emissions by 2050.

    b. An increasing number of large businesses in Australia and across the world have committed to net zero emissions targets between 2040 and 2050.

    c. There is increasing investment in the research and development of green hydrogen in Australia and across the world.

    d. There is increasing investment in diverse research and development into emissions reductions of industrial processes, either through the electrification of processes or the adoption of green hydrogen.

    e. More countries and companies are aiming for carbon reductions, which may encourage Western Australian producers to further decarbonise to maintain access to world markets or access to green product markets and green premia.

    f. Standard & Poors has revised its assessment of the risk to the whole oil and gas industry from 'intermediate' to 'moderately high'.

[10] ERA, Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025, 1 April 2021, para. 1502.

[11] ERA, Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025, 1 April 2021, para. 1514.

[12] ERA, Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025, 1 April 2021, para. 1509.

38. When reaching its decision to cap the economic life of pipeline assets to 2063, the ERA recognised that there can be considerable uncertainty over the economic life of long-lived assets. However, the ERA explained that regulators should not wait until they have certainty before revising their asset life assumptions to reflect a reduction in expected economic life:

> *The ERA notes that any view on the economic life of an asset, particularly one with a possibly long technical life, implies a forecast and a level of uncertainty. Uncertainty does not prohibit the possibility of a change in economic life, nor does uncertainty remove the need to update forecasts to reflect the best available information. The standard of evidence for changing the outlook is not certainty.*[13]

2.2.2 AER decision for Evoenergy

39. The National Electricity Rules (NER) require the AER to set the regulatory depreciation allowance for regulated electricity networks according to depreciation schedules that conform to the following requirement:

> *the schedules must depreciate using a profile that reflects the nature of the assets or category of assets over the economic life of that asset or category of assets*[14]

40. The AER has stated that new or emerging technologies and innovative alternatives may also foreshorten an asset's economic life:

> *An important trigger for assessing whether an asset is at the end of its economic life is an assessment that the asset is at or near the end of its technical life. However, asset retirement may be triggered by economically preferable alternatives to retaining the current asset in service. New or emerging technologies and innovative alternatives may render it economically preferable to retire an existing asset before its technical end-of-life or before a more traditional assessment would have deemed the asset to be at economic end-of-life.*[15]

[13] ERA, Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025, 1 April 2021, para. 1512.

[14] NER, rule 6.5.5(b)(1) and rule 6A.6.3(2)(b)(1).

[15] AER, Industry practice application note – Asset replacement planning, January 2019, p. 11.

41. In its final determination on the 2021-26 access arrangement for Evoenergy's gas distribution business, the AER decided to shorten the standard asset life assumptions for certain classes of Evoenergy's regulated assets.

42. The AER recognised that recent announcements about the ACT Government's climate change policy (an intention to prohibit new gas connections in new developments and to provide grants to households to replace gas appliances with new electric alternatives) increased the likelihood that the economic life of Evoenergy's gas network would be shorter than the technical life of the assets. The AER stated that:

> *At the time of the draft decision, we expected the ACT Government's decision on the path to net zero emissions from gas use to be made in 2024 (close to the next review) as per the timeline set out in its Climate Change Strategy 2019–2025. We expected further clarity on the impact of this pathway on Evoenergy's customers located in NSW at that time.*
>
> *However, following the October 2020 ACT election, the returned ACT Government has published an agreement which provides more certainty and clarity about its intentions and planned initiatives to phase out natural gas in the ACT. These include prohibiting new gas connections in newly developed estates and in new infill developments within existing areas in the ACT from 2023. Further, the agreement also commits to, among other measures, interest-free loans of up to $15,000 for households to help with the cost of replacing gas appliances with electric alternatives.*
>
> *We consider that the ACT Government's climate change policy has advanced considerably in the time between our draft decision and when we received the revised proposal. It is now more certain that Evoenergy's customer base in the ACT would start declining after 2023 as no new brownfield connections would be allowed. Existing customers in the ACT who have gas appliances installed in their homes would be more likely to switch to electricity once their appliances need to be replaced due to the rebates available to them and the marketing campaign to move away from gas use in the ACT.*[16]

43. Consequently, the AER shortened the standard asset life assumption of high pressure mains assets from 80 years to 50 years, and the standard asset life assumption of medium-pressure mains and medium-pressure services assets from 50 years to 30 years.

2.2.3 NZCC decision for gas pipelines

44. In May 2022, the New Zealand Commerce Commission (NZCC) published its third final determination on default price-quality paths (DPP3) for gas pipeline businesses (GPBs).

45. The NZCC recognised in its determination that the New Zealand Government had committed in legislation to achieving a net zero emissions target by 2050, and that the Government had published an emissions reduction plan (ERP) that involved phasing out the use of fossil fuels including natural gas. These developments meant that GPBs faced an increase in stranding risk,

[16] AER, Evoenergy access arrangement 2021 to 2026, Final Decision, Attachment 4, pp. 7-8.

since it would be unlikely under the Government's ERP that they would be able to recover their costs over the full expected design life of their network assets.

46. The NZCC responded by accelerating the depreciation allowance (and therefore cost recovery) of the GPBs, as summarised in **Table 1** below.

