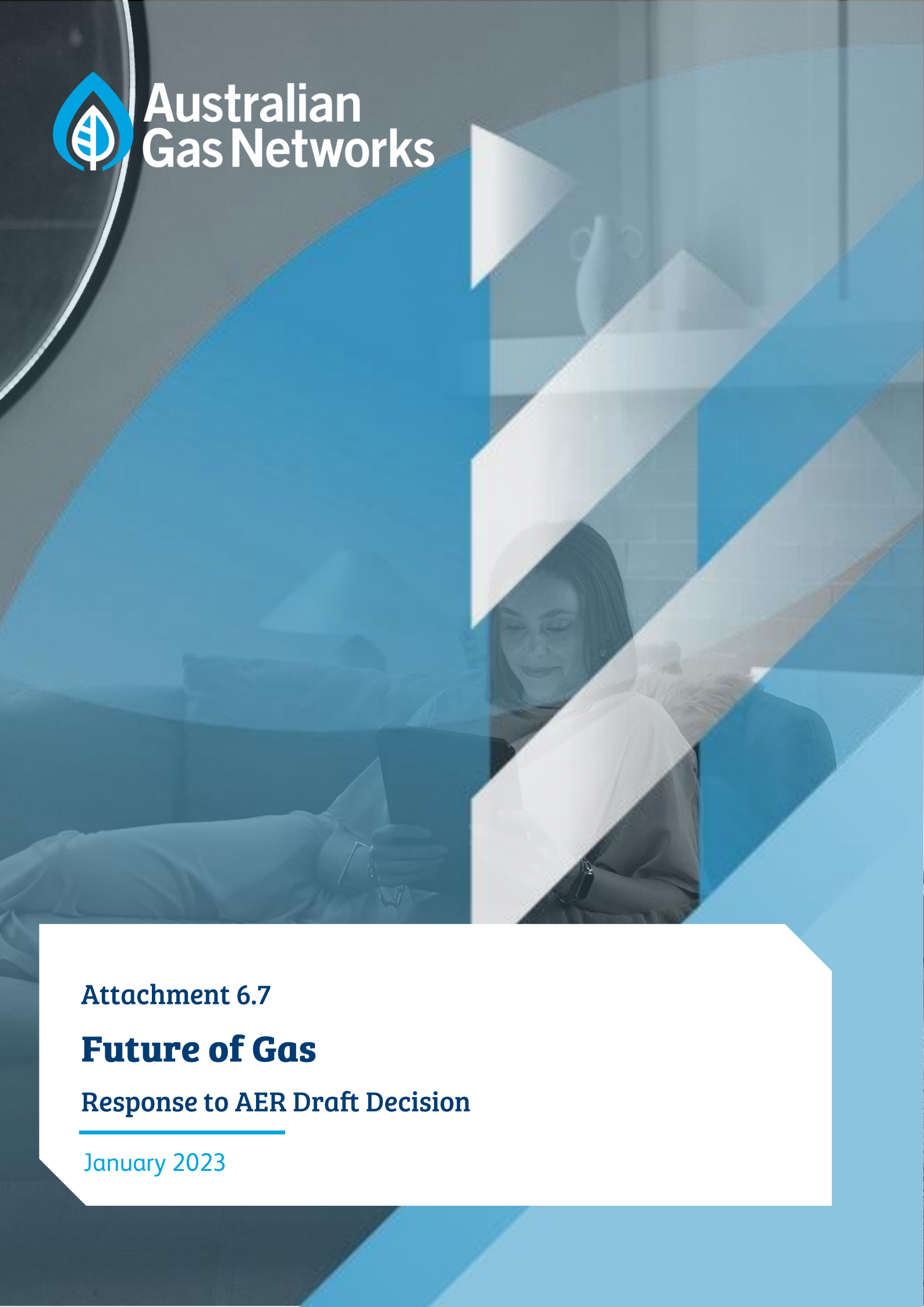

Australian Gas Networks

Attachment 6.7

Future of Gas

Response to AER Draft Decision

January 2023

Contents

1 Future of Gas

Our Revised Final Plan maintains $175 million of accelerated depreciation, as accepted by the AER in the Draft Decision. In this attachment we focus on the AER's target of a 0 percent per annum real price change when assessing accelerated depreciation. We present evidence supporting alternative assessment approaches which we consider will better meet the long-term interests of customers.

1.1 Overview

This attachment provides our response to the AER's Draft Decision on our accelerated depreciation proposal as part of our future of gas framework. The AER accepted the need to consider this issue and accepted the approach we adopted, including that the future of gas modelling was a useful tool to consider relative long-term impacts of accelerated depreciation on price and demand under a range of scenarios. It also accepted the amount of accelerated depreciation we proposed.

For the purposes of the Draft Decision, the AER assessed our proposal by reference to a target of a zero real price change per annum overall. However, the AER acknowledged that there may be scope to choose a different target price path in the Final Decision if there is sufficient supporting evidence and adequate further customer consultation.

We have accepted the AER's Draft Decision outcome in respect of the amount of accelerated depreciation. Our further engagement with our customers suggests that limiting the amount of accelerated depreciation to a zero real price change outcome does not provide the best balance of the short and long-term interests of our customers. We provide evidence in support of alternative assessment approaches as suggested in the Draft Decision in order to assist the AER when assessing other proposals and in its future consideration of these issues.

1.2 Customer and Stakeholder Feedback

The AER provides a summary of overall stakeholder feedback with the Draft Decision.[1] In Table 1.1 below we provide our responses to some key issues raised by stakeholders. Note that the abbreviation "AD" is used in place of "accelerated depreciation" for brevity.

Table 1.1: Summary of submissions on accelerated depreciation

What we heard	Our response
Public submissions on our Final Plan and GSR Response	
Several stakeholders raised concerns that AD transfers risks to consumers at a time of cost of living pressures and might increase the risk of an unmanaged exit from the network.	The Accelerated Depreciation proposal does not change the risks borne by customers compared to, say, ten years ago, before recent changes in the energy market. Rather it reflects changes in the energy market itself, and our proposal responds to these changes in an attempt to keep the risk balance the same as it has always been, as best we can. Failing to act would transfer new risk to networks and ultimately to low income and other consumers unable to exit. This is discussed in detail in Attachment 6.1 of our Final Plan (see pp21-2).

