energy networks association

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WRITTEN-DOWN VALUE?

Assessing proposals for electricity network write-downs

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It was the institution of the "free lunch" I had struck…
For something less than a rupee a day a man can feed himself
sumptuously in San Francisco, even though he be a bankrupt.
Remember this if ever you are stranded in these parts.

Rudyard Kipling, American Notes (1891)

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EXECUTIVE SUMMARY

Key findings

Over the past three years a number of parties have called for Australian governments to consider undertaking 'write-downs' of the regulatory asset bases of electricity network businesses, as a means of either lowering current prices for consumers, constraining future network charges, or recognising emerging competition in network services.[1]

A practical analysis of the effect of regulatory asset write-downs over a range of scenarios suggests, however, that far from benefitting customers:

- significant regulatory asset write-downs would generate higher, rather than lower, network tariffs;
- increasing the scale of any proposed write-down would not lead to tariff falls;
- write-downs would reverse existing downward pressures on the cost of capital and prices;
- write-downs would likely increase the risk of any 'utility death-spiral', not lower it;
- even a small increase in the future cost of capital resulting from the risk of write-downs would completely offset any notional 'savings' of such write-downs.

Analysis suggests that implementation of the examined range of write-down scenarios could lead to Australian consumers paying the equivalent of over $320 million in increased network charges each year, and experiencing unnecessary increases in average electricity bills of up to 2.4 per cent. Due to the estimation approach adopted, this is likely to represent a highly conservative lower-bound estimate of potential revenue and pricing impacts.

Overview of analysis

The current regulatory framework minimises stranding risk not because of the benefits to investors, but because it lowers the long-term cost of infrastructure services to consumers. Therefore, it is vital that proposals for asset write-downs are assessed on the benefits and costs to consumers.

This paper examines calls for 'write-downs' of the regulatory asset bases of electricity network businesses in the context of the established role of the regulatory asset base in monopoly regulation, and its role in underpinning access to low cost finance for investments in network assets.

The regulatory asset base represents as yet unrecovered past capital investments made by infrastructure owners. For electricity networks, a return on substantial capital investments already made represents typically around half or more of total regulated revenue. The regulatory asset base allows these costs to be borne through time by all the beneficiaries of long-term investments.

In recognition of the interest of consumers in providing for large network investments to be financed most efficiently, for example, through the capacity to use long-term investment-grade corporate bond issuances. Over the past two decades of energy market reform policy makers, rule makers, and regulatory bodies have systematically sought to provide increased certainty around the treatment of the regulatory asset base. This provision for regulatory stability and certainty around the asset bases is a feature of regulatory frameworks across major developed economies.

By lowering the risk of asset write-downs (i.e. regulatory 'stranding') and acting as an enduring regulatory commitment, the mechanism of a predictably updated regulatory asset base provides the critical foundation for low cost financing of new and ongoing network investments. This allows for the minimising of network charges to consumers. This lowering of financing costs has played a historically important role in constraining the overall cost of electricity network investment. With the CSIRO recently estimating required investment in electricity network of at least $300 billion by 2050, it should continue to play a critical role in constraining final electricity costs.[2]

1 Grattan Institute *Shock to the system*, December 2013; Major Energy Users Inc. *Network Regulation Rule Change Proposal*, October 2011; and Mountain, B.R. *Australia's rising electricity prices and declining productivity: the contribution of electricity distributors*; Energy Users Association of Australia, May 2011.

2 CSIRO *Change and choice: The Future Grid Forum's analysis of Australia's potential electricity pathways to 2050*, December 2013.

To illustrate the 'real world' implications of these concepts for typical household electricity consumers, this paper details scenario-based modeling on the revenue and pricing impacts of regulatory asset write-down proposals. Each of these scenarios is based on a hypothetical 'once-off' write-down of a proportion of the current combined regulated asset base of Australian electricity networks.

Three alternative scenarios were modeled.

