6 November 2017

CCP PTRM Sub-Panel
c/o CCP Secretariat, AER

AER Board
Australian Energy Regulator
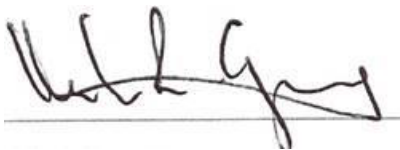
By email: warwick.anderson@aer.gov.au
RateOfReturn@aer.gov.au

Dear Warwick,

Re: Regulatory Treatment of Inflation

Please find attached our submission in relation to the above AER consultation process.

Kind Regards,

Mark Grenning
Sub-panel Chairperson

Submission to the Australian Energy Regulator (AER)

Consumer Challenge Panel

Response to AER Discussion Paper "Regulatory Treatment of Inflation – Preliminary Position" October 2017

Sub-Panel

Mark Grenning

Eric Groom

Bev Hughson

6 November 2017

The Regulatory Treatment of Inflation

1. Executive Summary

The Australian Energy Regulator (AER) has appointed a specially constituted Consumer Challenge Panel (CCP) sub-panel to provide a consumer perspective on the AER's review of the regulatory treatment of inflation. Specifically:

(i)   Does the current AER approach (which uses a 10 year average of the RBA forecast for the first two years then the mid-point of the RBA inflation band for the next 8 years) result in the best measure of expected inflation?

(ii)   Is inflation appropriately compensated for in the post tax revenue (PTRM), roll forward (RFM) and pricing models?

in the context of the National Electricity and Gas Objectives relating to the long-term interests of consumers.

This sub-panel's role is to participate in workshops and public forums, liaise with the AER established Consumer Reference Group and provide this submission. This is the second submission provided by the CCP following our submission on 29th June 2017.

In addition to the initial papers prepared by the ACCC and the AER,[1] this submission draws on:

- Submissions in June 2017 on the AER Discussion Paper
- The technical workshop on modelling held on 9th August 2017
- The AER's Preliminary Position Paper on the Regulatory Treatment of Inflation published in October 2017 ("AER Position Paper"),
- Consultant reports from the Sapere Research Group[2] ("Sapere") and Professor Shaun Vahey[3] submitted in September 2017, and
- Presentations and discussion at the AER forum on 31st October 2017.

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[1] Hayden Mathysen "Best estimates of expected inflation – a comparative assessment of four methods" ACCC Working Paper No 11 February 2017, updated October 2017
https://www.accc.gov.au/system/files/Working%20paper%20no.%2011%20-%20Best%20estimates%20of%20expected%20inflation.pdf
AER "Regulatory Treatment of Inflation – Discussion Paper" April 2017 https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-expected-inflation-2017/initiation
[2] Sapere Research Group "Efficient allocation and compensation for inflation risk" Report to the AER, September 2017 https://www.aer.gov.au/system/files/Sapere%20Research%20Group%20-%20Report%20for%20AER%20-%20Efficient%20allocation%20and%20compensation%20for%20inflation%20risk%20-%2025%20September%202017.PDF
[3] Professor S Vahey "Report to the AER on Estimated Expected Inflation" September 15, 2017
https://www.aer.gov.au/system/files/Prof%20Shaun%20P%20Vahey%20-%20Report%20to%20the%20AER%20on%20estimating%20expected%20inflation%20-%2015%20September%202017.PDF

Our conclusions are:

There should be a high "bar" for any change in approach

(i)   We re-emphasise the philosophical starting point made in our June submission - while some flexibility is important for exceptional circumstances, good regulatory practice is built on consistency and predictability. Both investors and consumers place a high value on these system attributes. This starting point is that there must be a very good reason for change – the "bar" for change should be set relatively high to ensure that any change is enduring and unambiguously in the long-term interests of consumers.

We support the AER continuing to use the current RBA inflation target method of measuring expected inflation and are prepared to consider a glide path under strict parameters

(ii)   We agree with the ACCC/AER's arguments in their Position Paper favouring continuation of the existing method of calculating expected inflation. Each approach has its strengths and weaknesses and selection is a matter of judgement, bearing in mind the AER's principles of congruence, robustness, transparency, replicability and simplicity. We support both the AER's principles and their judgement.

(iii)   The speaker representing the ENA at the October 2017 forum outlined what the networks believe are a number of categories of failures in the AER Preliminary Position Paper's analysis of different approaches. However, in the absence of any detail provided we are unable to assess their veracity.

(iv)   All methods have limitations. It is overly simplistic to justify change by a laundry list approach to claiming some gaps in the current approach. The AER's task is to come to a decision having tested each approach against proposed principles and to do so in the context of the objectives of the regulatory regime and the long-term interests of consumers. We believe the AER has done that.

(v)   The Tribunal in its October 2017 ActewAGL decision specifically endorsed the AER approach when ActewAGL was arguing for the bond break-even approach.

(vi)   While we understand the concerns raised by the ECA in its June 2017 submission drawing on the report by Professor Quiggin, we agree with the AER conclusion that adopting the upper range of the RBA inflation target band is inconsistent with the AER's task of selecting the best estimate of expected inflation. The shifting of risk from consumers to networks involved in this proposal is better examined as part of a wider review of the regulatory framework.

(vii)   Whereas the ENA had previously strongly supported the use of the bond break-even approach, at the October forum their representative proposed that the AER consider an approach that draws on all four approaches (existing AER, bond break-even, inflation swaps and surveys) to estimate expected inflation.

(viii) Based on the limited information provided, this approach seems to be involve drawing "relevant evidence" from all four approaches analysed by the ACCC/AER depending on "prevailing market conditions" to develop a "weighted average" approach. It appears to offer an approach that will inevitably lead to stakeholder challenges that would create significant uncertainty, complexity, administrative burden, and costs – a long way away from the AER

evaluation criteria. Consumers have no wish to have a repeat of the debate over the multi-model approach to modelling equity returns.

Any change in approach is so fundamental that it would be required to meet a very high bar for consumers to support the change.

(ix)   We are open to considering adopting a glide path approach to the calculation process, but it would have strict parameters such that it would only be used in extreme circumstances. We outline some possible design parameters for consideration and further research. We would welcome the opportunity to engage further with the AER if they were to undertake this research.

(x)   We support the AER's proposal to regularly review long term inflationary expectations through the Consensus Economics forecasts to see if they deviate substantially from the RBA midpoint.

The PTRM/RFM model, with a few minor "wrinkles", does adequately compensate networks for their real rate of return

(xi)   Our initial position presented at the June 2017 workshop and in our June submission – that the PTRM/RFM models, when considered over the full asset life (and not just one 5 year revenue period), do adequately compensate the networks for actual inflation and networks achieve their allowable real WACC irrespective of whether the actual inflation is above or below the RBA measure of expected inflation – has been substantially confirmed.

We agree with the small "wrinkles" to this conclusion discussed in the Sapere report eg first year effects, and agree with their conclusion that these do not take away from the substantive conclusion given they are small and symmetrical in impact.

We support the continuation of the current approach of targeting the real return on capital

(xii)   Some networks proposed that the AER should change the current approach and target the nominal return on capital or nominal debt/real return on equity. However, on balance we support continuation of the current approach. We do not consider that a sufficiently strong case has been made to demonstrate that a change in approach would provide a clear enduring improvement, particularly in regard to the long-term interest of consumers.

(xiii)   Changing the target return that the models would seek to maintain within a regulatory period is a fundamental change in approach. Hence, we consider that there should be high bar to change. If a change is to be made its should be well-tested and clearly superior across a range of circumstances and economic conditions

(xiv)   The AER's current approach:

- Is consistent with the requirements under the NER and NGR
- Is consistent with good regulatory practice in implementing incentive based regulation
- Reflects sound economic principles and is consistent with promoting efficient investment and financing strategies, and
- Provides an appropriate allocation of risk

It is important to note that the current approach provides a defined real price path for consumers and real income stream for the networks that ensures the opportunity to earn the real WACC set at the start of the regulatory period. A consequence is that the nominal return on capital and real return on equity will be different to that expected at the start of the period if actual inflation is different from expectations. However, we note that:

- These risks are borne by regulated businesses in other jurisdictions and unregulated businesses with long term real price contracts
- Evidence has not been provided that these risks are large in practice or that other businesses have not been able to satisfactorily bear and/or manage these risks
- Networks have the ability to manage their debt portfolio risk – debt equity ratio, fixed vs floating interest rate exposure - as they wish. This is a central part of the incentive based regulatory regime, and
- Reducing these risks for the networks would entail greater real price variability and uncertainty for consumers that generally do not have the ability to manage that risk.

(xv)   The modelling provided on the potential impacts on networks in support of the proposals to change the approach has been highly simplified and hypothetical. We have not seen strong evidence that the practical impact on utilities is large or unmanageable. We acknowledge that the impacts on consumers may be small but in the context of the rapid rise in energy bills that has occurred even small impacts can be difficult to manage.

(xvi)   To the extent that it is a systematic risk, the networks are currently compensated for this risk through the beta that is incorporated in the WACC. Furthermore, the AER has set the beta at the upper end of the range for the observed betas. If the approach is changed the AER would have to adjust the beta accordingly.

(xvii) We are not at all convinced of the relevance of the comment at the October forum that the AER has failed to disaggregate beta into its constituent 'risk' elements. The AER's range of 'reasonable' estimates of beta are determined by empirical analysis of historical equity returns and incorporates investors' overall assessment of risk. Whether or not the individual risks have been enumerated does not alter the fact that they are captured in the data to the extent they affect the variability of returns.

(xviii) The question of the trend in the beta was also raised at the October forum. There are many difficulties in interpreting this observation including the statistical reliability of beta estimates based on five years of data,[4] the reduction in and change to the relevant population of benchmark businesses, multiple regulatory changes over the period, and so on. However, irrespective of whether beta has changed, the principle remains that investors' perception of inflation risk is captured in the beta (along with other systematic risks). The separate rate of return review is expected to consider these issues.

(xix)   We see no benefit in the AER seeking to define a benchmark debt financing strategy. This will differ depending on ownership (State Government, local or overseas investors) and appetite for risk. This occurs irrespective of targeting an overall real return or a combination of real

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[4] It is generally accepted that the analysis of 10-year historical data provides more reliable and consistent results, and the most recent studies by the AER and by the industry consultants suggest an average beta very similar to that set out in the AER's 2013 Rate of Return Guideline.

equity/nominal debt. Again, it is up to the network to arrange its portfolio to achieve the best outcome.

2. Our philosophical starting point

As we emphasised in our June 2017 submission, good regulatory practice is based on the key principles of consistency and predictability[5]. While there needs to be provision for change in exceptional circumstances, consumers and long term investors value consistency and predictability. So our philosophical starting point is that there must be a very good reason to change. The "bar" for change should be set relatively high:

- To ensure the transactions costs of change do not swamp the proposed benefits of the change to consumers, and
- So that if adverse impacts appear down the track that were not anticipated at the time of the change, the costs of these impacts do not swamp the benefits of the change in measurement

What may appear to be a desirable change in one set of economic conditions may prove to have undesirable impacts when economic circumstances change leading to short-lived and changing approaches to regulation. 'Flip-flopping' of approaches as circumstances change is contrary to a primary objective of establishing professional independent regulation – time-consistency of decision making.