[1] *See Draft Decision, Attachment 4, pp11-12 and 14.*

What we heard	Our response
Trac partners for BSL, suggested AD discourages networks from investing once capital is recovered.	New investment is a function of the benefits investors see flowing from those assets, and not of the amount of existing capital already recovered. We will continue to invest in the network so long as we foresee benefits, including for example investment to allow the transport hydrogen.
Trac Partners for BSL noted networks do not appear to have modelled the impacts of waiting until 2028 to start AD	These results have been provided to the AER in response to an information request. It shows that delayed action, maintaining the same risk profile, would increase price changes later.
Trac Partners believed there were some issues with our model including: • The model is counter-intuitive because it appears to increase prices if there is a decrease in demand • The assumptions are not very accurate, which could lead to problems. • The scenarios have no likelihoods attached nor a spectrum of outlooks. • All scenarios appear to have adopted two different amounts of depreciation and it is not explained where these amounts have come from. • Many assumptions underpinning the model have not been outlined.	Each of these points is addressed in Attachments 6.1 and 6.3 of our Final Plan.
Several stakeholders suggested various actions by and in collaboration with Government/s should be pursued in place of AD.	AA proposals are developed and assessed within a framework of existing government policy and most importantly existing legislation. The matters raised by stakeholders, which may be desirable or undesirable for various policy reasons, sit outside the AA process.
Several stakeholders suggested networks should not be able to recover all stranding asset risk and that this was an (incorrect) assumptions in our model. Others stakeholders supported the notion of "regulatory compact" which allows the recovery of efficient investment.	Our model does not assume that all asset stranding is recovered. The models test whether it is possible to recover all asset stranding with a certain depreciation policy and certain price consequences. The NGL requires and the AER works to ensure that investors have a reasonable opportunity to recover efficiently incurred costs.
One stakeholder suggested changes in price now could precipitate the very death spiral AGIG and other stakeholders are seeking to avoid. In that the maximum tariff that could be charged before large numbers of disconnections occur is not far above current tariffs.	The BSL comment misunderstands the figures and the underlying modelling. 1.7 times the current price is not the maximum price which can be charged, but is simply a part of the modelling process agreed with the AER to facilitate it (see Attachment 6.1 pp74-5).
Some stakeholders suggested if there is an allowance for accelerated depreciation, growth capex should cease.	Growth capex is essential to the operation of the network. We cannot lawfully refuse a gas connection, where it is safe to do so, to a customer on our network that would like one. Where investment in new connections remains efficient (both in respect of cost and our ability to recover investment) we will continue to do so. We address this point in detail in our Final Plan (see Attachment 6.1 pp19-20).
Several stakeholders suggested there is a contradiction between seeking allowance for accelerated depreciation and hydrogen spending, and only one or the other should be allowed.	We addressed this issue in detail in our Final Plan (see Attachment 6.1 pp18-19). Our AD proposals allow for the *prudent* creation of options in a manner consistent with other businesses in meeting the needs of customers.
Several stakeholders noted that accelerated depreciation supports inter-generational equity.	Our revised Final Plan supports this view.
Origin Energy noted AD strikes a balance between investors and consumers	Our revised Final Plan supports this view.

What we heard	Our response
Several stakeholders suggested our AD proposal was unduly focused on the Gas Substitution Roadmap as a cause of asset stranding risk. EUAA noted that the Roadmap aims to get the right investment levels and minimise asset stranding risk but does not address the question of who bears that risk, noting that this is a question which cannot be ignored, particularly when government action like the Roadmap is potentially contributing to this risk.	Our AD proposals respond to the policy and legislative settings in place. Perhaps more importantly, the AD proposals reflect detailed modelling of consumer choice based on these policy and legislative settings and other factors including the price of alternative technologies and other market developments. These are not limited to positions set out in the GSR. See Final Plan Attachment 6.1 pp7-8
Origin Energy noted AD improves the ability of businesses to respond to policy changes noting that this can happen without adversely impacting prices provided regulation is flexible as policy changes.	We agree with this perspective which forms the basis of our proposal. We note that accelerated depreciation also improves our ability to respond to market-driven changes as well.

1.3 AER Draft Decision

Table 1.2: Summary of AER Draft Decision

Issue	AER Response	AER Comment
Concept of accelerated depreciation	Accept	Future demand is uncertain, and acting soon gives greatest flexibility. Meets AER Information Paper requirements
Modelling framework	Accept	Model framework is a "useful tool" which is "well-documented". Meets AER Information Paper requirements.
Scenarios	Accept	Scenarios are plausible and cover a spectrum of outlooks. Meets AER Information Paper requirements.
Engagement	Accept	Though not all stakeholders agreed with accelerated depreciation, there was active and meaningful engagement on the issues. Meets AER Information Paper requirements.
Result	Accept	Gives a result that meets the target of zero real price change

Note: In this 'traffic light' table, green shading represents the acceptance, orange represents a modification/modifications and red shading represents a rejection.

The AER ultimately accepted all aspects of our accelerated depreciation proposal and that it met the expectations of the AER's Information Paper[2], save for some minor issues such as estimating the likelihood or probability of each of our four scenarios.[3] As noted above, the decision on the amount of accelerated depreciation was also based on an additional criterion introduced in the draft decision, targeting an overall outcome that keeps real prices constant from the current AA period to the next. Since the amount of accelerated depreciation we proposed does this, the AER accepted our proposal.

The AER states that this additional criterion is not a regulatory principle which will guide its future decision-making but rather is something of a holding pattern for this Draft Decision, noting in particular (p15):

> "While we have considered a target of 0% per annum real price path for this draft decision, we note there may be scope to choose a different target price path for consideration in the final decision if there is sufficient supporting evidence and adequate

[2] AER, 2021, Information paper on regulating gas pipelines under uncertainty 15 November 2001, available here
[3] This was something we deliberately avoided doing, given the state of available information and objective of assessing a range of possible scenarios (see Final Plan Attachment 6.1 p4).

further customer consultation is undertaken. We acknowledge that economic conditions will evolve further before the final decision, and this will impact the values of the WACC and expected inflation."

1.4 Our revised Final Plan

Table 1.3: Summary of Our response to the AER Draft Decision

Issue	AER Draft Decision	Our response	Our Comment
Concept of accelerated depreciation	Accept	Accept	We are in alignment with the AER on this issue and make no further comments here.
Modelling framework	Accept	Accept	We are in alignment with the AER on this issue and make no further comments here.
Scenarios	Accept	Accept	We are in alignment with the AER on this issue and make no further comments here.
Engagement	Accept	Accept	We are in alignment with the AER on this issue and make no further comments here.
Zero real price change	n/a[4]	Modify	We do not believe that a real price change of zero will necessarily best balance the needs of current and future consumers. Below we provide further evidence to support different price paths.
Result	Accept	Accept	We are in alignment with the AER on this issue and make no further comments here

Note: In this 'traffic light' table, green shading represents the acceptance, orange represents a modification/modifications and red shading represents a rejection.