- A significant network write-down of **around 5 per cent** of current asset values, a scenario which is loosely based on one parties' estimate of 'excess assets'[3] (***Scenario A***).
- A scenario featuring a more substantial write-down of **10 per cent** of current asset values, equivalent to the value of the entire electricity distribution network across both Victoria and Tasmania. (***Scenario B***).
- A scenario which assumes an extremely large write-down (**20 per cent** of current asset values), equivalent to the value of every transmission network asset across the interconnected National Electricity Market. (***Scenario C***).

A key finding of this paper is that under every scenario examined, network write-downs resulted in substantial increases in network tariffs, and final electricity costs to Australian households.

Using a set of conservative assumptions under the scenarios modeled, households across individual Australian states would experience increases of up to around 7 per cent in the prices paid for network services. These tariff increases have the potential to lead to increases of up to 2.0 to 2.4 per cent on average electricity bills, from the implementation of the write-down scenarios modeled. Applying alternative modeling approaches based on rate of return assumptions made by some proponents of write-down options leads to even higher estimates, implying increases in network tariffs of between 13 and 30 per cent, with final electricity charge impacts of between 2.7 and 7.7 per cent.

Both of these modeling outcomes emphasise that current and future consumers substantially benefit from the 'regulatory compact' represented by the commitment to protect over time of the real value of invested assets. As a consequence, asset write-downs are likely to have large and enduring negative welfare effects on current and future consumers, rather than representing a feasible or desirable route to lowering electricity charges.

This outcome occurs because reductions in required networks revenues from the denial of a return on and of capital (i.e. rate of return and depreciation) on the written-down component of the assets base are more than outweighed by the impact of a higher required rate of return applying to the remaining regulatory asset base. This is true for all scenarios investigated, which range from significant multi-billion dollar write-downs to extreme stranding events with few historical precedents. This is summarised in ***Figure 1***, which examines the relative magnitudes and impacts on annual regulated revenues of these countervailing effects under each scenario. This shows that for two of the scenarios, required revenues would rise in net terms by over $320 million per annum. In the final scenario, required revenues rise by nearly $80 million.

These changes in revenue requirements would have significant consequences for network tariffs and final electricity costs to households. An illustration of the potential final bill impacts of each asset write-down scenario is set out in ***Figure 2***. This sets out the initial increases in household electricity bills that would be required to recover the new higher revenue requirements that arise under each scenario. It identifies the range of potential initial price increases in comparison to an average Australian final electricity bill.[4]

The following specific observations can be made regarding the three scenarios analysed.

- **Significant regulatory asset write-downs will generate *higher*, rather than lower, tariffs.** Under a scenario of a write-down of around 5 per cent of the regulatory value of network assets (***Scenario A***), due to the revenue impacts of an increased required rate of return exceeding the 'savings' of avoided depreciation charges and returns on written-down assets components, energy consumers would be likely to face increased charges. These are estimated at around $41 per household per year initially or a total of nearly $200 per household over a five year regulatory period.

3 Grattan Institute *Shock to the system*, December 2013, p.16

4 The reference case of $1771 is the assumed average final electricity bills set out in CSIRO *Future Grid Forum Report Change and choice: The Future Grid Forum's analysis of Australia's potential electricity pathways to 2050*, December 2013.