Table 1: Remaining asset lives in 2021, before and after application of accelerated depreciation

GPB	Unadjusted asset life	Adjusted asset life
GasNet	25 years	20 years
Powerco	22 years	18 years
Vector	32 years	21 years
First Gas Distribution	26 years	17 years
First Gas Transmission	23 years	17 years

Source: NZCC, Default price-quality paths for gas pipeline businesses from 1 October 2022, Final Reasons Paper, 31 May 2022, p. 102.

47. In making its determination, the NZCC made an explicit distinction between the "economic lives" and "physical lives" of the assets, and explained the following:

> *Prior to this DPP, our approach to asset lives assumed that GPBs will provide services for decades to come, and their assets will have economic lives approximating their physical lives. But with expectations for declining demand, the Government wanting to phase out the use of natural gas, and the potential for network closure, gas pipeline assets will now have a shorter expected economic life conveying natural gas than previously assumed.*
>
> *Accordingly, we have shortened the regulatory asset lives of the network to better match the period during which the network is still expected to convey natural gas. This means the period over which GPBs' investments in assets is to be recovered is shorter than previously assumed, which increases the allowance for depreciation in DPP3. This has the effect of better maintaining incentives for GPBs to invest in their networks while there is still demand for natural gas. We consider this to be in consumers' long-term interests, and have smoothed price increases over time to help reduce the impact on consumers.*[17]

[17] NZCC, Default price-quality paths for gas pipeline businesses from 1 October 2022, Final Reasons Paper, 31 May 2022, p. 12.

48. The NZCC explained that regulatory failure to address the increase in stranding risk faced by the GPBs could disincentivise efficient investment, which would not promote the long-term interests of consumers:

> *If [stranding risk is] not addressed, the risk could lead to underinvestment by GPBs, and the provision of GPB services which do not satisfy consumers' demand. To the extent that the DPP3 reset provides insufficient incentives to innovate and invest, and this leads to GPB services which do not meet consumers' demands, the purpose of Part 4 will not be promoted.* [18]

49. Some gas users had submitted to the NZCC that it was premature to accelerate GPBs' cost recovery as (a) there was no imminent threat of stranding faced by the businesses, and (b) there was some possibility that even if the use of natural gas were phased out, existing gas pipeline assets could be repurposed (e.g., to supply biomethane and/or hydrogen), in which case the GPBs' assets would not become stranded. For these reasons, several stakeholders urged the NZCC to delay action to address the emerging stranding risk.

50. The NZCC responded to these submissions by that the risk of asset stranding is informed by the expectation of the future under-recovery of costs, rather than the imminent threat of under-recovery:

> *While the prospect of asset-related costs not being recovered may not be imminent (ie, under-recoveries are unlikely to occur in DPP3 or DPP4), it is the expectation that under-recoveries may eventuate in the future (together with the challenges posed by the expectation of declining gas volumes and uncertainty over willingness or ability of consumers to pay in the interim) that signals an economic stranding event and threatens current investment incentives.*[19]

51. The NZCC went on to explain that its decision to accelerate GPBs' depreciation allowances was based on the information available at the current time, but that it would adjust its asset life assumption in future resets in response to any material change in information. [20] That is, the NZCC recognised that it was prudent for it to act now to preserve efficient investment incentives by accelerating GPBs' cost recovery—even in the face of some uncertainty about future outcomes—recognising that it has the option of making adjustments to asset life assumptions in future regulatory periods as this uncertainty resolves itself.

[18] NZCC, Default price-quality paths for gas pipeline businesses from 1 October 2022, Final Reasons Paper, 31 May 2022, p. 92.

[19] NZCC, Default price-quality paths for gas pipeline businesses from 1 October 2022, Final Reasons Paper, 31 May 2022, p. 92.

[20] NZCC, Default price-quality paths for gas pipeline businesses from 1 October 2022, Final Reasons Paper, 31 May 2022, p. 93.

2.2.4 QCA decision for the Dalrymple Bay Coal Terminal

52. Unlike the ERA and AER, the QCA is not compelled to determine regulatory depreciation allowances using economic life. However, the QCA has chosen to use economic life as the basis for determining regulatory depreciation allowances in a number of instances.

53. For example, in its final decision on the 2019 Dalrymple Bay Coal Terminal (DBCT) Draft Access Undertaking, the QCA explained that it is important that the regulatory depreciation allowance be set such that the initial cost of the investment is recovered over the period over which the asset is expected to remain economically productive.

> *Determining a regulatory depreciation profile requires an estimate of the period over which an asset is expected to remain economically productive. The initial investment in the asset is then returned to the asset owner over this period through a regulatory depreciation allowance.*[21]

54. The QCA noted that DBCT's depreciation allowance should be set using the economic life of the regulated assets, which may be shorter than the design (physical) life of the assets:

> *Depreciation allowances are typically determined such that the value of the initial capital investment is returned to the asset owner over the useful or physical life of the asset. However, we consider it appropriate to apply an economic constraint to the depreciation profile where it can be demonstrated that an asset's economic potential is likely to be depleted prior to the end of its useful or physical life. When applying a constraint, individual assets are depreciated over the shorter of their useful life, and the life implied by the economic constraint.*
>
> *As we concluded in previous investigations, the coal resources that ship through DBCT, while significant, are finite and will likely constrain the economic life of the Terminal to a term somewhat shorter than the potential physical life of the assets.*[22]

55. The QCA assessed the economic life of the regulated assets by estimating the economic life of the coal reserves in the DBCT catchment area (50 years ending 2054), rather than the design life of the terminal, which for some of the assets owned by DBCT extends beyond 2054.

