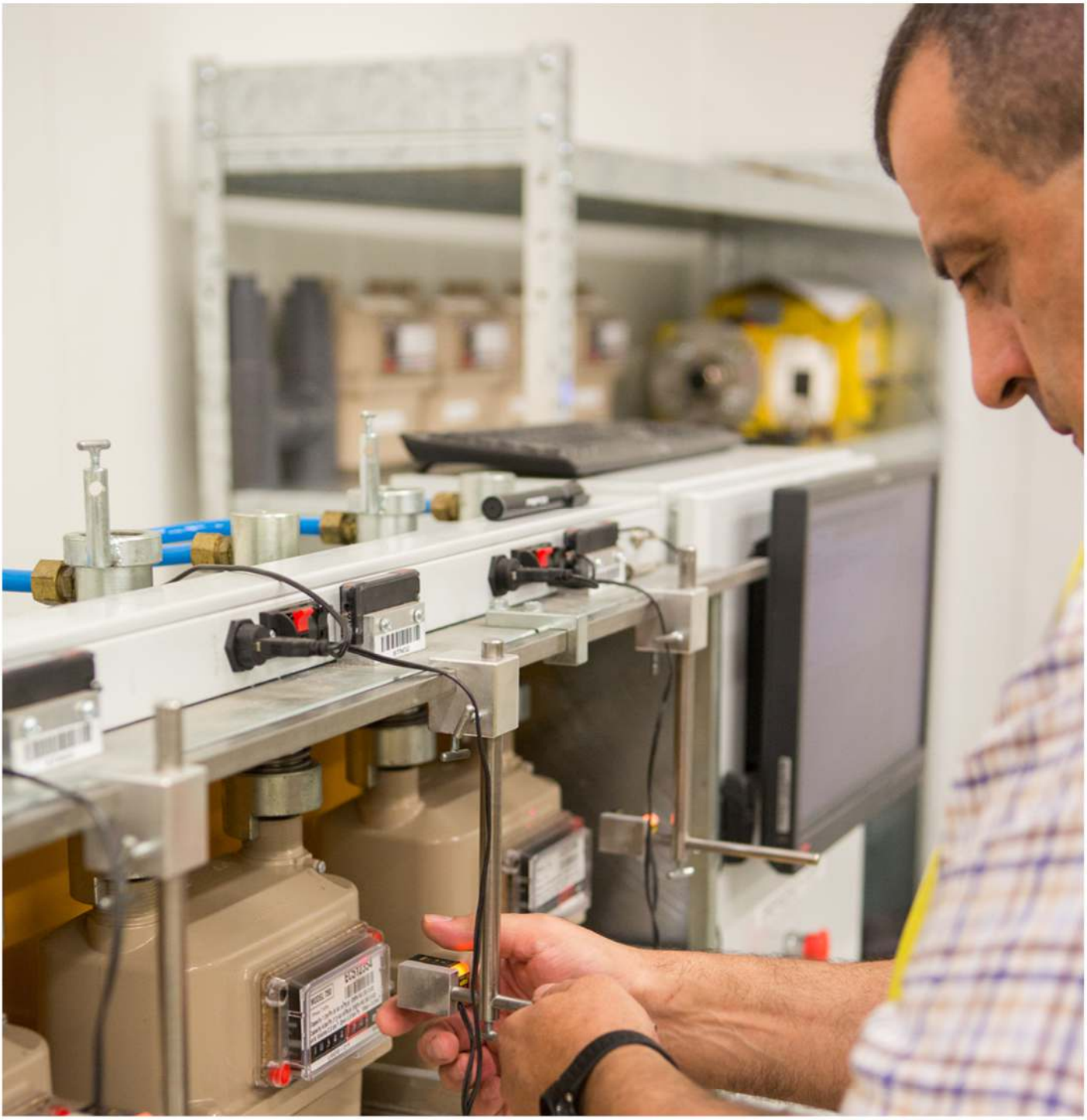

Jemena Gas Networks (NSW) Ltd

Revised 2020-25 Access Arrangement Proposal

Attachment 8.3

Response to the AER's draft decision - Using asset lives to manage stranded asset risks

Jemena
bringing energy to life

Using asset lives to manage stranded asset risks

Jemena Gas Networks

December 2019

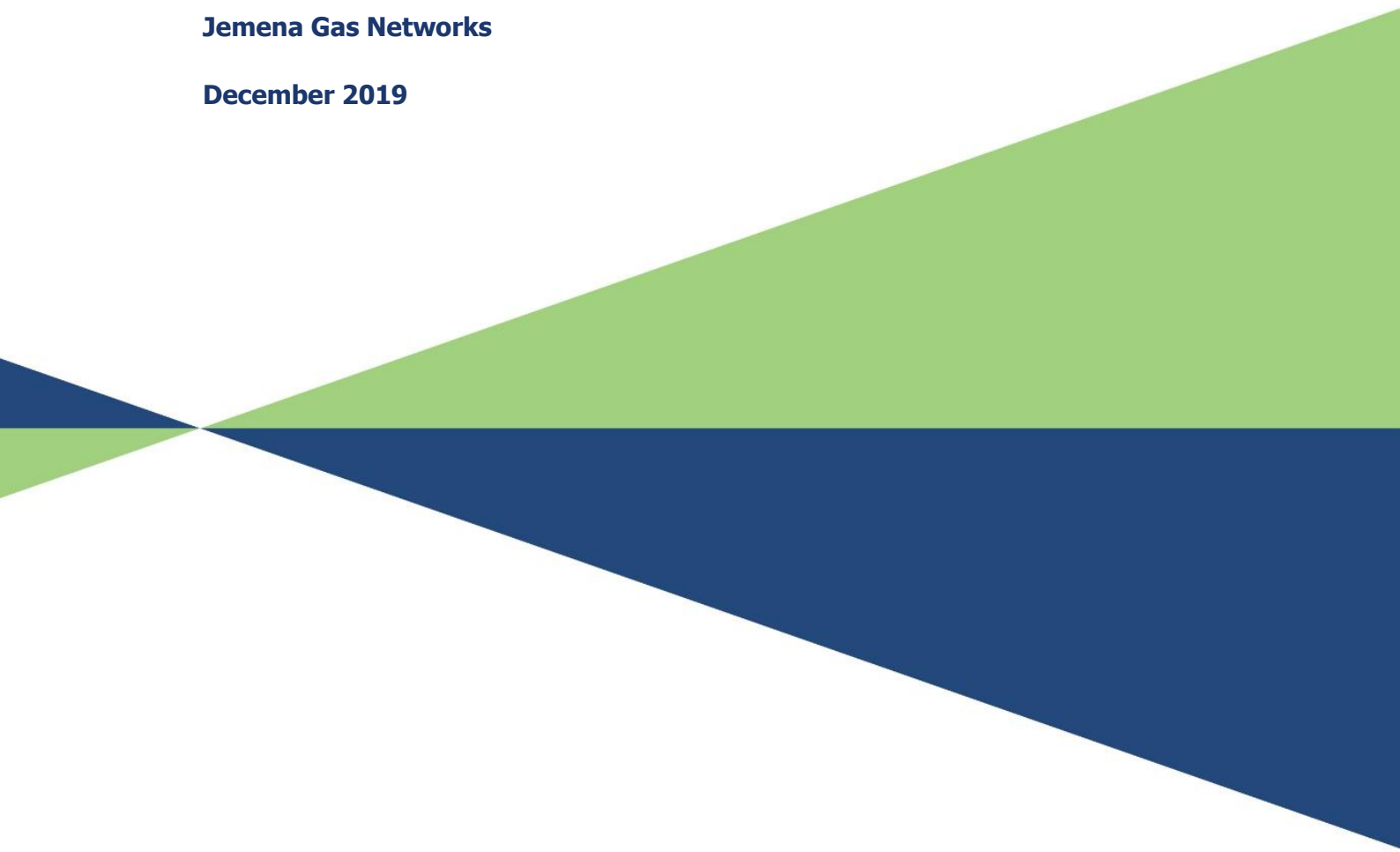

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Table of Contents

1. Introduction and summary

1.1 Introduction

Incenta Economic Consulting (Incenta) has been engaged by Jemena Gas Networks (JGN) to provide advice regarding its proposed approach to asset lives and depreciation for its upcoming access arrangement covering the period 1 July 2020 to June 2025. Specifically, JGN is seeking our views on the case for adjusting asset lives as a means of managing stranded asset risks.

JGN has asked that we address several specific topics in this paper, these are:

- what do economic principles tell us about how to manage stranded asset risks in competitive markets and for regulated services
- how can stranded asset risks be managed within the current regulatory framework, including having regard to the National Gas Objective and Revenue and Pricing Principles, and
- what approaches have been taken to managing stranded asset risks in other sectors and jurisdictions?

In relation to these topics we were also asked to provide our views on the conclusions reached in the Australian Energy Regulator's (AER) recent Draft Decision on JGN's access arrangement proposal.

1.2 Summary of our views

1.2.1 The JGN proposal

JGN has identified that there are several factors contributing to an increased risk of stranded assets for its system. The principal risk stems from carbon emission reduction measures – and the stated policy of the NSW Government for carbon neutrality by 2050 – which would imply either a cessation of reticulated gas supply or a conversion to reticulated hydrogen by that date, the latter of which would result in a material change to the economic characteristics of supply.[1] Indeed, the effects of this policy are already being felt via the decisions of number of major developers to make new developments 100 per cent electric. Adding to this risk is the declining usage per customer (reflecting the increasing competitiveness of electricity for traditional gas appliances) and the rising cost of natural gas even without explicit carbon-reduction measures in place.[2]

In response, JGN has proposed shortening the asset lives for new investments undertaken over the 2020-25 access arrangement period to minimise its exposure to this stranded asset risk in relation to these new investments. The intended outcome is to provide it with a reasonable expectation of earning

[1] In particular, substantial expenditure would be required to convert natural gas networks for hydrogen supply, the commodity element of the overall cost to customers would be materially higher than supply via natural gas (driven by the cost of producing carbon-neutral hydrogen), and there would also likely be a smaller customer base over which to spread fixed costs (as it may not be economic to convert all areas to hydrogen and, as customers will need to replace appliances, a number are likely to choose to convert their appliances to electricity).

[2] This evidence is presented in the JGN response on this matter, which we have reviewed, but have not repeated here.

a normal return in relation to these investments. A second motivation for JGN's proposed change to asset lives is to generate a more efficient and fairer spreading of costs over the period that the sector transitions to carbon-neutrality and beyond. The proposed change to asset lives is to apply only to new capital expenditure – so that there will be no reallocation of risk in relation to past investments – and does not preclude a review of the lives applying to the 2020-2025 capital expenditure and future vintages of capital expenditure as more information becomes available (indeed, the gas Rules encourage a dynamic review of lives).

1.2.2 AER Draft Decision

The AER is required to assess JGN's proposal for depreciation against a number of criteria in the Rules and in doing so have regard to the National Gas Objective (NGO) and the revenue and pricing principles contained in the National Gas Law.[3] In brief, the depreciation criteria provide for:[4]

- reference tariffs varying over time in a way that promotes efficient growth in the market for reference services
- each asset or group of assets being depreciated over their economic life
- allowance for adjustments to depreciation to reflect changes in the economic life of a particular asset or group of assets
- an asset being depreciated only once, and
- allowance for the service provider's reasonable needs for cash flow to meet financing, non-capital and other costs.