FIGURE 1: IMPACTS OF ASSET WRITE-DOWNS ON REVENUE REQUIREMENTS OF ELECTRICITY NETWORKS

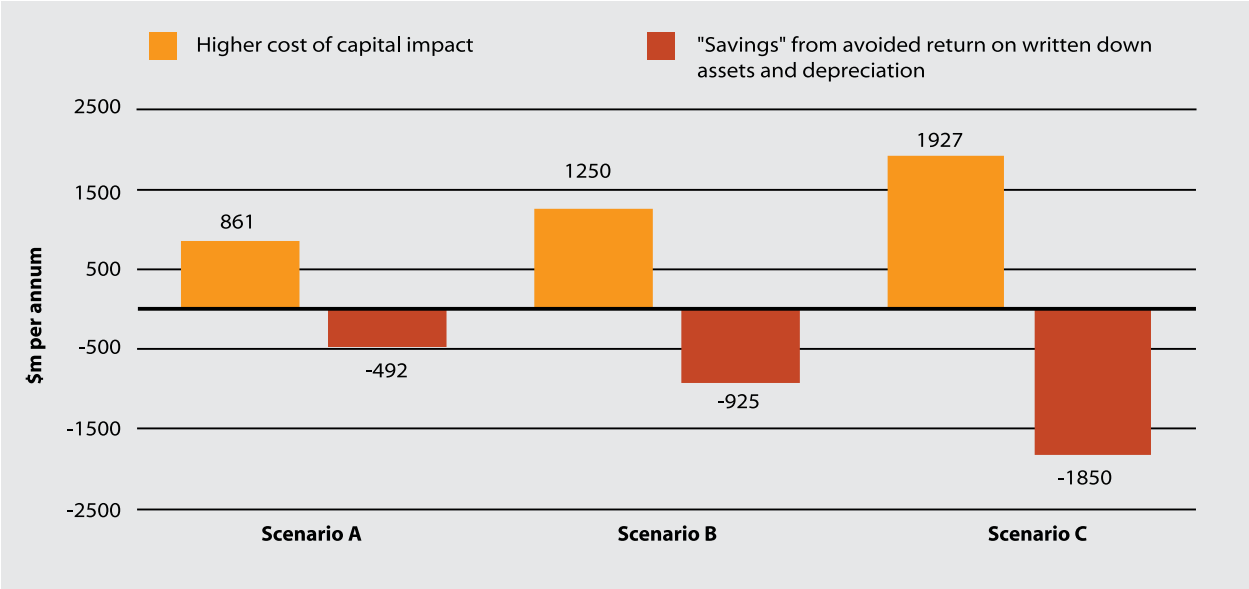
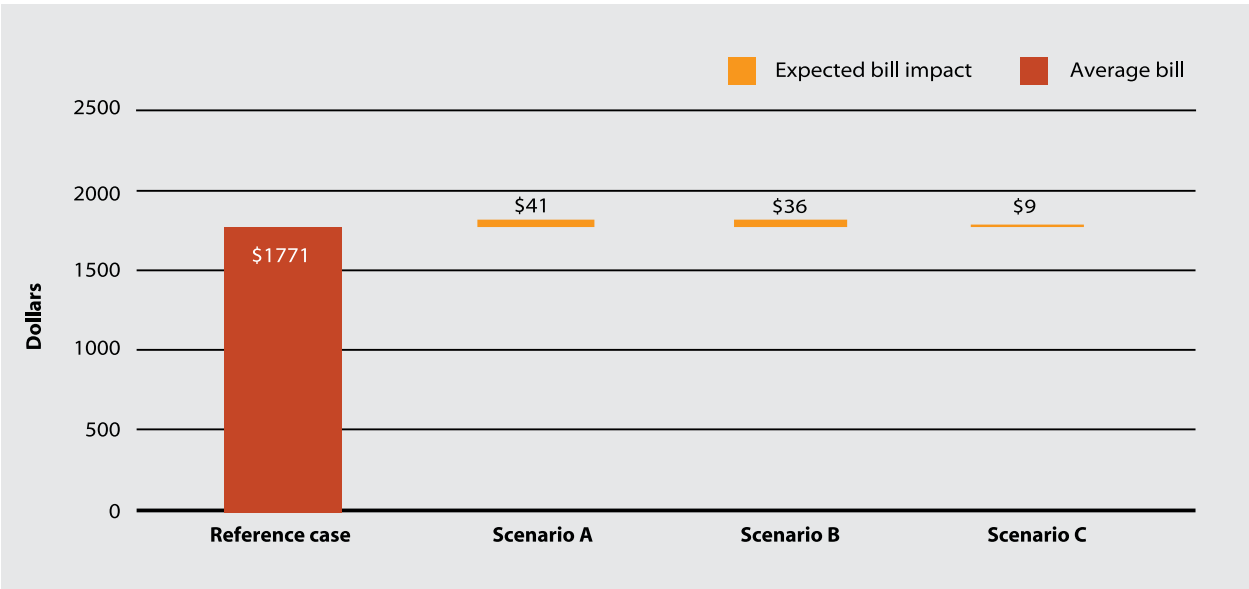