2.2.5 IPART decision for the Hunter Valley Coal Network

56. Under Schedule 6AA of the Transport Administration Act 1988, the NSW Rail Access Undertaking (the Undertaking) provides for third party access to the rail network in NSW, including specifying certain pricing principles that rail owners must apply in negotiating access prices. The Undertaking

[21] QCA, DBCT 2019 draft access undertaking, March 2021, p. 168.

[22] QCA, DBCT 2019 draft access undertaking, March 2021, p. 171.

requires IPART to, amongst other things, review every five years the depreciation that rail owners must apply when setting maximum prices.

57. The pricing principles in the Undertaking provide that:[23]

> *(i) Depreciation is to be calculated at the beginning of each financial year using a straight-line methodology and the estimate of the remaining useful life of the assets*
>
> *(ii) The useful life of a Sector or group of Sectors is to be determined by reference to the remaining mine life of the Hunter Valley coal mines utilising that Sector or those Sectors.*

58. The Undertaking requires that depreciation for the Hunter Valley Coal Network (HVCN) be calculated using the useful life of rail assets, estimated by IPART.

59. When making its determination on the useful life of the HVCN, IPART considered:

    a. The current and potential uses of the network to transport coal;
    b. Changes to demand for coal-fired electricity generation and the economic lives of the Eraring and Vales Point power stations;
    c. The outlook for coal users of the network; and
    d. The longest-lived substantial mines using the line, their marketable reserves and production levels.

60. That is, when assessing useful life, IPART considered the factors that would determine how long the line would likely remain economic. Since the HVCN is used to transport coal, IPART's focus was on how long users of the network were likely to require the network. That, in turn, was determined by the period over which the supply of, and demand for, coal transported over the HVCN was expected to exist. IPART did not consider the design life of the rail assets.

61. IPART noted in its final decision that:

    a. A number of power stations had actually closed or announced their intention to close since its previous review of asset lives;
    b. The owner of the power station at Eraring had advised IPART that it did not expect that it would require coal transported over the HVCN beyond 2032. Similarly, the owner of the Vales Point power station told IPART that the expected life of that power station is 2029;
    c. Coal revenues were expected to decline over the next five years; and
    d. Other users of coal transported using the HVCN indicated that their coal demand was likely to decline.

62. Based on this evidence, IPART decided to shorten its estimate of useful life from 2044 to 2040. IPART explained that:

[23] Undertaking, Schedule 3, clause 3.2(c).

> *While a number of mines could continue to supply coal to the power stations up to and beyond the current terminal date of 2044, this is likely to be limited by the economic life of the power stations. As such, we have decided to reduce our estimate of the remaining mine life to 2040.*[24]

63. When making its decision to shorten its estimate of the useful life, IPART recognised that there was considerable uncertainty about the future. It recognised that one response to this uncertainty would be to wait until some of that uncertainty had been resolved before shortening its estimate of useful life. To that end, IPART considered the impact of a number of different options (summarised in **Table 2**) for the 'terminal date' (i.e., end of useful life) for the rail assets of the HVCN.

Table 2: Options for the terminal date of the HVCN

Scenario	Description
Base case	Maintain the current terminal date of 2044
Option 1	Bring forward the terminal date to 2032, Origin's announced exit from coal fired generation
Option 2	Bring forward the terminal date to 2036
Option 3	Bring forward the terminal date to 2040
Option 4	In 2024, bring forward the terminal date to 2032
Option 5	In 2024, bring forward the terminal date to 2036
Option 6	In 2024, bring forward the terminal date to 2040

Source: IPART, Rate of return and remaining mine life 2019-24, Final Report, July 2019, Table 3.3.

64. IPART found that the longer it waited in order to act to bring forward the terminal date, the greater would be the impact on prices (see **Table 3**). This is because the same remaining asset value would need to be recovered over a shorter and shorter period, thus pushing up the required regulatory depreciation allowance to avoid the cost of the asset becoming stranded.

65. IPART explained that:

> *There may be more certainty when we next undertake this review in 2024. At that stage, we can adjust the estimated remaining mine life and depreciation schedule to reflect the longer or shorter remaining life. However, if we wait until our next review, in 2024, when there may (or may not) be*

[24] IPART, Rate of return and remaining mine life 2019-24, Final Report, July 2019, p. 24.

more certainty about the future of coal-fired generation, we would create substantial price shocks for access seekers if we reduce our terminal date.

Alternatively, reducing our estimate of the remaining mine life now spreads the price increase over a longer period. If we find at the next review that the power stations are likely to continue beyond the terminal date then we can adjust the depreciation schedule at that time.[25]

Table 3: Impact of a change of terminal date on ceiling prices

	Review date	Terminal date	Depreciation rate	Total depreciation ($2014-15pa)	Increase in allowed revenue %
Base case	**2014**	**2044**	**3.3%**		
Option 1	2019	2032	7.7%	1,201,112	13.5%
Option 2	2019	2036	5.9%	918,497	7.9%
Option 3	2019	2040	4.8%	743,546	4.4%
Option 4	2024	2032	12.5%	1,951,807	28.3%
Option 5	2024	2036	8.3%	1,301,205	15.4%
Option 6	2024	2040	6.3%	975,904	9.0%

Source: IPART, Rate of return and remaining mine life 2019-24, Final Report, July 2019, Table 3.4.

