Discussion paper

Regulatory treatment of inflation

May 2020

AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

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Shortened forms

Shortened form	Extended form
AER	Australian Energy Regulator
CAPM	Capital asset pricing model
capex	capital expenditure
CGS	Commonwealth Government Securities
CPI	Consumer Price Index
GDP	Gross Domestic Product
NEL	National Electricity Law
NEO	National Electricity Objective
NER	National Electricity Rules
NGL	National Gas Law
NGO	National Gas Objective
NSP	network service provider
opex	operating expenditure
PTRM	post-tax revenue model
RoR	Rate of return
RFM	roll forward model
SMAR	smoothed maximum allowable revenue

Invitation for submissions

The Australian Energy Regulator invites interested parties to make written submissions on the regulatory treatment of inflation by close of business, **15 July 2020**.

We prefer that all submissions sent in an electronic format are in Microsoft Word or other text readable document form. Submissions should be sent electronically to InflationReview2020@aer.gov.au.

Alternatively, submissions can be sent to:

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We prefer that all submissions be publicly available to facilitate an informed and transparent consultative process. Submissions will be treated as public documents unless otherwise requested. Parties wishing to submit confidential information are requested to:

- Clearly identify the information that is the subject of the confidentiality claim.
- Provide a non-confidential version of the submission in a form suitable for publication.

We will place all non-confidential submissions on our website. For further information regarding our use and disclosure of information provided to us, see the ACCC/AER Information Policy (June 2014), which is available on our website.

Please direct enquiries about this paper, or about lodging submissions to InflationReview2020@aer.gov.au or to the Networks Finance and Reporting Branch of the AER on 1300 585 165.

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About us

We, the Australian Energy Regulator (AER), work to make all Australian energy consumers better off, now and in the future. We are the independent regulator of energy network service providers (NSPs) in all jurisdictions in Australia except for Western Australia. We set the revenue requirements these NSPs can recover from consumers using their networks.

The National Electricity Law and Rules (NEL and NER) and the National Gas Law and Rules (NGL and NGR) provide the regulatory framework which govern the NSPs. Our role is guided by the National Electricity and Gas Objectives (NEO and NGO).

NEO:[1]

> …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.

NGO:[2]

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

The decisions we make and the actions we take affect a wide range of individuals, businesses and organisations. Effective and meaningful engagement with stakeholders across all our functions is essential to fulfilling our role, and it provides stakeholders with an opportunity to inform and influence what we do. Engaging with those affected by our work helps us make better decisions, provides greater transparency and predictability, and builds trust and confidence in the regulatory regime. This is reflected in our *Stakeholder engagement framework* and in the consultation processes we conduct.[3]

In line with the recently released *Statement of Expectations*, we would like to acknowledge the changing operating environment and the potential this may have on stakeholders' ability to participate. We will endeavour to adopt a greater degree of flexibility in our approach to stakeholder engagement so that input to this review is as effective and useful as it can be.

1 NEL, s. 7.
2 NGL, s. 23.
3 AER, *Revised stakeholder engagement framework*, September 2017.

1 Introduction

This discussion paper is the first step of our review of the treatment of inflation in our regulatory determination of revenue and prices for electricity and gas network services announced on 7 April 2020.[4]

Our treatment of inflation applies uniformly across all our electricity and gas regulatory determinations. As such, we are undertaking a sector-wide review to comprehensively consider all inflation related issues. We have released this discussion paper to encourage stakeholders to contribute to our consideration of the issues and whether any changes to our current treatment of inflation are warranted.

This discussion paper first explores at a high level why the treatment of inflation matters and then explains the context and scope of our review. The effects of inflation are compensated for in our regulatory models: post-tax revenue models (PTRMs), roll forward models (RFMs) and[5] annual pricing mechanisms. Through this review, we will investigate whether we should make changes to our regulatory models and/or regulatory framework. Any changes recommended from this review will be applied to regulatory decisions on a prospective basis.

We encourage stakeholders to become familiar with these models and mechanisms when participating in this review and providing submissions on this paper.[6]

We also include a list of questions where we are particularly interested in hearing stakeholders' views.

The remainder of the paper consists of three appendices:

- Appendix A includes further detail on the regulatory models, mechanisms, and other relevant aspects of our regulatory framework. Appendix A also provides further detail on the current treatment of inflation in the regulatory models.
- Appendix B sets out the key concepts relevant to the consideration of inflation in the context of regulatory revenues/prices of electricity and gas network services.
- Appendix C sets out key issues for consideration in further detail.

1.1 Why does the treatment of inflation matter?

To understand why the treatment of inflation matters to stakeholders, including consumers, there are a number of key concepts to understand. We outlines these below.

4 See: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-treatment-of-inflation-2020/initiation

5 The use of the PTRM and RFM is mandated by the National Electricity Rules (NER) and National Gas Rules (NGR) respectively. See: NER, Chapter 6 and 6A; NGR, r. 72(3).

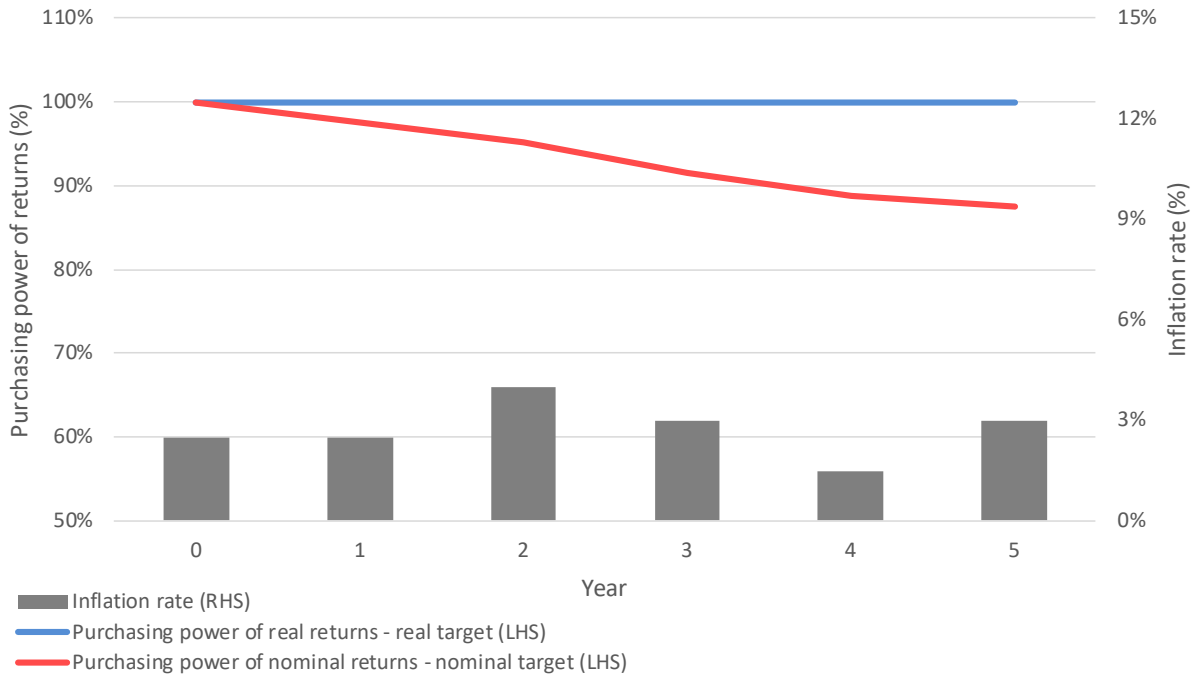
6 Material on these models was presented during our 2017 Inflation Review. See: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-expected-inflation-2017/initiation

1.1.1 Real and nominal

Inflation impacts the savings and investment returns of investors. Most investors aim to increase their long-term purchasing power. Inflation puts this goal at risk because investment returns must first keep up with the rate of inflation in order to maintain real purchasing power. Returns on an investment can be considered in either 'nominal' or 'real' terms.

The nominal rate of return on an investment is the return expressed as a percentage of the asset invested in unadjusted for inflation. The real rate of return on an investment is the nominal return adjusted for inflation. It is a measure of the income available to the investor after preserving the value of the original investment in real terms. Figure 1 illustrates the impact of inflation on the purchasing power of returns over a regulatory period. If the real rate of return is targeted over a regulatory period (current approach), then the purchasing power of the target return is not eroded by inflation and remains constant. If the nominal rate of return is targeted, then the purchasing power of these returns is eroded by actual inflation over the period.

Figure 1 Inflation impact on purchasing power of investment



The total revenue requirement for a NSP is a forecast of the efficient cost of providing electricity or gas distribution services over a 5 year regulatory control period. We determine annual revenue, and the total revenue requirement, in nominal terms.