Furthermore, such changes in approach may systematically advantage those parties who have a stronger voice in the regulatory process and one of the concerns of consumers is that by reason of interest and resources, if not the practical effect of regulatory processes, the utilities have a stronger voice in regulatory processes. The approach was changed to the current approach (and away from the bond break-even approach) in 2008 following representations from the networks.

We need to have confidence that any change to the existing approach is enduring ie it provides a better estimate of inflation expectations over multiple revenue reset periods and not just in the current market conditions. We do not want to be coming back again in a few years' time to discuss another change in the measurement approach. The PTRM model is at the core of the network regulatory structure and change is only made very advisedly.

In considering the 'best measure' of expected inflation, we have also borne in mind the principles set out by the AER of congruence with the regulatory framework, transparency, robustness, replicability and simplicity. We also consider the best measure must be consistent with the following:

- Consistent with the general regulatory approach, we are seeking the best method to estimate investor expectations, not actual inflation
- It is a measure of long-term expectations; we are not convinced with methodologies that rely on short term movements in expectations
- The approach must be assessed in the context of the AER's modelling framework, namely the PTRM, the RFM and the annual pricing adjustment in the CPI-X formula, and over a number of regulatory periods (given the cyclical nature of the underlying data)
- Each approach will alter both the size and balance of risk between investors and consumers; as a general principle, the model that minimises the deviation between the expected and actual outcomes will minimise this risk

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[5] See for example Utility Regulators Forum, Best Practice Utility Regulation, 1999 (available from ACCC website), B Tenenbaum et al, Handbook for Evaluating Infrastructure Regulatory Systems, World Bank, 2006.

- Similarly, and assuming a pattern of unbiased risk, the party that is best placed to manage the risk, should generally bear that risk, and
- Where risk is shifted from the equity investors to the consumer (as in the nominal debt approach), consumers should be 'rewarded' for bearing that risk in terms of lower prices.

As the review has progressed it has become apparent that there are two separate sets of issues:

1. Does the current approach provide the best estimate of inflation expectations?
2. Should the return on capital in the revenue requirements be based on the real Weighted Average Cost of Capital (WACC) times RAB or a different approach such as nominal debt + real equity or nominal WACC?

The first question is important and can have significant revenue impacts but, unlike the second question, it does not represent a fundamental change in the regulatory approach. The current approach of a 'real WACC on real RAB' has been adopted from the commencement of independent utility regulation in Australia in the early 1990's. It is the most common approach to incentive-based regulation, following on the original models in Chile and the UK. To change this approach would fundamentally alter the allocation of risk under the regulatory model. For these reasons we believe the proposal to change the approach to the return on capital should be held to an even higher standard of proof than the proposal to change the approach to estimating inflation expectations.

3. The best measure of expected inflation

Following the June 2017 workshop, network submissions almost unanimously argued for the adoption of the bond breakeven approach. We have reviewed these submissions and commentary from the various networks and their representatives.

3.1 Does the AER method reflect market expectations?

One particular theme in these submissions was the criticism that the AER's approach is too stable and too slow to respond to what are regarded as shift changes in the economic environment eg to a regime of low inflation consistently below the RBA's target range.

In our view this lower level of volatility is one of the virtues of the AER's current approach compared to the market based approaches proposed by most of the networks. This benefit is particularly relevant in the regulatory framework given the 10-year investment horizon and given the cyclical nature of CPI outcomes given the RBA's monetary policy objectives. As the RBA stresses, its aim is not to rigidly adhere to containing inflation within the 2-3% band at all times[6]:

> "The inflation target is defined as a medium-term average rather than as rate (or band of rates) that must be held at all times. This formulation allows for the inevitable uncertainties that are involved in forecasting, and lags in the effects of monetary policy on the economy...The inflation target is also, necessarily, forward looking."

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[6] Reserve Bank of Australia, "Inflation target", http://www.rba.gov.au/monetary-policy/inflation-target.html, accessed on 4 November 2017.

We consider that the RBA's purpose in setting and managing the inflation target is entirely consistent with the AER regulatory framework – it is about medium term outcomes , it accounts for the reality of uncertainty and business cycles and it is consistent with the forward looking estimation of the regulatory WACC. As the AER notes[7]:

- Since the start of inflation targetting in Australia, actual inflation has averaged ~2.5%, and
- The studies cited by the AER that long term expectations of inflation are anchored within the RBA's inflation target band near the mid-point

In addition to providing data on actual inflation, the RBA also provides data on various measures of 'expected inflation' including inter alia, expectations by market economists for 2 years ahead, and breakeven inflation measures for 10-years ahead. Figure 1 illustrates these two series since September quarter 2005. It demonstrates that:

- Market economist expectations for inflation 2 years ahead tend to move around the AER's target range with only a coupel of observations that sit outside the range, so there is no sign of a loss of confidence in this target, and
- The 10-year breakeven meassure is considerably more volatile, and more recently, is well below the target and below short term market economists' expectations.

Figure 1: Inflation Expectations: Market economists 2 year ahead and Break-even 10 year inflation rates
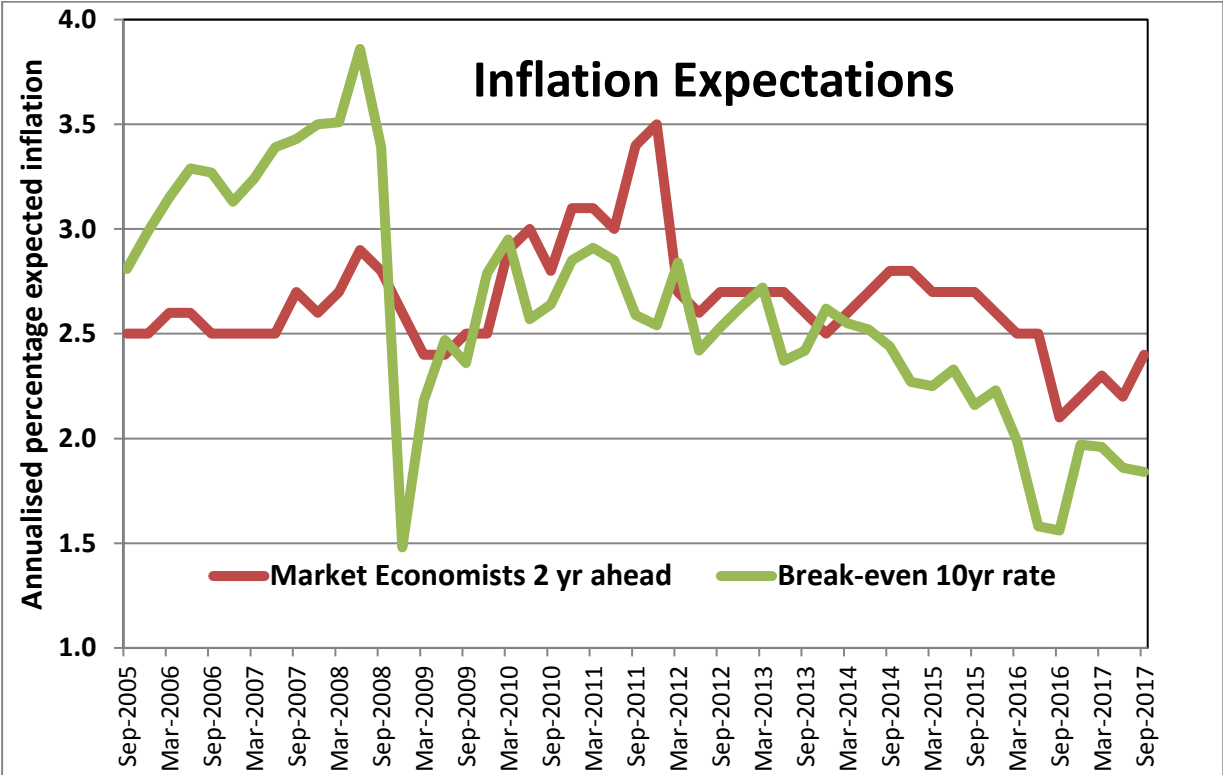
Source: RBA Statisticsl Tables Table G01hist.xls https://www.rba.gov.au/statistics/tables/ Accessed 4 November 2017.

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[7] AER Position Paper p.49

We consider this provides further evidence of the difficulty of using the breakeven approach as a direct measure of inflation expectations. For instance, there is no objective reason why long term inflation expectations should be as volatile as those indicated by the breakeven approach. Nor is there a rationale to explain why, in the current conditions, long term expectations would be lower than 2 year expectations given the cyclical nature of actual CPI and the reasonable expectation of reversion to the mean over time.

The speaker represeting the networks at the October 2017 forum outlined what the networks believe are a number of categories of failures of the AER Position Paper's analysis of different approaches. These included claims that points raised by networks in their June 2017 submissions were not considered by the AER, assertions by the AER were not supported by the evidence, conclusions were not explained, the AER's approach should be based on the benchmark financing strategy and selective interpretation of the evidence. However, in the absence of any detail provided, we are unable to assess their veracity.

As we commented in our June 2017 submission, there is no perfectly right approach. All methods have limitations. It is overly simplistic to justify change by a laundry list approach to claiming some gaps in the current approach. The AER's task is to come to a decision having tested each approach against proposed principles and to do so in the context of the objectives of the regulatory regime and the long-term interests of consumers. We believe that the AER has done that.

3.2 <u>What does the Tribunal think?</u>

The issue of bond break-even vs the AER's RBA approach was the subject of a recent ActewAGL appeal to the ACT where ActewAGL argued for the bond break-even approach. The Tribunal's decision on 17th October 2017 explicitly endorsed the AER's approach and commented[8]:

> "472   As a threshold point, the Tribunal accepts the AER's submission that its Final Decision conclusion – that it did not accept ActewAGL's approach because it did not consider CEG's application of the breakeven approach appropriately adjusted for bias – constitutes a finding for the purposes of r 40(2) of the NGR that the estimate of expected inflation produced using the inflation estimation method proposed by ActewAGL did not comply with r 74 because the estimate was not arrived at on a reasonable basis and did not represent the best forecast or estimate possible in the circumstances.
>
> 479   In assessing the question of statutory error, the Tribunal finds ActewAGL's submissions – and the relevant passages in the CEG report – unpersuasive as to the relative merits of the two methodologies. The question is which methodology is likely to produce the better forecasts. As to the first three years, the Tribunal heard no evidence to suggest that the official forecasts of the RBA were to be discounted. It might be noted that in making those forecasts – which are a vital input to market expectations and investment decisions – the RBA would employ a range of methodologies and market intelligence, no doubt including market estimation methodologies, of which the breakeven methodology is one.