The AER's Draft Decision is not to accept JGN's proposal for the adjustment of asset lives, apart from meters (and which was motivated for different reasons). The main reasons given by the AER for not accepting JGN's remaining proposals were:

- *Quality of the evidence* – there is insufficient evidence to conclude that the utilisation of the network is significantly declining such that there is a stranding asset risk to address. The AER considers that at this point the claims are speculative and not established by evidence-based forecasts. It indicates that if evidence emerges at a later point it will consider the available options to address the risk.
- *Inefficient time path of prices* – because the economic life proposed by JGN has not been established by evidence, tariffs will not vary in a way that promotes efficient growth in the market for reference services. The consequence of this is that the profile of prices is akin to accelerated deprecation being applied and so too high in early years and too low in later years. The AER contends that this will cause customers to consume less than efficient pre-2050 and more than is efficient post-2050. The AER also identifies intergenerational equity concerns with respect to pricing.

[3] Sections 23 and28(2) of the National Gas Law.
[4] Rule 89 of the National Gas Rules.

- *Inefficient investment incentives* – the AER believes inefficient investment may be driven by over-utilisation post-2050 when prices are lower. It also believes that JGN may have inefficient incentives for investment and asset management once most of the capital has been returned to investors.

- *Positive effects of hydrogen* – hydrogen may have substantial positive impacts for JGN and so mitigate against stranded asset risk.

- *Depreciation not the right tool* – depreciation is not appropriate tool to reduce a network service provider's exposure to potential network-wide asset stranding risk.

1.2.3 Our comments on the AER's conclusion

It is our view that JGN's proposal is consistent with the requirements of the National Gas Rules, the NGO, and revenue and pricing principles. Therefore, we do not agree with the AER's Draft Decision on this matter. We address each of the AER's main arguments in turn.

Quality of the evidence

In our view, the AER has approached the question of whether the quality of evidence on stranding is sufficient in the reverse to what the gas Rules, revenue and pricing principles and National Gas Objective require.

A common and central implication of these instruments is that investors should expect to recover efficient cost. A clear outcome of the current regime – and one that the AER has accepted – is that stranded asset risk is not compensated via the regime. Thus, to the extent that there is a reasonable basis for believing that stranded asset risk is more than immaterial,[5] then action is required to remove the risk, otherwise the prospect exists that efficient investment will be dissuaded and the long term interests of customers will be eroded. We further observe that a commitment to look again at the issue in the future is not a sufficient response because:

- investors are likely to perceive as "hollow" a commitment by the regulator to review regulatory settings in the future after irreversible investments have been undertaken – encouraging efficient investment requires the regulatory settings to be appropriate at the time the investment is being considered,

- by deferring decisions about whether to mitigate asset stranding risk, then a larger response would be required to mitigate the risk and further that it is too late – given competition from alternative fuels – to act and asset stranding results.

Further, the adjustment that JGN has proposed is the *minimum* required to ensure there is an incentive for investment during the next access arrangement period. JGN does not propose adjustments to the lives of past expenditures, and the ability exists to review the lives of the subject capital expenditures and those in future access arrangement periods in the next and subsequent periods as new information

[5] To be clear, stranded asset risk requires there to be uncertainty (risk) as to whether asset costs will be fully recoverable under current regulatory settings, it does not require certainty that costs will not be recoverable.

arrives (indeed, the gas Rules encourage a dynamic review of asset lives). Thus, there is little downside to acting early, but a potentially material upside.

Moreover, even if the onus was on JGN to prove that there is stranded asset risk, it is difficult to believe that an objective observer could conclude that there was not a non-immaterial risk of asset stranding from the material presented and that is easily available.

The NSW Government has a firm policy of carbon-neutrality by 2050, and this is consistent with commitments made by other state governments and a number of other nations (including the UK), and can be traced directly to the science as summarised by the Intergovernmental Panel on Climate Change (IPCC) as a necessary requirement if temperature increases are to be limited to 1.5 degrees Celsius. No one that we are aware of has suggested that reticulated natural gas would continue in a carbon-neutral world, and so the optimistic scenario for gas distribution businesses is that reticulated hydrogen will prove viable, but which faces a number of challenges (and, most notably, its likely cost).

The fact that the NSW Government (nor any other Australian Government) has implemented measures to give effect to a carbon-neutral outcome is irrelevant – the goal is to achieve the target over a 30 year horizon, and it is unreasonable that there would (or even could) already be the measures in place that will be required to meet that outcome. But the form of the measures is irrelevant – what matters for stranding risk is the intended outcome, and there is no lack of clarity about that.

Inefficient time-path of prices

We observe that the AER's concern about the efficiency of the time-path of prices is linked to whether there is stranded asset risk, which we addressed above.

We further note that the AER's views about the efficiency of the time-path of prices would appear to consider only the network element, and so ignore the prospect that advancing depreciation may improve the efficiency of gas use over time given:

- the projected increase in natural gas prices, and
- if a conversion to hydrogen takes place, the substantial capital expenditure required to convert natural gas networks and the higher cost of the gas commodity (i.e., carbon-neutral hydrogen).

Furthermore, the AER's conclusions were also based on its views about whether the decline in usage per customer will continue (which we understand JGN is disputing) and assumes implicitly that the price sensitivity of gas demand will remain constant in the future (whereas the increasing competition from electricity suggests an increasing price sensitivity of gas demand).

Inefficient future investment

The AER's concerns about inefficient future use and investment assume a situation whereby the Regulatory Asset Base (RAB) becomes fully (or largely) depreciated in the future, even though the assets remain in service. We observe that this outcome is very unlikely to occur because:

- the gas Rules encourages asset lives to be reviewed on an ongoing basis, and so if it became clear that gas assets would remain in service, the lives could be adjusted and depreciation dialled back (indeed, a hold could be placed on depreciation), and

- if a conversion to hydrogen takes place, substantial capital expenditure will be required, and so a material overall RAB would remain.

Moreover, even if the assets were to become fully (or largely) depreciated, then:

- *Inefficient over-use is unlikely* – as the efficient price signal is one that reflects forward-looking costs only, which are typically near-zero for a distribution network until capacity constraints are reached,[6] and

- *Inefficient over-investment is unlikely* – as there are financial incentives to discourage this (noting that JGN is subject to a capital expenditure sharing scheme), together with the opportunity for ex ante and ex post regulatory action.

Positive effects of hydrogen

The reticulation of hydrogen will be subject to material cost and demand challenges as we noted above, which suggests that it is unlikely that even if the assets were expected to become deregulated after conversion to hydrogen that an upside potential sufficient to address stranded asset risk could exist. Moreover, we think it is a reasonable assumption that regulation of the distribution networks would continue post conversion,[7] so that any benefits from faster depreciation now would be passed on to customers.

Is depreciation the appropriate tool to manage stranded asset risk?

There is substantial regulatory precedent for using depreciation to remove stranded asset risk to the extent that this is possible. There are good arguments to support this – compared to the main alternative tool of compensating for the risk, advancing depreciation has the advantage of not creating the prospect of creating windfall gains or losses.[8] Moreover, depreciation is also flexible as asset lives can be adjusted periodically in light of the arrival of new information. The other possible measures are either ineffective for managing stranded asset risk (higher fixed charges), likely to deter new customers and create perceptions of unfairness (higher capital contributions), create perceptions of unfairness, or be anticompetitive and unworkable (exit fees).

In addition, a key feature of the national gas regime is that there is substantial flexibility to tailor the regulatory approach between pipelines, reflecting the fact that the markets served by the different gas distributors vary materially. As such, there is no benefit to defer consideration of stranded asset risk

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6 Capacity constraints in the gas assets that can be used for hydrogen are unlikely (i.e., likely to be only the non-steel assets) as these are typically built with substantial redundant capacity, and because a loss of customers would be expected on conversion to hydrogen.

7 It is noted that the National Hydrogen Strategy recently proposed a review with respect to the application of the national gas regime to hydrogen.

8 Consequently, a regulated business would not be expected to argue for an acceleration of depreciation unless (i) it believed stranded asset risk to be material, or (ii) it considered the regulatory WACC to be materially below market requirements. The windfall gains and losses arise from the explicit compensation approach due to the difficulty in estimating the probability of asset stranding occurring and the consequences of that stranding.

for JGN until some form of national approach has been derived – as well as stymieing JGN's incentive to invest over the intervening period, a national approach is unlikely to be appropriate.[9]

1.2.4 Other findings

In addition to the response to the AER's Draft Decision above, other key findings in this paper are:

- An expectation of a normal return on investment is a pre-condition for an investment incentive in competitive markets as well as the regulated sector. If stranded asset risk is material but not managed, it will lead to perceptions that a normal return cannot be earned. This will have a detrimental impact on the incentive for investment.

- The long-term interests of consumers will not be met where businesses no longer have an incentive for efficient investment. While regulated businesses would be expected to continue to invest (driven by regulatory obligations and the need to "stay in business"), a reduction in discretionary expenditure (i.e., some growth and service improvement), a substitution towards operating expenditure and an absence of desire to explore and evaluate new opportunities would be expected.

- The implication for economic regulation from this is that:

  – efficiency will be promoted by ensuring that there is an incentive for efficient investment, and

  – the mechanism for providing this incentive is to allow for an expectation that costs incurred will be recovered and so a normal return on investment,

  these are also outcomes that are promoted by the National Gas Objective and the Revenue and Pricing Principles in the National Gas Law.

- There are two main ways to preserve an expectation of earning a normal return when stranded asst risk is present, these are:[10]

  – To remove, or substantially reduce, the prospect of a stranding event occurring. In competitive markets this method is observed where competition "for the market" is undertaken for services provided by means of substantial infrastructure assets, with the results of the tender translated into a long-term contract. In economic regulation this is done through permitting regulatory deprecation that is sufficiently fast that there is no material risk to costs being recovered.

  – Have the business retain the risk but for it to be compensated for bearing this risk. This is the common outworking in competitive markets where entry is delayed until prices permit an NPV=0 outcome in the presence of stranded asset risk (i.e., prices implicitly include a

9 For example, the prospects of a conversion to hydrogen is much more likely – and the resulting commercial viability – in a market like Victoria where there is a substantial winter heating load (and where a conversion of this load to electricity would require a substantial augmentation to electricity distribution networks).

10 We note some other methods to manage stranded asset risk exist have been put forward by stakeholders (higher capital contributions, higher fixed charges and exit fees). We address these in the main body of the report.

premium to compensate for stranded asset risk). Explicit compensation can also be provided in economic regulation, with the amount of compensation based on estimates of the probability and consequences of a stranding event occurring.

2. Stranded asset risk and JGN proposal

2.1 Introduction

The purpose of this chapter is to set out our understanding of the current circumstances for JGN with respect to stranded asset risk. This includes its assessment of the risk it faces, the capital expenditure program it believes is necessary for the future, and its proposal to address stranded asset risk.

2.2 Stranded asset risk faced by JGN

Stranded asset risk is the prospect that investors will not be able to recover all the amounts that have been invested over the life of the relevant assets. The nature of it being a 'risk' is that the event is not expected to occur with certainty. Instead it is something that might happen, and if it were to happen could impose material consequences. Assessing stranded asset risk is therefore different to other forecasting that might be done for planning capital expenditure programs and is perhaps more like the approach that is taken for insurance.