We accept the AER's Draft Decision to allow $175 million of accelerated depreciation for our AGN network. Below we focus on evidence of alternative ways of considering the amount of accelerated depreciation and other considerations that support alternative approaches to the AER's Draft Decision (being to provide for a zero real price change). We discuss below:

- the difference between price stability and a zero real price change approach and the long term interests of consumers;
- evidence on the degree to which the impact of accelerated depreciation on price might cause a further reduction in demand. This responds to a specific issue raised by some stakeholders and the AER;
- customer views on the acceptability of price outcomes of accelerated depreciation other than a zero real change in price;
- evidence of new ways to balance consumer interests in the short and long term, using measures of consumer surplus and allocative efficiency; and
- evidence on the degree to which different levels of accelerated depreciation limit unrecovered asset risk.

[4] Note that, whilst we had a general principle of preferring more price stability to less, this was not as strict as allowing no real price change.

In our view, these considerations provide better guidance to the AER in assessing the appropriate amount of accelerated depreciation than choosing an amount which leads to a real price change of zero in the next period. They would enable the AER to better assess the proposed accelerated depreciation by reference to the long term interests of consumers and balancing that with short term impacts, while also ensuring the AER's decision contributes to the national gas objective to the greatest degree.

1.4.1 Price stability v zero price change

We agree with the AER that price stability and the long run interests of consumers are key concerns. We focus here on price stability, covering the long run interests of consumers in Section 1.4.4 below.

Our Final Plan and GSR revisions sought to remove the risks of rapid price rises caused when demand falls more rapidly than costs, where this is possible. This is not the same as targeting no change in price between periods (other than CPI). The degree of price stability proposed by our Final Plan (see Final Plan Attachment 6.1 Sections 3.2.2 and 4.2) would not result in perfectly flat prices, and has a focus on removing price shocks over the long term, rather than focussing only on current prices. The long-term interests of consumers of having reasonably predictable or stable gas prices can be achieved without the need for a zero real price change constraint.

In respect of the role of price stability, in our Final Plan more stability over the longer term is an *indicator* that a given amount of accelerated depreciation is appropriate because it helps prevent demand destruction; hence keeping prices (costs divided by demand) relatively stable through time. However, the AER Draft Decision appears to use price stability now as a *goal*, rather than as an indicator. If prices rise now then accelerated depreciation should be reduced, without necessarily considering the impacts of this on demand in the long term.

We are aware that APA proposed, and the AER accepted, an approach to accelerated depreciation whereby the amount of accelerated depreciation was back-solved to produce relatively constant real prices given AEMO demand forecasts.[5] Under this approach, demand is held exogenous and cannot react (in the relevant models) to changing prices. This may be appropriate for transmission, but for distribution ignoring the impact prices might have on demand ignores the premise for a policy of accelerating depreciation in the first place. It is demand, not price, which is key.

We can see some significant problems which may arise if a very constrained form of price stability is used in either the short or the long term as the goal. For example:

- In the short term, if a zero price change constraint is applied and interest rates increase from the draft to final decision this would mean that the amount of accelerated depreciation allowed would be reduced. This would mean that the return of capital is dependent upon the return on capital. This is not logical when the former is based on non-systematic risk and the latter on systematic risk which are, by definition, unrelated.[6] In this case the decisions around accelerated depreciation are driven by short-term interest rate movements that are unrelated to the risks being addressed by accelerated depreciation.
- If an approach of zero real price change is applied in the longer term then, since it does not consider demand as the central concern, it could cause significant problems for consumers in the long term, because it does not allow flexibility to adapt to changing circumstances. For example:

[5] See the report prepared for APA by ACIL Allen, available here, and APA's shorter summary of the ACIL Allen work, and what APA proposed to the AER here; pp80-89. We note that the ACIL report produced constant prices, but that the APA submission did not go as far as this (see Attachment 4 of the final decision, p4, available here).
[6] See AER 2021, Regulation Gas Pipelines under Uncertainty: Information paper, p28, available here.

- If electricity prices declined substantially, then future gas distribution tariffs that are the same as those right now in real terms are likely to be much too high, and cause a death spiral.
- If the future turns out to be sufficiently favourable for gas networks that demand increases, then keeping real prices constant would allow more accelerated depreciation (to the extent that other costs increase by less than demand) at a time when it is arguably not necessary.

It is also not clear that a zero price constraint is the only way in which the AER might ensure that it is not overly focussed on risk compensation at the expense of consumers. In the Draft Decision (Attachment 4 p15), the AER suggests that a zero real price change is consistent with its information paper, where the Information Paper states that:

> "….regulated depreciation or risk compensation cannot be adjusted without constraint to guarantee cost recovery for the regulated businesses. [The AER] must have regard to consumers' interest in having affordable and stable or reasonably predictable gas access prices to encourage their use of the gas infrastructure."

We submit that adjusting depreciation "without constraint" and adjusting it within a very tight constraint of zero real price change are very different things. There are many other "constrained" depreciation adjustments than one which allows only zero real price change.

Even as price stability is, and should be, a key concern going forward (as an important indicator, as noted above) and is important to consumers, we do not consider that an extreme form of price stability such as a zero real change in price is necessary. We note that the APA decision, although it keeps prices relatively stable in the long term, allows a real price increase of roughly 20 percent between the end of the last AA and the end of the next.[7] This appears to be a different approach to that applied in the Draft Decision for the Victorian gas distributors. It is not clear why this difference in approach exists.

We note further that AER decisions often do involve real price changes for consumers. Some of these occur because of changes in opex (indeed, the point of incentive regulation is to induce efficiencies to reduce opex and, all else being equal, prices), but some occur because of building blocks outside the control of the AER or networks, such as rate of return. It is unclear why depreciation should be the one building block where a zero real price change constraint is imposed; particularly if this means, as noted above, the depreciation building block is compensating for changes in other building blocks.

For these reasons, although we share the AER's concerns in respect of the importance to consumers of price stability,[8] we believe that a very constrained form of price stability is not in the long-term interests of consumers. Rather, we think that price stability and the avoidance of price shocks should be considered over the long term, as an indicator of a robust accelerated depreciation decision, and not as a short run factor which constrains the ability of the regulatory framework to find robust long-term solutions. We think further that the impacts of price on consumer demand, in the long term, should be the primary focus, not price itself.

1.4.2 Evidence on potential for demand reduction in the short term

One issue which some stakeholders have suggested may arise with accelerated depreciation is a reduction of demand in the short term as prices are impacted by the inclusion of accelerated depreciation. The AER notes concerns from stakeholders that (Draft Decision, Attachment 4, p15):

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[7] See the AER's overview of its final decision, p13, available here. The figure quoted is 42.3 percent, but this is nominal, so we have subtracted five years of forecast inflation at 3.35 percent (the figure used by the AER) to get the real figure. Note that examination of the PTRM produces slightly smaller results.