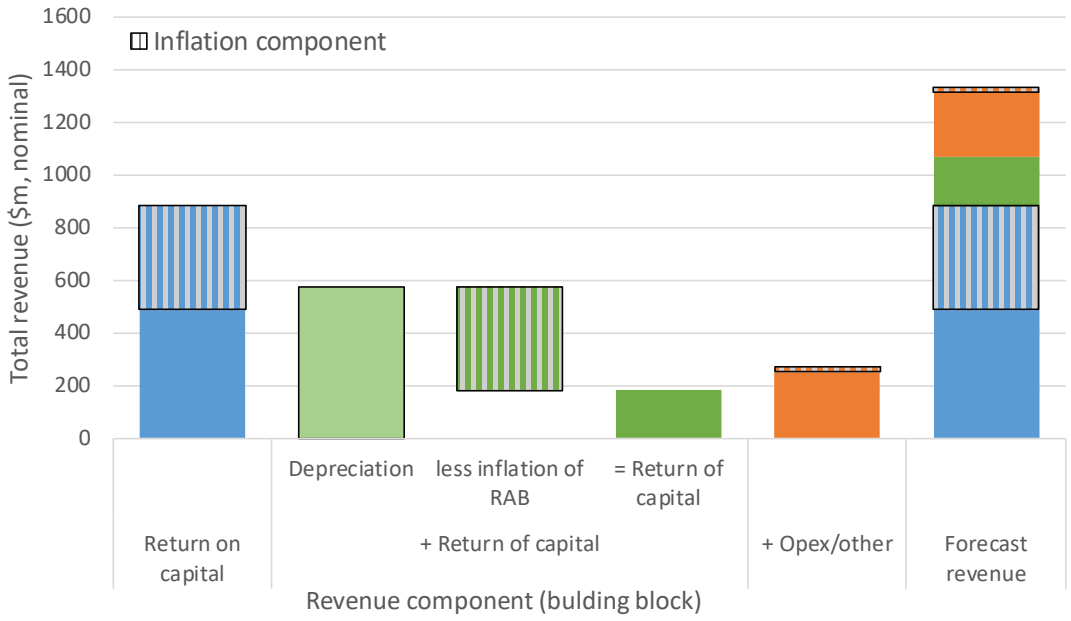
1.1.2 Expected inflation and actual inflation

Our regulatory determinations for NSPs are forward looking (ex ante). That is, they apply for the forthcoming 5 year period. Therefore, at the time of making our decision we do not know what actual inflation will be, so we use an estimate of expected inflation forecast over a 10 year horizon in our determination calculations.

1.1.3 How inflation impacts our decisions

In the regulatory framework, inflation has an effect on revenues, costs and regulated asset bases (RAB). Figure 2 shows the inflation components included in various building block costs.

Figure 2 Inflation components in revenue building blocks – example



- The return on capital[7] building block applies a nominal rate of return to the RAB. As the nominal rate of return includes expected inflation, part of that building block is the result of expected inflation.
- The return of capital[8] building block removes expected inflation of the RAB from forecast depreciation. This avoids compensation arising from the effects of inflation being double counted by including it in the return on capital building block and also as a capital gain (through the indexation of the RAB). A fact sheet explaining this in more detail is available on our website.[9]
- Other building blocks (such as operating expenditure or opex) include an inflation component, as the costs forecast in real dollar terms are escalated to nominal dollars using expected inflation in determining the required nominal revenues.

We use a common approach to inflation across all the cost building blocks, but this review is focused on the allowance for inflation in the return on and of capital. Our decisions use 10-year inflation expectations to convert the building block costs and revenues to nominal

7 Return on capital measures the return that an investment generates for capital contributors.

8 Return of capital refers to the principal payments back to investors. It should not be confused with rate of return, which measures a gain or loss of an investment.

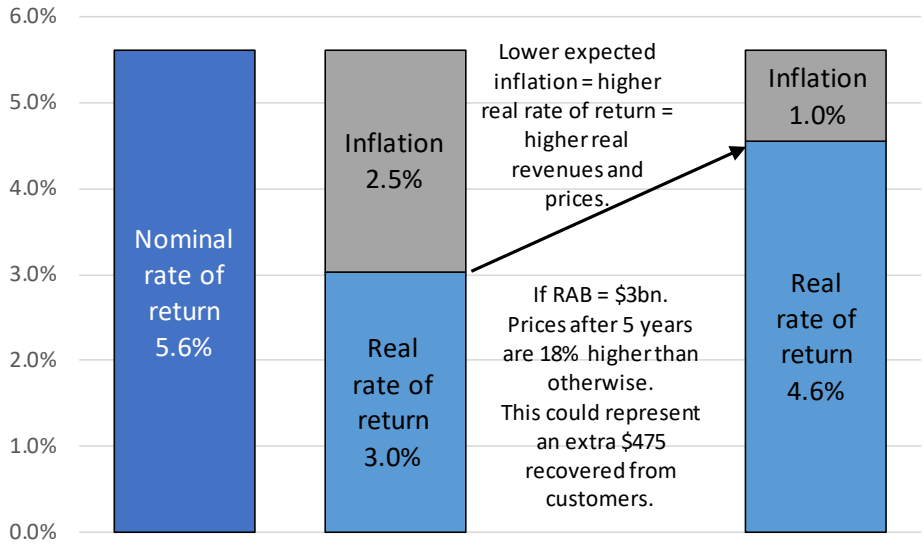
9 See website: https://www.aer.gov.au/node/56868.

values. Specifically, we use a geometric annualised average rate over 10-years to estimate expected inflation.[10] This aligns with the term of the rate of return (as the cost of funds is based on bonds and debt raising costs with a 10-year maturity).

Our current approach to setting the rate of return for NSPs makes adjustments for the effect of inflation to target a real rate of return (ex-ante) for a NSP and its investors. This means that the real rate of return set at the commencement of a 5-year regulatory control period is realised at the end of that period, no matter the actual movements in the inflation rate.

Figure 3 shows the impact of different expected inflation rates on the real rate of return. At the time of making our final decision for a NSP, we determine a nominal allowed rate of return (e.g. 5.6 per cent). If the value determined for expected inflation is 2.5 per cent, the underlying real rate of return is lower (3.0 per cent) than if expected inflation were 1.0 per cent (4.6 per cent) at the decision.

Figure 3 Impact of expected inflation on the real rate of return



Note: These numbers do not sum, rather a real rate of 3.0% combined with inflation of 2.5% results in a nominal rate of 5.6% due to the Fisher equation.[11]

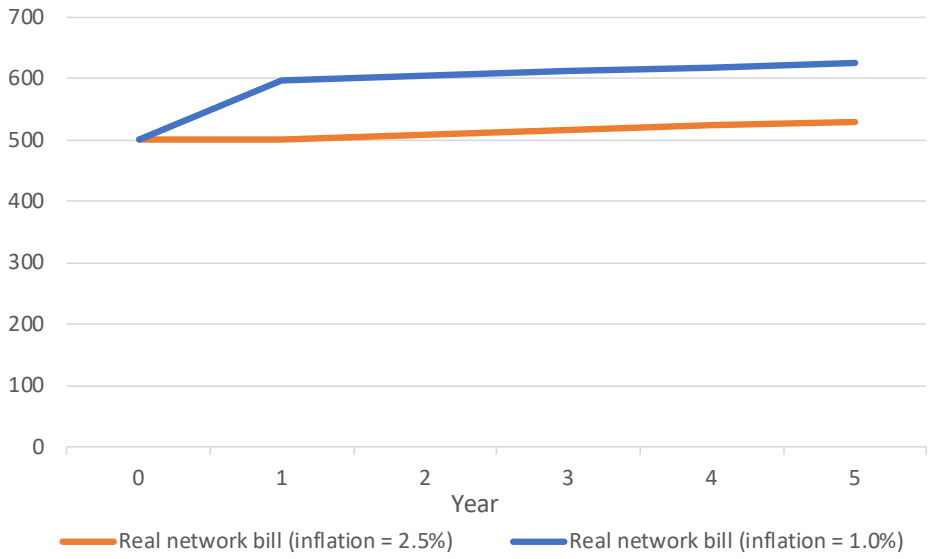
Under our current framework, the NSP's returns from its RAB are driven by the underlying real rate of return determined in our final decision. Therefore a lower (higher) estimate of expected inflation will increase (decrease) the real rate of return, all else being equal. A NSP's RAB is generally valued at several billion dollars, meaning that our approach to choosing the best estimate of expected inflation has a direct and potentially material impact

10 A geometric annualised average rate is an average rate that takes into account the impact of compounding returns.

11 The Fisher equation is a concept in economics that describes the relationship between nominal and real interest rates under the effect of inflation. Put simply, the equation states that the nominal interest rate is equal to the sum of the real interest rate plus inflation.

on a NSP's returns and the amount that consumers pay for electricity and gas services.[12] Figure 4 shows the impact of different expected inflation values on a customer's network bill component in real dollar terms.

Figure 4 Impact of expected inflation on network component of bill ($ real) – example



Assumptions: Opening RAB = $3 billion, Capex = annual depreciation, Opex = $50 million/annum, Tax = nil, Nominal rate of return = 5.60% (RoD = 5.00%, RoE = 6.50%), Actual inflation = Expected inflation, Starting network component of bill = $500.