FIGURE 2: ESTIMATED FIRST YEAR ELECTRICITY BILL IMPACTS – MEDIAN AUSTRALIAN HOUSEHOLD



- **Increasing the scale of the write-downs does *not* automatically lead to tariff falls.** Even under a larger write-down of 10 per cent of existing network assets ***no*** savings eventuate for ordinary consumers due to the higher offsetting required return on existing and future capital. In fact, consumers still face higher overall charges (of around $36 per year initially, or around $165 over five years in ***Scenario B***).[5]
- **Even extremely large write-downs do not achieve price falls.** Dramatically increasing the magnitude of asset write-downs still fails to result in real price reductions. Once the increased risk premium needed to attract ongoing investments is taken into account, following an implausibly large asset write-down event, households would ***still*** face increased network charges of around $9 per year initially, or a total of around $31 over a five year regulatory period (***Scenario C***).
- **Write-downs would reverse existing downward pressures on the cost of capital and prices.** Exposing networks to the risk of regulatory asset value write-downs would increase the regulatory cost of capital, effectively reversing years of downward pressures on prices arising from declines in regulatory estimates of the cost of equity.
- **Asset write-downs would increase, not reduce, the risk of a utility 'death spiral'.** Increased network tariffs under all scenarios modeled suggests that far from being part of a possible regulatory policy solution to the risk of rising electricity charges leading to incentives for disconnection from the grid, asset write-downs would be likely to *increase* this risk, and substantially strengthen economic incentives to disconnect.
- **Even a *small increase* in the future cost of capital resulting from write-downs would completely offset any notional 'savings' from write-downs.** Based on the analysis undertaken, it is indicatively estimated that an increase of only around 50 basis points (or 0.5 per cent) to the average required cost of capital would be sufficient to offset ***all*** of the notional savings of a 5 per cent write-down Australia's electricity networks.

Asset write-downs therefore have the real potential to substantially increase both network charges and household electricity bills, based on analysis which solely considers the existing regulatory asset values, i.e. absent any ongoing need for capital investment. The impact of increasing financing charges on new investment by electricity networks has not formed part of this analysis because it would effectively require a highly uncertain projection of likely forward expenditure following a write-down.

Initial high-level analysis, however, indicates that were increasing financing charges on new investment included it would be likely to significantly compound the impacts already outlined. As an illustrative example of this, assuming an average capital expenditure of around $7 billion undertaken each year on Australian networks, network charges would have to recover an additional $345 to $915 million over the next five years to recover the associated increased financing costs arising from the implementation of any regulatory asset write-downs.[6]

Similarly, the revenue and pricing impacts detailed in this report exclude the likely material increase in refinancing costs associated with the ongoing debt financing of existing network assets forming the regulatory asset base, were regulatory stranding to occur. It also does not quantify the revenue and price impacts of the likely substitution by networks between capital costs (recovered from current and future consumers) and operating costs (recovered in full from current consumers) that would be likely to occur were the risk of regulatory stranding to materialise. Each of these three factors would tend to increase overall estimated network tariff and pricing outcomes, meaning the initial estimates contained in this paper can be considered as conservative lower bound estimates of potential impacts.

Collectively, these findings, and the analysis presented in this paper, suggest that proposals for asset write-downs have the significant potential to create substantial regulatory risk, distort future investment incentives, and add unnecessarily to the cost of electricity for Australian households. The National Electricity Objective in the regulatory framework seeks to promote the long-term interests of consumers. These findings and the other economic efficiency impacts discussed make it highly implausible that asset write-downs represent a regulatory policy option with a reasonable prospect of promoting the long-term interests of consumers.