JGN has identified that there is uncertainty about its ability to recover the cost for its gas pipeline assets past 2050 that exposes it to increased stranded asst risk. It is our assessment that the evidence it has put forward suggests there is sufficient risk of asset stranding that some action is necessary to manage it. The threats to cost recovery identified by JGN are:

- The NSW Government has recently announced that it will commit to lowering greenhouse gases by 35 per cent by 2030 and has a firm target of net zero carbon emissions from 2050. The 2050 target is in line with the advice from the IPCC on the trajectory of carbon reductions that are required to keep the temperature change to within 1.5 degrees Celsius and the commitments made by a number of other countries. It is our understanding that these targets now have cabinet approval.[11] The consequences of this commitment are that:
  - reticulated gas supply may no longer exist beyond 2050, with current gas customers who use gas as an energy source (rather than as a chemical feedstock) having converted to electricity, or
  - the reticulation of hydrogen, albeit with a likely smaller customer base and usage per customer reflecting the increase in cost of this option compared to reticulated natural gas (i.e., the higher cost of the commodity as well as the need to undertake substantial pipeline capital expenditure, including the replacement or upgrading of high pressure steel pipes to make them capable of transporting hydrogen).
- State, territory and federal policy is directed largely towards to electrification and increasing the availability and interconnectedness of renewable electricity. The implication of this being to reduce the relative cost of electricity compared to gas.

[11] We note that while these commitments may eventually come with legislation to implement them, this need not occur. For instance, the policy commitment can be implemented in a number of ways, including directing what action is taken in other areas. For instance, requiring new developments to be net zero carbon emission.

- Developers are increasingly looking to sell new developments based on their environmental credentials and reducing their carbon footprint, including the prospect of them being net carbon neutral. This means that they will likely avoid gas reticulation. Indeed, such developments may be a requirement from governments. As an example, the Australian Capital Territory (ACT) Government is currently trialling a gas-free housing development with mandatory solar panels as part of its policy of achieving 100 per cent renewable energy by 2020.

- A reduced rate of connections amongst potential new customers and a reduced usage per customer, reflecting:

  – an emerging trend amongst major developers in NSW to eschew the installation of gas infrastructure in new developments, as well as the changing nature of dwelling construction (i.e., towards multi dwelling units, which are typically wholly electrical)

  – improvements in electrical appliances and a continued reduction in the price of electricity relative to gas, and

  – improvements in the efficiency of gas appliances and reduction in energy generally.

2.3 Investment needs for JGN's system

As will be explained further in the following chapter, stranded asset risk has a chilling effect on the incentive for new investment. Therefore, the problem to address is whether there is new investment that is needed that may be deterred, or delivered less efficiently, if JGN is inappropriately exposed to stranded asset risks.

It is apparent from the AER's Draft Decision that it is of the view that there a large amount of capital expenditure that is required to be undertaken for the 2020-25 access arrangement period. Specifically, its Draft Decision approved $791.1 million ($2019–20) of total net capex for the 2020–25 access arrangement period on the basis that this is conforming capex under the NGR.

JGN's proposal indicates that capital expenditure over the forthcoming access arrangement period is focused on three areas:

- connecting new customers, which constitutes over 50 per cent of the capital program,

- asset replacement such as for inaccurate meters or deteriorated mains, and

- investment on IT systems.

In the context of stranded asset risks, these investments are either needed for the proper operation of the system, or will work to minimise the impact of the risks to stranded assets identified above. As such, where the new investments can proceed with stranded asset risks being managed, it remains efficient for this investment to proceed over the medium term. Specifically, connecting new customers works to spread fixed costs over more customers and so lower the impact that declining usage may otherwise have on bills. Further, even if the assets are expected to be stranded in the future there nevertheless remains a need to service those customers currently connected in a safe and secure way.

We note that the approach from JGN to new investment is still highly cognisant of the future risks it faces. It is apparent that except where there are large benefits from economies of scale, it has decided to focus its investment on the medium term rather than the long term. This approach minimises costs to customers now while allowing beneficial investment to proceed.

Conversely, where there are material economies of scale present, and a reasonable prospect that long term demand may be present, JGN has adopted what it refers to as a 'mixed approach'. This is where investment is focused on the medium term but with some decisions facilitating a longer-term focus. The prime example of this being the investments associated aerotropolis. Making investments in this new area will benefit existing customers by facilitating a share of fixed costs, recognising that capital contributions will account for the incremental costs of these connections above expected incremental revenue.

2.3.1 JGN's proposed solution to stranded asset risk

JGN's proposed solution to address the risk of stranded assets is predicated on the fact that the AER has been clear that the return on capital will not be used to compensate for stranded asset risks and also how the gas Rules are intended to operate.

In the first instance, it is relevant to note that JGN proposing an individual approach to depreciation is consistent with the intended operation of the gas regime. In this respect, it is quite different to the regime that applies to electricity. The gas Rules require the implementation of an access arrangement specific to each business, whereas in electricity the rules for access are largely codified with revenue determinations left to more implementation matters. The different approach is applied to gas because it is far less uniform in its supply and demand characteristics than electricity. For instance, electricity is ubiquitous across the country with supply determined by flows rather than direct contractual agreements. Conversely, gas demand and usage profiles are materially different in NSW compared to Victoria. In Victoria there is materially more gas demand focused on heating, whereas this is not the case in NSW. Further, there are different constraints on supply in each region. The implication of this is that the approach to access regulation has to be more fit-for-purpose for gas pipelines than might be the case for electricity. It also means that a specific approach to managing stranded asset risk for a specific business is warranted.[12]

In response to the potential threats to cost recovery JGN has proposed to increase the rate of depreciation for investment in new assets that occurs over the 2020-25 access arrangement period. The effects of this being to:

- Return invested funds back to investors over a shorter period compared to relying on standard asset lives that have been applied in the past. The intention being to provide more assurance that cost recovery can be achieved relative to the status quo for new investments.

[12] We note that a case could be made that a more detailed national approach may be warranted for considering how stranded asset risks for previous investments is managed. This is because these investments were made under an expectation of a much longer asset life. Even in this case though, the Rules clearly contemplate that depreciation profiles can change as the economic lives of the assets change over time such that adjusting depreciation can already be considered part of the regulatory compact that has been made with customers.

- Increase the revenue allowance for JGN over the 2020-25 period by $22 million without there being a change to the total costs recovered on an NPV basis.

- Reduce the Regulatory Asset Base (RAB) at a faster rate so that in the future there is less RAB that needs to be returned to investors, with the intention being to put less pressure on prices over the long-term when demand is expected to be lower.

- The increase in revenue equates to a $3 increase per year per customer, we note, however, this is significantly offset by other reductions that arise for the access arrangement period such that, overall, customer charges are lower over the period.

The specific adjustments proposed by JGN are set out in the following table.

Asset Class	Current standard lives (years)	Proposed standard lives for new investment
Trunks	80	50
High pressure mains	80	50
Meters/meter reading devices	20	15
Medium pressure mains	50	30
Medium pressure services	50	30

The proposed changes were supported by the majority customers during consultations undertaken by JGN on this matter.

An important feature of the JGN proposal is the adjustment to standard asset lives only applies to new investments undertaken within the 2020-25 regulatory period and so is intended to impact on the incentive for new investment. It has not proposed a change to the asset life for any investments made prior to the 2020-25 regulatory period. The implication of this being that:

- The depreciation rate and profile for any investments that have been undertaken prior to the start of the new access arrangement period remain unchanged. This means that there is no change to the allocation of risk between JGN and its customers recognising that JGN retains any heightened stranded asset risk inherent in investments undertaken prior to the forthcoming regulatory period without any corresponding compensation.

- The investments that are subject to the shorter-asset life is relatively narrow as it only applies to investments undertaken over a relatively short 5-year regulatory control period.

- The asset lives for any new investments undertaken over this 5-year period are not locked in beyond this next regulatory period. That is, if new information over the next five years reveals that asset lives for these investments should be longer or shorter, this adjustment can be made at the subsequent access arrangement determination.

- The choice of asset lives for the forthcoming regulatory control period does not imply the same asset life is applied for any new investment forecast in a subsequent regulatory control periods. Instead, it will be open to JGN to propose an economic asset lives for any investments undertaken for the period beyond 2025 and for the AER to decide if that proposal is consistent with the requirements of the Rules.

3. Economic principles and stranded asset risk

3.1 Introduction

This chapter sets out the relevant economic considerations for the treatment of stranded asset risks. It addresses why this is a risk to be concerned about, and how it can be managed in both competitive markets and in economic regulation. We conclude the chapter by identifying why the proposal put forward by JGN is consistent with the economic case for managing stranded asset risk.

3.2 What is stranded asset risk and what is its effect?

3.2.1 Stranded asset risk

Stranded asset risk refers to the potential that investors will not be able to recover all the amounts that have been invested – including a normal rate of return – over the life of an asset. The particular form of stranded asset risk that we deal with in this report is where the demand for the services of a particular asset falls to the point where it is no longer possible to recover costs, which may occur through technological change that reduces the relative cost of substitute technologies, a change to consumers' preferences away from the services of the asset in question, government policy measures, or a combination of these.[13]

As the terminology suggests, stranded asset risk refers to an uncertainty in future returns – it is only if a certain event occurs that cost recovery from that point will be limited. It follows that there will also be a commensurate potential that costs will be fully recoverable, this is the nature of risk. A further point that we would observe upfront is that stranded asset risk is by its nature a "downside" potential effect on returns that is not accompanied with any offsetting "upside" potential.

The principal effect of stranded asset risk for a business that is subject to cost-based regulation is that the business will not expect to recover the cost of their investments, assuming there is no change made to how prices are regulated. That is, the familiar NPV=0 objective for setting regulated prices will not be met. It is important to note in this regard that while the rate of return that is factored into the calculation of regulated prices compensates for risk, it does not provide compensation for losses that may be associated with stranded asset risk. Rather, the WACC for the variation in returns around

[13] For a regulated business, stranded asset risk would also arise where the regulator is expected to remove assets from the regulatory asset base (RAB) in certain circumstances (for example, if utilisation were to fall), even though the costs would be recoverable from customers if this was permitted (this latter cause of stranded asset risk is often referred to as "regulatory stranding"). The focus of this report is on stranded asset risk that is caused by factors external to the regulatory regime. We observe that the AER has not foreshadowed removing assets from the RAB where utilisation falls. Nevertheless, this is not without precedent for gas pipelines in NSW as IPART reduced the RAB value of assets for the NSW gas pipeline network following the inability of the then-owner AGL and the developers of the Eastern Gas Pipeline to agree terms of third party access to the AGL network, which led to the Eastern Gas Pipeline duplicating part of the AGL network. Therefore, it is something businesses may remain alert to.

the average value, and implicitly assumes that all forecasts reflect their expected (probability-weighted) values.[14]

3.2.2 Importance of the expectation of cost-recovery

The proposition that regulated prices should be derived such that regulated businesses expect to recover the costs they incur including a reasonable ("commercial", "competitive" or "normal") rate of return – at least where those costs pass reasonable hurdles for prudence and efficiency – is a central plank of cost-based regulation as conventionally applied, for a number of reasons.

First, to the extent that firms do not expect to recover cost – and hence expect to achieve a normal return on investment – then investing in the regulated activity will yield poorer returns than available in alternative activities when adjusted for the relative risk. It follows that the firm would no longer have a financial incentive to invest in the regulated activity,[15] but instead would have the incentive to reduce this to the extent possible. The expectation of earning returns below the cost of capital would not be expected to lead to an immediate cessation of investment given that some investment would be driven by various regulatory requirements and some is required to provide existing services,[16] the incentive not to invest nonetheless would be expected to lead to a number of undesirable outcomes, including:[17]

- cessation or deferral of discretionary projects, which may include projects associated with extending the network to new areas or improvements to existing services
- a substitution from capital expenditure to operating expenditure where this is possible,[18] even where this comes at higher cost to customers
- a deferral of asset replacement where possible, and a possible increase in the risk of outages, and

14 The proposition that the WACC when estimated in a conventional manner does not compensate for stranded asset risk has been well-accepted by finance experts and regulators and so is not expanded upon further here. For further discussion see AER, 'Discussion paper, The allowed rate of return, compensation for risk and the use of data when judgement is required', February 2018, p.93, and AER, 'Discussion paper, Equity Beta', March 2018, p.29.