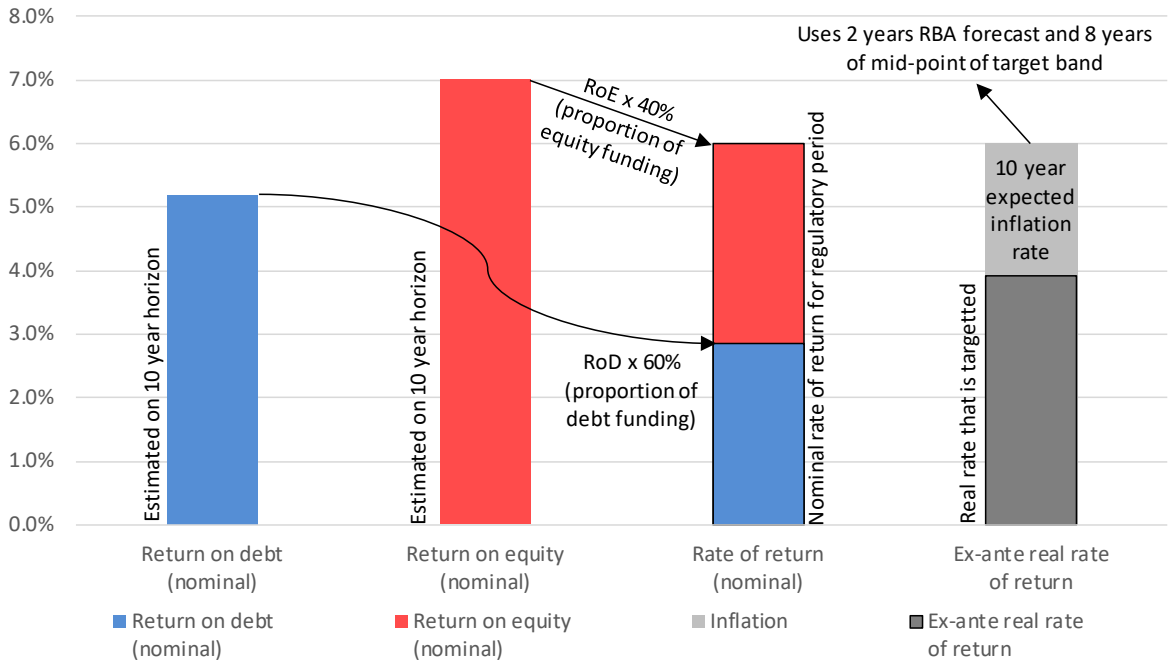
When we set the allowed rate of return for NSPs we initially use market data that is presented in nominal terms to inform our decision.[13] Actual inflation is not known at the time of the decision, so we employ this estimate in our PTRM. In doing so, we need to make an adjustment to allow for expected movements in inflation. This adjustment is made using an estimate of expected inflation over the next 10 years.

Figure 5 illustrates an example construction of our rate of return decision and demonstrates that expected inflation is integral to the real rate of return targeted by our regulatory framework. The allowed nominal rate of return is made up of the nominal return on debt (multiplied by the proportion of funding the NSP obtains through debt) and the return on equity (multiplied by the proportion of funding the NSP obtains through equity). Both of these are determined on a 10 year term horizon. The underlying real rate of return is the result of removing the expected inflation rate (also based on a 10 year horizon) from the allowed nominal rate of return.

12 Our approach applies a nominal rate of return to an indexed (nominal) RAB and then makes an adjustment to revenue through the regulatory depreciation building block. The overall effect is the same as applying a real rate of return to the indexed (nominal) RAB.

13 For example, we use Commonwealth Government Securities (CGS) with 10 years to maturity to estimate the risk free rate. This is a nominal rate that is used in estimating both the return on equity and return on debt.

Figure 5 Example rate of return decision components



Currently, our estimate of expected inflation is calculated by using forecasts published by the Reserve Bank of Australia (RBA) for two years combined with the mid-point of the RBA's target band for inflation for the remainder of the ten years. When we conducted our review in 2017 we concluded that the RBA's short-term forecasts were the best available for the first two years. Beyond two years, the RBA does not provide a forecast. However it has a mandate to target inflation in the range of 2 to 3 per cent and takes action to achieve this outcome. Our review of the data showed that the mid-point of the target band was the best estimate of inflation going forward. We concluded that long term expectations were most likely to be anchored around the mid-point of the target and that this was therefore the best available estimate of long term inflation expectations.

1.2 Why have we commenced this review?

In our 2017 inflation review, we indicated that we would continue to monitor the relevant inflation information and engage with stakeholders on it. Until recently, our ongoing monitoring has indicated broadly consistent observations in the key information we relied on in 2017.

We now observe that there have been some movements across the spectrum of data and information we examine. While no individual piece of evidence is determinative, when considered in aggregate these movements support the commencement of a new review. In commencing this review we have not formed a view that there is a better approach to estimating expected inflation than the method we currently use.

However, the movement we have observed in key information suggests it is prudent to review the method for estimating expected inflation. The application of expected inflation in our regulatory framework is complex and the indicators of expected inflation are imperfect.

Through this sector-wide review we will be able to transparently test our current approach and whether there is an alternative that will better contribute to the NEO and NGO. We will be able to hear from all stakeholders and carefully consider the alternatives. We will be able to obtain expert advice including from the RBA, which is the expert body in this space. Inflation has an economy-wide impact and common impact on NSP compensation and we propose a unified treatment of inflation across gas and electricity service providers.

Further, the findings of this review may have implications for the method of estimating the rate of return, which is set under a binding rate of return instrument that we will review in 2021–22. Undertaking the inflation review now should equip us to factor in any changes into the rate of return review.

1.3 Scope of the review

Issues considered in this review are likely to include a number of key themes from our 2017 inflation review[14] and ongoing engagement with stakeholders.

Initially, we propose to examine three key issues:

1. What method should we use to estimate expected inflation? This is an important input into our regulatory determinations. We discuss our current approach further in Appendix A.
2. Does the regulatory framework successfully deliver the expected real rate of return under the current approach? We discuss the framework further in Appendix A.
3. Should we instead target a nominal or hybrid[15] return? Recognising that a change to the regulatory framework would be a material change with wide-ranging impacts.

We are open to hearing views on each of these issues or other topics stakeholders would like to raise. Moving forward we are seeking to focus the scope of this review in our draft position paper. At the draft position stage we propose to focus our inquiries in one of three broad directions:

1. No change to our current approach or framework is required. We would explain our reasons if this is our conclusion.
2. We are proposing changes to how we estimate and apply expected inflation in our PTRM, RFM and/or pricing methodology to better focus the return provided to NSPs. We would set out the broad direction of the changes we propose for stakeholder feedback.
3. We are proposing changes to the regulatory framework to move to a nominal or hybrid rate of return framework. We would set out the broad direction of the changes we propose for stakeholder feedback.

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14 See AER website on 2017 Inflation review including final position paper and stakeholder submissions. See: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-expected-inflation-2017

15 Under the hybrid approach, the framework would target the initial real return on equity and the initial nominal return on debt.

We see a divergence between path 2 on the one hand, and path 3 on the other. For example, if we decide to move in the direction of a nominal rate of return framework we would no longer need to estimate expected inflation.[16] Alternatively, if we decide not to pursue a change to a nominal framework then we would focus on determining the best method for estimating expected inflation.

The choice between paths is an important decision point and we are seeking clear views from stakeholders.

In responding to our discussion paper, if path 1 is your preferred option, please submit your reasons and supporting evidence. We conducted extensive work on path 2 in our 2017 review. The material and modelling considered at that time is available on our website.[17] If you support changes to our models, please refer to that material and explain your position with supporting modelling.

In particular, we would like to hear views from stakeholders about whether we should pursue path 3. In our 2017 review, there was no clear view from stakeholders about whether we should change to a nominal or hybrid approach. We see this as a substantial change to the framework which moves risk between NSPs, their investors and consumers and would impact the ultimate level of compensation required. In particular, if we move to a nominal rate of return then the returns that investors receive would no longer be protected from unexpected movements in the inflation rate. Therefore, before moving in the direction of path 3 we would want to see submissions that address how such a change would be in the long term interests of consumers, including modelling to show the potential impact on prices for consumers as a result of the change. We also would want to consider whether transitional arrangements are needed.

Further questions for stakeholders to consider in formulating their responses to this discussion paper are set out in section 1.5.

1.4 Next steps

An updated indicative timeline for this review is set out below. We will revisit the timeline for the review after considering responses to this discussion paper. We may further alter the timeline in response to emerging issues, including issues around the ongoing management of COVID-19.

16 There may be some components of capital and operating costs that require an estimate of expected inflation to be applied as well as for the smoothing process.

17 See: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-expected-inflation-2017

Date	Milestone
7 April 2020	Initiation notice published
May 2020	Discussion paper published
June 2020	First consultation period
15 July 2020	Submissions on discussion paper close
Sept 2020	Draft position paper
September–October 2020	Second consultation period
October/November 2020	Submissions on draft position paper close
December 2020	Final position paper (If required) Proposed PTRM/RFM amendments and explanatory statement released (If required) Proposed rule changes released
January 2021	(If required) Six week submission period on proposed model amendments
April 2021	(If required) Final PTRM/RFM amendments released

1.4.1 Implementation phase

A number of implementation processes flowing from this review are possible, depending on the recommendations (if any) in our final position. Any changes under path 2 are most likely to be able to be implemented by a change to our regulatory models. We will consult on the implementation of these changes in early 2021. We expect we could make model changes by April 2021, in time to apply to the final decisions for the Victorian electricity distribution determinations due by 30 April 2021.