5 All scenarios represent a highly conservative assessment of potential cost of capital impacts because a regulator, following an asset write-down event, would be required for a significant period to offer more than the efficient cost capital of a benchmark competitive firm as a means of credibly signalling that the asset write-down event would not be repeated.

6 Indicative estimates based on outputs of *Scenario A*.

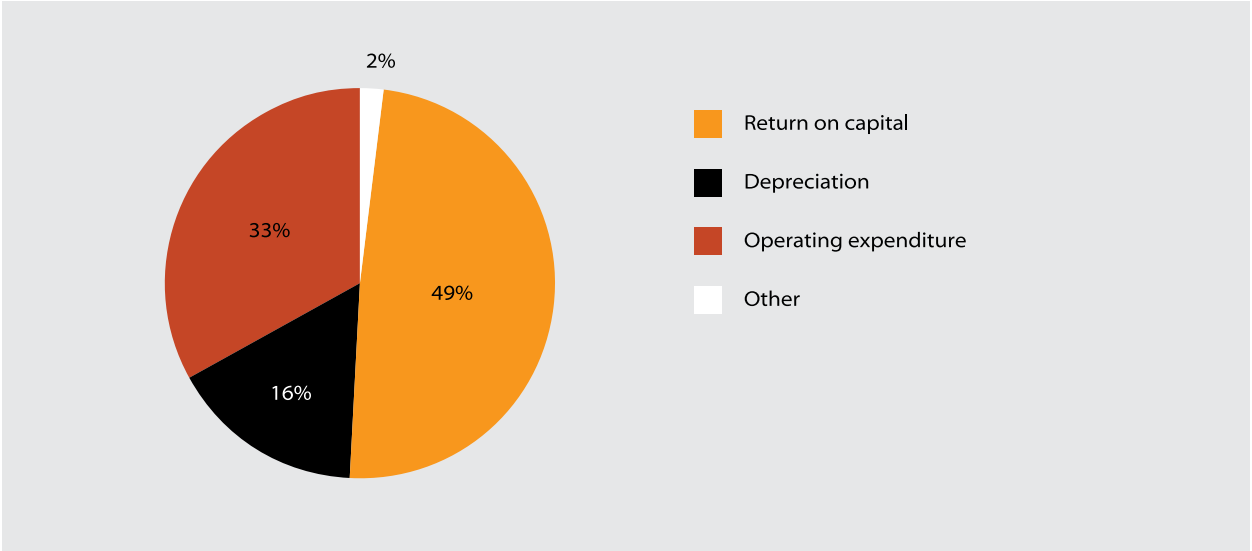
1. ROLE OF THE REGULATORY ASSET BASE

The regulatory asset base plays a central role in monopoly infrastructure regulation across Australia, and most developed economies. It represents unrecovered past capital investments made by the infrastructure owner. Provision of a rate of return on the value of these past capital investments usually represents the single largest component of energy network revenue, under the 'building block' approach to setting network prices. For typical electricity networks, this means that the return on capital component represents around 50-60 per cent of total regulatory revenues, with operating costs and depreciation charges making up the other significant components (see ***Figure 3***).

The regulatory asset base exists to recognise that networks are required to fund long-lived capital intensive physical assets that will supply both existing and future consumers over their service life.[7] In the case of electricity networks, these physical asset lives typically span between 30 and 50 years. The mechanism of the regulatory asset base allows these costs to be borne through time by beneficiaries of the services enabled by the assets, avoiding current consumers subsidising future consumers, or an unfair deferral of current costs onto future consumers.