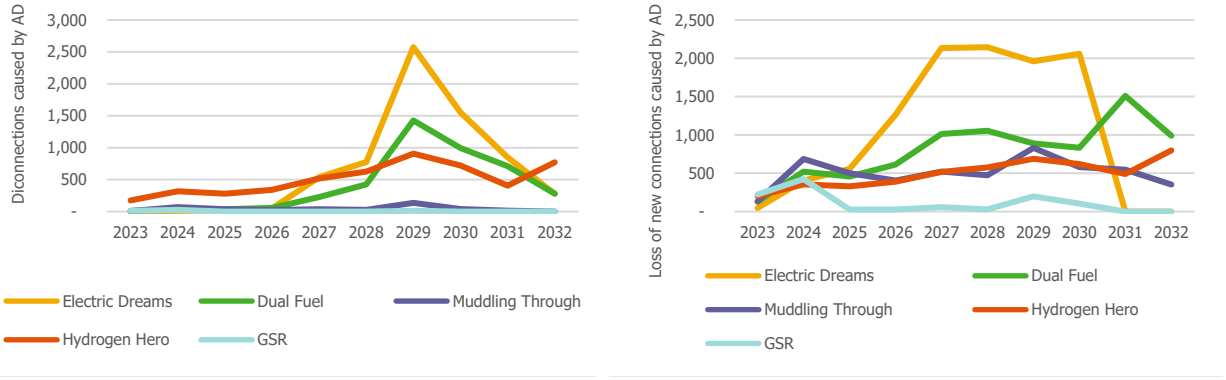
[8] See p15 of Attachment 4 of the AER's Draft Decision, available here.

> "accelerated depreciation and the resulting higher prices would potentially lead to customers increasingly disconnecting from the network sooner than necessary."

We are aware that some stakeholders raised this as a concern, and agree that higher prices leading to disconnections sooner than necessary would be an issue. However, it is a testable proposition. In fact, our modelling framework has been designed to test precisely this issue.

We have considered the amount of disconnection of existing customers over the next two AA periods (which is when our model raises prices the most with accelerated depreciation) caused by accelerated depreciation. The results are shown in Figure 1.1, which show the differences in disconnections and new connections with and without accelerated depreciation (so disconnections without accelerated depreciation minus disconnections with accelerated depreciation, and similarly for new connections).[9] By way of context, the current number of connections is currently around 700,000, and we have historically had a disconnection rate of around 0.5% per annum, with a new connection rate of around 2 percent per annum.

Figure 1.1: Differences in disconnections (LHS) and new connections (RHS) with and without accelerated depreciation



The results are very clear; although additional disconnections in the immediate future would be a legitimate concern, they are not a material risk caused by our accelerated depreciation proposal, according to the Future of Gas modelling framework. The largest spike in Figure 1.1, for example, is caused because wholesale gas prices rise but then current environmental levies[10] (which expire in 2030) fall away, and even this represents only one third of one percent of connections.

We believe that tests like this represent a useful way of using the model to test depreciation proposals, which can assist the AER in balancing short and long term consumer interests. It should be noted that the above assessment is not a forecast of demand over the next AA period (which is addressed in Attachment 13.6), but rather a consideration of disconnections and loss of new connections that the model shows could arise from higher prices caused by including accelerated depreciation.

1.4.3 Customer views on zero price change

The AER's Draft Decision noted that we had not consulted with customers since March 2022, which meant we had not (given the short timeframes involved) had an opportunity to consult on the increase in accelerated depreciation brought about by our response to the Gas Substitution Roadmap and its impact on our risk profile (see Attachment 4 p 14). It also noted:

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[9] There are fewer new connections with accelerated depreciation, so the graph shows loss of new connections to put the results in the same quadrant of the graph.
[10] See Attachment 6.3, pp15-16, available here.

- that several other parameters had changed, including WACC and inflation (p14); and
- that current cost of living pressures should mean more focus on current price stability (p15).

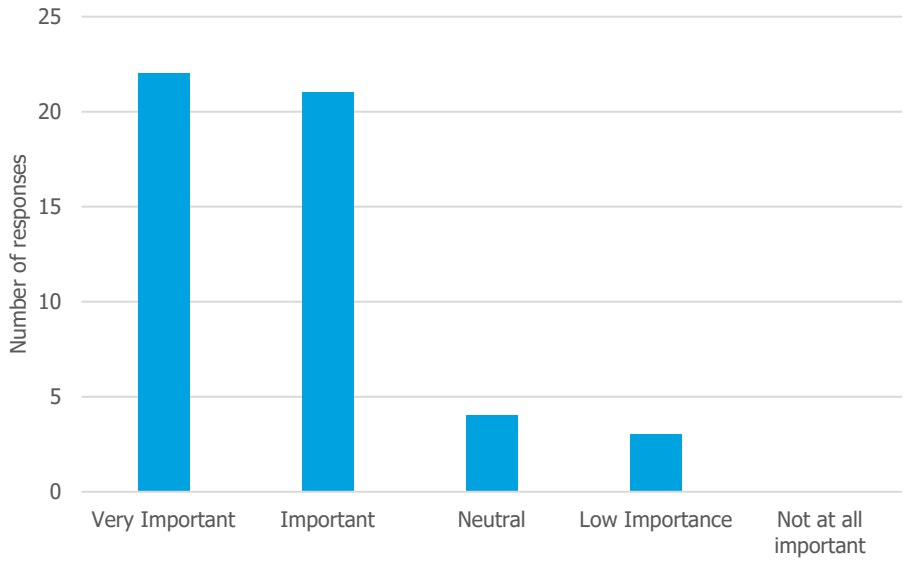
For this reason, the AER suggested that we should consult with customers again using updated parameters and outlining the revenue and price impacts of those updated parameters. The AER also indicated that part of its consideration of a price path different from a zero real price change would involve adequate customer consultation on this point (See Attachment 4 p16).

We agree with the AER that it is important to consult with our end-use customers again at this point in the process. When we last spoke to our customers, the building blocks, including the level of accelerated depreciation we proposed, led to a 10 percent price cut after inflation as per our July Final Plan.[11] The impact of accelerated depreciation was to give current customers a smaller price reduction from June 30 to July 1 2023 than would have been the case had we not sought accelerated depreciation. We received 78 percent customer support for our proposals.[12]

In response to the AER's Draft Decision, we have engaged with customers on our updated accelerated depreciation proposals (post the Gas Substitution Roadmap) and updated for changes in rate of return and other parameters (like demand). We had 51 attendees across two sessions and these customers were all part of our previous three workshops. The two questions we asked and the subsequent results are set out below and are detailed further in Attachment 5.5.

The results of the first question are shown in Figure 1.2.