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[8] Application by ActewAGL Distribution [2017] ACompt2
http://www.judgments.fedcourt.gov.au/judgments/Judgments/tribunals/acompt/2017/2017acompt0002#_Ref495393556

481   Attention must turn to the use of the breakeven methodology for the out-years of the ten-year inflation forecasts versus the use of the mid-point of the RBA's target range. Even three years out, forecast inflation is highly unpredictable. That much can be seen by the surprises in the market at inflation being lower than expected in the recent past. The Tribunal sees no inherent unlikelihood in inflation being 2.5 per cent in 2018-19, as assumed in the AER's methodology. The only evidence that such an outcome was unlikely was that it would involve inflation increasing from 2.0 per cent the year before. This was merely asserted to be implausible, with no evidence regarding, for example, the frequency or otherwise of such events in the past.

482   Given the widely reported intention of monetary authorities in many countries to encourage inflation to increase, and the historical coincidence between actual inflation outcomes and the mid-point of the range, the Tribunal accepts that use of the RBA's target range provides the best possible inflation forecasts for the time being. Of course, that assessment should be reconsidered by the AER from time to time."

3.3 Should the the rate the AER use in years 3-10 be the upper bound rather than the mid-point of the target range?

We have considered the ECA proposal, based on a report to them by Professor Quiggin, that it is ultimately consumers that are the party currently exposed to inflation risk [9] and therefore consumers should be 'compensated' for this risk by selecting an expected inflation for years 3-10 at the upper end of the RBA's range of 2-3%.

We agree with the AER's view that this would result in a transfer from networks to consumers but not necessarily lower risk. In any case such a change may not meet the NER/NGR test that the measure is in "best estimate" given the risk shifting. As the AER notes[10]:

"Transfers of risk are best considered as part of any change to the regulatory framework."

3.4 A change of view from the networks

At the October 31st 2017 forum, the speaker on behalf of the ENA proposed a different approach from bond break-even, though provided little detail. He said that the choice of approach should not be binary ie you have to pick one of the four options – the AER's current method based on the RBA inflation target, bond break-even, zero coupon inflation swaps or surveys. The risk with that approach is that all the risk is with the one method chosen. He argued that an alternative approach is to look at "relevant evidence" from all four measures depending on "prevailing market conditions". Taking the "good bits" from each of the measures should minimise the risk of using just one method. For example, if the bond market lacks liquidity then the reliance on this approach would be small.

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[9] That is, once the expected inflation is determined by the AER, the investors are guaranteed to receive the promised real return on equity while consumers face variation in real prices as they are charged in nominal terms. Moreover, the residual risk which is the risk that the AER's measure of long-term expected inflation does not reflect actual inflation (which it never can), can be managed by a business through the inflation swap market, a market that consumers do not generally have access too. However, we see no evidence that the businesses have sufficient concerns with the AER's current inflation estimate to hedge their exposure in the inflation swap market.

[10] AER Position Paper p.50

Given the lack of detail, we can only make some general observations on this approach.

Each measure has biases and the issue is how to assess their importance and whether they are transient or more permanent, non-systematic or systematic.

Presumably the AER would be tasked with assessing the relative weightings for each approach at a particular point in time. But will the AER only do this assessment once for each revenue rest? If so, then when will it do that and how does it address the risk that weightings will inevitably change over the 5 year regulatory period? If not, then does it assess the weightings in each year of the five year revenue reset period? Whether once every five years or once every year, it will inevitably lead to stakeholder challenges that would create significant uncertainty, complexity, administrative burden and costs – a long way away from the AER evaluation criteria that we support.

Moreover, it is not clear that weighting of multiple models or methods can provide better solutions, even if – and it is a big if – assuming the AER could get agreement on the weighting criteria and their relative weights for each criterion. For example, if there are four methods, but the inputs to two of them are closely correlated, then should each of the two models be weighted 25% given each one adds limited new information to the other? On the other hand, if the models reflect very different approaches, is a weighted average of the outputs of the four models a meaningful concept? In all probability it will produce an outcome of convenience that has no theoretical foundation and limited explanatory power. We have a false and very misleading sense of accuracy.

Given this latest proposal, it is perhaps not surprising that the ENA did not support the "simplicity" criteria proposed by the ACCC/AER in evaluating alternatives. As noted above we believe that consumers do place a high value on "simplicity". We await further evidence to see how the proposed approach fits with the principals of congruence, robustness, transparency and replicability that the ENA did agree with.

3.5 Summary

We acknowledge that no measure is perfect. All have advantages and disadvantages. Each approach has its strengths and weaknesses and selection is a matter of judgement, bearing in mind the AER's principles of congruence, robustness, transparency, replicability and simplicity that we agree with.

Having carefully considered each of the four methods set out by the AER and the proposal by the ENA representative for some form of weighted average of the four options, we have concluded that the AER's current approach provides the 'best estimate' of inflation consistent with the regulatory framework and objectives. Our conclusion is based on the information provided by the AER, the ACCC and the various submissions and presentations by the networks and the ECA, and our philosophical approach. In our previous submission, the CCP provided more detailed analysis of the four different approaches and we consider these arguments are still relevant so will not repeat them here.[11]

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[11] CCP submission 29 June 2017
https://www.aer.gov.au/system/files/Consumer%20Challenge%20Panel%20submission%20on%20regulatory%20treatment%20of%20inflation%20-%2029%20June%2017.PDF

Finally, this choice requires ongoing monitoring of the market evidence. Hence, we would support the AER's proposal to regularly review long term inflationary expectations through the Consensus Economics forecasts to see if they deviate substantially from the RBA midpoint. However, the parameters of 'when' and 'what' of this review need to be more specifically and objectively defined by the AER to avoid future disputes that may then be subject to judicial review.

4. The potential role of a glide path

A number of networks have argued that if the AER were to keep with its existing RBA method then it should consider a "glide path" for some (2/3/4?) years from year 3 where the expected inflation forecast gradually reverts to the RBA's mid-point. The AER presented academic evidence that the revision to the mid-point is relatively quick with achoring of expectatiions within the RBA band[12], suggestign that there is little reason for a glide path. Neverthesss the AER still sought submissions on the glide path issue.

Our approach here is consistent with our philosophical approach – is there a case for giving the AER some flexibility to respond to more extreme economic conditions, due for example to an exogenous event, that would lead to expectations not being anchored in the RBA band and expose either investors or consumers to an unacceptable level of risk and financial stress? If yes, then:

- how might such a situation be defined?, and
- what adjustments should be made in the form of a glide path?

This submission suggests some very early thoughts on these questions. Much more research would be required before more serious consideration is given.

4.1 Definition of a relevant event

The definition should be reflective of the event being rare eg a statistical test such as 2 standard deviations from the observed historical mean (currently the RBA mid-point at 2.5%). Alternatively it could be defined by reference to significant deviation from the average of relevant and independent data on inflation expectations such as that provided in the Consensus Economics mid-long term forecasts. Such definitions are relatively objective and measurable, but the exact parameters used would need to be tested to ensure they are robust and meaningful in terms of the principle of only modifying the approach for rare events

However, the task of defining a relevant event in these statistical terms is not straightforward and requires further research by the AER. Moreover, it appears that recent history will provide little guidance to us on how we should identify these events. For example, we note that both Figure 1 above (inflation expectations) and Figure 2 below (actual CPI) provide no support for the theory that either expected or actual inflation is currently (or has in the past) been disconnected from the RBA target range.

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[12] AER Position Paper p.46

This is despite the fact that the last 20-25 years have seen period of high and low interest rates, recession and strong economic growth, the dot.com bubble and the GFC. But there still may a future event that does provide a significan shck to the system eg a sudden large drop in the currency.

Figure 2: Long-run inflation
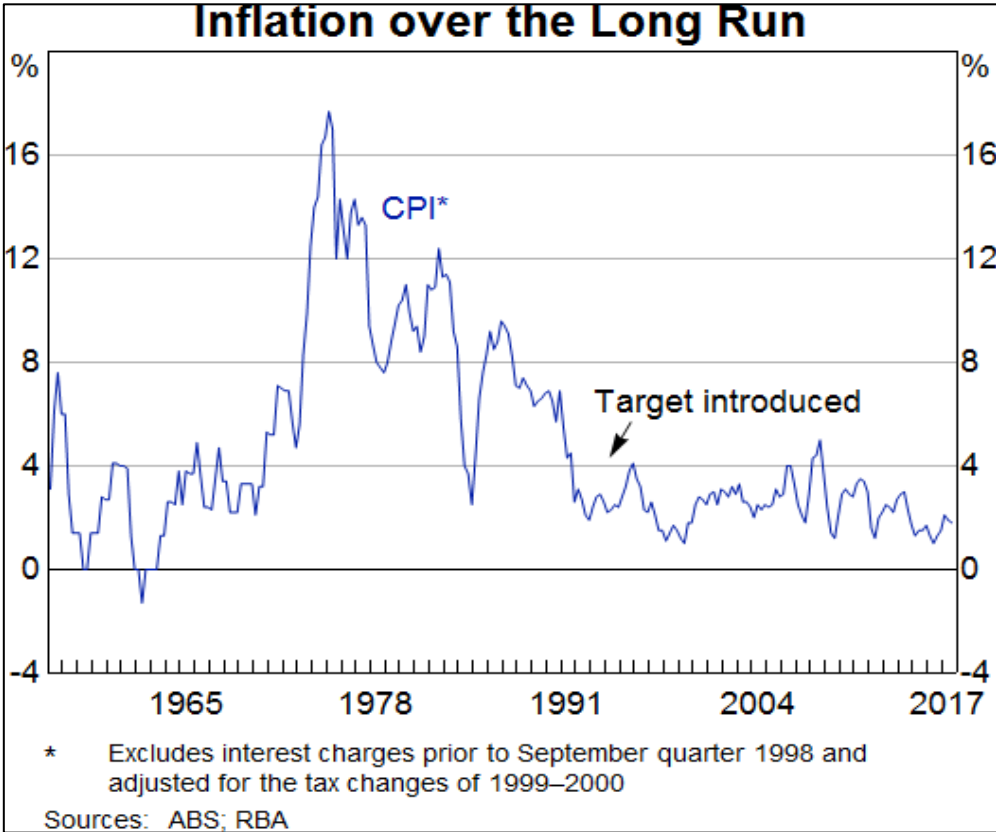
Source: RBA, http://www.rba.gov.au/monetary-policy/inflation-target.html, accessed 4 November 2017.

4.2 Assessing a glide-path

By taking the RBA's actual forecasts for years 1 and 2, the AER's current approach effectively assumes a two year revision to the RBA mid-point. The extreme event as described above would be where that revision would be longer than the first two years of the ten year forecast period. Some thoughts on how this glide path might work:

- The parameters that define when the option is exercised should be clearly defined in advance and are such that it is called up on very limited and pre-defined occasions
- The period over which the glide-path to the RBA's inflation target mid-point, is limited to two years, making a total of four years to reflect prevailing conditions, and
- The glide path should be a simple linear transition from the second year of the RBA forecasts to the mid-point of the RBA's target range by the 5th year.