Importantly, the regulatory asset base also reflects large non-discretionary investments that have been made to meet regulatory obligations. As a common example, because electricity is deemed to be an essential service, most jurisdictions place (and have for decades) an 'obligation to connect' on electricity distribution networks covering a broad range of customer types. This places the distribution network in the position of being required to make long-lived customer-specific investments in connection, in addition to any required shared system augmentation to enable that connection, to discharge statutory obligations. Further, many jurisdictions place statutory restrictions on how and from whom networks recover these and other capital investments. This means that network businesses are effectively barred from allocating the price, or terms and conditions, for access, taking into account the risk of future stranding. Rather, state and territory arrangements, combined with the existing rules framework (providing for returns over the life of the asset, irrespective of the risk of future stranding), effectively dictate how, when and from whom many electricity networks recover networks investments.

FIGURE 3: INDICATIVE COMPOSITION OF ELECTRICITY NETWORK REVENUES – VICTORIAN DISTRIBUTION



Source: AER State of the Energy Market Report, 2013

7 Rodriguez Pardina, M et al. *Accounting for infrastructure regulation: an introduction*, World Bank, 2008, p.92

2. TREATMENT OF THE REGULATORY ASSET BASE IN ENERGY FRAMEWORKS

The treatment of the regulatory asset base represents a critical part of the overall regulatory compact. This is because assets that form the regulatory base, unless they are protected by either credible or binding long-term regulatory rules or commitments from a regulatory body, are subject to the risk of regulatory 'asset stranding' or 'regulatory taking'.[8] The degree of this risk will affect the cost of financing the regulated firms new and existing investments, since the regulatory treatment of past capital investment is the best objective information available to investors on how current investments are likely to be treated over their lives.[9]

Over the past two decades of energy market reform policy makers, rule makers, and regulatory bodies have systematically sought to provide increased certainty around the treatment of the regulatory asset base, recognising that it is in the interest of consumers to provide for large network investments to be financed efficiently, for example, through the capacity to use long-term investment-grade corporate bond issuances.

Australian practice, in both the energy and wider infrastructure sectors, has consistently, and as a matter of deliberate policy and regulatory choice, moved away from allowing an opportunity for periodic or ***ad hoc*** revaluations, because of recognition of the significant disadvantages these entail.[10] These disadvantages include the potential to increase regulatory risk, distort patterns of investment, introduce additional costs, the potential for dispute, and complexity into the regulatory process and the non-recovery of prudent investments.[11]

The mechanisms used to effect this shift have varied over time. They have ranged from governments providing guarantees in state legislation and regulations, to the Australian Competition and Consumer Commission (ACCC) consulting on and adopting in 2004 a regulatory commitment to an approach of not revisiting electricity asset bases, despite having a formal (though never exercised) capacity to do so under previous electricity rules.[12]

In 2006 and 2007 energy rule and policy makers took the additional step of specifying the opening regulatory asset bases of all electricity network assets in schedules of the ***National Electricity Rules***.[13] This was done to provide greater security to investors that their investments would be treated in an appropriate way over time and that the value of the assets would be maintained in real terms.[14]

Comparable regulatory commitments to maintaining the real value of the regulated asset base are a common feature of economic regulatory frameworks internationally. Regulatory commitments to avoid re-valuations of past capital investments are a critical element of regulatory regimes in energy, water and other infrastructure sectors across OECD economies, including the United Kingdom, United States and many European Union member states.[15] There are a small number of exceptions to this norm, where periodic revaluations do occur, with an example being Colombia.[16]

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8 Stern, J *The role of the regulatory asset base as an instrument of regulatory commitment*, Centre for Competition and Regulatory Policy, City University London, Working Paper No.22, March 2013. In the United States the Supreme Court ruling in *Federal Power Commission v.* Hope Nat. Gas Co. - 320 U.S. 591 (1944), 3 January 1944 is widely credited as having defined the legal limitations on the scope for modern utility regulation decisions to deprive an asset owner of a just and reasonable return on invested assets. The Court held that investors return "*…should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital*" at [603].