15 In economics, the cost of investing in one activity is defined in terms of the returns that are forgone by not being able to invest in an alternative activity and earn the returns expected therein (after adjusting for relative risk), hence the term "opportunity cost of capital" or cost of capital for short. Thus, if the returns from investing in a particular activity would not be expected to generate a return that is at least as great as available elsewhere (after adjusting for relative risk), then those returns are said to be lower than the cost of capital.

16 That is, there will be capital expenditure required to maintain existing levels of service that would be undertaken even if the incremental costs were not fully recovered because the investment is required to avoid the even larger loss that would arise if the existing services could not be provided.

17 It also follows from this that the fact that a regulated business may continue to invest 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.

18 There may also be an incentive to substitute capital expenditure from items that have a high capital cost but long life or low operating expense to lower capital cost items with a short life or high ongoing cost, even if this raises overall cost to customers.

- a general reduced preparedness to investigate or explore new initiatives that may require investment.

Secondly, providing the expectation that regulated business will be able to recover their costs (at least if reasonable hurdles for prudence and efficiency are met) is a key part of the arrangements in utility regulation to secure a fair balancing of the interests between regulated businesses and their customers. That is, utility firms agree to undertake irreversible investment and recover that over an extended period and submit to service obligations, and in return are permitted to recover their costs. Similarly, customers are protected by ensuring that prices are limited to cost, those costs are spread fairly over time and reasonable service levels are assured. It could easily be the case that clear excursions from a fair balancing of interests in one utility sector could have implications for other sectors if investors view that the decision may signal how the regulator may consider similar issues for other businesses and/or sectors.

3.3 What mechanisms exist to provide an expectation of cost recovery in the presence of stranded asset risk?

3.3.1 Competitive markets

One feature of competitive markets that is in common with regulated sectors is that firms would only be expected to invest in projects where the return that is expected is at least as high as the return that is available elsewhere, after adjusting for relative risk. It follows that stranded asset risk must be managed in some manner,[19] although the means through which this risk is managed will differ between the sectors.

In many of the sectors that consumers deal with – where a firm undertakes an investment and takes on the risk of the price and quantity of sales – where there is material stranded asset risk then firms would be expected to defer entry into the market until prices had risen to a level that provided a normal rate of return after accounting for the stranded asset risk. The effect of this is that the market price would thereby "price in" the premium that is required to compensate *ex ante* for the prospect that a stranding event will occur and create a loss for a business. The size of the premium would be based on the probability of the stranding event occurring and the consequences that this would create. It also follows that if perceptions of stranded asset risk change over time, then market prices would also change as the trigger for entry or exit into the industry also changed.

An alternative to "pricing in" the stranded asset risk exists in competitive markets for services provided by means of large infrastructure assets. In this type of market, competition tends to exist prior to the assets being constructed, such that firms compete to build and own the assets, and where the results of the tender are then specified in a long-term contract. In this situation, the long-term contract serves to protect the customer (who may also make an irreversible investment) from the prospect the supplier may seek to revise the terms of the deal,[20] and also provide the supplier with the

[19] One point to note is that the potential for assets to be stranded – and so cause loss for the firm – assumes implicitly that the relevant asset is irreversible and so cannot be repurposed at no cost to another activity if technological change erodes the value of the asset in its current use. Thus, stranded asset risk is not an issue that arises in either textbook perfectly competitive or perfectly contestable markets (where investment is assumed to be perfectly reversible) and indeed only becomes a significant thing where an activity requires substantial irreversible (sunk) investment.

[20] This is often referred to as "hold-up".

confidence that it will be able to recover its cost, and so protect it from stranded asset risk. An outcome of this is that the customer would typically bear the risk associated with future technological change in the service it consumes,[21] and the provider thereby would be implicitly shielded from stranded asset risk.

In summary, the main conclusions that can be drawn from how competitive markets manage stranded asset risk are that:

- in all cases, for investment to occur investors must expect to earn a normal return after taking account of the potential for assets to become stranded, and
- the precise mechanisms through which stranded asset risk is managed differs across sectors, with two examples being that:
  - the required ex ante compensation for stranded asset risk becomes embedded in the market price as investors defer investing until prices are sufficiently high to compensate for stranded asset risk, or
  - customers bear the stranded asset risk, which occurs in instances where customers sign a long-term contract for the services they require and so implicitly forgo the opportunity to switch providers and so avail themselves of new options should these emerge.

3.3.2 Managing stranded asset risk for regulated entities

The discussion above leads to the conclusion that for economic regulation:

- efficiency will be promoted by ensuring there is an incentive for (efficient) investment, and
- the mechanism for providing this incentive is to allow a recovery of efficient costs incurred.

This means that economic regulation needs to permit an expectation that a normal return can be earned. There are two primary ways for this to be achieved in regulation in the context of stranded asset risks:

- remove, or substantially reduce, the prospect of a stranding event occurring, or
- allow the stranding risk to remain with the regulated business but compensate the business for bearing this risk.

We discuss these options in the remainder of this section.

Remove stranded asset risk

Removing (or, in practice, reducing to a level that is immaterial) stranded asset risk for businesses means that they are insulated from the risk and so no further compensation is necessary. Achieving this requires that invested funds are recovered at a sufficiently fast rate so that there is certainty (or, in

[21] That is, the buyer would commit to buying the relevant service from the provider at the price and for the term specified in the long term contract, irrespective of whether technological change meant that an alternative technology would provide a lower cost alternative part-way through the contract term.

practice, no material uncertainty) that costs will be recovered. This is akin to the competitive market approach described above where the customer signs a long-term contract to purchase the relevant services and so implicitly accepts stranded asset risk. The lever used when cost-based regulated prices to alter the period over which funds invested are returned to investors is regulatory depreciation.

Specifically, the removal of stranded asset risk requires depreciation to be sufficiently front-ended that:

- where there is a risk that use of the assets may cease after a point in time in the future, costs would be fully returned prior to that time, and with the profile of depreciation over the intervening period such that there is no material risk to those costs being recovered, or

- where there is a prospect that the assets will continue in use but with a reduced scope for cost recovery after a particular period of time, capital is returned sufficiently quickly that there is no material risk that the costs remaining to be recovered at that future time will, in fact, be recoverable.

Two further points should be noted with the "remove stranded asset risk" option.

First, one of the important and desirable characteristics of using depreciation to manage stranded asset risk is that, while this measure changes the timing of cash flow to the service provider, it does not change its value (i.e., in present value terms). This means that advancing depreciation – even if unnecessary – would not provide a windfall gain to the regulated business, although by altering the time path of prices it could have implications for the efficiency of use of pipeline services and/or the perceived fairness of charges between generations of customers. This is discussed further in section 4.3 below.

Secondly, a decision to advance depreciation in one regulatory period need not be a permanent decision, but rather it is open for a review of the appropriate depreciable life of the relevant assets – together with other matters like the choice of depreciation method – whenever prices are reviewed. Thus, it follows that it is open to act in response to a potential future risk at an early stage when the opportunity for adjustment is greatest – but when the uncertainty about the risk is also likely to be at its greatest too – and adjust over time as more information becomes available. By acting early in this manner – but then adjusting as new information arrives – the adverse effects on investment can be avoided (i.e., which is affected by the nature of the regulatory regime at the time that investment are contemplated), but where the risk associated with getting the adjustment wrong is low.

Figure 1 demonstrates, via a stylised example, how such an adjustment may work. It is assumed in this figure that:

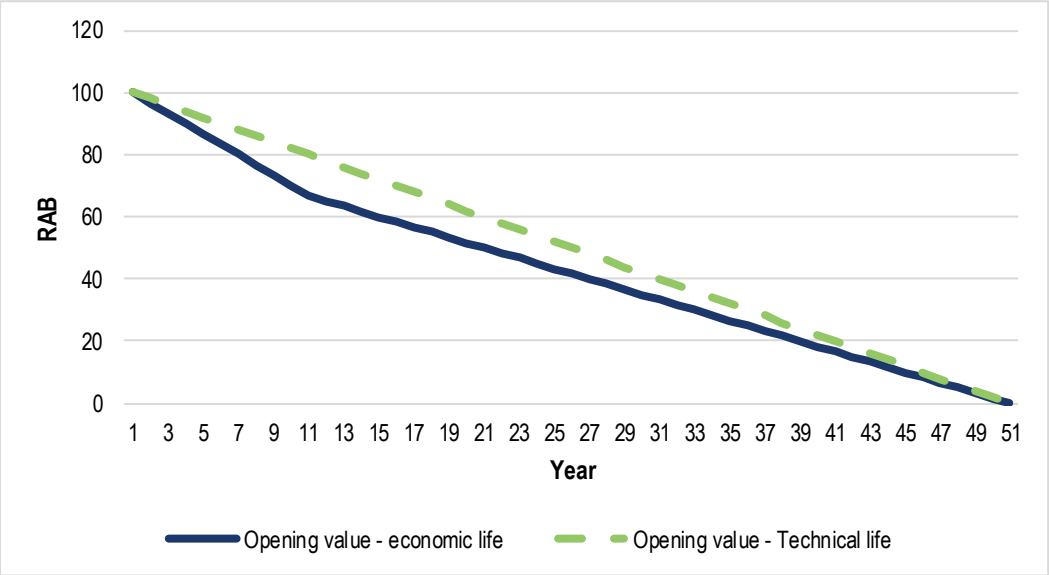
- the asset has an original cost of 100

- the asset has a technical life of 50 years, but a potential event may leave the asset unable to generate any further income after 30 years, and this belief persists for two regulatory periods (10 years), and

- after that 10 years there is new information that the stranding event will not occur, and the remaining asset life is adjusted back to reflect its remaining technical life from that time forward.

In this stylised example, the asset value under accelerated depreciation would be 17 per cent lower compared to the situation where depreciation occurred over technical life.

Figure 1 – Profile of depreciation with and without a temporary advancement of depreciation



Compensating for stranded asset risks

The second option that is available in economic regulation is to provide the regulated business with explicit compensation on an ex-ante basis for the stranded asset risk it faces. The compensation would be paid based on the stranded asset risk remaining with the business, meaning that if asset stranding occurred the business would incur a loss. This solution is analogous to the market premium outcome of competitive market described above.

Providing ex-ante compensation for stranded asset risk is akin to an allowance as an insurance premium that maintains the expectation of earning a normal return in the face of a future asset stranding risk. The insurance premium that is paid in this case should reflect the probability of the estimated loss from the stranded event. Therefore, if stranding has only a low chance of occurring, say 5 per cent over a defined interval, the actuarially fair compensation for the event would be only 5 per cent of the estimated consequence of the stranding. If the stranding does not occur that they service provider will have kept the implicit insurance premiums (5 per cent of the consequences), but suffered no asset stranding. However, if asset stranding did occur, then the service provider would have to bear this consequence and would be left in the position of suffering 95 per cent of the stranding consequence. The implication being that the regulated business would have an incentive to take whatever steps it could to reduce the risk of stranding event occurring.