Any changes under path 3 are likely to require changes to the National Electricity and Gas rules. If a rule change process is required, we will submit a rule change request to the Australian Energy Market Commission (AEMC). The AEMC would then conduct a rule change process and consider whether to make a change. This process may take several months.

In each of these cases, changes arising from the inflation review would apply to subsequent gas and electricity regulatory determinations on a prospective basis. Any changes would not apply to regulatory decisions that have concluded.

1.5 Stakeholder questions

This below list of questions is not exhaustive and we welcome submissions on any aspect of our approach to estimating expected inflation:

1. What are the available indicators of expected inflation and what are their strengths and weaknesses?

2. Should we continue to use our current approach to estimating expected inflation?
3. Are there improvements we could make to our current approach to estimating expected inflation?
    i. For example, should we consider a glide path approach? If so, explain why we should consider it and how the approach would be implemented — linearly or non-linearly, time horizon?
    ii. For example, should we use a different measure of inflation rather than the headline Consumer Price Index or CPI? If so, explain why we should consider an alternative measure and its advantages.
4. Should we use an alternative approach to estimating expected inflation? If so, set out the alternative approach and its advantages over our current approach?
5. Does our current approach deliver the target ex-ante expected real rate of return?
6. Should we switch to a nominal or hybrid approach to setting NSP revenues? If so,
    i. How should this mechanism be implemented?
    ii. Why is it superior to our current approach?
    iii. Are investors in NSPs prepared to take on the risk of unexpected movements in inflation?
    iv. Is there a need for transitional arrangements?
7. What is the best approach to incorporate inflation expectations into the trailing average return on debt?[18] Explain why you consider your approach is the best approach.

[18] The return on debt is estimated using the ten year trailing average portfolio approach. Under this approach the return on debt allowance for the forthcoming year is a simple average of the annual return on debt estimate for that year and the annual return on debt estimates for the nine previous years.

Appendix A The current regulatory framework

Electricity and gas networks tend to exhibit natural monopoly characteristics. We apply an economic regulatory framework to electricity and gas NSPs to address these natural monopoly properties.

Most aspects of the regulatory framework relevant to inflation are similar across electricity distribution and transmission networks and gas distribution and transmission pipelines. This discussion paper focuses on the common framework and uses generic terms rather than those legislated in the NER and NGR. Where it is necessary to refer to specific terms, we have used those relating to electricity distribution for convenience.

Under the economic regulatory framework, we set regulated revenue based on the efficient costs that a NSP expects to incur in running its electricity network or gas pipeline. The forecast revenue stream is derived using a 'building block' assessment, where total revenue is the sum of four components (building blocks):[19]

- return on capital (to compensate investors for the opportunity cost of funds invested in the business)
- return of capital (depreciation, to return the initial investment to investors over time)
- operating expenditure (opex, to cover the day-to-day costs of maintaining the network and running the business)
- cost of corporate taxation.

Regulatory determinations usually occur every five years for each regulated business. The regulatory framework aims to provide incentives for a NSP to run an efficient business and ensure consumers pay no more than necessary for safe and reliable service. Once regulated revenue is set for this period (or tariff caps in the case of gas providers), the NSP has an incentive to provide services at the lowest possible cost because its returns are determined by its actual costs of providing services. If a NSP reduces its costs to below the regulatory estimate of efficient costs, the savings are shared with consumers in future regulatory periods. This benchmark incentive framework is embedded in the building block allowances specified under the NER and NGR.

To calculate each building block we use the RFM and PTRM. The RFM is used to establish the RAB from one regulatory period to the next (or rolling forward from one year to the next in the same regulatory period). The role of the PTRM is then to determine the total revenue requirement for NSPs by calculating each building block then adding the building blocks to determine the annual revenue requirement each year within the regulatory control period. The PTRM also smooths the revenue profile over the regulatory period, so that the expected

[19] There is also a fifth building block for 'revenue adjustments', which reflects revenue increments or decrements arising from the operation of incentive schemes and other adjustments.

revenue over the regulatory control period equals the total revenue requirement (in net present value terms).[20]

A.1 What does the RFM do?

The RFM establishes the method used to roll forward the RAB—that is, increase or decrease from the previous value:[21]

- from one regulatory period to the next regulatory period
- from one year to the next in the same regulatory period.

The closing value of the RAB for a regulatory period as calculated by the RFM becomes the opening RAB to be used for the purposes of making a building block determination for the next regulatory period.

The RAB values calculated in the RFM are used as inputs into the PTRM, where they are rolled forward from one year to the next on a forecast indicative basis.[22] They are used in the PTRM as part of the calculation of annual revenue requirements.

The RFM deals with many aspects of RAB estimation, including:[23]

- establishment of the opening RAB for a regulatory period
- adjustments for prudent and efficient capital expenditure (capex)
- the approach to depreciating the RAB, which may be based on forecast or actual capex
- circumstances where other assets may be removed from or added to the RAB.

The roll forward of the RAB from year-to-year reflects:

- additions for actual net capex
- reductions for depreciation (based on approved asset lives and methods)
- indexation for actual inflation
- other adjustments or true-ups required under certain circumstances in accordance with the NER and NGR.

We have published RFM templates that electricity and gas NSPs are required to use as part of their regulatory proposals. The decision documents and handbooks that accompany the model templates set out the inputs, assumptions and workings of the RFM and PTRM in greater detail.[24]

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20 In 'net present value' terms means that we discount cash flows (at the relevant weighted average cost of capital) across the regulatory period to reflect the time value of money.

21 NER, cll. 6.5.1(e) and 6A.6.1(e); NGR, r. 75B(3).

22 When we initially set total revenue for a NSP in the PTRM, the actual CPI is unknown. Therefore, we use our estimate of expended inflation as an input to the RFM on an indicative basis. This provides consumers with an indication of what prices will be in the forthcoming year(s).

23 NER, cl. S6.2 & S6A.2; NGR, Div 4.

24 Refer AER website for Electricity RFMs (https://www.aer.gov.au/node/65053/) and Gas RFMs

A.2 What does the PTRM do?

The PTRM is used to calculate the allowed expected nominal revenue for a NSP over a given regulatory period. Specifically, the PTRM performs iterative calculations to derive the:

- Annual revenue requirement (unsmoothed);
- Annual expected revenue (smoothed); and
- X factors (converts unsmoothed revenues to smoothed revenues over a given period).

The calculations are performed for each regulatory year of the regulatory period from a set of given input costs. The PTRM then uses these inputs to undertake the building block derivation of total revenue, consistent with the requirements of the NER and NGR. Under this approach total revenue is set to equal the total efficient costs required to provide safe and reliable delivery of electricity and gas services to calculate total unsmoothed revenue for the NSP.

We determine revenues in nominal terms because it will be in nominal dollar amounts that consumers will be paying. Therefore, we need to take into account expected inflation in our distribution determination to calculate what the nominal price levels will be in future periods.

The PTRM uses 10 year inflation expectations to convert revenues to nominal values. After determining the nominal annual revenue for each year using the PTRM, 'X factors' are then used to adjust the yearly revenue amounts to 'smooth' revenues across the regulatory period. The X factors are percentage changes in real annual revenue from year to year and must follow certain rules in their calculation, which may be set out in control mechanism formulas,[25] in addition to the NER or NGR. For electricity, they are to comprise part of the CPI–X constraint on regulated services, and they must be set such that the following conditions are met:

- The sum of the annual revenue (unsmoothed) and forecast expected revenue (smoothed) are to be equal in net present value (NPV) terms
- the value of expected revenue and the annual revenue in the final regulatory year of the period must be as close as reasonably possible.

The PTRM then uses X factors to smooth the revenue across the regulatory period. It is important that the revenue is smoothed over the regulatory period before setting prices charged by NSPs to limit price volatility for consumers throughout the period. Once the revenue for each year has been smoothed using the X factors the nominal prices or reference tariffs charged for each period can be derived.

(https://www.aer.gov.au/node/65055/).

25 We must impose controls over the prices and/or revenues of the electricity and gas services we regulate. This may be in the form of a revenue cap or price cap control mechanism. We then set control mechanism formulas to give effect to these control mechanisms.

A.3 How do the annual pricing mechanisms work?

The process for setting prices is performed outside the PTRM. At a general level our process for determining regulated prices over a five year regulatory period is:

1. Prices (or tariffs) are determined in the first year of the next regulatory period based on the nominal revenue for the first year and forecast demand for the first year.
2. For each subsequent year of the next regulatory period, revenue is determined annually by starting with the previous year's approved revenue and applying the applicable control mechanism formula which will adjust for:
    - the X factor (revised after the annual return on debt update) for that year,
    - the amount of actual inflation (as measured by Consumer Price Index or CPI) for the previous year
    - other miscellaneous adjustments arising from the previous year to be carried into the next year, such as service performance or cost pass through.

For each year, prices are determined so that—when applied to expected demand—they comply with the revenue we set in our regulatory decision calculated as above.

The inputs, assumptions and workings of the PTRM are set out in the relevant handbooks that accompany the PTRM templates, as well as the decision documents.

A.4 Current treatment of inflation

Our current treatment of inflation 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.[26] Targeting the real rate of return means that nominal revenues received by the NSP move in the same direction as inflation. If actual inflation outcomes are below expected inflation, NSPs recover less revenues in nominal terms than expected in the determination; but if actual inflation outcomes are above expected inflation, NSPs recover more revenues in nominal terms than expected.