So, in summary, we support the AER undertaking further research to define the parameters around how a glide path might be triggered and how in might operate in "extreme" circumstances. We

would welcome the opportunity to engage further with the AER if they were to undertake this research.

5. Does the current approach deliver the target return on capital?

5.1 <u>What is the basis of the return on capital in the current framework?</u>

Under the AER's approach to regulation the objective is to provide a real return on an indexed, or real, rate base, as the AER has set out in the position paper[13]:

> "Our current approach targets the delivery of the initial real rate of return (derived from the initial nominal rate of return and expected inflation) plus actual inflation outcomes over the regulatory period. Targeting the real rate of return means that revenues received by the service provider move in the same direction as inflation. If actual inflation outcomes are below expected inflation, service providers recover less than expected; but if actual inflation outcomes are above expected inflation, service providers recover more than expected."

The approach that can simply be described as a 'real WACC on real RAB' is the most common means of implementing incentive-based regulation following the models concurrently but separately established in Chile and the UK. It has also been the common model for implementing incentive-based regulation in Australia from the early 1990's.

While the approach provides for the return to investors through a 'real WACC on real RAB', in the form adopted by the AER it involves the following steps:

1. Estimation of a nominal WACC
2. Indexation of the RAB for inflation
3. Deduction of the increase in the RAB due to inflation from depreciation.

Step 3 is required to avoid 'double counting inflation'. The nominal WACC includes expected inflation in the interest rates and actual inflation is included through the indexation of the RAB. Deducting the indexation component of the RAB from depreciation removes this double counting and makes the approach equivalent to a 'real WACC on real RAB'. This is implemented through three linked models/processes:

1. The Post-Tax Revenue Model which sets the real revenue stream (in the form of a CPI-X revenue path) based on expected inflation
2. The Asset-Roll Forward Model which rolls forward the asset base to the start of the next regulatory period using actual inflation
3. The annual price adjustment model/process that adjusts prices/revenues based on actual inflation rather than forecast inflation.

The third step is important in reconciling the PTRM, which is based on forecast inflation, and the Asset Roll-Forward Model, which is based on actual inflation.

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[13] AER Position Paper, p59.

Joskow has usefully summarised the basis of incentive-based regulation and the 'real WACC on real RAB' approach as follows[14]:

> "When a price cap mechanism (RPI- X) is applied to capital costs, the calculation of the amortization formula for capital (depreciation, rate of return on investment) and the valuation of the capital stock (rate base or RAV) need to be done in a particular way to ensure that there is not over- or underpayment for capital services over the lives of capital investments. Specifically, at the time of a price review the RAV (original cost of capital investments less depreciation) should be adjusted for inflation that has occurred since the last price review, and the allowed rate of return on the RAV during the price review period should be based on the real cost of debt and equity capital net of taxes, with tax allowances then added back in. Because prices are based on both operating and capital costs, the RPI- X formula essentially yields a nominal return equal to the real cost of capital plus the rate of inflation. Capital- related charges rise with the rate of inflation in this case and this is consistent with the RAV rising with the rate of inflation, together yielding an approximation to the economic depreciation rate (depending exactly on how the depreciation rates are set…)."

In summary, the AER's approach and models are designed to provide a real weighted average cost of capital for the regulatory period. However, this real return is not guaranteed – outcomes will vary if actual opex and capex is different from the benchmark level of spending, for example. The next section examines whether the real return achieved is affected by differences between forecast and actual inflation.

5.2 Does the current approach 'deliver' the targeted return on capital?

As noted above, the current approach is designed around the provision of a real WACC in building up the projected revenue requirement. This section first addresses whether the current models used by the AER deliver the real WACC assumed and whether it still delivers the real WACC if actual inflation is different from forecast. To assist in answering these questions the CCP ran a set of scenarios using the scenario model provided by AER[15].

The basic assumptions and scenarios are set out in the tables below:

Table 1: Common Assumptions for Modelling

Inflation Assumption	2.5% (constant)
Real WACC	5.0% (constant)
Opex	0 (to abstract from its impact)
Capex	1000 in year 0, 100

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[14] Paul Joskow, "Incentive Regulation in Theory and Practice Electricity Distribution and Transmission Networks", Nancy L. Rose (eds) "Economic Regulation and Its Reform: What Have We Learned?" University of Chicago Press, 2014, p322
[15] See https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/roll-forward-model-distribution-december-2016-amendment/initiation.

Depreciation	Straight-line, 30 year asset life	

Table 2: Scenarios for Actual Inflation

	Base Case	Low Inflation	High Inflation
Actual Inflation	2.5	1.5	3.5

5.2.1   Does the model provide the assumed real WACC ex-ante?

This point is uncontroversial as the models used by the AER have been well-tested over many reviews. The models provide the assumed real WACC in the annual revenue requirements, given the other assumptions such as opex, capex and inflation. Sapere provide a mathematical demonstration that the models do provide the real WACC ex ante (i.e. that the NPV of revenues and costs is zero)[16]. CPP's modelling of its Base Case where actual inflation equals expected inflation also demonstrates this - see Attachment 1.

5.2.2   Does the model provide the assumed real WACC if actual inflation is different from assumed inflation?

It now appears to be agreement from the August 2017 workshop, that the current models used by AER ensure that, other things being equal, the achievement of the real WACC that is not significantly affected if actual inflation is different from the assumed inflation. This is because the annual adjustment of prices, which is based on actual inflation rather than forecast inflation, effectively corrects the outcomes of the PTRM for variations between the assumed inflation and actual inflation for all its components. That is, if the PTRM was run using the actual inflation, the resulting nominal revenues would be (approximately) the same as that delivered by the CPI-X price path established at the start of the regulatory period. This then aligns the PTRM with the RFM.

The scenarios presented to the August Workshop demonstrated these results for a simplified example. The results showed that if in each year actual inflation was 1% below the assumed inflation the NPV of the cash flows was +$16.73m or +1.6% of revenues. The small increase in the cash flows was contrary to expectations and reflected the first-year effect (discussed below). Prices were 1% higher in real terms – again due to the first year effect (see graph below).

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[16] Sapere pp6-9.

Impact - Actual Inflation (1.5%) Less than Assumed Inflation (2.5%)
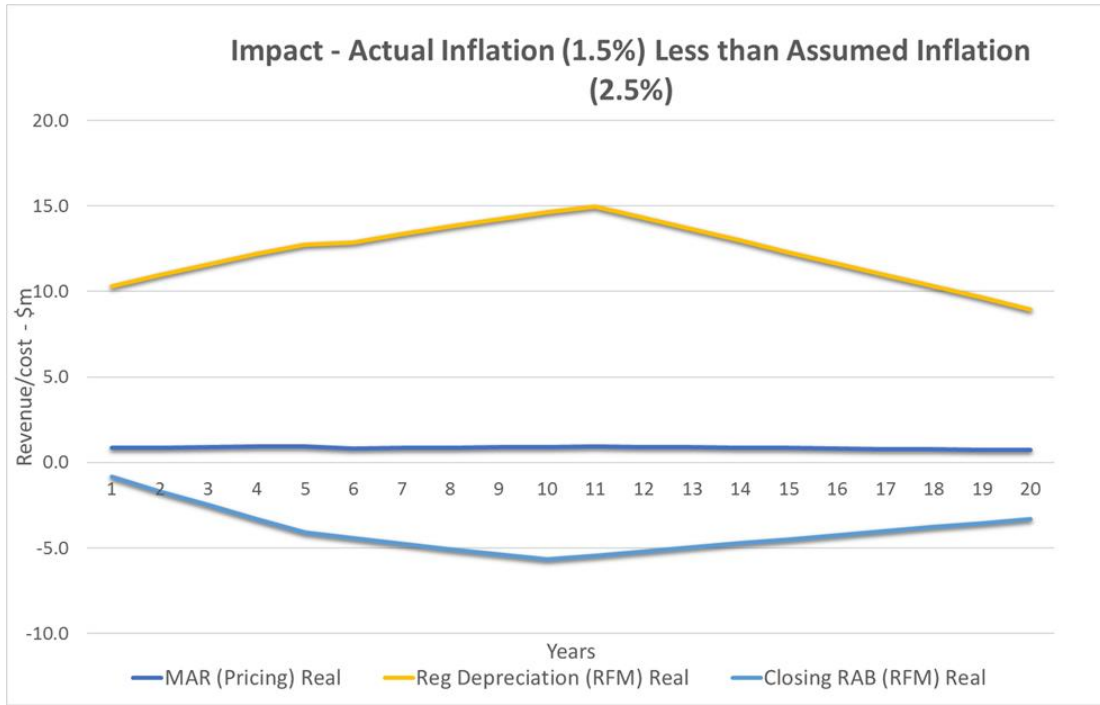
The results when actual inflation was 1% higher than assumed inflation in each year were symmetrical. The NPV of cash flows was -$16.6m (-1.6% of revenues) and prices were 1% lower in real terms (see graph below).

Impact: Actual Inflation (3.5%) Exceeds Assumed Inflation (2.5%)
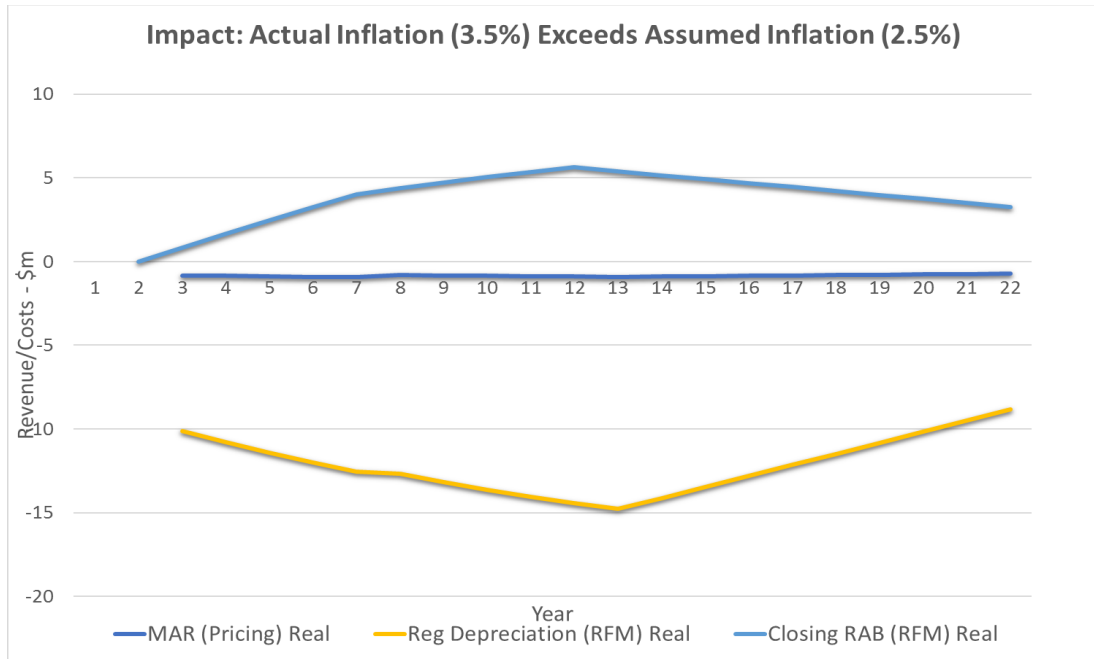
As the Position Paper notes[17]:

> "Initially, stakeholders expressed divergent views on whether the current regulatory framework delivered this intended target. However, following engagement and consultation,

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[17] AER Position Paper p.60

stakeholders at our technical workshop reached consensus that the current regulatory framework delivers the initial real rate of return."