If the amount of compensation that is paid is perfectly estimated, in an ex-ante sense, customers would expect to be no better or worse off in an economic sense as a consequence of the ex-ante stranding compensation. However, the main limitation of this approach is that it is very difficult to accurately estimate the probability and consequence of a stranding event occurring. It requires an estimate of how likely it is asset stranding will occur, and then a view about when asset stranding is

likely in order to discern the expected consequences of it (that is, how much investment remains unrecovered). These are very difficult things to estimate with the degree of precision that would be necessary to avoid material windfall gains or losses arising.

Increase capital contributions

Capital contributions apply to new connections. Their purpose is to avoid existing customers subsidising the connection of new customers. As such, a charging system applies whereby connecting parties are required to pay upfront the incremental costs caused by their connection that are above the incremental revenue that is expected to be received over a certain period.

Capital contributions can be used to manage stranded asset risks by requiring connecting customers to make more of a contribution to the fixed costs of supply upfront. This in turn means that there is less cost to recover through ongoing charges.

One problem with increasing capital contribution requirements is the upfront nature of the charge may deter otherwise efficient connections proceeding, which may be magnified where decisions over whether to connect to gas are made by developers rather than the final customers. Deterring new connections would have the effect of reducing the base over which fixed charges are set, and so increasing prices.

A further difficulty with relying on capital contributions is one of fairness. That is, why should new connections be required to bear a greater burden of the fixed cost upfront than had applied to customer connections immediately preceding the change?

Higher fixed charges

Higher fixed charges were raised by at least one stakeholder to the AER as a potential means of addressing the stranded asset risks that had been identified by JGN. In this case the argument was that a more efficient price structure may reduce the stranded asset risk faced by JGN on the basis that the fixed costs of supply would be recovered through capacity charges that are not dependant on total use. As such, the contribution to fixed costs would remain stable irrespective of changes to average use over time.

Capacity charges are an effective way to preserve revenue stability in the face of declining average use, provided that the number of customers served is unaffected. However, we think that the ability of to address the asset stranding risks is limited.

First, raising fixed charges has the potential to encourage customers to disconnect from gas supply completely. Whilst the current structure accommodates a customer that may just want to have one appliance connected to gas, a higher fixed charge may encourage conversion of all appliances to electricity (at least as appliances are replaced). While the revenue from existing low-use customers may be low, as the incremental cost is also low, they nonetheless would be making a contribution to fixed costs.

Secondly, the key longer term stranding risk to JGN arises from government policy measures to cease the use of natural gas as a fuel, which would not be ameliorated by a change to tariff structure. Gas supply no longer an option. Further, customers are unlikely to want to pay a high supply charge merely to use gas for limited purposes such as cooking.

Exit fees

One further option that was raised in the consultation on JGN's proposal to manage stranded asset risk was to levy exit fees. In this case the proposal would be that customers pay a lump sum amount upon disconnecting from the gas supply that reflects an estimate of the amount of unrecovered costs associated with their connection. In this case the calculation would be similar to that undertaken for capital contributions except that the customer would be required to pay the difference between what revenue had actually been attributed to it compared to what was forecast to be required at the time of connection.

It is our view that this proposal would be difficult to apply in practice.

- First, there does not appear to be any clear means by which customers could be forced to pay large exit fees of this type under the current regime. Networks would likely severely under-recover the required amounts because customers would simply refuse to pay. This would particularly be the case for existing connections where no exit fee was identified upon connection.

- Secondly, it is likely to be an approach that would raise other concerns. For instance, there would be scenarios where disadvantaged customers could not afford to disconnect from gas due to the exit fee they would face. The application of a fee for switching from gas to electricity may also be considered anti-competitive.

- Thirdly, it is unclear how customers relocating, or disconnecting for short periods of time, could be managed under the scheme. The only way an exit fee may work is if it was charged up-front and then returned to customers only if they remained connected for a minimum duration of time. However, this then raises similar problems to those identified above with increasing capital contributions.

3.3.3 Preferred method – accelerate depreciation to remove stranding risk

In our view, the preferred mechanism for addressing stranded asset risk should be to advance depreciation, given that this option does not create the potential to create windfall gains or losses (i.e., under the "compensation" option) and does not suffer from the concerns that we identified with the other options above. In particular, we note that it should be acceptable to advance depreciation at a time when the uncertainty about future stranding events is higher than if compensation were instead to be applied given the absence of windfall gains or losses.

Having said that, we note that there are issues with the implementation of the advancing depreciation option that have arisen, which include:

- When should the option be implemented, and related to this, how certain should we be of the future stranding event before action is taken? And

- Is there a potential problem if the acceleration of depreciation leads to asset becoming fully depreciated prior to the end of their useful lives?

These issues are addressed in turn.

When should accelerated depreciation commence?

At the heart of this issue is the question of what burden of proof should be required before asset lives are adjusted. Inherent in this is the issue that whether a stranding event occurs and/or the consequences of that event inevitably will be inherently uncertain.

Our view is that economic and broader regulatory principles suggest that it is appropriate to respond to the prospect of assets becoming stranded if the risk is material, by which we mean that it is real but not necessarily fully understood. We say this for two reasons.

First, the economic problem that we identified with stranded asset risk in the presence of standard building block regulation is that, absent some form of adjustment, businesses will not expect to earn a normal return on new investment, which in turn may encourage investment to be dissuaded or distorted to the detriment of customers. Recall that the building block method of deriving regulated prices assumes that firms do not face any stranded asset risk. Deferring the decision over whether to recognise and adjust for stranded asset risk where the risk is real but uncertain will not remedy this incentive problem, especially given that a regulated businesses' alternatives and even bargaining power largely disappear once the (largely irreversible) investment is made.

Secondly, the consequences of getting the period and profile for depreciation wrong are asymmetric. That is, the profile could err on the side of either returning funds too quickly or too slowly, but the costs of returning funds too slowly are materially higher than the alternative. This asymmetry of outcomes occurs because there will become a point where it is too late to manage the stranding risk anymore and stranding is inevitable, either because the assets are no longer able to remain in service (e.g., natural gas use is banned), or the price of substitutes limits prices to below what would be required to recover cost. Thus, looking at the alternatives:

- If there is a bias towards early action, then if the stranding risk eventuates the business will recover its costs. If, however, the stranding risk does not eventuate, the opportunity exists to dial back the rate of depreciation from that point (or even to cease depreciation for a period). Prices to customers would have been temporarily higher than would have been the case with perfect foresight, but would be lower afterwards (the regulated business would not make a windfall gain). The benefit to customers from these higher prices is the preservation of the incentive to invest, without which prices may have been higher than otherwise,[22] or projects of benefit to customers may not have taken place.

- Conversely if action has been delayed and new information confirms a material and material stranded risk exists, there is a prospect that it will then be too late to remedy the problem and that full cost recovery is not possible.

The implication of this is that action to remove asset stranding risk should only be delayed where there is compelling evidence that stranded asset risk does not exist or is not material.

[22] For example, discretionary growth-related projects may permit fixed costs to be spread across a larger number of customers.

Is there a problem with assets becoming fully depreciated?

We note that some have raised concerns that returning funds too quickly may distort the incentives for investment, specifically that it will drive suppliers to replace assets sooner than is efficient. The concern raised appears to be that assets may become fully depreciated even though they may continue to be used and this may cause the regulated business to want to replace the assets prematurely to raise its financial investment in the activity.

In our view, this concern does not have a solid base.

First, as we explained earlier, the decision to accelerate depreciation for particular assets is not something that need be locked-in for future regulatory periods, and indeed as we explain in the next chapter the Gas Rules encourage the economic life to be re-evaluated at each review. Thus, to the extent that new information arrives that suggests assets will have a continuing life, then they should not become fully depreciated.

Secondly, even if assets were to become fully depreciated, it is difficult to see that a regulated business would have a financial incentive to replace assets prematurely. Replacing assets requires capital expenditure to be incurred, for which the regulatory return would be earned. If the regulatory return matched the true cost of capital, then the regulated business would be neutral towards the new investment, to the extent that any uncompensated stranded asset risk remained the incentive for the business would be to avoid any unnecessary investment, and the operation of financial incentives for cost minimisation should then further discourage any investment that is not necessary.

Thirdly, even if the regulated business for some reason wanted to undertake unnecessary replacement expenditure, then regulators typically have a range of tools to minimise this risk, including ex ante assessments of capital expenditure proposals, the provision of financial incentives for regulated businesses to minimise all costs (noting that a "capital expenditure sharing scheme" now applies to JGN) and ex post review of the prudence and efficiency of expenditure that has been undertaken, which are all empowered in the Gas Rules.

Moreover, turning to the facts of the JGN application, as we discussed in Chapter 1, whilst there is a prospect that some of JGN's assets will have a life that extends past the time when net zero carbon emissions are achieved, this will not be a situation of "business as usual".

Rather, there will be a need for substantial capital expenditure to make the networks hydrogen ready (noting that many high pressure steel mains would need to be replaced or upgraded), a substantial effort will be required to progressively decommission the natural gas network and commission hydrogen (noting that the latter will require customers to have replaced their appliances so that they can run on hydrogen) and the numbers of customers served and their average volumes are likely to be far lower than what would have been the case without the need to switch to hydrogen.

It follows that if a regulated business at this time wished to spend money to expand the RAB then there would be ample opportunity to do this via necessary expenditure, and moreover that stranding risks at this time would remain material.

3.4 A further issue – impact on the time profile of prices

Subject to the cost recovery objective being achieved, the other key economic objective for depreciation is that the profile for cost recovery promotes the efficient use of the assets,[23] and a further regulatory objective is that the profile of recovery be judged fair from an intergenerational perspective.

Efficient pricing occurs where prices signal to consumers the relative scarcity of the resources used to provide the service. The objective being that consumers are encouraged to consume only when the benefits they derive from consumption exceeds the costs of providing the service. This also then sends a signal to suppliers that it would be efficient to expand capacity when demand is growing.

For gas pipelines, an efficient price is one that reflects the cost of supplying an additional unit of consumption – which is the marginal cost. However, pricing in this manner would leave a substantial share of cost unrecovered (referred to below as the "residual" costs). The aim then is to recover these costs 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 recovery of the residual costs are spread over time.

To date it has been assumed that (i) targeting prices that remain approximately constant in real terms over time would be expected to provide for the most efficient spreading of residual costs over time, and (ii) straight line depreciation over the technical lives of the assets will achieve this in approximate terms. However, the current dynamics in the gas markets provide reason to question both of these assumptions.

First, the projected decline in the rate of consumption per customer means that the continued use of straight-line depreciation may not deliver a constant price in real terms so that an efficient spreading of residual cost would imply more accelerated depreciation. Moreover, the projected increasing competitiveness of electricity as a substitute for gas would suggests that a price path that declines in real terms – and so reacts to the increasing price sensitivity of gas consumption over time – would be efficient.[24] This increasing demand sensitivity would suggest that allocative efficiency would be advanced by increasing the portion of residual costs that are recovered earlier (i.e., targeting a trajectory of prices that is declining over time).

Secondly, in conjunction with the above point, even if it is assumed that a conversion to hydrogen occurs, then substantial costs will be incurred at the time to convert the pipeline network to one that is suitable for hydrogen. Moreover, the process of conversion to hydrogen would be likely to see a reduction in the number of customers served given that it may not be economic to reticulate hydrogen to all areas currently served by natural gas, and because there is the prospect that, as customers will be required to install new appliances if reticulated hydrogen eventuates, at least some will decide to convert to electrical appliances instead.