Our current approach to estimating expected inflation is to use a 10 year geometric annualised average of the RBA's headline rate forecasts for 1 and 2 years ahead[27] and the mid-point of the RBA's target inflation band of 2 to 3 per cent for years 3 to 10. This is a key input to the PTRM in determining the rate of return for NSPs, and the total revenue. The RFM subsequently 'trues-up' the RAB for differences between the estimate of inflation expectations and actual inflation outcomes.

Our decision on the rate of return is a key determinant of total revenue a NSP may recover. As discussed above, we use actual and estimated expected inflation at multiple stages in the regulatory framework and in calculating the rate of return. The values used for inflation are

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26 In other words, the initial real rate of return is the expected (ex ante) real rate of return on equity at the start of the regulatory period.

27 Where the RBA forecast headline inflation rates for 1 and 2 years ahead is a range, the midpoint of the range is used.

dependent on the available information at the time, as well as whether inflation or expected inflation is the source of (efficient) financing costs for the NSP. This leads to different inflation values being used in the PTRM, annual pricing and RFM processes. To assess the full impact of inflation in the regulatory framework, the treatment across all our regulatory models must be considered, with these inflation aspects summarised at table A.1 below.

Table A.1 Key inflation aspects of PTRM, annual pricing and RFM

PTRM
• Include expected inflation (embedded in the nominal rate of return) in the return on capital building block • Deduct expected inflation from the return of capital building block • Include expected inflation in the projected RAB roll forward (consistent with the deduction from the return of capital building block) • Generate first year nominal revenue and X factors consistent with the estimate of expected inflation, where the NPV of unsmoothed revenues equate to the NPV of smoothed revenues.[28]
Annual Pricing Process
• Adjust smoothed revenue to reflect actual inflation (CPI outcomes) within the regulatory period. This involves replacing the estimate of expected inflation for within-one regulatory period cash flows.[29]
RFM
• Include actual inflation in the RAB roll forward. This involves replacing the estimate of expected inflation for all regulatory period cash flows.

Combined the PTRM, annual pricing and RFM:

- derives an initial real rate of return from the initial nominal rate of return and estimate of expected inflation[30]
- delivers the initial real rate of return plus ex post inflation outcomes.

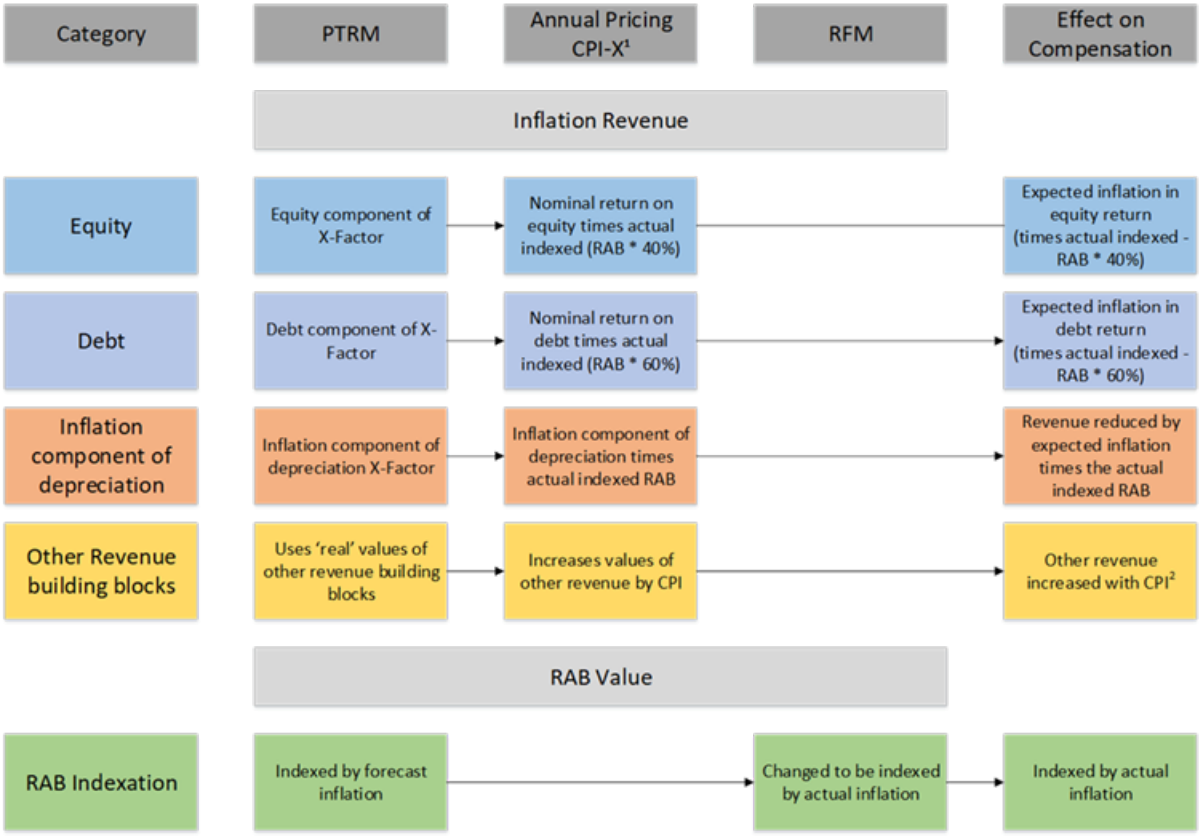
The impact from the inflation values used in the different stages of the regulatory framework is summarised in Figure A.1.

28 The X factors can be interpreted as the change in real revenue each year—that is, before the adjustment of revenue for inflation. They are expressed in negative terms by convention (so a negative X factor results in a real revenue increase).

29 This describes the 'complete' pricing adjustment (implemented for APA VTS); the standard approach introduces a first year pricing effect (discussed in section C.2 below).

30 In other words, the initial real rate of return is the expected (*ex ante*) real rate of return on equity at the start of the regulatory period.

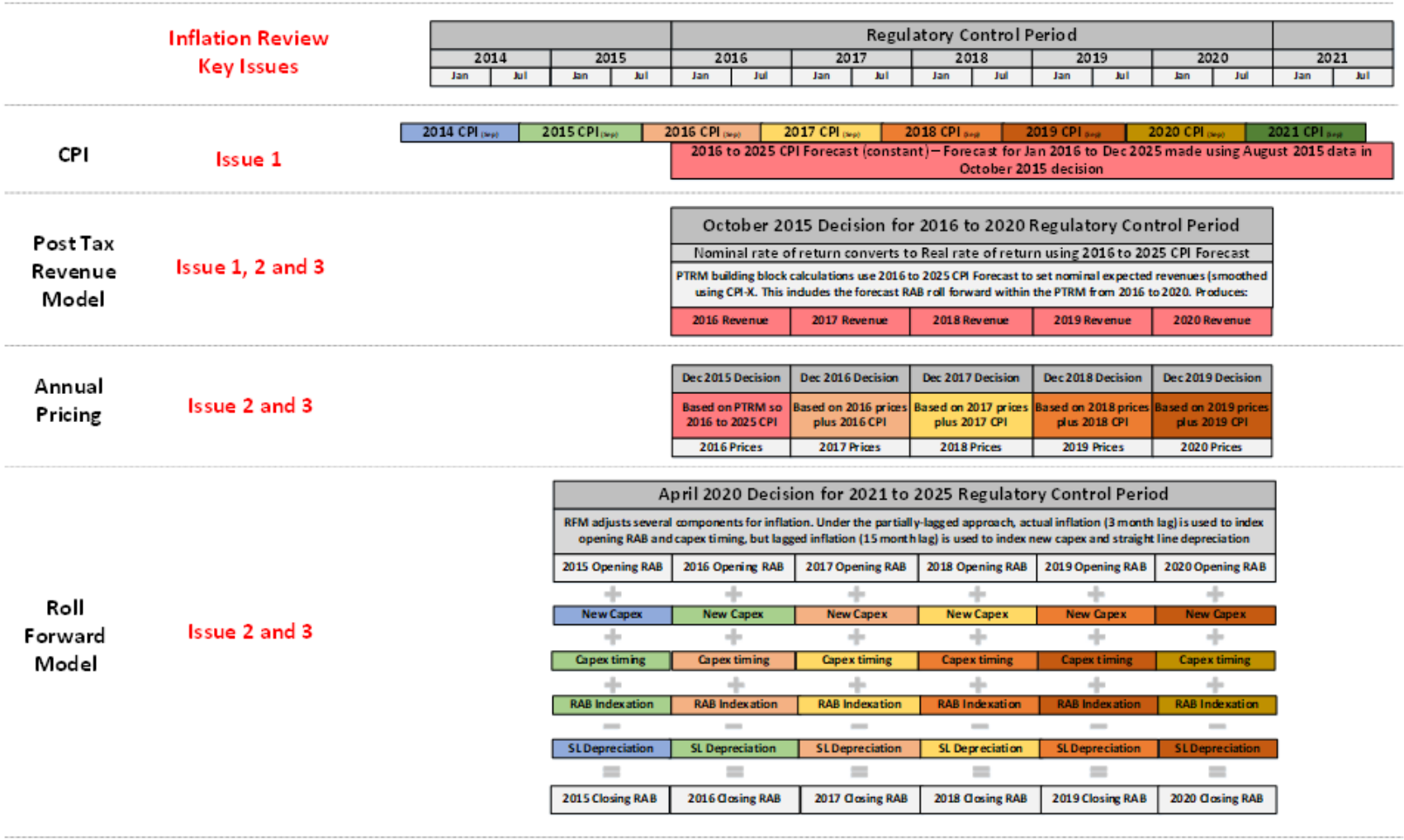
Figure A.1 Inflation in different stages of regulatory framework



1. Applies in years two to five of the regulatory period.
2. Applies in years two to five of the regulated period. In year one, the other revenue is increased by expected revenue

The inflation values we use to make a determination are also provided in Figure A.2 (below). This figure illustrates the "partially lagged" approach in the inflation values, and when read top-to-bottom, reflects the broad timing of our regulatory determination processes.