66. Based on this analysis, IPART concluded that it would be more prudent to act now by accelerating the depreciation allowance (which would result in a relatively modest price increase) than to act later and potentially impose large price increases on future customers:

Reducing our estimate of remaining mine life now would result in an increase in RailCorp's allowed revenue of 4.4% to 13.5%. However, waiting until 2024 could result in a much larger increase of 9.0% to 28.3%, because of the shorter time period until termination to recover costs.

...

On balance, given the price impacts, we consider that basing our estimate of the remaining mine life on a terminal date of 2040 would provide an appropriate balance between reducing the risk of stranding the line and moderating price impacts for access seekers.[26]

[25] IPART, Rate of return and remaining mine life 2019-24, Final Report, July 2019, pp. 24-25.

[26] IPART, Rate of return and remaining mine life 2019-24, Final Report, July 2019, p. 26.

2.3 Conclusions

67. The regulatory examples surveyed above indicate that:

    a. A number of regulators are required to set depreciation allowances using economic life—as IPART is required to do in SDP's case;

    b. Regulators recognise that economic life can be shorter than the design life of the asset due to, for instance:

        i. government policy that truncates the period over which the asset may generate economic returns;

        ii. innovation and competition from emerging, alternative technologies; and

        iii. declining demand for the services of the regulated business.

    c. Regulators have considered those specific factors when determining the economic life of the relevant regulated assets.

    d. Some regulators (e.g., the QCA) have chosen to set the depreciation allowance using economic life (rather than design life) even if there is no explicit requirement for them to do so. This is because doing so allows regulated businesses to recover the efficient cost of their investment in regulated assets, which promotes incentives to undertake efficient investment in future. Allowing the investment in a regulated business's assets to become stranded would likely deter future efficient investment; and

    e. Regulators have balanced considerations relating to certainty of economic life estimates with price impacts and in many cases have decided on balance that 'action is required' rather than waiting until they have certainty that economic life is shorter than design life before acting to accelerate recovery of the investment in regulated assets. Delayed action can result in future generations of consumers facing disproportionately large price increases in order to allow full recovery of efficient costs.

3 IPART's treatment of SDP's asset lives for the 2017-22 regulatory period

68. SDP has asked us to provide an opinion on whether IPART set SDP's regulatory depreciation allowance, for pipeline assets, for the 2017-22 regulatory period in line with economic life. This section addresses that question.

3.1 IPART's decision and considerations

69. SDP's pricing proposal for the 2017-22 regulatory period proposed that the regulatory depreciation allowance for pipeline assets should be set in line with the 100-year design life of the pipeline assets.

70. In its draft decision, IPART adopted an asset life assumption of 120 years based on advice from its engineering expert, Atkins Cardno:

> *we have not accepted SDP's proposal to adjust the asset life for the pipeline from 140 years (2012 Determination) to 100 years based on its design life. Instead, we have adopted Atkins Cardno's recommendation to set the asset life for new pipeline infrastructure at 120 years. This decision takes into account that half the length is land-based and the other half is in a more aggressive environment under Botany Bay. When this revised new asset life is applied from 1 July 2012, the remaining life of existing pipeline infrastructure assets becomes 115 years, compared with SDP's proposal of 95 years.*[27]

71. Atkins Cardno's original advice to IPART noted, in relation to the pipeline assets, that:

> *The current assumption of 140 years is the same as SWC applies to its water mains of a similar diameter. SDP proposes a reduction in the asset life as it states that the design life is 100 years. SDP provided a report on the asset management of the pipeline which indicates a design life of 100 years although there is little evidence to justify this. The asset lives set for determining depreciation are economic design lives which in some instances are greater than the design lives defined in design contracts.*
>
> *Our view is that that the land-based pipeline asset life should be consistent with SWC assumption of 140 years; a lower asset life for the length of main in twin under-sea pipelines, some 50% of total length, would be appropriate. It is inconsistent to have buried or over ground pipelines having*

[27] IPART, Sydney Desalination Plant Pty Ltd – Review of prices from 1 July 2017 to June 2022, Draft Report, March 2017, p.98.

different asset lives. The SDP states that the asset is well maintained and there is no evidence of pipeline deterioration.

There is a case to consider the under-sea section of pipeline as having a lower life because of the more aggressive environmental conditions. We accept that the proposed 100 year life for the under-sea length of pipeline. The report identifies some mechanical assets such as valves having a lower life although we are unclear of the proportion of these assets by value. We suggest a weighted life of 120 years should be used to take account the relative lengths of pipeline on land and under the sea.[28]

72. That is, Atkins Cardno advised that:

    a. The appropriate asset life for SDP's land-based pipeline assets is 140 years, consistent with the assumed design life of Sydney Water's water mains of similar diameter to the pipeline;

    b. The appropriate asset life of the under-sea length of the pipeline is 100 years (consistent with the design life proposed by SDP), because those assets are located in more aggressive environmental conditions than the land-based section of the pipeline;

    c. Approximately 50% of the pipeline is land-based, with the remainder of the pipeline assets located under-sea; and

    d. This suggests a weighted average asset life of 120 years.