Subsequently Sapere provided a more rigorous demonstration of these results and in particular the source of the minor variations from the assumed real WACC. The primary factor is the first year effect: the revenues and prices in the first year are set on the basis of the forecast inflation rate and are not subsequently corrected for the actual inflation rate.

In summary, the real WACC achieved is not significantly affected by a difference between actual and assumed inflation: that is if the only difference in all the modelling parameters was a variation between actual and assumed inflation the network would still achieve the real WACC (with minor variations) that underpinned the determination of regulated revenues/prices.

5.2.3   Do other measures of return vary with differences in actual inflation and assumed inflation

The review process has increased the understanding of all parties of the impacts of variations between actual and assumed inflation. As noted above, such variations do not affect the real WACC but it will affect other measures of return.

As Sapere conclude in their advice to the AER[18]:

> "There is some residual risk to equity holders because service providers typically issue debt in fixed nominal terms. If actual inflation were less than expected, and hence nominal cashflows were lower, returns to equity would be lower than expected because the residual cashflow after meeting debt costs would be less than expected (conversely, if inflation is unexpectedly high, equity holders receive a benefit). This impact on the return on equity is magnified by leverage. For example, with leverage of 60%, a 1% difference between the AER's estimate of expected inflation from the expectation of inflation implicit in the nominal WACC, would mean a 2.5% difference in the nominal return to equity."

These effects can be broken down into sub-components:

1. If inflation is higher than expected, revenues and prices will be higher in nominal terms ($'s of the day). Assuming other costs move in line with inflation the nominal return on capital will be higher.
2. If the network issues debt in nominal terms (i.e. not through indexed bonds or through using inflation swaps) the interest costs will not increase in nominal terms with the higher rate of inflation. Hence, although the total return on capital increases in nominal terms in line with the higher rate of inflation, the increase return to equity will be greater and the real return on equity will increase.

The effect is symmetrical: if inflation is lower than expected the nominal return on capital will be lower than expected and, depending on financing strategies, the real return on equity may be lower than expected.

However, if the regulatory regime sought to keep the nominal return on capital constant, prices and the real return on capital would vary with differences between the actual and assumed inflation rate.

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[18] Sapere p.vi

This would also apply if the regulatory regime targeted a combination of a nominal return on debt and a real return on equity.

In conclusion, CCP considers that the current models and approach to setting revenues/prices achieves the objectives of allowing the achievement of the real rate of return and maintenance of the price path in real terms irrespective of actual inflation outcomes. This necessarily means the nominal return on capital will vary if inflation outcomes differ from expectations. Depending on the network's financing strategy, the real return on equity may also vary.

6. The potential for varying the real WACC objective

6.1 Is the current approach consistent with the current rules?

The overarching principles guiding the AER's regulation of energy networks the National Electricity Objective (NEO), its gas counterpart and the allowed rate of return objective. The NEO is[19]:

> "…to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to— (a) price, quality, safety, reliability and security of supply of electricity; and (b) the reliability, safety and security of the national electricity system."

The allowed rate or return objective (ARORO) for electricity networks is[20]:

> …that the rate of return for a *Distribution Network Service Provider* is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the *Distribution Network Service Provider* in respect of the provision of *standard control services* (the *allowed rate of return objective*).

Neither the NEO or the ARORO mandate the 'real WACC on real RAB' approach. However, the concurrent provisions in the NER that the RAB is to be indexed for inflation and a nominal WACC is to be determined introduce a conundrum for the AER. This means that potentially the network is compensated twice for inflation - in the WACC and through the indexation of the RAB. This has been resolved through the deduction of the increase in the RAB through indexation from the allowed depreciation. Mathematically this is equivalent to providing a real return on the indexed RAB, consistent with the 'real-on-real' antecedents for incentive-based regulation in Australia and overseas.

The result of this is a contract, supervised by the AER, between the networks and electricity consumers expressed in real terms: the networks have certainty of a revenue stream in real terms and the consumers have certainty of a price path expressed in real terms. Arguably this is in the interest of both parties and best achieves the NEO. For consumers, prices will be linked to inflation. If household incomes are also linked to inflation it means that the part of household income consumed by the network component of energy bills will also be known and not vary with inflation. That does not make rising real energy bills any more palatable but it may make household budgeting easier.

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[19] NEL sect. 7
[20] NER cl. 6.5.2(c)

As the NEO reflects, a key interest of both consumers and the utilities is adequate investment. A real WACC on real RAB is also more conducive to this. Whether the WACC is set in real or nominal terms the same principle applies: the WACC should be sufficient, but no higher than necessary, to provide an incentive to invest efficiently. In that context the following comment from Sapere is particularly relevant[21]:

> "Ex ante a firm must have an expectation that its investment will be profitable, or it will not invest. This means investors expect the present value of future revenue to be no less than the present value of costs, where cost includes a reasonable return on the investment (the opportunity cost of capital)
>
> …
>
> As specific, long-life, assets are a significant fraction of total costs of NSPs, the long-term credibility of the regulatory rules are important in convincing investors they will be fairly compensated for the efficient costs they incur in the provision of services. Future decisions are influenced by past outcomes. The long-term interest of consumers requires both an ex ante expectation of real returns, and that these returns are able to be achieved ex post."

This highlights that the relevant concept is the cost of capital in aggregate and it also focusses on the importance of real returns. Oxera also emphasises the latter point[22]:

> "Inflation is central to regulation. It is a given, in the UK and abroad, that investors' returns should allow for inflation, and that what matters are the real returns received by investors."

This is consistent with the Position Paper's statement, which we agree with, of the economic rationale for targeting the initial real rate of return[23].

An issue that has been raised is whether the ARORO, which refers to "efficient financing costs of a benchmark efficient entity" requires the targeting of the nominal return on capital or a separate targeting of a nominal return on debt and real return on equity. Firstly, it should be noted that objective relates to the overall 'rate of return' on assets not the cost of debt as distinct from the cost of equity. This means the question of efficient financing of the benchmark entity concerns both debt and equity. Secondly, the efficient costs of financing can be expressed in either nominal or real terms, with the same outcome for the allowed revenue streams. The concerns raised by some networks about the impact of a constant real income stream do not relate to how the efficient cost of capital is determined, consistent with the ARORO, or how it is expressed, but rather the question of whether the nominal return on capital or the real return on equity should be held constant (rather than the real return on capital) when inflation varies.

It has also been argued that the rule change and the switch to a trailing average for debt require that the AER change from targeting the real return on capital. This is not correct.

Firstly, the rule change and the decision to adopt the trailing average approach were separate decisions. The AER's discussion in its final report on the rule change on the approach to estimating

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[21] Sapere pp2-3.

[22] Oxera "Which WACC when? a cost of capital puzzle" Agenda, September 2005
https://www.oxera.com/Latest-Thinking/Agenda/2005/Which-WACC-when-A-cost-of-capital-puzzle.aspx

[23] AER Position Paper pp70-71.

the cost of debt made it quite clear that the rule change increased the options available to the AER, and did not mandate a change to the trailing average. The AER could, if it wished, have maintained the on-the-day approach. From the AER's discussion of the options in its explanatory statement on the rate of return guideline it is clear that the AER considered it could have maintained the on-the-day approach if it considered it was the superior approach.

Secondly, it does not logically follow that because the AER has adopted the trailing average approach that it should shift from its current targeting of a real WACC. Other regulators, such as OfWat and Ofgem have adopted the trailing average approach without changing from targeting the real WACC.[24] The adoption of the trailing average approach results in the cost of debt reflecting past inflation rather than forecast inflation. This was known at the time of the decision to adopt the trailing average. The consequence is that at any point in time the cost of debt will reflect the financing cost of capital of an incumbent supplier who chooses not to hedge rather the cost of the new entrant. The latter aligns better to the economic cost of debt, but the adoption of the trailing average was seen to have benefits in reducing financing risks and transaction costs for the regulated networks. The change in the measure of debt used to estimate the WACC does not appear to significantly affect the risks arising from the difference between actual and expected inflation that some stakeholders have highlighted in proposing a change from targeting the real WACC.

In summary, we consider that the current approach of focussing on the real rate of return on a real RAB is well-understood, has strong precedents, and is consistent with the requirements of the National Electricity Rules (NER) and National Gas Rules(NGR).

6.2 <u>Could the current approach be changed within the current rules?</u>

While the current approach that effectively establishes the revenue requirement to achieve an efficient real cost of capital is consistent with the requirements under the NER and NGR, this does not mean that it is the only possible approach that would be consistent with the NER and NGR. The key requirements are that the approach should satisfy the NEO and ARORO and be consistent with the indexation of the RAB and the setting of a nominal WACC.

We understand that in principle it would be possible to construct revenue models and regulatory controls that would satisfy the requirements to index the RAB and set a nominal WACC while avoiding double counting of inflation while targeting the nominal rate of return or real return on equity. However, it would be necessary for the AER to clearly demonstrate that an alternative approach better meets the requirements of the NEO/NGO and ARORO.

In our view such changes would represent a major change to the regulatory framework and approach. In these circumstances it would be appropriate for the AER to set a high bar for changing the approach given its implications. Such changes go to the heart of the current regulatory framework and would make an already complex regulatory model more complex. This raises significant risks of unanticipated or unintended consequences. It also makes it even more important

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[24] OfWat is consulting on an arrangement for indexing the cost of new debt to a benchmark cost of debt in that year. This is relevant to the adoption of the trailing average but it is not changing the underlaying real WACC framework. Ofgem introduction an inflation correction factor in 2011 unrelate to the adoption of the trailing average but it did not change the underlying approach to regulation.

that any new approach is enduring and robust under changing circumstances and economic conditions.

6.3 Should the current approach be changed?

6.3.1 What has been proposed?

The two alternatives set out in the AER's position paper are:

1. Targeting the nominal return on capital. While it is not clear how this would be implemented there appear to be two options. Under one option we would no longer have CPI-X regulation. Prices would be set in nominal terms based on nominal forecasts of cost. This would leave the network broadly exposed to inflation risk on its non-debt costs.