Figure 1.2: Importance of mitigating future price risks



As is clear, customers place significant importance on addressing future price risk. This was further highlighted in comments made by customers when asked to share why they had made the choice they had made. For example:

- In the context of reducing future price shocks by making incremental changes now, one customer said *"I would rather have small incremental increases as opposed to larger increases".*

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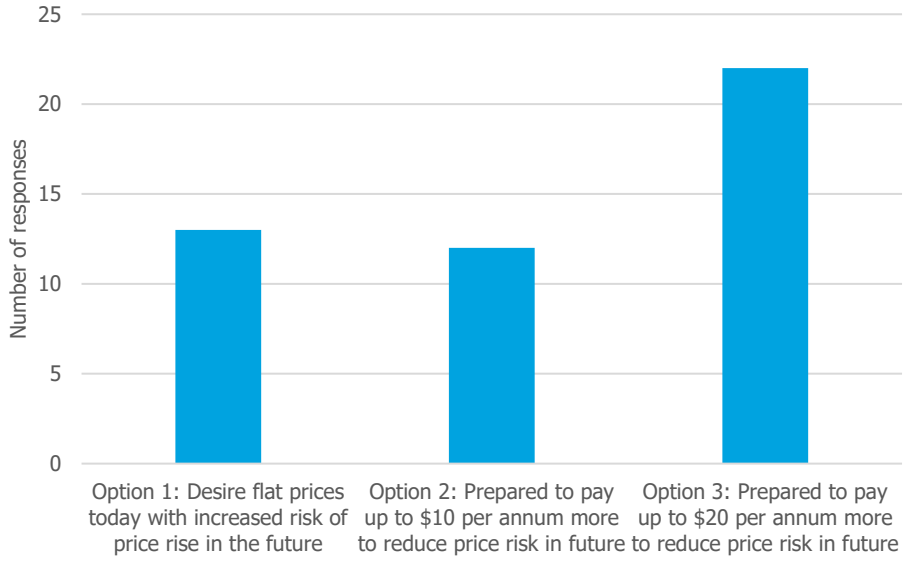
[11] See our Final Plan of July 2022, p5, available here. This changed to a six percent price decrease following the Gas Substitution Roadmap (see p6 of the overview to our response, available here).
[12] See our July Final Plan, p34, available here.

- In the context of protecting low income earners, one customer said that our proposed price increases were *"easier to absorb than sudden large increases…. Particularly [for] those in lower SES groups*".
- In respect of their own budgeting for the longer term, one customer said *"I prefer no surprises down the track".*
- In respect of future bill shocks, one customer said *"Everything that can be done to minimise bill shock is appreciated".*
- In the context of remaining a gas customer into the long term, one customer said *"Cooking with gas is way better than electric and I want to be able to afford it forever".*

There was, however, some concern about the extent to which prices will be reduced in the future, given the uncertain environment which means that guarantees are complex. One customer said *"uncertain if we pay more now, that prices is (sic) reduced in future"*, and another said that *"I feel it is important to mitigate future price rises, but it is not clear to what extent (i.e. how much) future price rises may be minimised*".

The results of the second question are shown in Figure 1.3.

Figure 1.3: Preferred option to address future price risk



More than 70 percent of customers who attended the workshops prefer a price rise now if it will serve to reduce risk going forward. Importantly, 47 percent of consumers prefer a higher price increase now, which has more impact on future price risk. These results suggest that, when price increases today are relatively small, customers are willing to pay for risk reduction.

This is entirely consistent with what economic theory would suggest. A rational consumer considers consumption of a good or service over their lifetime and does not focus solely on the present.[13] Where options exist to reduce lifetime consumption costs, these tend to be preferred over options which increase lifetime consumption costs, even if they lead to immediate price rises.

Further insight on why our customers chose the options they did is evident from some of the comments they made around their choices. For example:

[13] Only the very simplest economic models assume consumers and other economic agents who live for a single time period. More complex models assume production, consumption and investment occurs over multiple time periods.

In comparing the proposed price rises compared to what may happen in future, one customer noted that the *"…extra over the year is affordable to reduce the risk of a large surprise later"*, and another said that *"$20 per annum now is a reasonable amount to pay to help reduce the potential for rises in the future"*, with a third saying that *"I can easily find another $20 p.a. now, if that means not paying huge amounts once I'm retired"*, and a fourth noted that *"it's like insurance…. Paying $20 now could pay off in the future".*

Some customers noted the collective nature of the issue being addressed, with one saying *"I am prepared to pay a bit as [I] think it's in all our benefit"*, whilst a second focussed particularly on vulnerable households, noting *"I'd rather help share the load now than leave financially vulnerable customers in the future having to shoulder potentially much higher costs".*

One customer noted a preference for increased surety in light of current economic conditions, noting that *"I prefer the certainty, but am scared of all cost rises"*, but another preferred flat prices, noting *"Considering the high costs of living generally at the moment, I think it best (in a way) to wait".*

Finally, some customers noted that, despite their own preference for the higher of the price increases today, certainty about the future could not be provided, with one consumer noting that *"I think $20 per annum is ok, but how do we know if we pay this that prices won't go up?"*, and another noting that *"… I can afford it now, but who knows what is around the corner?"*.

1.4.4 Evidence associated with zero price change – consumer surplus and allocative efficiency

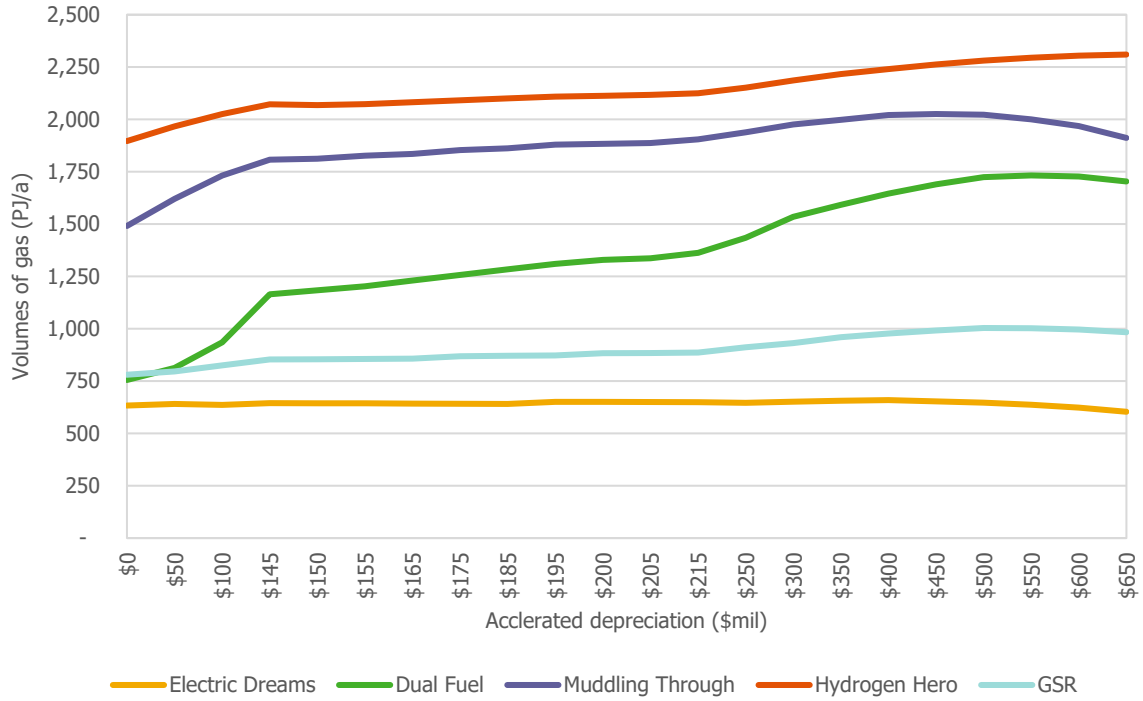
As noted in Section 1.4.1 above, we believe that price stability and the long run interests of consumers are key (and indeed, intertwined) concerns. As discussed, price stability is best considered as an indicator of appropriate decisions on the amount of accelerated depreciation.