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23 A further objective for depreciation that is not relevant in this instance is that the depreciation method generate a cash flow that supports the financeability of the regulated activity.

24 That is, if the price sensitivity of gas consumption is expected to increase over time then the loss in allocative efficiency (i.e., demand that is dissuaded even though the marginal benefit of consumption exceeds the marginal cost) from a 1 per cent increase in price today would be lower than the allocative loss from the NPV-neutral price increase at a future time, in which case advancing depreciation would raise allocative efficiency.

Thirdly, the discussion above focusses only on the transportation component of the natural gas supply, whereas the efficiency of use of the gas pipeline will depend on the combination of movements of all components of the delivered gas price. To this end, the discussion in Chapter 2 noted that:

- the price of natural gas is projected to continue to increase materially over time, and
- if reticulated hydrogen does become efficient, the cost of the commodity component is projected to be materially higher than the cost of natural gas.

These projected movements in the price of the gas commodity provide further reason to advance the recovery of capital for the gas pipeline network, that is, to provide a greater capacity for customers to be able to absorb these future cost increases.

Thus, our view is that it is plausible that the current gas dynamics would provide a reason to accelerate depreciation even if the stranding risks were not considered material.

Lastly, in relation to intergenerational fairness, whilst we note that this is not an economic concept and further that this is a multifaceted concept, there are aspects of JGN's proposal to advance depreciation that we would expect to advance intergenerational equity, in particular:

- the proposition that a greater contribution to the network should be secured during times when the use of the assets is at their greatest, and
- that it is valid to use the pattern of recovery of network costs to ameliorate the potential for price increases to future generations arising from an increase in the cost of the gas commodity, and especially to smooth the transition to hydrogen given that the need to make such a transition is to remedy environmental issues that are the result of current and past generations.

3.5 Assessment of JGN proposal against economic principles

It is our opinion that the proposal put forward by JGN to manage the forecast stranded asset risks is consistent with economic principles and good regulatory practice as set out above. We take this view for the following reasons:

- The proposal is to set the asset life for capital expenditure undertaken in the next regulatory period at the longest period over which it has some certainty that cost recovery will be possible (i.e., aligning with the NSW Government target of "net zero" by 2050). In our view, there is a reasonable basis for JGN's view that cost recovery may be restricted to this period, and hence that its proposal is necessary to ensure that incentives for investment are not compromised. Moreover, its proposal relies on using depreciation as the mechanism for managing stranded asset risk, which we consider to be the preferred mechanism against the options as it is NPV-neutral to the regulated business and customers (i.e., it will not create the prospect of windfall gains or losses for JGN or its customers).
- The investment that the proposal aligns to is reasonably narrow. It only applies to investment that occurs over a 5-year period between 2020 and 2025. This has the advantage of allowing a broad range of options to remain open to JGN and the regulator in the future while maintaining the incentive to invest over the next regulatory period. Specifically, if new information reveals that the economic life the assets is longer or shorter than first thought this adjustment can be made. It

also means that any new investment that occurs beyond 2025 can apply an updated economic life based on the most up-to-date information. As such, decisions taken for this forthcoming period are not 'locked-in". The decision to apply a shorter economic life for investments undertaken within the 2020-25 period is therefore a 'no regrets' option.

- There is no reason to believe that applying a shorter asset life for investments made over a 5-year period will create an incentive for excessive investment should the actual economic life of the assets prove to be longer than forecast (e.g. early replacement). As indicated above, to the extent that the conversion to hydrogen does proceed the opportunity exists to reduce the rate of depreciation once this prospect becomes more certain (and so avoid assets becoming fully depreciated before the end of their useful lives) and, even if assets are fully depreciated there is no reason to assume that JGN will have an incentive to over-invest, and there are regulatory measures to prevent this in any event.

- The acceleration of depreciation may also advance the allocative efficiency of cost recovery over time in light of the projected declining demand, costs of converting to hydrogen if this were to proceed and the increasing degree of competition from electricity for the energy services provide via reticulated gas.

4. Application within the existing regulatory framework

4.1 Introduction

In this chapter we describe the formal guidance and requirements of the regulatory framework for gas pipelines that are relevant to the consideration of stranded asset risk, and explain what we think those provisions mean for JGN's proposal. Our principal conclusion is that the high-level guidance and detailed provisions in the Law and Rules guide one to applying economic and regulatory principles that are materially the same as we discussed in the previous chapter, and so our main findings and conclusions are the same as those we reached earlier, and we cross-reference that earlier discussion where relevant.

We first consider the overarching objectives and principles for gas pipeline regulation in the National Gas Law. We then consider whether JGN's proposed solution to managing stranded asset risk is consistent with the requirements of the Rules.

4.2 Overarching objectives and principles

4.2.1 National Gas Objective

The objective of the National Gas Law is:

> *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*

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

- the requirement to promote economic efficiency with respect to investment, operation and use
- the reference to the long-term interests of consumers, and
- the requirement that the above instruction be focused on the price, quality, safety reliability and security of supply of natural gas.

A common interpretation of the first two components are they essentially lead to the same outcome, namely that the long-term interests of consumers will be promoted by targeting economic efficiency. Therefore, it is apparent that a key focus of the NGO is to promote efficiency, and with particular attention drawn to efficient investment. As has been identified above, the capacity and incentive to invest 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. Consequently, in circumstances where stranded asset risks are heightened, shortening the life of investments as proposed by JGN supports the recovery of cost, and so the motivation for continued investment when it is efficient.

The NGO also includes a focus on efficient use and that, among other things, this be promoted for the long-term interests of consumers with respect to price. As we explained in the previous chapter, one implication of a change in regulatory depreciation is to alter the time-path of prices to customers,

which in turn may affect the efficiency of use of the pipeline and the intergenerational equity of the pricing outcomes, and further that JGN's proposal is likely to:

- enhance the efficiency of use of the JGN network, and
- advance the intergenerational equity with which pipeline costs are recovered.

4.2.2 Revenue and Pricing Principles

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

The RPP are highly relevant to the approach taken to depreciation and the management of stranded asset risk. This is because they provide a direct instruction that regulated businesses be provided with a reasonable opportunity for cost recovery. In addition, they seek to ensure an expectation of earning of at least a normal return, and that the regulator has regard to the costs and risks associated with under-investment.

The key provisions of the RPP that are relevant when considering how to act where there is a future prospect of asset stranding are summarised as follows:

- A regulated network service provider should be provided *"with a reasonable opportunity to recover at least the efficient costs"* the operator incurs.[25] If an impending threat to future cost recovery exists, as has been put forward by JGN, and action is not taken within a sufficient period of time, this principle cannot be met. Action that seeks to align the recovery of costs with the economic life of assets is, however, consistent with this principle.

- A price or charge for the provision of services should allow *"for a return commensurate with the regulatory and commercial risks involved".*[26] If the regulatory approach does not permit that capital invested is returned to investors, it is clearly not possible for JGN 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. The proposal from JGN is aimed at allowing it to recover efficient costs and so earn a normal return on investment.

- *"Regard should be had to the economic costs and risks of the potential for under and over investment"* by a regulated network service provider.[27] Returning capital invested to JGN earlier than otherwise does not mean that it earns a higher return; again, it is NPV neutral. Therefore, given the asymmetric consequences of not taking early action where stranded asset risk is a prospect, there is little reason to be concerned that returning capital earlier than otherwise would lead to over-investment by a service provider. Further, as was discussed above, there is little reason to believe NSPs would have the incentive or capability to over-invest in the network purely due to capital being returned sooner than otherwise. Conversely, however, where businesses perceive there is a material risk of cost being unrecoverable, this is likely to have

[25] Section 24(2) of the NGL.
[26] Section 24(5) of the NGL.
[27] Section 24(6) of the NGL.

detrimental impact on the incentives for investment, and so a consequent risk of under-investment.

4.3 National Gas Rules

4.3.1 General structure of the regulatory regime

As we discussed in Chapter 2, the structure of the gas regulatory regime for gas pipelines varies materially to that for electricity, which in turn affects the approach that is taken to matters such as depreciation. Electricity networks, while they have differences, are far more homogenous than is the case for gas pipelines. For gas pipelines there is first a genuine question about whether regulation should apply, whereas regulation is assumed for electricity. Electricity use is ubiquitous across Australia, whereas the penetration and use of gas varies greatly across systems. In Victoria there is high penetration with high use for heating. Conversely, in NSW there is much less penetration and much less demand for gas heating. In addition to this, supply factors also impact on gas systems more than electricity. Electricity constraints are relatively easy to build out, conversely, for gas it can be constrained due to limitations at the source of gas and considerable difficulties in achieving interconnection across systems.

The differences impact on the approach to the rules and regulation is a number of ways. Most relevant in this case is that far more flexibility is provided to tailor the approach taken to regulation for individual pipelines than for electricity where there is a high amount of codification in the Rules. This reflects that the individual circumstances of a pipeline can have a more material impact on the efficient application of regulation than is likely to be the case for electricity and that an approach taken for one pipeline may not be suitable for other pipelines. Conversely, for electricity NEM-wide approaches tend to be common and appropriate. The difference in approach is evident in a gas pipeline regulatory decision being an 'access arrangement' whereas for electricity the access arrangement provisions are largely set out in rules, with the regulatory decision being a determination of the application of that arrangement.

4.3.2 Depreciation criteria

The arrangements in the gas Rules for the approach to be taken for depreciation are as follow:

> **89 Depreciation criteria**
>
> *(1) 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*
>
> *(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), an 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.

(2) Compliance with subrule (1)(a) may involve deferral of a substantial proportion of the depreciation, particularly where:

(a) the present market for pipeline services is relatively immature; and

(b) the reference tariffs have been calculated on the assumption of significant market growth; and

(c) the pipeline has been designed and constructed so as to accommodate future growth in demand.

(3) The AER's discretion under this rule is limited.

Note:

See rule 40(2).

We will now address each of these requirements in turn.

Rule 89(1)(a)

A depreciation method that is directed to encourage a time-path for reference tariffs that are consistent with the efficient growth in the market for services has two implications for the current matter.

First, this criterion is guiding 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" in section 3.4. As we noted in that section, an important role for regulatory depreciation is to ensure that what are essentially fixed costs are spread over time in a manner that encourages the efficient use of the pipeline (i.e., growth that is consistent with efficient use, or – if relevant – to ensure that "negative growth" is consistent with efficient use). As we concluded in section 3.4, we think there are good grounds to believe that the advancement of depreciation would improve the efficiency of use of the JGN network:

- *Considering network costs alone* – putting aside for now the implications of carbon abatement policies, the combination of the forecast decline in use per customer of natural gas, and the likely increase in the degree of price sensitivity of gas consumption in the future (i.e., as electricity becomes an increasingly competitive energy source for traditional gas uses), means that it is likely that allocative efficiency would be improved by bringing forward the recovery of capital. In addition, it was also noted that the best case for the continued use of the JGN network over the long term is that the distribution of hydrogen becomes efficient, but even in this case substantial network expenditure would be required to convert natural gas networks to hydrogen networks. Advancing the recovery of capital – and so creating scope for these additional costs to be absorbed – would be likely to advance further the efficiency of use of the gas network.