   The other option would be to maintain CPI-X regulation to continue to protect the network from the impact of inflation on its costs. The initial price path may be established as it is at present, but the prices would need to be adjusted each year to ensure the originally modelled nominal return on equity. Thus, if inflation were higher than forecast the nominal return would be higher. In this case prices would have to be reduced relative to the established real price path. For the network the real rate of return would fall. The reverse would happen if inflation was below forecast - prices and the real rate of return on capital would be higher than anticipated.

2. Targeting the real return on equity. The initial price path may be established as it is at present, but the prices would need to be adjusted each year to ensure the originally modelled real return on equity. If inflation were higher than forecast, the nominal return would be higher. Assuming embedded debt is financed in nominal terms the real return on equity would increase. In this case prices would have to be reduced relative to the established real price path. For the network the real rate of return on capital would be lower than anticipated. The reverse would happen if inflation was below forecast: prices and the real rate of return on capital would be higher than anticipated.

At this stage we have not seen modelling that shows in a practical sense the relative impact of these alternatives on real prices and the real return on capital relative to the benchmarks established at the start of the regulatory period.

6.3.2 What would be the criteria for changing the current approach?

To be adopted, an alternative approach would need to:

- Clearly demonstrate that it better meets the NEO and the ARORO in a wide range of circumstances and economic conditions
- Better satisfy the best practice principles of regulation such as efficiency, transparency and simplicity
- Be fully specified, modelled and thoroughly tested

Achievement of the NEO and ARORO

The NEO and NGO focus on the long term interest of consumers, particularly in terms of the incentives for efficient investment. It also requires consideration of the impacts on consumers over multiple regulatory periods.

We do not believe that it has been demonstrated that the alternatives better meet the requirements of the NEO/NGO:

- A focus on, and maintenance of the real WACC better aligns with the opportunity cost of capital and the economic principles of efficient investment
- It provides a better assignment of risk that is consistent with regulatory practice elsewhere and unregulated businesses that also have long term supply contracts (explicit or implicit) specified in real prices
- The focus on WACC rather than the ROE provides stronger incentives to pursue efficient financing strategies.

One of the consequences of a change in approach would be a change to the real price-real WACC contract between customers and the networks implicit in the current form of regulation. Real prices would change in way that at the margin may exacerbate energy affordability issues for vulnerable households and businesses and make budgeting for energy bills more difficult for all customers. This is because network prices would become more variable and less predictable. In particular, when inflation is low and incomes rising more slowly than CPI, the network component of energy bills would increase relative to the expected levels.

The current approach satisfies the ARORO which focuses on the ex ante efficient cost of financing. An alternative approach that reduces short term financing risk, by passing on an ex-post inflation risk to consumers (through price variability) is not necessarily more efficient. The starting point should be an appropriate allocation of risk. Given that allocation of risk the efficient financing costs can be assessed, but it is not possible to determine the efficient financing cost without considering the relevant risks and the appetite of the business for risk. In this case, there are financing instruments available (inflation swaps, indexed bonds) that businesses can, and do, use to manage inflation risks, but they come at a cost. However, one cannot say that a strategy seeks to reduce risks through such instruments is a priori less efficient than one that does even though the latter may have a lower cost.

These issues are discussed in more detail below.

Consistency with Best Practice Regulatory Principles

The table below summarises set of best practice principles of regulation. The first three – efficiency, commercial sustainability and the consideration of the interest of consumers are covered under the NEO and ARORO. The consistency principle is covered by our insistence that there should be a high hurdle for change. It does not appear that the alternative approaches would significantly impact on the principles of transparency. However, they may well impact on

- Certainty – the alternatives would reduce the certainty consumers currently have on the real price path for the network component of electricity bills
- Simplicity – the alternatives appear more complex than the current approach
- Administrative and compliance costs – due to the additional analysis required and additional steps in assessing and processing annual price adjustments.

Principle	Features
Efficiency	The regulatory framework has strong incentives to promote efficient service provision and efficient allocation of risk. Prices reflect the efficient costs of supply.

Commercial Sustainability	Regulated revenues provide a commercial return on investment and sufficient cash flows to finance efficient provision of services, including efficient investment.
Social Sustainability and customer interests	Prices are stable and no higher than necessary for efficient supply and investment. Impacts on customers are assessed and, if necessary, transition paths established. Impacts on vulnerable customers are considered
Transparency	Regulatory processes and decisions are well explained. Models and data used are public and can be replicated.
Certainty	Rules and approaches are complete and well-specified and allow stakeholders to predict outcomes.
Consistency	Consistent regulatory models and approaches over time/utilities. Changes in approach are considered carefully with full consultation and justification
Simplicity	Simpler approaches are preferred as they are more easily understood and less prone to error.
Compliance and administrative costs	Compliance and administration costs are kept as low as possible consistent with achieving the principles above.

Specification modelling and testing of the proposed changes

As far as we are aware it appears only limited analysis in support of the proposed changes has been provided. The case for change in terms of demonstrating impacts on networks in practice of the current approach has not been made. The modelling provided has been, in several cases, highly simplified and rudimentary. While supporting the theoretical propositions acknowledged in the AER Position Paper and above (i.e. that while the real WACC is achieved the nominal WACC and real ROE may vary), the modelling provided does not give an adequate basis for practical evaluation of the alternatives. Nor has the potential impact on the alternatives on the variability of real prices for customers been modelled and analysed.

The mechanisms/models for implementing the proposed alternatives have not been clearly set out in detail and tested. Hence, it is difficult to assess their practicality and whether there are potential administrative requirements or effects on stakeholders that have not yet been foreseen.

6.3.3   Is the current approach consistent with good practice?

The most common approach to incentive-based regulation[25] is to set a real WACC on real RAB. Following the example in Chile, it is commonly used in South America where asset values are based on replacement costs for optimised networks. It is also the most common approach to regulation in the UK[26] where the RAB is typically indexed for inflation. The UK-model has also been widely adopted in Europe (eg France, Netherlands and a number of re-constructing Eastern European countries) and developing countries such as the Philippines.

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[25] Often referred to as CPI-X regulation
[26] "All regulators have used a cost of capital expressed in real terms (which is applied for price control purposes to a Regulatory Asset Value (RAV)); although for some price controls Ofcom has used a nominal cost of capital while Ofgem utilises a modified approach to reflect the impact of a longer price control period." UK Regulators Network, Market Returns and Cost of Capital: A Refresh, 2015, p.7.

The OfWat and Ofgem undertake financeability analysis and sensitivity testing of the return on equity as a complement to – not a replacement for – the real WACC on real rate base model for determining regulated revenues. The intention of these tests is to provide a cross-check that the regulated revenues are sustainable. However, these models are not used to test the impact of variations in inflation outcomes from forecast on nominal returns to capital or equity.

The key message from the comparison with regulatory practice in other countries is that the issue of the potential impacts on nominal returns and the return on equity from a mismatch between expected and actual inflation are not unique to the regulated businesses in Australia. It is common to other countries that have adopted the real WACC on real RAB model. However, as far as we are aware these risks have not been identified as the cause of substantial financial instability for regulated businesses or deterred investment. Indeed, the large multiples of market value to RAB (typically 1.25-1.5) observed across these countries suggests that risk-return package offered is attractive to investors.

As noted above, underpinning this approach is a 'real price' contract with consumers set at each regulatory reset. Other unregulated businesses also have explicit 'real price' contracts, often with longer terms than the regulatory period for the networks. Toll roads are a prime example. Such businesses face similar risks of matching a nominal debt cost to a real income stream. Beyond this, even businesses without a formal contract with customers set in real prices will not have the privilege of being able to increase prices to preserve nominal returns when price rises have been lower than expected but debt costs are fixed in nominal terms. Hence:

1. the approach adopted by the AER is consistent with good practice in incentive-based regulation, and

2. these risks are not unique to Australian regulated energy businesses - they are faced, and managed, by other regulated and unregulated businesses more generally.

6.3.4   Is the current approach consistent with efficient investment incentives?

As the earlier quote from Sapere points out, efficient investment requires that the network should have a reasonable expectation that at the time of the investment it will have an opportunity to earn a reasonable rate of return on its investment.

It is accepted that the impacts on the rate of return in nominal terms or the real return on equity form variations between forecast and actual inflation are symmetrical. If the methodology for estimating inflation is unbiased – and the argument has not been made that it is biased over the long term – then given the long life of network assets these effects can be expected to balance out over the life of the investment. Hence, for an investment being considered at the start of the regulatory period the network can expect to achieve the real WACC and real ROE, periodically up-dated for changes in the underlying parameters[27]. Furthermore, for the investor it is assurance on the ability to earn a real rate of return that is critical for the investment decision as this removes the long-term inflation risk.

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[27] The nominal return will vary over the long term with changes in average rates of inflation.

During the regulatory period the real WACC would not vary with variations in inflation relative to expectations but the nominal rate of return and the real return on equity would vary. The question is whether such short term variations in returns would affect the decisions to invest in long term assets. We would argue that they do not. In practice, long term investment planning and decisions are driven by expectations for long term returns rather than short term variations in returns. But if it were the case that long term investment decisions were affected by short term variations in returns:

1. Would expectations for nominal returns remain constant (and expectations for real returns vary) with variations in inflation. For example, if inflation were higher than expected would the expected nominal return remain constant and the expected real return fall? Such response would seem inconsistent with economic fundamentals.

2. Would variations in the real return on equity (while the real cost of capital remains constant) affect investment. The answer to this is perhaps less clear although typically the focus is on the on the WACC, with financing strategies used to optimise the return to equity for investments that meet the hurdle rate of return.

6.3.5 What would be the impact of changing the approach?

In regard to the potential impact on return on equity, Sapere noted that[28]:

> "While the impact on equity holders could increase the likelihood of financial distress (when inflation is lower than expected), we consider it is likely that service providers can bear this risk, or manage it (at a cost) by issuing inflation-indexed debt and choice of leverage. This judgment relies on the AER's inflation estimates being reasonable and unbiased; that is, the estimation errors are relatively small and are not systematic."

Furthermore, Sapere also concluded that[29]:

> "Provided errors are relatively small and not systematic, we consider that any additional costs associated with inflation risk would likely be factored into the nominal rate of return. This is because the equity beta selected by the AER is at the top end of a range estimated from comparator companies which, at least for nearly a decade, have been subject to the same inflation risk as NSPs."

This assessment is consistent with observed experience. As noted above, we are not aware of cases in practice where these risks have been the primary cause of financial instability.

Change the approach as proposed would transfer these risks to the consumers in the former of increased variability and uncertainty about the network component on energy bills. The effects on consumers have not been modelled, but may well be small. However, at the margin may exacerbate energy affordability issues for vulnerable households and businesses and make budgeting for energy bills more difficult for all customers. This is because network prices would become more variable and less predictable. In particular, when inflation is low and incomes rising more slowly the network component of energy bills would increase relative to the expected levels.

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[28] Sapere p.vi
[29] ibid

6.3.5 Do the alternatives provide a better assignment of risk?

To recap, under the current approach:

1. The consumers have a price fixed in real terms. This real price does not vary in real terms from the path set at the start of the regulatory period, but if the inflation outcome is different from expectations the nominal price varies.