Since our Final Plan, we have undertaken further work on the second part of the equation; the long run interests of consumers. Although the work is still exploratory, we believe that it is promising in respect not only of comparing short and long term impacts, but also of potentially quantifying the concept of the long run interests of consumers. We explore some of these measures below, noting that this is new work since the Final Plan.[14]

As part of our addendum to our Final Plan, we introduced a new measure to assess consumer benefits (see Attachment 6.6, Figure 1.4); the volumes of gas sold.[15] When accelerated depreciation is applied, prices rise now (relative to no accelerated depreciation), and in the modelling framework we use, this results in some volumes being lost at certain points in time. However, in many cases, the rise in accelerated depreciation leads to the network remaining viable for longer, meaning gas (and this includes hydrogen) being transported in future. To the extent that our customers value having gas, then this is a rough measure of the long run interests of consumers. The results of this analysis, across all five scenarios, is shown Figure 1.4.

[14] As we point out in our Final Plan (Attachment 6.1 pp31-7), the area of assessing accelerated depreciation and market and policy forces which give rise to the need for it is an emerging area of regulation, and we, like the AER, have been learning as we go. We expect further learning before an industry-wide consensus on how to deal with and analyse the issues is reached.
[15] Noting that the "gas" may be methane or hydrogen, depending upon the timeframe.

Figure 1.4: Volumes of gas transported over the life of the asset by accelerated depreciation amount



The curves all peak at around the $500 million mark for accelerated depreciation, with the exception of Electric Dreams, which is relatively flat throughout. This means we could triple our accelerated depreciation before, over the longer term, demand would start to fall for gas. This suggests that, from the consumer perspective, there is still substantial scope for increases in accelerated depreciation, because the model shows consumers still demand more gas, over the next several decades, even with much more accelerated depreciation now.

With our Final Plan (see Attachment 6.4) we provided an expert report from Incenta which included an appendix detailing both graphically and mathematically how to estimate allocative efficiency and consumer surplus. Incenta has expanded on this earlier analysis (see Attachment 6.8) to separate out the consumer surplus from the overall allocative efficiency more clearly.

As Incenta point out (see Attachment 6.8) both the consumer surplus and allocative efficiency measures provide useful information which can assist regulators in assessing amounts of accelerated depreciation. In particular, they note that if aggregated consumer surplus over time increases as a consequence of a specific acceleration of depreciation, then this suggests that customers in aggregate would benefit from that acceleration.

The analysis is still, at this stage, exploratory and builds on the work summarised in Figure 1.4.[16] However, we believe it shows substantial promise as a tool for the AER to use to balance long and short term consumer interests and to analyse and compare different accelerated depreciation options that the model suggests are feasible.

The analysis is relatively simple; it considers the amount of consumer surplus or allocative efficiency (in present value terms) which exist with and without a given amount of accelerated depreciation. If either or both improve with a given amount of accelerated depreciation, then this is an indication that welfare and efficiency gains are possible. Moreover, both measures are assessed over the long run (80 years in this instance) and therefore directly and quantitatively approach the issue of the long run interests of consumers; something which has to date primarily only been considered from a qualitative perspective in the regulatory context.

Turning first to consumer surplus. In our analysis, we break-down the change in consumer surplus from the case *with no* accelerated depreciation to the case *with* accelerated depreciation into three components:

- A loss in consumer surplus in those years where accelerating depreciation increases prices. These will be the early years, given the nature of the "tilt factor" we use in our proposal.
- The gain in consumer surplus which occurs when demand is positive, but because the RAB falls and prices reduce consumers gain an increase in consumer surplus from the fall in price. This happens later in the timeframe.
- The gain in consumer surplus which occurs because prices fall enough with accelerated depreciation to mean that demand goes from zero to a positive number. This happens last.

The third component is challenging to estimate due to the fact that the model does not produce a simple measure of the price at which all demand is zero, and we therefore derive a conservative estimate of this value via simulation.[17]

The results of the analysis are shown in Table 1.4 below, which shows the present value ($millions) of the change in consumer surplus associated with $175 million of accelerated depreciation.

[16] The simple two dimensional examination of price and quantity belies the numerous extra dimensions driving consumer choice. Expansion of consumer surplus and allocative efficiency calculations from two to multiple dimensions is commonplace in economics, but the timeframe between Draft Decision and revised proposal is too short to develop such measures fully. This is an area we are exploring further; consideration of accelerated depreciation is new (as the AER points out, even the legislative framework has yet to catch it up – see Draft Decision, Attachment 4 p12) and many issues remain to be resolved. We present our early work here in the hope that it will both assist the AER in its final decision, and spur future work.

[17] This is an area we are still working on, as the model has more than two dimensions (gas price and gas quantity). For the purposes of this Attachment, we switch off the model constraint that sets the maximum network price at 1.7 times current (agreed with the AER, see Attachment 6.1 pp74-75), and then run the model with setting least favourable to gas to get a conservative result. We then record the price at which the death spiral starts, which is roughly 4 times the current network price (or delivered gas prices roughly 80 percent above current prices. We undertake sensitivity analyses with three and five times.