- *Considering the delivered product* – we also noted in section 3.4 that an analysis of the efficiency of use of the pipeline network requires a consideration of all elements of the supply chain, as all

> elements in combination dictate how a customer uses the network. Further, we noted that (i) even putting aside carbon abatement measures, the price for natural gas is expected to continue increasing relative to the price of substitute energy forms, and (ii) as noted above, the best case scenario for a gas distribution network in a carbon neutral economy is that distributed hydrogen proves to be commercial, but in that circumstance the cost of the commodity will be substantially greater than natural gas. As such, we explained that the efficiency of use of the gas network would be improved by advancing the recovery of network costs and so creating a greater scope to accommodate the projected future increase in the cost of the gas commodity.[28]

Secondly, it can be observed that a key contributor to the efficient growth in the market for services is that the incentives exist for regulated businesses to make the investment that is necessary to support that growth. As we concluded in Chapter 3, absent some means of managing stranded asset risk the incentive for investment will be harmed, and so the prospect exists that the investment required to support the efficient growth in the market may not occur. This is particularly the case with respect to efficient expansions of the gas network for which the supplier may have more discretion over when (or indeed whether) to undertake these projects.

Rule 89(1)(b)

Rule 89(1)(b) provides that the depreciation schedule should be designed *"so that each asset or group of assets is depreciated over the economic life of that asset or group of assets"*. The term "economic life" refers to the life that an asset is expected to remain in service, which may differ to the asset's technical life if the useful life for the asset is expected to be curtailed earlier as a consequence of technological change (i.e., it becomes efficient to replace the asset at an earlier time because a superior technology exists) or the market served by the asset is expected to cease prior to the asset reaching the end of its technical life. Thus, this rule requires a holistic assessment of the factors that are likely to affect an asset's useful life.

We observe that the useful life for an asset can never be known with certainty because it will be dictated by factors that are inherently unknowable (like the rate of technological change and changes to government policy), and so the best that can be arrived at are scenarios for the economic life and possible views on the likelihood of each. This raises the question of what should be applied as the economic life – should it be some form of expected (i.e., probability weighted) value for the economic life, or some other value? As we have explained earlier, an important outcome for the regime – which is promoted by the National Gas Objective and Revenue and Pricing Principles – is that incentives are provided for efficient investment, which in turn requires stranded asset risk either to be compensated or removed. As the regime does not include compensation for this risk, it necessarily follows that preservation of investment incentives requires the risk to be removed. This, in turn, would dictate that the economic life applied should reflect the minimum life over which there is substantial confidence (or, stated alternatively, no material risk) that the asset will remain in useful service, given the information available at that point in time.

If, as has been put forward by JGN, there is a material risk that the economic life of the assets will be shorter than their technical lives, imposing shorter asset lives for regulatory depreciation is justified and permitted by the Rules.

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[28] We also concluded that pre-empting these future costs now is likely to advance intergenerational equity.

Rule 89(1)(c)

In Chapter 3, we observed that it is appropriate to refine the depreciation settings over time as new information becomes available. As a consequence, we remarked that JGN's proposal should be viewed as a proposal to change the economic lives for capital expenditure that is undertaken during the next access arrangement period that is applicable only for the next access arrangement period, and with the option to reassess the economic lives for these assets – and for capital expenditure that is undertaken in future periods – in future access arrangement periods as new information becomes available. The effect of Rule 89(1)(c) is to dictate that this refinement of lives over time should be undertaken.

Turning to JGN's proposal, this rule provides a firm basis for assuming that where new information reveals that a longer economic life may be realistic (for example, because the prospects for hydrogen become more certain), adjustments will be made to the asset lives for any investments made within the 2020-25 period as well as those undertaken in future periods. This flexibility, in turn, should encourage early action in the face of future uncertainty to avoid a position whereby assets may be stranded and so preserving the incentive to invest, as JGN has proposed.

Rule 89(1)(d)

The main purpose of this rule is as a check on the integrity of the depreciation calculations, and to reinforce that a key feature of the gas regulatory regime precludes revaluations of assets that are not properly taken into account when deriving the revenue requirement.

JGN's proposed changes to the lives of certain assets meet the requirements of this rule.

Rule 89(1)(e)

This rule envisages the use of depreciation as a tool to address the cash flow needs of a regulated business.

JGN's application does not rely upon this clause to justify its proposal.[29]

[29] Equally, JGN's proposal is not antagonistic to this provision. If JGN's assets were to become stranded in the future, or if the RAB needed to be reduced substantially to be recoverable if hydrogen becomes economic, then JGN would need to have reduced its debt and also repaid principle to equity providers in order to be consistent with the returns to debt and equity providers that would be generated in the future. Thus, JGN's cash flow needs during the intervening period would have increased.

5. Examples of managing stranded asset risks in regulation

5.1 Introduction

The purpose of this chapter is to set out some examples of where regulators have taken action to manage stranded asset risks, and specifically where decisions have been made in a period where stranded asset risks were subject to substantial uncertainty. This chapter will show that the approaches that have actually been applied by regulators have been consistent with the economic case for managing stranded asset risks.

Further, the chapter also demonstrates a pre-disposition to regulators taking early action on managing stranded assets given the asymmetric consequences of inaction.

The examples identified in this chapter are taken from New Zealand, the United Kingdom and Australia.

5.2 New Zealand Fibre Network

New Zealand is rolling out ultra-fast broadband in the form of a fibre optic cable network. The right to build and own the network was established via a competitive tender process and initial investments have been made based on that tender process. The next stage is for the development of the rules for ongoing economic regulation of the network, known as the Input Methodologies, under a building block form of regulation. In developing these rules the economic regulator, the Commerce Commission, has considered how it should treat stranded asset risks that exist with respect to the fibre network. In this case the stranded asset risks mainly arise from the threat of alternative technologies.

For Chorus, the main fibre network provider in New Zealand, the Commerce Commission has stated in its draft reasons for the new Input Methodologies that several measures are warranted to manage stranded asset risks. These measures include depreciation, specific compensation and retaining some assets in the RAB (and paid for by other customers).[30] The Commerce Commission summarised its position as follows:

> *3.1300 For type II asymmetric risk associated with asset stranding, our draft decision allows for stranding risk to be mitigated by allowing businesses to retain some stranded assets in the RAB, allowing firms to reduce asset lives or provide for an alternative depreciation path as well as by providing a small ex-ante allowance.*

The Commerce Commission explained its decision to provide for ex-ante measures to address stranded asset risk by having regard to the need to maintain an expectation of a normal return[31] and to motivate efficient investment:

> *3.1309 Stranding risk can affect the way a revenue cap functions. The problem arises where revenue is lower in one regulatory period and regulated providers subject to PQ [price and quality] regulation cannot generate sufficient revenue the following regulatory period, even*

30 The "retain assets in the RAB" option is intended to apply to the situation where some customers are lost to competitors, but sufficient customers remain to permit all costs to be recovered.

31 Financial capital maintenance, or FCM, is the terminology used by the Commerce Commission and is used by it to mean the same thing as NPV=0.

> *though we allow it. This may occur where the regulated fibre service provider no longer has the market power or end-user base to do so. This creates an asymmetric risk which is not compensated for in cash flows without adjustment. As such if stranding risk is material and no ex-ante adjustment is provided, the revenue path will fail to provide for ex-ante real FCM and would harm the outcome in s 162(a) of the Act, which promotes regulated providers having incentives to invest.*

Specifically with respect to the approach to depreciation, the Commerce Commission explain how it can be used to manage stranded asset risks as follows:

> *3.1335 If we know an asset will be stranded in five years' time, bringing depreciation forward, by reducing asset lives to five years, can allow full recoupment and eliminates the stranding risk. In practice, neither we nor the regulated providers know with certainty the extent of risk or the timing of the risk. However, as a general principle, bringing cash flows forward mitigates this risk, and may do so to the point it is no longer material. This can be achieved through:*
>
> > *3.1335.1 Shortening asset lives (and therefore, shortening the depreciation profile).*
> >
> > *3.1335.2 Changing the depreciation profile (and hence reducing the asset value subject to stranding risk).*

The Commerce Commission went on to identify how shortening asset lives is a natural way to manage stranded asset risks in an NPV neutral way. It also noted that the characteristics of the market for fibre services in New Zealand means that some stranded asset risk remains even where flexibility is provided for depreciation, although this has less relevance to the situation of JGN.[32] It noted that by the time stranding becomes imminent, it would typically be too late to react (addressing ex ante compensation in particular), stating:

> *3.1421 We also considered delaying this decision to a later date, effectively allowing for an allowance but setting an initial value of zero. Delaying this decision is proposed by Spark who notes the uncertainty of any such estimate and whether there is any substantive stranding risk. Spark also note the tight timelines for setting the IMs and the potential impact to end-users from increasing prices.*
>
> *3.1422 However, this is a core decision in the regulatory package, goes directly to one of our core economic principles and our consideration of the outcome in s 162(a) of regulated providers having incentives to invest. Delay would result in greater uncertainty. We consider that we are likely to best give effect to the purpose of the IMs in s 174 and the purpose of Part 6 in s 162 by reaching our best view of the appropriate allowance now.*
>
> *3.1423 We also took into consideration that the nature of asset stranding means that one can never have a precise estimate of its likelihood until the stranding is about to occur. When*

[32] The NZ fibre networks already face some competition from alternative telecommunications technologies (e.g., mobile / fixed wireless / existing HFC networks in some areas / apart from Chorus, existing copper networks) and so acting early with depreciation is only expected to reduce stranded asset risk, but not eliminate it. In contrast, the assumption behind JGN's proposal is that acting early with depreciation will remove the stranded asset risk in relation to the target capital expenditure, which we agree is likely.

stranding is imminent it is typically too late to provide ex-ante compensation and may not be possible to provide ex-post compensation (for example if there are insufficient end-users left to generate the revenue required to provide compensation).

5.3 New Zealand electricity networks

The Commerce Commission has recognised that there is a changing landscape that applies to the energy sector such that it is necessary to consider now how to respond to the potential challenges these changes might impose. In 2016 the Commerce Commission published its decision on how it intends to manage the implications of emerging technologies in the energy sector as part of the Input Methodologies.[33] The decision was mainly focused on electricity distribution networks but it also had recommendations that were relevant for gas pipelines.

In its review the Commerce Commission recognised that new technologies posed a risk to cost recovery for network businesses. The problem identified by the Commerce Commission appears very similar to the problem that JGN identified it is facing, namely that, depending on how the future unfolds, there may be an insufficient customer base to all for the full recovery of costs. Specifically, it stated:[34]

70. The problem: increasing deployment of emerging technologies potentially changes the risk to EDBs' ability to fully recover their invested capital, under existing physical asset lives assumptions set out in the IMs. These new technologies enable greater deployment of distributed generation or greater distributed electricity storage. Such technologies may enable:

70.1 more consumers to generate and store their own electricity; and/or

70.2 new competitors to enter the market and bypass distributors' networks.

71. As a result, an EDB's network may be used by fewer consumers and the EDB may not be able to fully recover the costs of its historic investment from its remaining consumers. We have assessed the potential change in this risk relative to what it was in 2010, when we first set the IMs.

72. The IMs allow for assets to stay in the RAB even though they have ceased to be used (ie, become physically stranded). Therefore, physical asset stranding is not the risk under consideration. Rather, it is the risk that the network becomes economically stranded. That is, the risk is that at some future point enough consumers elect to disconnect from EDBs' networks such that the revenue EDBs are able to recover from the remaining customer base is insufficient to allow them to fully recover their historic capital investment (hence the title 'risk of partial capital recovery'). This is because prices to those remaining consumers would need to rise beyond their willingness to pay given their economic alternatives (or beyond politically acceptable levels).