2. The network's revenues are fixed in real terms. This provides for a fixed real return on capital but the nominal return on capital and real return on equity vary if the inflation outcome is different from expectations.

Both the consumer and the network bear the inflation risk in different forms. The consumer through the variation in nominal prices and the network through variations in the nominal return on capital and the real return on equity. While the consumer cannot directly manage the nominal price risk, if household and business incomes move in line with inflation the nominal energy price risk is offset by increases in income. For consumers, income may provide a hedge for unanticipated changes in nominal energy prices.

The network can, if it wishes, reduce its exposure to the real return on equity risk by reducing its level of gearing and/or using interest rate swaps. This comes at a cost, but it should be noted that the network has been compensated for this risk through the beta in its WACC (see below). It is for the network to decide if the benefits of reducing this risk exceed the costs. In principle this is a sound allocation of risk: the consumers nominal expenditure risk will hopefully be offset by variations in income and the network has opportunities to manage its exposure to risks in regard to the real return on equity. The network has the incentive to efficiently manage its financing risks given the costs of doing so and its risk appetite. Importantly there is no single efficient financing strategy.

Furthermore, as Sapere commented[30]:

> "Provided errors are relatively small and not systematic, we consider that any additional costs associated with inflation risk would likely be factored into the nominal rate of return."

The beta in the determination of the WACC is based on observed historical covariance of returns for regulated energy business in Australia. As those businesses have been exposed to these risks since the commencement of regulation, to the extent that the risks are systematic they are reflected in the observed beta. Furthermore, the AER has set the beta at the upper end of the observed range. To the extent that the risks are non-systematic they should not be reflected in the WACC.

In summary, the current approach appears to provide an appropriate allocation of risk and adequate reward for the utilities for the risks they bear.

Changing to targeting either the nominal return on capital or real return on equity would alter the allocation of risk. The consumer would now bear a real price risk for which there is not a natural offset in terms of changes in income. If the nominal WACC is targeted the network would bear a risk in its real return on equity, which in principle it can manage, at a cost, through its financing strategy.

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[30] Sapere, p.vi.

The effect of the maintenance of the nominal rate of return and counter-cyclical movement in the real rate of return would be to reduce systematic risk. This should be reflected in the beta but as historical data will not be available the AER would necessarily have to exercise its judgement in determining the reduction in beta. Not adjusting beta would be neither efficient nor equitable. Similar changes would be required if the real return on equity were targeted.

In summary, the proposed changes would result in a less efficient allocation of risk and require the AER to exercise its judgement and discretion in reducing the beta.

6.4 CCP's Position

The review has raised substantial issues in regard to whether the AER should maintain its current approach of targeting the real WACC. Through the process the nature of the risks and who bears those risks have been greatly clarified. However, on balance we support continuation of the current approach. We do not consider that a sufficiently strong case has been made to demonstrate that a change in approach would provide a clear enduring improvement, particularly in regard to the long-term interest of consumers. In our view:

1. Given the importance of the targeting of the real WACC in the regulatory framework, there should be a high hurdle for changes in approach

2. The AER's current approach:

   - Is consistent with the requirements under the NER and NGR
   - Is consistent with good regulatory practice in implementing incentive based regulation
   - Reflects sound economic principles and is consistent with promoting efficient investment and financing strategies, and
   - Provides an appropriate allocation of risk

3. The current approach provides a defined real price path for consumers and real income stream for the networks that ensures the opportunity to earn the real WACC set at the start of the regulatory period. A consequence is that the nominal return on capital and real return on equity will be different to that expected at the start of the period if inflation is different from expectations. However, we note that:

   - These risks are borne by regulated businesses in other jurisdictions and unregulated businesses with long term real price contracts
   - Evidence has not been provided that these risks are large in practice or that other businesses have not been able to satisfactorily bear and/or manage these risks
   - Reducing these risks for the utilities would entail greater real price variability and uncertainty for consumers.

4. To the extent that it is a systematic risk the networks are currently compensated for this risk through the beta that is incorporated in the WACC. If the approach is changed the AER would have to adjust the beta accordingly.

Consumer Challenge Panel
6 November 2017

Summary Results of CPP Modelling

Outcomes under current inflation scenario- Base Case

Year		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Actual Inflation	Chosen inflation		2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
	Constructed index	1	1.025	1.051	1.077	1.104	1.131	1.160	1.189	1.218	1.249	1.280	1.312	1.345	1.379	1.413	1.448
Closing RAB (PTRM)	Nominal	1037.4	1134.3	1231.6	1329.5	1427.6	1525.9	1624.2	1722.3	1820.2	1917.5	2014.1	1973.7	1930.1	1883.0	1832.3	1778.0
MAR (PTRM)	Nominal		88.6	98.1	107.8	117.8	127.9	138.4	149.0	159.9	171.0	182.4	194.0	194.2	194.3	194.2	194.1
MAR (Pricing)	**Nominal**		**88.6**	**98.1**	**107.8**	**117.8**	**127.9**	**138.4**	**149.0**	**159.9**	**171.0**	**182.4**	**194.0**	**194.2**	**194.3**	**194.2**	**194.1**
Opening RAB (RFM)	Nominal		1037.4	1134.3	1231.6	1329.5	1427.6	1525.9	1624.2	1722.3	1820.2	1917.5	2014.1	1973.7	1930.1	1883.0	1832.3
Capex (RFM)	Nominal	1024.7	106.3	109.0	111.7	114.5	117.4	120.3	123.3	126.4	129.6	132.8	0	0	0	0	0
Reg Depreciation (RFM)	Nominal		9.5	11.6	13.9	16.4	19.1	22.0	25.2	28.6	32.2	36.2	40.4	43.7	47.1	50.6	54.4
Closing RAB (RFM)	**Nominal**	**1037.4**	**1134.3**	**1231.6**	**1329.5**	**1427.6**	**1525.9**	**1624.2**	**1722.3**	**1820.2**	**1917.5**	**2014.1**	**1973.7**	**1930.1**	**1883.0**	**1832.3**	**1778.0**
Cash Flow	Nominal	-1037.4	-17.7	-10.9	-3.9	3.2	10.6	18.0	25.7	33.5	41.5	49.6	194.0	194.2	194.3	194.2	194.1
Cash Flow	Real	-1037.4	-17.3	-10.4	-3.6	2.9	9.3	15.6	21.6	27.5	33.2	38.7	147.8	144.4	140.9	137.5	134.0
NPV end period							0.0					0.0					0.0
NPV overall		0.00															
NPV change this period (% of MAR)							0.00%					0.00%					0.00%
Closing RAB (PTRM)	Real	1037.4	1106.6	1172.3	1234.5	1293.3	1348.7	1400.5	1448.9	1493.9	1535.4	1573.4	1504.3	1435.1	1365.9	1296.8	1227.6
MAR (PTRM)	Real		86.5	93.4	100.1	106.7	113.1	119.3	125.4	131.2	136.9	142.5	147.8	144.4	140.9	137.5	134.0
MAR (Pricing)	**Real**		86.5	93.4	100.1	106.7	113.1	119.3	125.4	131.2	136.9	142.5	147.8	144.4	140.9	137.5	134.0
Opening RAB (RFM)	Real		1012.1	1079.6	1143.7	1204.4	1261.8	1315.8	1366.4	1413.6	1457.5	1497.9	1535.1	1467.6	1400.1	1332.6	1265.2
Capex (RFM)	Real	1024.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	0.0	0.0	0.0	0.0	0.0
Reg Depreciation (RFM)	Real		9.3	11.0	12.9	14.8	16.9	19.0	21.2	23.4	25.8	28.3	30.8	32.5	34.2	35.8	37.5
Closing RAB (RFM)	**Real**	**1037.4**	1106.6	1172.3	1234.5	1293.3	1348.7	1400.5	1448.9	1493.9	1535.4	1573.4	1504.3	1435.1	1365.9	1296.8	1227.6

Actual inflation below forecast

Year		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Actual Inflation	Chosen inflation		1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
	Constructed index	1	1.015	1.030	1.046	1.061	1.077	1.093	1.110	1.126	1.143	1.161	1.178	1.196	1.214	1.232	1.250
Closing RAB (PTRM)	Nominal	1037.4	1133.7	1230.6	1327.9	1425.5	1523.2	1541.6	1634.5	1727.2	1819.4	1910.9	1782.9	1743.5	1700.9	1655.1	1606.0
MAR (PTRM)	Nominal		88.6	98.1	107.7	117.6	127.8	131.3	141.4	151.8	162.3	173.1	175.2	175.4	175.5	175.5	175.3
MAR (Pricing)	**Nominal**		**88.6**	**97.1**	**105.6**	**114.2**	**122.8**	**131.3**	**140.1**	**148.8**	**157.6**	**166.4**	**175.2**	**173.7**	**172.1**	**170.4**	**168.6**
Opening RAB (RFM)	Nominal		1037.4	1122.3	1206.0	1288.3	1369.2	1448.5	1526.6	1602.8	1677.1	1749.4	1819.4	1765.5	1709.6	1651.6	1591.5
Capex (RFM)	Nominal	1024.7	104.8	106.4	108.0	109.6	111.2	112.9	114.6	116.3	118.0	119.8	0	0	0	0	0
Reg Depreciation (RFM)	Nominal		19.9	22.7	25.6	28.7	31.9	34.8	38.3	42.0	45.8	49.8	53.9	55.9	58.0	60.1	62.3
Closing RAB (RFM)	**Nominal**	**1037.4**	**1122.3**	**1206.0**	**1288.3**	**1369.2**	**1448.5**	**1526.6**	**1602.8**	**1677.1**	**1749.4**	**1819.4**	**1765.5**	**1709.6**	**1651.6**	**1591.5**	**1529.2**
Cash Flow	Nominal	-1037.4	-16.2	-9.3	-2.3	4.6	11.6	18.5	25.5	32.5	39.6	46.6	175.2	173.7	172.1	170.4	168.6
Cash Flow	Real	-1037.4	-15.9	-9.0	-2.2	4.4	10.8	16.9	23.0	28.9	34.6	40.1	148.8	145.3	141.8	138.3	134.8
NPV end period								2.9					7.2					10.9
NPV overall		16.73																
NPV change this period (% of MAR)								0.56%					0.65%					0.51%
								0.22%					0.28%					0.30%
Closing RAB (PTRM)	Real	1037.4	1117.0	1194.5	1269.9	1343.0	1413.9	1409.9	1472.8	1533.2	1591.2	1646.5	1513.6	1458.2	1401.6	1343.7	1284.6
MAR (PTRM)	Real		87.3	95.2	103.0	110.8	118.6	120.1	127.4	134.7	141.9	149.1	148.8	146.7	144.6	142.5	140.2
MAR (Pricing)	**Real**		87.3	94.2	101.0	107.6	114.0	120.1	126.2	132.1	137.8	143.4	148.8	145.3	141.8	138.3	134.8
Opening RAB (RFM)	Real		1022.1	1089.4	1153.3	1213.8	1271.0	1324.7	1375.5	1422.8	1466.8	1507.4	1544.6	1476.7	1408.8	1340.9	1273.0
Capex (RFM)	Real	1024.7	103.2	103.2	103.2	103.2	103.2	103.2	103.2	103.2	103.2	103.2	0.0	0.0	0.0	0.0	0.0
Reg Depreciation (RFM)	Real		19.6	22.0	24.5	27.0	29.6	31.8	34.5	37.3	40.0	42.9	45.8	46.8	47.8	48.8	49.8
Closing RAB (RFM)	**Real**	**1037.4**	**1105.7**	**1170.6**	**1232.0**	**1290.0**	**1344.6**	**1396.1**	**1444.2**	**1488.8**	**1530.0**	**1567.8**	**1498.8**	**1429.9**	**1361.0**	**1292.1**	**1223.1**