73. Atkins Cardno reiterated these views in its supplementary advice to IPART. Based on that advice, IPART concluded in its final decision for SDP that:

We are satisfied with Atkins Cardno's assessment and have decided to adopt its recommendation to set the asset life for new pipeline infrastructure at 120 years. This reflects that half the length of the pipeline is land-based (140 years) and the other half is in a more aggressive environment under Botany Bay (100 years).[29]

74. In reaching this conclusion, IPART stated that it had determined the life of SDP's pipeline assets in line with the economic life, rather than design life, of the assets:

[28] Atkins Cardno, Sydney Desalination Plant - Expenditure Review, Final Report, 21 February 2017, p. 68.

[29] IPART, Sydney Desalination Plant Pty Ltd Review of prices from 1 July 2017 to 30 June 2022, Final Report, June 2017, p. 128.

> *We set asset lives on the principle of economic life (ie, over what period should the asset provide a service), and not on its design life. This is consistent with Atkins Cardno's rationale.*[30]

3.2 Analysis

75. On the face of it, this statement is puzzling because Atkins Cardno's advice comprised entirely of an engineering assessment of the *design life* of SDP's pipeline assets. That is, Atkins Cardno's assessment considered evidence on the design life of Sydney Water's water mains of similar diameter to SDP's pipeline, and evidence submitted by SDP on the design life of the pipeline assets.

76. Atkins Cardno did not consider any of the factors (discussed in section 2) that might shorten the economic life of assets relative to design life, such as:

    a. government policy that could truncate the period over which the asset may generate economic returns;

    b. innovation and competition from emerging, alternative technologies; and

    c. declining demand for the services of the regulated business.

77. Hence, it is difficult to see how Atkins Cardno's rationale for recommending an asset life assumption for the pipeline reflected the principle of economic life.

78. Two assumptions made by Atkins Cardno in its advice help explain IPART's statement that it had "set asset lives on the principle of economic life…and not design life."

79. Firstly, Atkins Cardno *assumed* that there would be perpetual demand for desalination or technically equivalent services:

> *There is an assumption that a desalination plant or a technical equivalent will be on the site in perpetuity to meet its obligations under the MWP.*[31]

80. Atkins Cardno presented no evidence to support such a strong assumption.

81. By assuming at the outset that obligations under the Metropolitan Water Plan would be met in perpetuity through desalination technology (or a technical equivalent) Atkins Cardno appears to have excluded the possibility:

    a. of alternative, innovative technologies emerging that could render SDP's services uneconomic; and/or

    b. that the requirements of the Metropolitan Water Plan could change over time (e.g., due to changes in government policy about the sorts of technologies that could provide water security services for Greater Sydney and/or catchment management),

[30] IPART, Sydney Desalination Plant Pty Ltd Review of prices from 1 July 2017 to 30 June 2022, Final Report, June 2017, p. 128.

[31] Atkins Cardno, Sydney Desalination Plant - Expenditure Review, Supplementary Report, 25 May 2017, p. 26.

in ways that would mean SDP could not continue to operate in perpetuity, or even to the end of the full design life of the pipeline assets.

82. Secondly, Atkins Cardno seems to *assume* that it would be possible for SDP to operate its pipeline assets, and generate economic returns, beyond the design life specified by the designers of those assets (for instance, if the designers had been too conservative in their estimate of design life):

> *SDP provided a report on the asset management of the pipeline which indicates a design life of 100 years although there is little evidence to justify this. The asset lives set for determining depreciation are economic design lives which in some instances are greater than the design lives defined in design contracts.*[32]

83. This would account for IPART's statement that it had determined the life of SDP's pipeline assets in line with the period over which the assets "should…provide a service", rather than the design life of the assets. That is, IPART appears to have accepted Atkins Cardno's advice that SDP's pipeline assets should, in principle, be able to provide regulated services, and generate economic returns, beyond the 100-year design life specified by the asset's designers.

84. In effect, IPART determined the life of SDP's pipeline assets for the 2017-22 regulatory period on the basis of design life, rather than economic life. That determination reflected what IPART's engineering adviser considered to be a reasonable design life for SDP's pipeline assets, which exceeded the design life specified by its designers. We surmise that IPART viewed the asset life it had determined as an economic life because Atkins Cardno *assumed* that there would be perpetual demand for desalination (or technically equivalent) services in Greater Sydney. That assumption was never tested by Atkins Cardno.

85. We note that if there were no demand for SDP's services beyond the life of its existing Water Supply Agreement with Sydney Water—which is due to expire in 2062[redacted]—then adopting a design life assumption for the purposes of setting the depreciation allowance would result in economic stranding of SDP's pipeline assets.

3.3 Conclusions

86. In summary:

a. For the 2017-22 regulatory period, IPART considered that it had set the regulatory depreciation allowance on the basis of the economic life, rather than the design life, of SDP's assets;

b. However, it appears that IPART considered that the economic life of SDP's pipeline assets (i.e., the period over which the assets could potentially generate economic returns) *exceeded* the design life specified by the designers of the asset;

c. IPART's conclusion on this issue was informed by advice from Atkins Cardno. That advice presented no evidence to suggest that SDP's pipeline assets could continue to generate economic returns beyond the design life specified by the designers of the asset. Atkins

[32] Atkins Cardno, Sydney Desalination Plant - Expenditure Review, Final Report, 21 February 2017, p. 68.