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33 Commerce Commission, 'Input methodologies review decisions, Topic paper 3: The future impact of emerging technologies in the energy sector', 20 December 2016.

34 Commerce Commission, 'Input methodologies review decisions, Topic paper 3: The future impact of emerging technologies in the energy sector', 20 December 2016, pp.32-33.

The Commerce Commission also noted that there was a high degree of uncertainty about the magnitude and direction of the risk of asset stranding. It identified that partial capital recovery was unlikely in the short term, but may be an issue over the longer term.

Despite there being a high degree of uncertainty about the potential for asset stranding the Commerce Commission clearly believed it was necessary to take action early. Its solution to the potential asset stranding problem was to allow distributors to shorten remaining asset lives at the next reset. It decided to cap how much asset lives could be shorted by 15 per cent. The Commerce Commission described its approach as follows:[35]

> *84. We have decided to implement a 'net present value (NPV) neutral' risk mitigation measure. We consider that the best way to reflect the higher uncertainty attached to the magnitude and direction of the risk of partial capital recovery is to allow EDBs to apply for a discretionary NPV-neutral shortening of their remaining asset lives. This would happen at the time of the DPP reset.*
>
> *85. This adjustment will be capped at a 15% reduction in remaining average asset lives as compared to the situation at the time of the DPP reset. EDBs may propose a smaller reduction, but the Commission has the final say over this quantum. We note that the IMs already allow EDBs to extend their asset lives.*
>
> *86. This solution changes our pre-review IM decision on asset lives to provide a mechanism for firms to elect new asset lives based on their assets' expected economic asset lives rather than their physical asset lives. These changes to the IMs will take effect at the next reset for EDBs.*

It is particularly relevant to note that in justifying its approach the Commerce Commission noted that shortening asset lives in the face of stranded asset risk would *improve* the profile of prices over time. This is because it would reduce the amount of capital that would need to be recovered in the future when demand was expected to be declining. It noted in this respect that not taking action now would increase the materiality of future adjustments needed.[36]

> *88. Our chosen solution mitigates the risk of potential future price shocks for consumers, which would likely be required to maintain the expectation of ex-ante FCM if (and when) the downside risk scenario becomes more likely. In that sense, this is a precautionary measure consistent with the nature of the problem – one of increased uncertainty.86 By allowing EDBs the option of a more rapid time profile of capital recovery, should the risk of widespread disconnections eventuate, the amount of remaining capital to recover at that time will be less than would otherwise be the case. Not permitting asset life adjustments now would risk increasing the materiality of any potential future adjustment to asset lives, if the risk becomes more likely. The resulting price shock would be larger, and we therefore consider that acting now is a prudent way for the IMs to reflect the changed environment. The Commerce Commission also recognised that adjusting the asset lives was NPV neutral, maintained an*

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35 Commerce Commission, 'Input methodologies review decisions, Topic paper 3: The future impact of emerging technologies in the energy sector', 20 December 2016, p.36.

36 Commerce Commission, 'Input methodologies review decisions, Topic paper 3: The future impact of emerging technologies in the energy sector', 20 December 2016, p.37.

> *expectation of earning a normal return on investment, and did not require customers to pay an unnecessary premium for this "precautionary measure".*

Finally, it is worth noting that the Commerce Commission took the view that reducing asset lives did not entirely mitigate the risks for distributors. Instead, it merely expanded their capacity to manage the risk:[37]

> *92. Our solution is only modest and partial. It likely does not fully mitigate the downside risk. This is intentional. EDBs ultimately bear the risk of economic network stranding (as opposed to asset stranding). They are therefore best placed, and have the strongest incentive, to manage this risk, for example through pricing (eg, to ensure uptake of solar PV is not inefficiently incentivised).89 Our solution expands their ability to mitigate this risk. We would expect EDBs to act if they genuinely see this risk increasing.*

5.4 Ofgem gas pipelines

Ofgem, like the Commerce Commission, has recognised that there is an impending threat of asset stranding due to factors outside of the control of network owners. Again, similar to the case in New Zealand, Ofgem has chosen to use depreciation as the main tool to address stranded asset risk. In this case, in its Overview document for its Final Proposals for gas distribution over the 2013-21 period (i.e. its final decision), Ofgem identified that it has front loaded deprecation in order to reduce stranded asset risks for gas businesses:[38]

> *6.9. We do not agree with the GDNs" views on our relative risk assessment, which we consider supports an assumption of the cost of equity of 6.7 per cent (real post tax). As part of both the RPI-X@20 review and the RIIO-T1 and GD1 price control review we commissioned two separate reports on the relationship between equity risk and duration of cash-flows. Drawing on these reports, we concluded that the difference between adding 50 percent of repex to the RAV and adding 100 percent (with transition over eight years) has no material impact on risk.* ***We considered the stranding risk as part of our asset life review, and we consider that we have mitigated any risk by introducing a front end loaded deprecation profile.*** *We also note that the efficiency incentive rate for GDNs is in line with the current incentive rate. We also consider the incentive rate in the context of overall gearing and our RORE analysis as opposed to an equity risk issue. [Emphasis added]*

The approached in the United Kingdom, however, appears to be retain the average asset life for the portfolio of assets despite front loading depreciation. Ofgem noted in a supporting document to its final decision that this approach had a positive effect on the profile of prices by decreasing the risk of increasing charges in the future.[39]

> *2.4. In overview, these decisions were to leave the average economic asset lives unchanged at 45 years. In arriving at this decision we noted that there was sufficient uncertainty surrounding the future use of the gas distribution networks that this decision should be reviewed again for RIIO-GD2. We also decided to use a front loaded depreciation profile for*

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37 Commerce Commission, 'Input methodologies review decisions, Topic paper 3: The future impact of emerging technologies in the energy sector', 20 December 2016, p.38.

38 Ofgem, 'RIIO-GD1: Final Proposals – Overview, Final Decision', 17 December 2012, pp.35-36.

39 Ofgem, 'RIIO-GD1: Final Proposals - Finance and uncertainty supporting document Finance and uncertainty supporting document', 17 December 2012, pp.6-7.

post 2002 assets to decrease the risk of increasing customer charges (on a per unit basis) should lower utilisation of the network transpire under the various scenarios of the future use of the gas distribution network.

5.5 ACCC NT Gas

In 2002 the Australian Competition and Consumer Commission (ACCC) accepted that the Amadeus Basin to Darwin Pipeline (ABDP) owned by NT Gas faced risks that threatened its ability to recover costs. In response to this stranded asset threat the ACCC permitted NT Gas to speed up its recovery of depreciation.

In making its decision the ACCC noted that its preference, as it had outlined in the Draft Regulatory Principles was for service providers to anticipate potential redundancy, and in response it would then provide for the potential redundancy of the identified assets via an increased depreciation allowance. Because of this preference from the ACCC, NT Gas proposed accelerated deprecation to a residual value of $61.84m in 2011 in recognition of the risk of reduced economic usage or the possibility of stranding faced by the pipeline after that date. The risk in this case being driven by the likelihood that alternative sources of gas would cause the ABDP to be bypassed (two potential projects to bring Timor Sea gas onshore and to the eastern states – one by Epic Energy and another by APT – were then being discussed). This was despite an otherwise expected asset life of 80 years for the pipeline.

In making its decision the ACCC acknowledged there was uncertainty as to whether the asset stranding would occur. Given the ultimate decision made by the ACCC, it is clear it felt it was prudent to take action to address stranded asset risk even in the face of this uncertainty:[40]

> *Given the limited capacity of the ABDP, it appears that Epic Energy currently has no intention of utilising the ABDP and should the project go ahead it is more than likely to result in a major by-pass of the pipeline. With the majority of the ABDP's market located in Darwin, it is likely that gas transportation along the ABDP would be limited to supplying a small number of users located along the lower portion of the pipeline. It should be noted however, that while planning for Epic Energy's proposal has advanced significantly, the construction of the pipeline is by no means a forgone conclusion.*
>
> *Australian Pipeline Trust also announced an alternative proposal for shipping Timor Sea gas to Southern markets, however, at this stage it is unclear to what extent the ABDP might be used.*
>
> *The Commission cannot rule out the possibility that alternative project proposals involving Timor Sea gas exist. While some of these projects might involve the ABDP, others may by-pass the pipeline entirely. Therefore, the ultimate involvement of the ABDP in the delivery of Timor Sea gas to South East Australia remains uncertain. However, it is evident that the majority of options for the delivery of Timor Gas to Southern markets are likely to result in the partial stranding of the ABDP.*

[40] ACCC, 'Final Decision Access Arrangement proposed by NT Gas Pty Ltd for the Amadeus Basin to Darwin Pipeline', 4 December 2002, p.65

And:[41]

> *It is the Commission's view that the risk of a reduced usage for the ABDP due to the expiration of its foundation contract in 2011 and the uncertainty surrounding the remaining Amadeus Basin gas reserves appears valid. On their own, these circumstances suggest a risk of at least partial stranding. When combined with the potential for Timor Sea gas to replace Amadeus Basin gas as the supply source for the Darwin market, the result is a risk that utilisation of the pipeline would be reduced.*

In deciding to change its approach to depreciation to take account of potential asset stranding the ACCC considered the projected usage of the asset. That is, it considered what is the likely economic life of the asset in the context of potential asset stranding risks, given this is the period where there is the highest chance of successfully returning capital to investors. Notably, the ACCC identified that future regulatory periods provide an opportunity for assessment and revision of the approach to depreciation should the risk of stranding change.[42]

> *The Commission believes that its approach to accelerated depreciation appropriately reflects the projected usage of the pipeline and the risks of partial stranding after 2011. The Commission considers that the advice provided by PWC [Power and Water Corporation] supports the likelihood of future events that will effect the economic usage of the ABDP. Future developments in the gas market may, however, affect the risk of stranding faced by NT Gas. The Commission will monitor these developments and reassess the risk of stranding and the value of the pipeline in subsequent revisions. It should also be noted that the new developments in related markets could also activate the trigger mechanism that has been included in this Final Decision. This process will therefore provide a mechanism to protect the interests of users under section 2.24(f) of the Code.*

Specifically, the ACCC recognised that even though there was a prospect that asset stranding would not occur, not taking action now would impose undue risk on the service provider:

> *Though Santos suggested that the depreciation profile should take into account the future possible use of the ABDP due to developments in gas production of Australia's northern coast, there remains considerable uncertainty about such investments and the related demand for backhaul services. A depreciation profile based on such assumptions places undue risk on the service provider who may not be able to recover the cost of their investment, such an outcome would be contrary to section 2.24(a). Further the inclusion of a trigger mechanism should a new gas field be developed would enable the Commission to review the depreciation profile. As mentioned previously, this possibility takes into account the interests of users and prospective users under section 2.24(e) of the Code by allowing scope for the adjustment of the depreciation profile and reference tariffs as a result.*

We note in the case of this example that in actuality the assets did not become stranded as had been predicted. Nevertheless, we are not aware of the AER or other parties identifying that advancing

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41 ACCC, ACCC, 'Final Decision Access Arrangement proposed by NT Gas Pty Ltd for the Amadeus Basin to Darwin Pipeline', 4 December 2002, p.67

42 ACCC, ACCC, 'Final Decision Access Arrangement proposed by NT Gas Pty Ltd for the Amadeus Basin to Darwin Pipeline', 4 December 2002, p.68.

deprecation to ensure the potential asset stranding risk was managed has led to distortions from economic efficiency in terms of either efficient use or efficient investment.