Differences in Outcomes (scenario - Base Case

Year		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Closing RAB (PTRM)	Nominal	0.0	-0.5	-1.0	-1.6	-2.1	-2.7	-82.6	-87.8	-93.0	-98.1	-103.3	-190.8	-186.6	-182.0	-177.2	-171.9
MAR (PTRM)	Nominal		0.0	0.0	-0.1	-0.1	-0.2	-7.0	-7.6	-8.1	-8.7	-9.3	-18.7	-18.8	-18.8	-18.8	-18.7
MAR (Pricing)	**Nominal**		**0.0**	**-1.0**	**-2.2**	**-3.5**	**-5.1**	**-7.0**	**-9.0**	**-11.1**	**-13.4**	**-16.0**	**-18.7**	**-20.5**	**-22.2**	**-23.8**	**-25.5**
Opening RAB (RFM)	Nominal		0.0	-11.9	-25.6	-41.1	-58.4	-77.4	-97.6	-119.5	-143.0	-168.1	-194.7	-208.2	-220.4	-231.3	-240.8
Capex (RFM)	Nominal	0.0	-1.6	-2.6	-3.8	-4.9	-6.2	-7.4	-8.7	-10.1	-11.5	-13.0	0.0	0.0	0.0	0.0	0.0
Reg Depreciation (RFM)	Nominal		10.4	11.1	11.7	12.3	12.8	12.8	13.2	13.4	13.5	13.6	13.5	12.3	10.9	9.5	7.9
Closing RAB (RFM)	**Nominal**	**0.0**	**-11.9**	**-25.6**	**-41.1**	**-58.4**	**-77.4**	**-97.6**	**-119.5**	**-143.0**	**-168.1**	**-194.7**	**-208.2**	**-220.4**	**-231.3**	**-240.8**	**-248.8**
Cash Flow	Nominal	0.0	1.6	1.6	1.6	1.4	1.1	0.4	-0.2	-1.0	-1.9	-3.0	-18.7	-20.5	-22.2	-23.8	-25.5
Cash Flow	Real	0.0	1.4	1.4	1.4	1.4	1.5	1.3	1.3	1.4	1.4	1.4	0.9	0.9	0.9	0.9	0.8
NPV end period								2.9					7.2					10.9
NPV overall		16.7	0.0															
NPV change this period (% of MAR)			0.0					0.0					0.0					0.0
Closing RAB (PTRM)	Real	0.0	10.4	22.2	35.3	49.7	63.1	9.3	23.8	39.4	55.8	73.1	9.3	23.1	35.7	46.9	57.0
MAR (PTRM)	Real		0.9	1.8	2.9	4.1	5.5	0.8	2.1	3.5	5.0	6.6	0.9	2.3	3.7	5.0	6.2
MAR (Pricing)	**Real**		0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8
Reg Depreciation (RFM)	**Real**		10.3	11.0	11.6	12.2	12.8	12.9	13.4	13.8	14.2	14.6	15.0	14.3	13.6	13.0	12.3
Closing RAB (RFM)	**Real**	0.0	-0.8	-1.7	-2.5	-3.3	-4.1	-4.4	-4.8	-5.1	-5.4	-5.7	-5.4	-5.2	-5.0	-4.7	-4.5

Actual inflation above forecast

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Year																	
Actual Inflation	Chosen inflation		3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
	Constructed index	1	1.035	1.071	1.109	1.148	1.188	1.229	1.272	1.317	1.363	1.411	1.460	1.511	1.564	1.619	1.675
Closing RAB (PTRM)	Nominal	1037.4	1134.8	1232.7	1331.0	1429.7	1528.5	1710.3	1813.9	1917.1	2019.9	2121.9	2182.8	2134.5	2082.4	2026.4	1966.3
MAR (PTRM)	Nominal		88.6	98.1	107.9	117.9	128.1	145.7	156.9	168.4	180.1	192.1	214.5	214.7	214.8	214.8	214.6
MAR (Pricing)	**Nominal**		**88.6**	**99.1**	**110.0**	**121.4**	**133.2**	**145.7**	**158.4**	**171.7**	**185.4**	**199.7**	**214.5**	**216.8**	**219.0**	**221.1**	**223.1**
Opening RAB (RFM)	Nominal		1037.4	1146.2	1257.6	1371.5	1487.9	1606.6	1727.0	1849.5	1973.8	2099.9	2227.4	2204.1	2176.3	2144.0	2106.7
Capex (RFM)	Nominal	1024.7	107.9	111.7	115.6	119.6	123.8	128.1	132.6	137.3	142.1	147.1	0	0	0	0	0
Reg Depreciation (RFM)	Nominal		-0.9	0.3	1.7	3.3	5.1	7.7	10.2	12.9	16.0	19.5	23.4	27.7	32.4	37.3	42.5
Closing RAB (RFM)	**Nominal**	**1037.4**	**1146.2**	**1257.6**	**1371.5**	**1487.9**	**1606.6**	**1727.0**	**1849.5**	**1973.8**	**2099.9**	**2227.4**	**2204.1**	**2176.3**	**2144.0**	**2106.7**	**2064.1**
Cash Flow	Nominal	-1037.4	-19.3	-12.6	-5.6	1.8	9.4	17.5	25.8	34.4	43.4	52.7	214.5	216.8	219.0	221.1	223.1
Cash Flow	Real	-1037.4	-18.6	-11.7	-5.0	1.5	7.9	14.3	20.3	26.1	31.8	37.3	146.9	143.5	140.0	136.6	133.2
NPV end period							-2.8					-7.1					-10.8
NPV overall		-16.50															
NPV change this period (% of MAR)							-0.59%					-0.67%					-0.53%
							-0.21%					-0.27%					-0.30%
Approach C																	
MAR (PTRM)	Real		85.6	91.6	97.3	102.7	107.9	118.5	123.3	127.9	132.2	136.2	146.9	142.1	137.4	132.7	128.1
MAR (Pricing)	**Real**		85.6	92.5	99.2	105.8	112.1	118.5	124.5	130.4	136.1	141.6	146.9	143.5	140.0	136.6	133.2
Opening RAB (RFM)	Real		1002.3	1070.0	1134.3	1195.2	1252.7	1306.9	1357.4	1404.5	1448.2	1488.6	1525.7	1458.6	1391.6	1324.5	1257.5
Capex (RFM)	Real	1024.7	104.2	104.2	104.2	104.2	104.2	104.2	104.2	104.2	104.2	104.2	0.0	0.0	0.0	0.0	0.0
Reg Depreciation (RFM)	Real		-0.8	0.3	1.5	2.8	4.3	6.3	8.0	9.8	11.8	13.8	16.0	18.3	20.7	23.0	25.4
Closing RAB (RFM)	**Real**	**1037.4**	1107.4	1174.0	1237.0	1296.6	1352.7	1404.9	1453.7	1498.9	1540.7	1579.1	1509.7	1440.3	1370.9	1301.5	1232.1

Differences in Outcomes (scenario - Base Case

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Year																	
Closing RAB (PTRM)	Nominal	0.0	0.5	1.0	1.6	2.1	2.7	86.1	91.6	97.0	102.4	107.7	209.0	204.4	199.5	194.1	188.4
MAR (PTRM)	Nominal		0.0	0.0	0.1	0.1	0.2	7.3	7.9	8.5	9.1	9.7	20.5	20.5	20.6	20.6	20.5
MAR (Pricing)	**Nominal**		0.0	1.0	2.2	3.6	5.3	7.3	9.4	11.8	14.4	17.3	20.5	22.6	24.8	26.9	29.0
Opening RAB (RFM)	Nominal		0.0	11.9	25.9	42.0	60.3	80.7	102.8	127.1	153.6	182.4	213.3	230.3	246.3	261.0	274.4
Capex (RFM)	Nominal	0.0	1.6	2.7	3.9	5.1	6.4	7.8	9.3	10.9	12.5	14.3	0.0	0.0	0.0	0.0	0.0
Reg Depreciation (RFM)	Nominal		-10.4	-11.3	-12.2	-13.1	-14.0	-14.3	-15.0	-15.6	-16.2	-16.7	-17.0	-16.0	-14.7	-13.4	-11.8
Closing RAB (RFM)	**Nominal**	**0.0**	11.9	25.9	42.0	60.3	80.7	102.8	127.1	153.6	182.4	213.3	230.3	246.3	261.0	274.4	286.2
Cash Flow	Nominal	0.0	-1.6	-1.7	-1.7	-1.5	-1.2	-0.5	0.1	0.9	1.9	3.1	20.5	22.6	24.8	26.9	29.0
Cash Flow	Real	0.0	-1.3	-1.4	-1.4	-1.4	-1.4	-1.3	-1.3	-1.4	-1.4	-1.4	-0.9	-0.9	-0.9	-0.9	-0.8
NPV end period							-2.8					-7.1					-10.8
NPV overall		-16.5	0.0														
NPV change this period (% of MAR)			0.0				0.0					0.0					0.0
Closing RAB (PTRM)	Real	-1037.4	-1106.6	-1172.3	-1234.5	-1293.3	-1348.32	-1400.5	-1448.9	-1493.9	-1535.4	-1573.4	-1504.3	-1435.1	-1365.9	-1296.8	-1227.6
MAR (PTRM)	Real		-0.8	-1.8	-2.8	-3.9	-5.2	-0.8	-2.0	-3.4	-4.8	-6.3	-0.9	-2.3	-3.6	-4.8	-5.9
MAR (Pricing)	**Real**		-0.8	-0.9	-0.9	-0.9	-0.9	-0.8	-0.8	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.8
Reg Depreciation (RFM)	**Real**		-10.1	-10.8	-11.4	-12.0	-12.6	-12.7	-13.2	-13.6	-14.1	-14.4	-14.8	-14.1	-13.5	-12.8	-12.1
Closing RAB (RFM)	**Real**	**0.0**	0.8	1.7	2.5	3.3	4.0	4.4	4.7	5.0	5.3	5.6	5.4	5.2	4.9	4.7	4.5