Cardno appears to have reached this conclusion by benchmarking the design life of SDP's pipeline assets to the design life of Sydney Water's water mains of similar diameter to the pipeline;

d. Atkins Cardno's advice to IPART was based entirely on an engineering assessment of design life. It did not consider whether the economic life of SDP's pipeline assets might be shorter than design life due to government policies that might shorten economic life, competition from other technologies, or falling demand. These are the normal considerations that regulators have regard to when assessing economic life; and

e. Atkins Cardno assumed, without presenting any evidence for doing so, that there would be perpetual demand for desalination or technically equivalent services.

4 Regulatory action if economic life is shorter than design life

4.1 Asset stranding and consequences for consumers

4.1.1 The role of the regulatory asset base

87. IPART has explained that under its regulatory framework, the regulatory asset base (RAB) represents the amount of financial capital invested in regulated assets that must be recouped over time by investors:

> *IPART's approach has been to establish a RAB which represents the amount of financial capital invested by Sydney Water which should be maintained. This RAB is then rolled forward to take account of new capital expenditure, inflation, depreciation and disposals. The financial capital maintenance concept incorporated in this approach provides consistency in dealing with sunk costs, developer charges, and legacy issues. The prices derived from this RAB enable Sydney Water to earn a return on its investment consistent with its WACC.*
>
> *As Sydney Water's assets reach the end of their useful lives the Tribunal allows the value of any replacement asset, including the replacement cost of assets previously funded by developers or through grants, to enter the RAB. Sydney Water is then able to recoup the value of the funds it outlays on the replacement (including the opportunity cost of the funds invested) through prices over the lives of the replacement assets. The recovery of the cost of assets over the life of the assets in question is consistent with normal commercial practice.*
>
> *The mechanism described above will ensure that over time Sydney Water receives the income to which it is entitled to support its investments in its own business undertakings.*[33]

88. As IPART notes in the excerpt above that the recoupment over time of financial capital invested (including the opportunity cost of funds) in the regulated assets is consistent with the concept of *financial capital maintenance*, and would ensure that the regulated business would receive the income required in order to support investment.

4.1.2 The consequences of allowing regulated assets to become stranded

89. IPART has previously recognised that, in principle, it could set prices in such a way that ignores (i.e., does not allow recovery of) sunk investments. However, doing so would harm incentives to invest

[33] IPART, Review of prices for Sydney Water Corporation's water, sewerage, stormwater and recycled water from 1 July 2008, Issues Paper, August 2007, pp. 10-11.

efficiently in the assets required to deliver regulated services to customers. Therefore, IPART's approach—which is consistent with the approach taken by all other regulators in Australia—is to allow the full recovery of the efficient costs associated with providing regulated services, including sunk investments reflected in the RAB:

> *The marginal cost of supplying water is largely dependent on the capacity of large, indivisible capital investments such as dams, desalination plants, treatment plants and transmission pipelines. Once a utility has incurred the cost of building the infrastructure, the marginal cost of supplying water is much lower than the average cost of supply. This means that, if prices are set at marginal cost, the utility may not fully recover its costs. This will impact on the utility's incentive to invest in the business in the future.*
>
> *For this reason, it is generally accepted that pricing of monopoly services is efficient if it meets the following objectives:*
>
> - *it signals to consumers the costs imposed (or avoided) if they increase (or reduce) their consumption by a small amount*
> - *it allows utilities to recover the efficient cost of service provision and recovers these costs with the least harm to economic efficiency.*[34]

90. If a business is unable to fully recover the sunk investments reflected in its RAB, then the cost of those assets would effectively become stranded.

91. One reason regulated assets could become stranded is if the regulator sets the depreciation allowance for the business on the basis of design life, but the true economic life of the asset is shorter than the design life on which the allowance is set. For instance, suppose the regulator assumes the asset could be physically operational for 100 years, and allows the recovery of the investment in the assets over that 100 year period. If in fact demand for the asset exists only for 50 years (e.g., because the assets have been rendered redundant by new technology), then the business would be unable to recoup the full cost of the investment within the 100-year recovery period assumed by the regulator when setting the depreciation allowance.

92. IPART recognised this in its 2019 decision on the useful life of the Hunter Valley Coal Network. In that decision, IPART noted that the full economic cost of the rail network would not be recovered if the demand from power stations for the coal transported by the rail network were truncated relative to the design life of the rail network:

[34] IPART, Review of prices for Sydney Water Corporation's water, sewerage, stormwater and other services, Determination and Final Report, June 2008, pp. 85-86.

While a number of mines could continue to supply coal to the power stations up to and beyond the current terminal date of 2044, this is likely to be limited by the economic life of the power stations. As such, we have decided to reduce our estimate of the remaining mine life to 2040.

If the power stations were to close before 2044, it is unlikely that the line would be able to recover its full economic costs. Even if there were smaller mines using the line to transport coal to Newcastle, or BlueScope in Port Kembla, the necessary increase in prices to cover return on capital would probably make it uneconomic for those users to continue to use the line. [35]

93. The key consequence of allowing regulated assets to become stranded, identified by IPART, is the disincentive created to make future efficient investments in regulated assets. IPART's current framework is underpinned by a 'regulatory compact' between investors and the regulator, whereby investors agree to contribute scarce capital to large investments in assets that provide long-term benefits to consumers in exchange for an assurance from IPART that they will be allowed to recover the full cost of those investments over a defined period of time.