Figure A.2 Overview of the partially-lagged approach to inflation



Under the current approach, delivery of the real rate of return set in our determination for the forthcoming regulatory period is not exact. That is, when actual inflation outcomes are above or below expected inflation, the obtained real rate of return will differ slightly from the targeted real rate of return in our regulatory determination. However, as stated in the final decision of our 2017 inflation review, the deviations around this target appear to be minor and symmetrical. Further, one of the key deviation sources—the first year pricing effect—acts to offset potential errors in our estimate of expected inflation. Section 5 of the *2017 inflation review discussion paper* sets out a detailed explanation on the treatment of inflation in the regulatory framework and was unchanged in the final position of the 2017 inflation review.[31]

[31] AER, *Discussion paper – Regulatory treatment of inflation*, April 2017, pp. 33–43; AER, *Final position paper – Regulatory treatment of inflation*, December 2017, pp. 63–64.

Appendix B Key concepts

This appendix sets out some key concepts relevant to the discussion of expected inflation in the regulatory context.

B.1 What is inflation?

Inflation is a general measure of an increase in prices and fall in the purchasing value of money. Inflation refers to changes in the general or overall price level, rather than prices for particular products. For example, over a period of time the price of oil may increase and the price of bread may decrease, but there may be no change in the overall price level.[32]

The presence of inflation within the economy makes it difficult to compare prices across different time periods. In order to account for inflation, the terms real and nominal are used. The real value of a good has been adjusted for inflation and can therefore be used to compare prices over different periods. Conversely, the nominal value has not been adjusted for inflation.

Broadly, the nominal rate of return is made up of a real rate of return plus a rate of expected inflation. However, as the values are rates of return, you cannot simply sum the numbers. An equation used in economics—known as the Fisher equation—must be used to estimate the relationship between real and nominal returns with regard to inflation:

$$(1 + interest\ rate_{nominal}) = (1 + interest\ rate_{real})(1 + inflation\ rate)$$

This equation shows that when inflation is positive the nominal return is greater than the real return.

Real returns (or real prices) are important to use because they are able to illustrate the purchasing power of a return regardless of what happens to price levels in the future. In essence, a real return strips out the effects of inflation and allows the value to be seen in terms of the current period's purchasing power.

There are a number of different measures of inflation. The most widely known and used measure is the CPI. The CPI is a measure of changes in the price level of a 'basket' of consumer goods and services purchased by households. The Australian Bureau of Statistics (ABS) monitors changes in the CPI and publishes results quarterly.

Other measures of inflation may differ in the types of products and prices that are tracked over time. For example:

[32] The opposite of inflation is deflation: a decrease in the general price level. The NER and NGR refer to inflation, but do not expressly refer to deflation. We consider that the term 'inflation' in the Rules includes deflation as a negative amount of inflation. See: NER, Chapter 6; NGR, Part 9.

- Underlying CPI (exclusion or trimmed mean measures) which seeks to remove elements of the CPI that may obscure the underlying inflation rate.[33]The 'trimmed mean' approach ranks the various categories of goods and services in the CPI in order of increase/decrease (seasonally adjusted). The ends of the distribution of price changes are 'trimmed' and the mean change for the remaining goods and services calculated.
- Producer price indices measure changes in the price from the seller's perspective. The "basket' of producer goods and services may also be classified to its specific industry.
- The Gross Domestic Product (GDP) deflator measures inflation across all goods and services produced within the economy over a specific period. This measure is not based upon a fixed basket of goods and services, but rather changes with people's consumption and investment behaviours.

In our 2017 review, we concluded that CPI is a well-recognised measure of inflation and is the most appropriate measure.[34] The RBA provides forecasts of both trimmed mean and headline CPI. Except for extraordinary periods, there is normally little difference between the forecasts.

B.2 What is the best estimate?

We are required to estimate expected inflation, but the inflation outcome may turn out to be different to the original expectation. A difference between an estimate of inflation expectations and the subsequent inflation outcomes does not necessarily mean that the estimate of expectations did not reflect expectations at the time.

The NER and NGR state that the PTRM must specify: 'a method that the AER determines is likely to result in the best estimates of expected inflation.'[35] The NGR states that an estimate must be arrived at on a reasonable basis and must represent the best forecast or estimate possible in the circumstances.[36]

The 2017 inflation review considered four approaches that could be employed to derive the best estimates of expected inflation, and the criteria by which they were assessed. We propose to adopt these approaches and criteria will again be used for this review.

33 See T Richards and T Rosewall, *Measures of Underlying Inflation*, RBA Bulletin, Mar Qtr, 2010.
34 AER, *Regulatory treatment of inflation, Final position*, December 2017, pp. 18–19.
35 NER cll. 6.4.2(b) and 6A.5.3(b)(1); NGR, r. 75B(2)(b).
36 NGR, r. 74.

Table B.1 Potential approaches for achieving 'best estimates' of expected inflation and assessment criteria

Approaches	Assessment criteria
1. A 10 year geometric annualised average of the RBA's forecast headline rate for 1 and 2 years ahead[37] and the mid-point of the RBA target inflation band of 2 to 3 per cent for years 3 to 10. Following completion of the 2017 inflation review, this remains our approach to estimating expected inflation.	• Relative congruence with the market-expected inflation rate (whether estimates of a particular approach more closely correspond to the market-expected inflation rate) • Robustness • Transparency • Replicability • Simplicity.
2. A 10 year geometric annualised average of the RBA's forecast headline rate for 1 and 2 years ahead and then a gradual movement to the mid-point of the RBA target inflation band of 2 to 3 per cent for years 3 to 10. This is also known as the glide path approach.	
3. The 10 year bond breakeven inflation rate (BBIR) implied by the difference between the yields-to-maturity on nominal and indexed Commonwealth Government Securities (CGS).	
4. The 10 year expected inflation rate implied from zero coupon inflation swaps, and	
5. Survey-based approaches of expected inflation.	

These issues are also relevant to the reasonableness of the basis upon which an estimate is arrived at. We propose to employ the criteria to help us assess which approach is likely to result in the best estimate of expected inflation in line with the NER and NGR. We invite submissions on these proposed approaches and assessment criteria.

B.3 Efficient allowed rate of return

We incorporate inflation in the PTRM, annual pricing process and the RFM. Inflation also affects many of the inputs to these models. These effects are individually accounted for in the current methodology and are a key input to us determining an efficient rate of return for each NSP. This section explores the current methodology and the issue of appropriately accounting for inflation, correct compensation for inflation risk and the term of the inflation expectations used.

B.3.1 Appropriately accounting for inflation

The NER and NGR requires use of a nominal rate of return in setting total annual revenues.[38] The NER also requires the RAB to be indexed and maintained in real terms,[39] whilst the NGR requires the capital base to be depreciated in a manner that ensures that an

37 Where the RBA forecast headline inflation rate one and two years ahead is a range, the midpoint of the range is used.

38 NER, cl. 6.5.2(d), 6A.6.2 and NGR r. 87.

39 NER, cll. S6.2.3(c)(4) and S6A.2.4(c)(4).

asset is depreciated only once and that asset values are adjusted for inflation.[40] This results in inflation being accounted for in both returns on and of capital.

To avoid double compensation for inflation, we subtract the indexation of the RAB[41] from the depreciation building block when determining the total annual revenue.[42] The approach provides for the same total annual revenue and RAB regardless of whether a nominal or real rate of return is used in combination with an indexed RAB.

B.3.2 Risk and return

NSPs expect to receive a set real rate of return on the overall RAB, but inflation-related risks may still be present.[43] This may present inflation risk to the NSPs. However, NSPs are likely to be compensated for these risks through our current approach to setting the rate of return.

This is because the equity beta, which is part of the return on equity, should reflect the systemic risk incurred by equity investors in Australian regulated energy utility firms.[44] We estimate the beta using market data on the variability of returns for listed regulated energy networks in Australia.

If inflation risks due to regulation meant that the NSPs faced higher systemic risks, then the calculated equity betas in the Capital Asset Pricing Model[45] (CAPM), would likely reflect this. Given that our current approach to estimating expected inflation has been applied consistently for a number of years, the NSPs would therefore be compensated for their current levels of inflation risks through the beta and the allowed rate of return.