Table 1.4: Decomposition of consumer surplus results – central case ($ mil PV)

Scenarios	Total change in Consumer Surplus	Change in consumer surplus when prices rise	Change in consumer surplus when demand is positive but prices fall	Change in consumer surplus from new supply
Electric Dreams	-$143	-$310	$40	$128
Dual Fuel	$1,193	-$461	$87	$1,568
Muddling Through	$569	-$297	$481	$384
Hydrogen Hero	$204	-$291	$496	$0

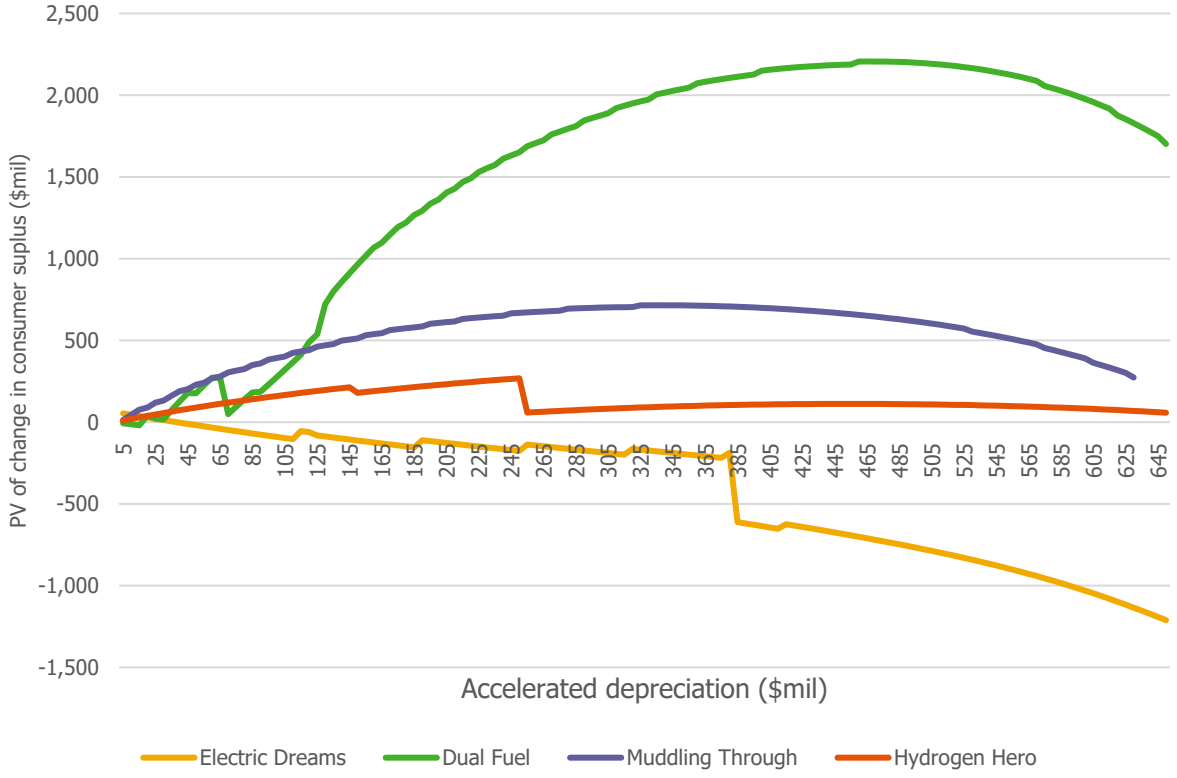
Note – totals may not sum exactly due to rounding

With the exception of Electric Dreams, all scenarios provide a positive change in consumer surplus. Moreover, this change is substantially positive; $175 million is clearly a long way from the point at which consumer gains from accelerated depreciation are exhausted. The same is true in both of the sensitivity cases where the maximum price is higher and lower than noted above.[18] Note in particular that, whilst consumers have a negative result initially when accelerating depreciation increases prices, this is significantly outweighed by the longer-term benefits they receive. In balancing short-term and long term consumer interests, it is clear that the long term benefits significantly outweigh the short-term costs, even in this relatively conservative estimation approach. This, we believe, is a more important consideration than whether short-term prices rise, particularly if the increase is relatively small and because the consumer surplus analysis incorporates both short and long-term price impacts. It is also consistent with the achievement of the national gas objective which directs attention to the long term interests of consumers.

The conservative nature of the $175 million proposed accelerated depreciation is clear when the analysis in Table 1.4 is extended to show the results for different amounts of accelerated depreciation. The results of this analysis are shown in Figure 1.5, where we focus just on the overall change in accelerated depreciation.

[18] We test five and three times the current price as the proxy for the price when demand is zero. Electric Dreams has a difference of about $50 million either way, Dual Fuel shows the largest change, with a price of three times halving the consumer surplus gain and a maximum price of 5 increasing it by 60%, Muddling Through has a difference of around $140 million either way and Hydrogen Hero shows no change because it has no extension of network life.

Figure 1.5: Changes in consumer surplus with different levels of accelerated depreciation



With the exception of Electric Dreams, which is negative for all but a handful of small accelerated depreciation amounts, the change in consumer surplus is positive throughout.[19] This means that consumers are better off with all levels of accelerated depreciation shown (with the exception of Electric Dreams). For Electric Dreams and Dual Fuel, it is the extension of network life which provides the bulk of the benefits. For Electric Dreams, these longer-term benefits do not outweigh the costs imposed on consumers when prices rise initially (except for small amounts of accelerated depreciation; less than $40 million) whilst for Dual Fuel the network extension benefits significantly outweigh the initial costs to consumers. For Muddling Through and Hydrogen Hero, it is the decrease in price when demand is still positive that dominates.

Although the change in consumer surplus is positive throughout in three of the scenarios, the AER may also like to consider the maximum change. After this point, although consumers are still benefiting from more accelerated depreciation, their additional benefits start to fall. For Hydrogen Hero, this would suggest an amount of around $250 million, whilst for Muddling Through and Dual Fuel, the amounts would be roughly $350 and $450 million respectively. All are significantly higher than what we have proposed.

We now turn to allocative efficiency, which includes producer benefits and determines overall allocative efficiency for society with a particular focus on the reduction of deadweight losses. This is discussed further in Attachment 6.8. We perform the same analysis for allocative efficiency that we do for consumer surplus, splitting the benefits into times when prices rise, prices fall but demand is positive and new demand is brought forth.[20] Note that, in this case, the network generally gains when prices rise

[19] The Electric Dream scenario is an extreme scenario designed as a bookend worst case scenario where gas networks are out of business by 2050 and face very intense competition before that date.
[20] Allocative efficiency adds producer (ie network) surplus to consumer surplus, see Attachment 6.8 for more details.

initially, loses when prices fall (so consumer and producer interests are opposed in these cases, as one would expect to be the case), but gains when demand goes from zero to some positive number.[21] Considering producer surplus as well is a more general measure of overall social welfare which does not focus solely on consumers. However, the measure has the same long-term focus.

The results of the allocative efficiency analysis are shown in Table 1.5, which shows the present value, in millions of dollars of the change in allocative efficiency, of the proposed $175 million in accelerated depreciation.