94. Even if this assurance is not given in the form of an explicit guarantee, it is implied very clearly in the many and consistent statements that IPART has made, over decades, that a core feature of its regulatory framework is to allow full recovery of efficient costs. That assurance is reinforced by the fact that IPART has never, to our knowledge, allowed any significant stranding of regulated assets. To the contrary, as IPART's decision in relation to the Hunter Valley Coal Network demonstrates, IPART has in the past taken active steps to avoid regulated assets becoming stranded.

95. Against this backdrop, any actual stranding of regulated assets would be viewed by investors as a breach of the regulatory compact. This would have consequences for future investment decisions:

    a. Future investments are, by definition, not yet sunk. Hence, the costs of those investments may be avoided by businesses if they decide not to proceed with those investments. In order for those investments to proceed, the businesses would at a minimum need to have confidence that the costs of those investments will be recouped over the expected economic life of those assets. To date, investors in assets regulated by IPART have relied on an assurance that their investments would not become stranded once made. However, if that proves to no longer be true, then investors would be more reluctant to make efficient future investments that would be in the long-term interests of consumers, for fear that they may not be able to recoup the full cost of those investments. This would result in lower service quality for consumers.

    b. Alternatively, investors would only be willing to invest if they were compensated for the risk of future stranding via a higher return on capital allowance. This would result in consumers paying higher prices than they would otherwise.

96. These consequences may not be limited to the regulated business that suffered the stranding event. If IPART were to allow stranding of one business's RAB, that would be a clear signal to the wider industry that they too are exposed to the risk of future asset stranding. This could result in a scaling back of investment, and an increase in the cost of capital, across the whole industry.

[35] IPART, Rate of return and remaining mine life 2019-24, Final Report, July 2019, p. 24.

97. The consequences of asset stranding on the investment decisions of regulated businesses, and on the cost of capital, have been recognised in the academic literature. For example, Crew and Kleindorfer (1992) state that:

> *Capital recovery is increasingly important to utilities, especially telephone companies, when technological change and competitive entry are occurring. In the absence of efficient capital recovery policies companies are going to see their equity eroded. In addition to losses by the companies there are likely to be losses to ratepayers [i.e., consumers] in the form of reductions in service quality and higher rates in the future…There is a limited time for regulators to take remedial action, and if timely action is not taken there is no alternative but for the company to fail to recover some of its capital.*[36]

4.2 Regulatory action to mitigate stranding risk

98. There are two main things that regulators can do to mitigate the risk of future asset stranding:
    a. Increase the allowed rate of return to compensate investors for bearing stranding risk that they were previously not exposed to; and/or
    b. Accelerate the recovery of the RAB by shortening asset lives to reflect the expected economic life of the assets.

99. Crew and Kleindorfer (1992) explain that:

> *the regulator might therefore provide relief on capital recovery grounds either by increasing the allowed rate of return, s, or by increasing the allowed rate of capital recovery by accelerated depreciation allowance. Either of these will increase the achievable cashflows early on, before competitive forces make this infeasible.*[37]

100. We discuss each of these options below briefly.

4.2.1 Increasing the allowed rate of return to compensate for stranding risk

101. One option would be for the regulator to increase the allowed rate of return to provide investors compensation for bearing stranding risk that they were previously not exposed to.[38] Providing higher allowed returns when the asset is in operation would reduce the quantum of any costs that may be stranded in the future.

[36] Crew, M. A., Kleindorfer, P. R. (1992), Economic depreciation and the regulated firm under competition and technological change, *Journal of Regulatory Economics* (4), p. 51.

[37] Crew, M. A., Kleindorfer, P. R. (1992), Economic depreciation and the regulated firm under competition and technological change, *Journal of Regulatory Economics* (4), p. 56.

[38] This approach is explained in: Crawford, G. (2014), Written-down value? Assessing proposals for electricity network write-downs, Energy Networks Association.

102. There are limited examples of regulators overseas having applied such an approach. For example, in 2010 the European Commission provided guidance to national regulatory authorities within the European Union on making decisions for regulated access to Next Generation Access (fibre) networks (NGAs). The European Commission recommended that the WACC allowances provided by national regulatory authorities should include an investment risk premium to accommodate amongst other things stranding risks (arising from, for example, uncertainty relating to technological progress, evolving competition and future demand).[39]

103. The purpose of this investment premium was to provide firms rolling out NGAs a sufficient return to compensate for future uncertainty, including the risk of stranding, thereby encouraging the investments to proceed. We understand that some national regulatory authorities (e.g., in Germany and the Netherlands) followed the European Commission guidance and did allow an investment premium over and above the standard WACC allowance.

104. In addition, since 2010, the NZCC has allowed regulated gas network businesses to earn a higher rate of return than regulated electricity networks (via an uplift to the beta allowance), in part because the NZCC considered that gas networks are likely to be more exposed to stranding risk.[40]

105. In both of these cases, the allowed return is increased such that the *expected* return (i.e., the probability-weighted average return that recognises the probability of the assets being stranded) is equal to the return that investors might reasonably require for an investment with those risk characteristics.

106. We are not aware of any regulator in Australia that has followed this approach. However, the 2017-18 ACCC Retail Electricity Pricing Inquiry examined the consequences of network asset stranding if the RABs of regulated electricity networks were written down to reduce electricity prices. The argument under consideration was that certain networks had 'overinvested' in network capacity, which had in turn helped drive up retail electricity prices to inefficient levels.