B.3.3 Investment term

Inflation expectations can vary on the number of years included in the assessment. Our approach involves using the a geometric annualised average rate over 10 years to estimate the expected inflation, which matches the term for the return on capital determined in our Rate of Return Instrument.[46] This in turn, sets the duration of the nominal risk free rate used in the nominal vanilla[47] return on debt and the return on equity[48] as the 10 year

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40 If the accounting method approved by the AER permits. See NGR, r. 89(d).

41 NER, cll. 6.4.3(b)(1) and 6A.5.4(b)(1).

42 The indexation of the RAB is subtracted from the straight line depreciation. This calculated amount is the NSP's regulatory depreciation.

43 These inflation-related risks include the first year pricing effect and inflation lags and (for equity holders) the effect fixed nominal debt issuance.

44 Return on equity is a measure of financial performance calculated by dividing net income by shareholders' equity. Because shareholders' equity is equal to a NSP's assets minus its debt, ROE is considered the return on net assets.

45 The Capital Asset Pricing Model (CAPM) describes the relationship between systematic risk and expected return for assets, particularly stocks. CAPM is widely used throughout finance for pricing risky securities and generating expected returns for assets given the risk of those assets and cost of capital.

46 AER, *Rate of return instrument*, December 2018.

47 The nominal vanilla rate of return calculates a 'vanilla' or 'plain' cost of capital. This is the weighted average of the post-tax nominal return on equity and the pre-tax nominal return on debt, and therefore excludes all tax-related obligations from the rate of return calculations.

48 AER, *Final Decision: SP AusNet transmission determination 2008–09 to 2013–14*, 31 January 2008, p. 107; AER, *Revised*

Commonwealth Government Securities (CGS) rate. We therefore use 10 year expected inflation estimates.

Debt contracts (and therefore our return on debt calculations) are based on prices investors are willing to pay. These prices reflect investor expectations of the risk free rate, debt risk premium and inflation over their investment horizon at the time they raise this debt.

Our 2017 inflation review noted that, historically, NSPs agreed that this horizon (or term) for the return on debt is 10 years.[49] Therefore, while debt contracts may fix the nominal cost of debt, this cost incorporates investor expectations of inflation over the next 10 years. The term in these inflation expectations is what we want to match.

We note that the number of years included in the assessment was discussed in the 2017 inflation review. For this inflation review, stakeholders are invited to review our 2017 final position and provide comments on any errors or inconsistencies in our reasoning.

49 *access arrangement by GasNet Australia (Operations) for the Principal Transmission System*, 30 April 2008, p. 66. AER, *Regulatory treatment of inflation, Final position*, December 2017, p. 23.

Appendix C Key issues for consideration

This appendix sets out the key issues for consideration in further detail. However, we encourage stakeholders to familiarise themselves with the analysis and outcomes of the 2017 inflation review, in particular our final position paper.[50]

In the 2020 inflation review, there are three key issues to explore:

1. What method should we use to estimate expected inflation? (**Issue 1**)
2. Does the regulatory framework successfully deliver the expected real rate of return under the current approach? (**Issue 2**)
3. Should the target be the initial real rate of return (or a hybrid approach)?[51] (**Issue 3**)

C.1 What method should we use to estimate expected inflation?

The first issue relates broadly to our current method and whether an alternative method (such as the previously-employed breakeven approach) should be used to estimate expected inflation. Broadly, in our 2017 review we considered four main approaches for estimating inflation:

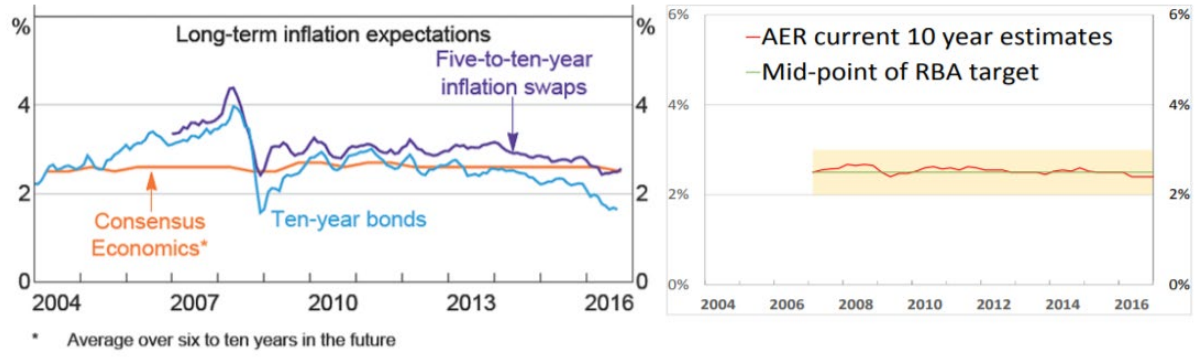
1. Our current approach – which is a 10 year geometric annualised average of the RBA's forecast headline rate for 1 and 2 years ahead and the mid-point of the RBA target inflation band of 2 to 3 per cent for years 3 to 10.
2. The breakeven approach – the 10 year bond breakeven inflation rate implied by the difference between the yields-to-maturity on nominal and indexed CGS.
3. The 10 year expected inflation rate implied from zero coupon inflation swaps.
4. Survey-based approaches of expected inflation.

Each approach has its strengths and weaknesses, recognising that we are seeking to estimate expected inflation. At the conclusion of our 2017 review, we decided to continue to use our current approach, as this was found to be the best available estimator (see Figure C.1).

50 See: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-expected-inflation-2017/aer-position

51 Under the hybrid approach, the framework would target the initial real return on equity, and the initial nominal return on debt.

Figure C.1 Four inflation expectation measures indicators over time



In brief, our findings on each of the four approaches in the 2017 review were:

1. Our current method is simple and transparent and can be replicated easily by stakeholders. The RBA is highly respected and has been generally successful in its inflation targeting. This was found to be the best available approach, and a number of stakeholders (including consumer groups) supported the approach.[52] While the method has some dependencies (such as the reliance on the anchoring of long term expectations), a monitoring program can help to mitigate this.

2. The bond breakeven approach is the method we used to estimate inflation prior to 2007. In 2007, NSPs identified a range of problems with this approach and persuaded us to move to our current approach. On its face, this method offers the advantage of deriving the estimate of expected inflation using market data —a submission put forward by many NSPs since 2015. However, upon closer examination, we considered that the breakeven approach suffered from a range of deficiencies including a number of biases and premiums which are significant and time varying. Evidence of these deficiencies is present for the US and UK markets (more mature and liquid than the Australian market), as well as for the Australian market. These biases persist, and as a result, there is an overestimation or underestimation of expected inflation. The RBA stated that this method is probably unviable.[53]

   An example of how a bias could result in an underestimate of expected inflation is shown in Figures C.2 and C.3.The implied expected inflation under the breakeven approach is the difference between the indexed CGS and the nominal CGS yields (shown in Figure C.2). If the indexed bond was to have liquidity premium due to illiquidity in times of market turmoil, the breakeven method deducts too much off the nominal risk free rate and results in an underestimation of the expected inflation — equivalent to the liquidity premium (Figure C.3).

52 ACCC/AER Working Paper #11, *Consideration of best estimates of expected inflation: comparing and ranking approaches*, April 2017, pp. 94-104.

53 RBA, *Letter re: Regulatory treatment of inflation - Inflation expectations*, 5 July 2017, p. 1.

Figure C.2 Breakeven approach without bias

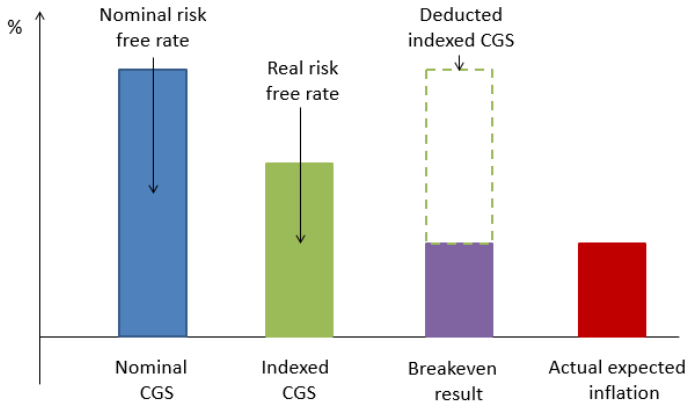
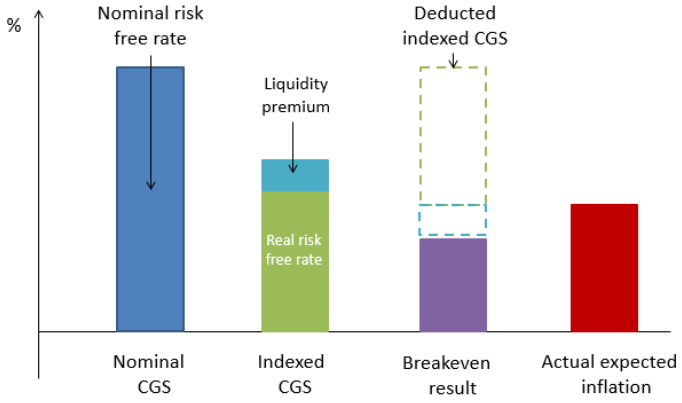


Figure C.3 Breakeven approach with bias



3. The swaps method has a number of positive attributes. Estimates of expected inflation using swaps are simple to calculate, can give daily estimates and the biases are arguably smaller than the bond breakeven approach. At the conclusion of our 2017 inflation review, we did not consider the inflation swaps method produced a better inflation forecast than our current approach. The estimates produced using the inflation swaps methods are likely to incorporate biases and distortions (due to hedging costs, liquidity premium and other premiums) and these biases and distortions are likely time-varying. Additionally, the RBA stated that this method is probably unviable.[54]
4. Surveys have the potential to rank highly as an approach. However, long term survey estimates are proprietary.