Table 1.5: Decomposition of allocative efficiency results – central case ($ mil present value)

Scenarios	Total change in allocative efficiency	Change in allocative efficiency when prices rise	Change in allocative efficiency when demand is positive but prices fall	Change in allocative efficiency from new supply
Electric Dreams	$195	-$89	-$3	$287
Dual Fuel	$2,915	-$139	$12	$3,042
Muddling Through	$1,017	-$68	$336	$750
Hydrogen Hero	$314	-$52	$366	$0

Note – totals may not sum exactly due to rounding

The pattern of results for allocative efficiency is the same as consumer surplus. That is, there is an early fall, followed by a later rise. Since networks generally gain from the earlier price rise from accelerated depreciation and suffer when prices fall (both consumers and networks benefit when new demand is brought forth), this means that the impacts on consumers are greater. For example, the gains to producers from earlier price rises are smaller than the losses to consumers. The net result, across all three time-periods, is that Electric Dreams switches from being negative overall to positive, and the other three scenarios have greater positive results.

Perhaps the most important consideration associated with allocative efficiency is the time period where demand goes from zero to a positive value, for it is here that the interests of networks and consumers are aligned, with both groups benefiting from the service being provided. This is discussed in more detail in Attachment 6.8. Here we see this gain in the increase in the rightward column when compared to Table 1.4 which looks just at consumer surplus.

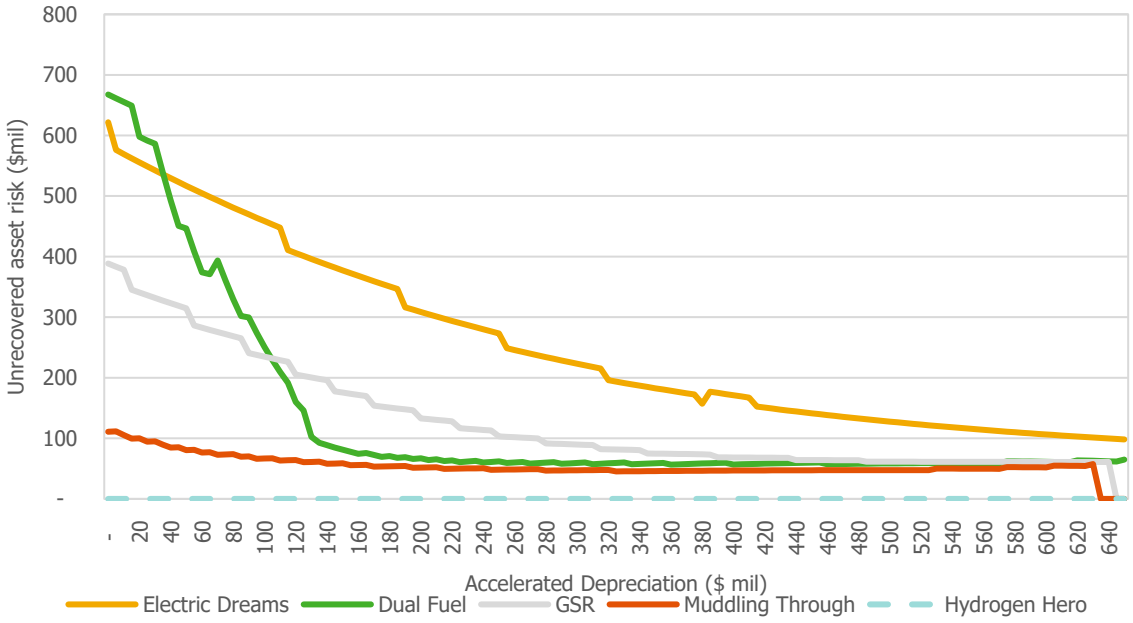
While this work is at early stages and we do not submit that it gives precise answers, it provides a useful guide for assessing how accelerating depreciation impacts the long run interests of consumers.

1.4.5 Evidence for zero price change – investors and unrecovered asset risk

In our response to the Gas Substitution Roadmap,[22] we introduced a new measure for considering different levels of depreciation, being the amount of unrecovered asset risk alleviated by each level of accelerated depreciation. We provided this information with Attachment 6.6 just for the scenario associated with the Gas Substitution Roadmap, and Figure 1.6 provides the same information for all five scenarios.

[21] See Attachment 6.8. If prices fall, producers lose surplus on the existing units of gas transport sold, but the lower price induces some more demand, which benefits the network. The net change is the difference between the change for existing demand and the growth of new demand. In general, however, the effect on existing demand dominates, producing the pattern noted in the main text.
[22] See Attachment 6.6 pp9-13, available here.

Figure 1.6: Future of Gas model investor benefit results – unrecovered assets vs accelerated depreciation



For the Gas Substitution Roadmap and Electric Dreams scenarios, investor risk essentially falls throughout, with the Roadmap scenario providing no significant differences in results to the Dual Fuel and Muddling Through scenarios beyond about $400 million in accelerated depreciation in the current AA period, and appears to start flattening off around $250 million. The Dual Fuel scenario has a kink in recovery at around $150 million because accelerated depreciation is very effective in managing the large loss of network segments under the Dual Fuel scenario with the network subsequently becoming sustainable under low gas (and hydrogen) prices in the scenario, and gives similar results to Muddling Through beyond around $200 million. Neither scenario shows much decrease in investor risk beyond this level.

While the analysis does not produce a clear result, it does provide support for amounts of accelerated depreciation somewhere between $150 and $200 million as being prudent to reduce unrecovered asset risk (on the basis larger amounts above $400 million (when the Roadmap scenario starts to level off and even the Electric Dreams scenario reduces unrecovered asset risk to between 10 and 20 percent of the RAB) are considered by the AER to be too large at this stage of the consideration of how best to manage future uncertainty). Additionally, the scenarios which are not at the extremes (Dual Fuel and Muddling Through) support numbers between $150 and $200 million. This, in turn, suggests that $175 million is reasonable; even though it is clear that this amount is well short of removing unrecovered asset risk.

1.5 Summary

Whilst we accept the amount of accelerated depreciation allowed in the Draft Decision, and we accept the AER's assessment of our modelling framework and overall approach, we do not consider that assessing the amount of accelerated depreciation by reference to a zero real price change is in the long term interests of consumers because it focusses too much on the short-term impacts over the next AA period.

We have asked our customers their views in respect of balancing short and long-term price risks, and we find support for a price rise now (provided it is relatively small) if it will contribute to lower price risk in the future. We have also undertaken analytical work which supports this view expressed by customers.

We have provided examples of alternative approaches that the AER could use to assess the amount of accelerated depreciation that should be allowed. While the assessment approaches and considerations above do not give precise answers as to how much accelerated depreciation is reasonable, they are useful

tools for the AER to consider when exercising its judgment on the amount that best balances the long term interests of consumers with short term price impacts. We believe this evidence provides the AER with a sufficient basis to move away from its Draft Decision approach.