107. One option that had been proposed to address this concern was that RABs of at least some networks should be written down to remove underutilised assets. In its final report on the Inquiry, the ACCC recognised that government-imposed write-downs of the RABs of privately-owned network businesses (a form of regulatory asset stranding):

> *may require a material increase in the rate of return (as calculated by the WACC)... the ACCC considers that there would be clear regulatory risk introduced by a general writedown.*[41]

108. That is, the ACCC acknowledged a link between asset stranding (in this case through government action) and the regulated rates of return required by businesses that were subject to the stranding.

109. We note that IPART's WACC methodology does not provide any allowance for stranding risk.

[39] European Commission, Official Journal of the European Union, Commission Recommendation on regulated access to Next Generation Access Networks (NGA), 20 September 2010, 2010/572/EU, section 6.

[40] NZCC, Input Methodologies (Electricity distribution and gas pipeline services), Reasons Paper, December 2010, Appendix E11; NZCC, Input Methodologies, Final Reasons Papers, Topic 4: Cost of capital issues, December 2016, para. 433.

[41] ACCC, Restoring electricity affordability and Australia's competitive advantage, Retail Electricity Pricing Inquiry, Final Report, p. 168.

4.2.2 Accelerating the recovery of the RAB

110. Another option way of addressing stranding risk would be to accelerate the recovery of the RAB by shortening the asset life assumption used to set the regulatory depreciation allowance. This could be done by setting the assumed asset life equal to the expected economic life of the asset. As the risk of stranding increases, the economic life of the asset would fall. This, in turn, would result in the RAB being recovered more quickly.

111. This is the approach adopted most frequently by regulators in Australia, including by IPART (see section 2).

112. In our view, acceleration of depreciation would be preferable to allowing regulated businesses a higher rate of return to reflect stranding risk. This is because the approach of accelerating depreciation would result in regulated businesses recovering only the efficient costs of the asset—no more, and no less.[42] By contrast, the approach of allowing an uplift to the allowed rate of return may result in the business either over-or-under-recovering its efficient costs, because the mark-up to allowed rate of return required to compensate properly for the risk of asset stranding cannot be estimated with certainty.

113. It is worth noting that the regulated business would not enjoy any windfall gain (i.e., recover more than the efficient cost of the regulated assets) if the regulator under-estimates the economic life of the assets. Nor would consumers suffer a windfall loss (i.e., pay more than the efficient cost of the assets over their lifetime). Consider a regulated business with a RAB of $1,000 million. Suppose the true economic life of the assets is 50 years, but the regulator mistakenly estimates the economic life to be 45 years (i.e., the regulator under-estimates the true economic life by five years). In this situation, the regulator would allow recovery of the RAB of $1,000 million over 45 years rather than 50 years.

114. At the end of the 45 years, the business would only have recovered $1,000—no more, and no less. The business would not have received any windfall gain.

115. In practice, the business would be able to continue operating the asset for a further five years, because there would continue to be demand for the services delivered by the asset for that period of time. However, since the cost of the asset would have been recovered fully by 45 years (i.e., it would have been depreciated fully), there would be no need for the business to earn a return on capital, or return of capital, over those remaining five years.

116. However, the business would suffer a *windfall loss* if the regulator *over-estimates* the economic life of the assets. Suppose for instance that the regulator estimates the economic life of the assets to be 55 years rather than 50 years. In those circumstances, the business's depreciation allowance would be set assuming a recovery period of 55 years, but reality the asset would only be able to generate economic returns for 50 years, leaving approximately $91 million of RAB unrecovered at the point the asset becomes stranded.

117. Hence, the consequences of mis-estimating the economic life of the asset are asymmetric. If the regulator under-estimates economic life, the business will not over-recover its efficient costs. However, consumers today would pay more than they would if the regulator knew the economic life of the assets with certainty.

[42] That is, the accelerated depreciation approach would be NPV-neutral.

118. If, on the other hand, the regulator over-estimates the economic life of the assets, then the business will recover less than its efficient costs—potentially distorting the incentives to make efficient future investments—and consumers would pay less than the efficient cost.

4.3 Conclusions

119. In summary:

a. Regulated businesses would be unable to recover the full efficient cost of their regulated assets if the economic life of those assets is shorter than the asset life assumed by the regulator when setting the depreciation allowance;

b. In those circumstances, part of the investment in the regulated assets would become stranded;

c. A regulatory framework that allows the stranding of regulated assets is likely to:

i. Deter efficient investment in the regulated assets used to deliver regulated services. This could result in a deterioration in service quality to consumers; and/or

ii. Increase the return required by investors to compensate for the risk of their investments in regulated assets becoming stranded. This would raise the cost of supplying services, and would ultimately result in consumers paying more than they would if stranding were prevented by the regulator;

Both of these outcomes would harm consumers, rather than promote their long-term interests.

d. A regulator could mitigate stranding risk by either increasing the allowed rate of return (to compensate investors for the risk of stranding) or accelerating the recovery of the cost of the regulated assets (by setting the regulatory depreciation allowance in line with the expected economic life of the assets). Most regulators in Australia, including IPART, have adopted the latter approach.

e. Delaying action to mitigate stranding risk (for instance, by accelerating depreciation) can result in large price increases being imposed on future generations of consumers, in order to ensure the full cost of the regulated assets is recovered before the asset becomes stranded. This would cause intergenerational equity problems. Acting early would result in only modest price increases being borne by all generations of consumers, and would avoid the detriment to consumers that would arise as a consequence of regulated assets becoming stranded.

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