The main challenge for our current approach is whether it is sufficiently responsive to movements in long term inflation expectations.

Since the completion of our review in 2017, we have been monitoring a long term inflation expectations survey undertaken by Consensus Economics. This followed RBA advice which stated:

54 RBA, *Letter re: Regulatory treatment of inflation - Inflation expectations*, 5 July 2017, p. 1.

> Long-term surveys of expectations are a good way to estimate long-term inflation expectations since they should not be influenced by temporary deviations or financial market developments, and because the respondents are well-informed. They should also react to any unanchoring of expectations. Internal work has found that the Consensus Economics survey is the measure of long-term expectations that best abstracts from near-term influences on inflation. The main drawback of the Consensus Economics survey is its frequency; long-term expectations are only surveyed twice a year (in April and October). Furthermore, the information in this survey is proprietary, which may restrict replicability.[55]

As part of the 2017 review, we also considered some modifications to our current approach, such as introducing a glide path. The glide path method is based on the proposition that it may take a number of years for inflation to return to the mid-point of the RBA's target band following a disturbance. The Commerce Commission of New Zealand uses an equivalent version using Reserve Bank of New Zealand forecasts. However, the evidence before us at that time suggested that expected inflation did not take a long time to revert to the midpoint and so it was decided not to modify our current approach with a proposed glide-path approach.

C.2 Does the regulatory framework successfully deliver the expected real rate of return under the current approach?

The second issue relates to whether the current approach to estimating expected inflation delivers a real rate of return. In the 2017 review, there was a degree of consensus (although this was not universal), that the current regulatory framework delivers the initial real rate of return. Following its review of our regulatory framework, the Sapere report also reached this finding:[56]

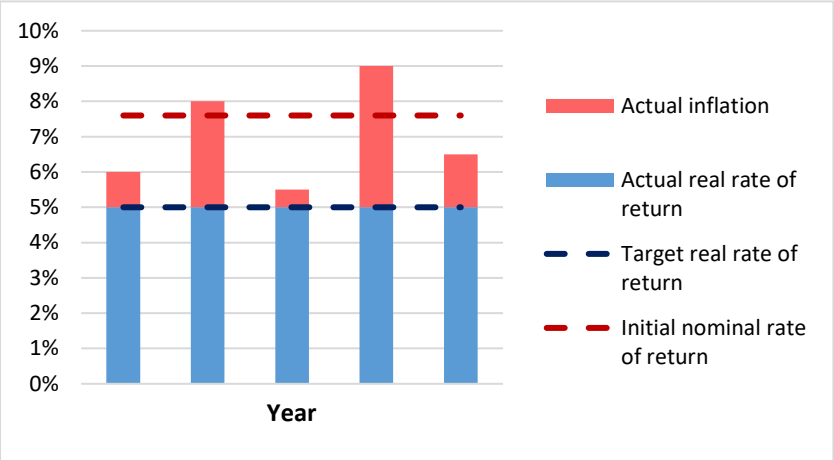
> The application of the RFM and the PTRM achieves the expected result that the net present value of the investment is zero and the NSP maintains the real value of its capital investment.

Figure C.4 shows that the difference between actual inflation and expected inflation has no effect on the achievement of the initial target real rate of return. Therefore, investors should achieve their target real rate of return (set ex-ante) regardless of actual inflation.

55 RBA, *Letter re: Regulatory treatment of inflation - Inflation expectations*, 5 July 2017, p. 2.

56 Sapere, *Efficient allocation and compensation for inflation risk, Report prepared for the Australian Energy Regulator*, 25 September 2017, p. 8 (paragraph 46).

Figure C.4 Targeting the real rate of return



However, delivery of the intended real rate of return target is not exact. There are some factors that give rise to minor variations from the target real rate of return. Importantly, these deviations are generally minor and symmetrical. These deviations arise because of practical limitations on when inflation outcomes are known. The first year pricing effect is discussed below.

The use of expected inflation in the first year, instead of (lagged) actual inflation, will result in a deviation from the intended real rate of return.[57] This effect was noted in our discussion paper,[58] demonstrated in several models presented at the technical workshop,[59] and identified in the Sapere report:[60]

> The effect of keeping the first year smoothed maximum allowable revenues at the value set at time 0 is to lock into the outcome for the first year the expected inflation rather than actual inflation. This means that for most NSPs, there is a difference between the expected real revenue and the actual real revenue. If expected inflation for the first year is greater (less) than actual inflation, the NSP receives a higher (lower) return than expected. This effect persists through the regulatory period because each year's revenue is a function of the previous year and so ultimately all are a function of the first year.

This first year pricing effect appears well understood, and has been present in the regulatory framework for more than fifteen years. We do not consider that the first year pricing effect requires any changes to the regulatory framework because it is:

- relatively small
- symmetrical, which means the net effect will reduce across multiple regulatory periods (provided the estimate of expected inflation is unbiased).

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57 The effect of using lagged inflation, instead of unlagged inflation, is discussed in the next section.

58 AER, *Regulatory treatment of inflation, Discussion paper*, April 2017, p. 39.

59 See the models and presentations from the AER, CCP and ECA available at https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/review-of-expected-inflation-2017/initiation.

60 Sapere, *Efficient allocation and compensation for inflation risk, Report prepared for the Australian Energy Regulator*, 25 September 2017, p. 12 (paragraph 77).

C.3 Should the regulatory framework target a different rate of return outcome?

This issue relates to the framework of the regulatory approach itself, and the way in which the NER/NGR compensate NSPs for inflation.[61] It is an important framework issue and changes in the framework will require a rule change by the AEMC. When we consulted on this issue in the 2017 review, there was a diversity of views among stakeholders. Changing the targeted approach means shifting risk within the framework from one stakeholder to another. For example, if we were to target a nominal rate of return rather than the current real rate of return, then returns to investors would no longer be protected from movements in inflation.

Therefore, before we propose changes to the current framework we would want to see substantial evidence to demonstrate that such a change is consistent with the NEO/NGO.

There are three different approaches to rate of return targeting that have been raised by stakeholders:

- Target real rate of return on capital (current approach)
- Target nominal rate of return on capital
- Target real return on equity (hybrid approach).

C.3.1 Target rate of return

We set the allowed rate of return so that NSPs can 'attract the necessary funds from capital markets for these investments and service the debt they incur in borrowing the funds'.[62] The underlying objective for the NSP is to achieve a real return consistent with the opportunity cost of capital. Since the revenue recovered by the NSP will be in nominal dollars, they also expect to be compensated for inflation.

Importantly, a target on real return on capital will provide stable real returns to investors (in aggregate) and stable real prices to consumers. Furthermore, it was found that targeting a real rate of return was consistent with both the NER and NGR. The current regulatory framework therefore focuses on this outcome.

C.3.2 Target nominal return

One alternative is to target the nominal return on capital. This would not compensate NSPs for changes in inflation outcomes. Furthermore, consumers will not receive stable real prices. Figure C.5 shows that the real price for consumers and real return for NSPs will vary over time — their purchasing power will not remain constant over time.

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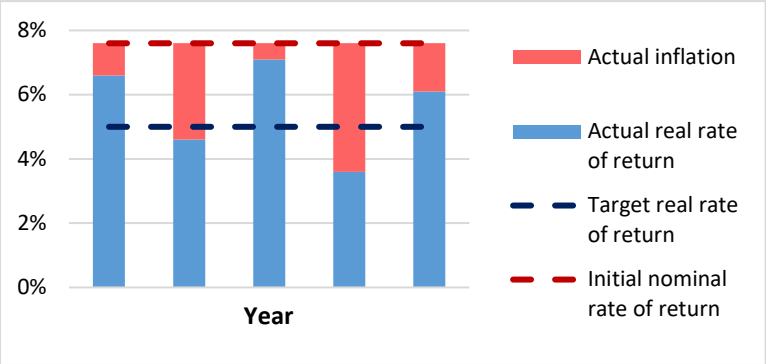
61 Where we describe the regulatory framework, we refer to the combined PTRM, RFM and annual pricing process as prescribed under the NER.

62 AEMC, *Rule determination: Economic Regulation of Network Service Providers, and Price and Revenue Regulation of Gas Services*, 2012, page iii.

Figure C.5 Targeting the nominal rate of return



C.3.3 Target hybrid return

A further alternative is a hybrid rate of return target, such as targeting the real return on equity and a nominal return on debt. This would improve stability in real returns for one type of investor (shareholders), but worsen stability in real outcomes for consumers. This question goes to the balance of risk between NSPs, their investors and consumers. A change in approach has the potential to impact the balance of these risks and the ultimate level of compensation required.