9 Edison Electric Institute *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*, January 2013, p.10, and see also Pindyck, R. '*Mandatory unbundling and irreversible investment in telecom networks*', MIT Sloan Working Paper No.4452-03, December 2003, p.12

10 For example, the new access arrangement for the National Broadband Network specifically adopts a fixed asset base, departing from previously highly contentious arrangements under the access provisions of Part XIC of the *Telecommunications Act* which led to repeated regulatory asset revaluations. The 2012 AEMC *Economic Regulation of Network Service Providers* rule amendments introduced an option for the AER to deny recovery in limited circumstances of capital investments that are in excess of capital expenditure allowances and deemed to be inefficient through an *ex post* review process. This is a common feature of a number of Australian and equivalent international regulatory regimes, and is not comparable to asset write-down proposals.

11 See for example, Covec *Initial Views on Changes Proposed by MEU*, 6 February 2012, AEMC *Final Determination - Optimisation of Regulatory Asset Base and Use of Fully Depreciated Assets*, September 2013, p.21

12 See for example, Clause 7.2 of *Electricity Pricing Order* made under the s.35B *Electricity Act 1996 (SA)* and ACCC *Statement of principles for the regulation of transmission revenues*, December 2004

13 See Standing Committee of Officials of the Ministerial Council on Energy *Explanatory Material - Changes to the National Electricity Rules to establish a national regulatory framework for the economic regulation of electricity distribution*, April 2007, p.44

14 AEMC *Economic Regulation of Transmission Services*, Rule Determination, November 2006 and Standing Committee of Officials *Response to stakeholders comments on exposure draft of the National Electricity Rules for distribution revenue and pricing (Chapter 6)*, 2007, p.14-15

15 Stern, March 2013, p.7

16 Presentation by CEPA Director Ian Alexander '*UK and International Regulatory Approaches to the Regulatory Weighted Average Cost of Capital*' to City University London Centre for Competition and Regulatory Policy, 20 February 2014

3. MAINTAINING A LOW COST OF CAPITAL FOR FINANCING NETWORK INVESTMENTS

The mechanism of a predictably updated regulatory asset base provides the critical underpinning for low cost financing of new and ongoing network investments, by lowering the risk of asset stranding, and acting as an enduring regulatory commitment.[17] This allows for the minimising of network charges to consumers, by reducing the cost of financing from that which might apply to comparable project financing contracts (often 15 per cent return on equity or more) to current cost of capital allowances (with more recently allowed returns on equity averaging around 9 per cent).[18] This cost of financing benefit arises because of the avoidance of the risk of windfall losses, and systematic under-compensation that would arise under any write-down approach.[19] This is a position recognised widely by energy rule makers and regulators. As the Independent Pricing and Regulatory Tribunal (IPART) has noted:

> *…the RAB is a key element of the regulatory framework. Subsequent changes to the RAB — other than through its formulaic updating — create risk and uncertainty for a utility and its customers.*[20]

The ACCC has also previously concluded, when ruling out revaluations:

> *The ACCC considers that periodic revaluation could potentially lead to significant variations in the value of the asset base from one period to the next. This could result in the TNSP facing an unpredictable revenue stream and large and uncertain shocks to consumer prices. Further, the uncertainty created by such an approach could deter efficient investment.*[21]

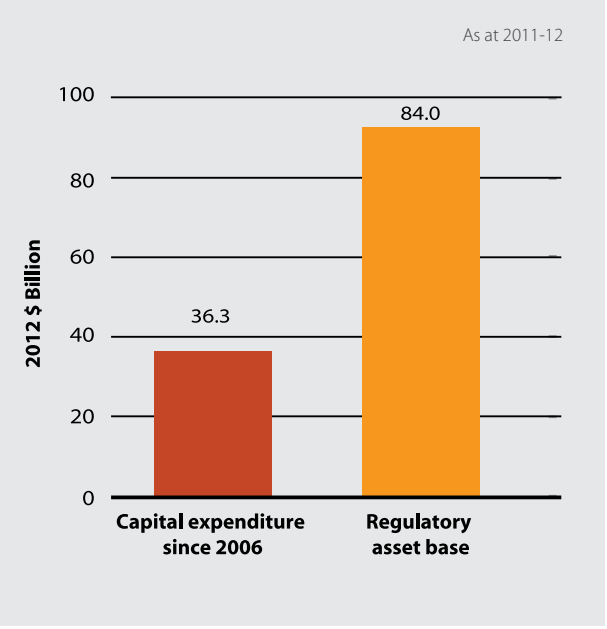
Similarly, the Australian Energy Market Commission (AEMC) has concluded in a 2006 review:

> *A key mechanism for managing the investment risk for TNSPs was to 'lock-in' and roll forward the RAB from one regulatory period to the next. This aimed to give greater security to investors in the transmission system that their investments would be treated in an appropriate way over time. More specifically, the RAB would not be subject to optimisation at regulatory resets to reflect the economic value of the assets to users, which would otherwise present a significant risk to investors.*[22]

Around $40 billion of network investment has occurred under regulatory rules in electricity that were based on the automatic locking in and updating or, 'roll forward', of regulatory asset bases on the basis of actual expenditure. This represents around 40 per cent of the total invested asset base of the electricity network sector, as set out in ***Figure 4***.

Equity analysts and debt rating agencies consistently place significant weight on the level of stability and predictability offered by a regulatory regime, including the levels of discretion afforded to the regulator with respect to the recovery of past investments.[23] Standard & Poors, for example, considers a utility company's regulatory framework to be the single most important factor in determining its competitive position and therefore its credit risk.[24]

FIGURE 4: VALUE OF SUNK NETWORK ASSETS INVESTED UNDER EXISTING REGULATORY REGIME[25]



17 'Rate Base Selection and the Structure of Regulation', Bruce Greenwald, *Rand Journal of Economics*, 15(1), Spring 1984, 85-95

18 AER *SP AusNet 2014-17 – Final Decision, p.22 and AER ElectraNet – Final Decision, p.7.* See also Stern, March 2013, p.10

19 Biggar, D. '*Updating the Regulatory Asset Base: Revaluation, Roll Forward and Incentive Regulation*', April 2004, p.6

20 IPART *Financeability tests in price regulation – Draft decision*, August 2013, p.19

21 ACCC *Statement of principles for the regulation of transmission revenues*, December 2004, p.40-41

22 AEMC *Economic Regulation of Transmission Services*, Rule Determination, November 2006, p.98

23 Fitch Ratings, *Australian Utilities: Face Near Term Pressures*, 18 March 2014 and see also Stern, March 2013, p.18-19, and Engel et al '*Finance and Public-Private Partnerships*,' *Paper for Reserve Bank 2014 Conference Financial flows and infrastructure financing*, March 2014, p.6

24 Standard & Poors 'Why UK Utilities' Regulatory Framework Merit A "Strong" Regulatory Advantage Assessment, 11 December 2013, p.2 and see also Edison Electric Institute *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*, January 2013, p.8

25 Data for Figure 4 is sourced from *AER Annual Report 2012-13*, p.2, published post-tax revenue model data (actual expenditure) and regulatory determinations. Figure 4 includes only confirmed actual expenditure up to 2011-12, and therefore represents a conservative underestimate of the total network investment under the current regime to date.

4. THE REGULATORY RISK IMPACTS OF ASSET WRITE-DOWNS

The most immediate and significant impact of a risk of asset write-downs would be a material increase in the return required to attract investment in network infrastructure assets. Investors would require an additional margin above past regulated returns to compensate them for bearing the risk that investments made could be stranded or written down in the future.[26] This risk would arise due to the potential for future write-downs to result in systematic under-compensation by the regulated entity for prudent investments.[27]

The most immediate and significant impact of a risk of asset write-downs would be a material increase in the required return to attract investment in network infrastructure assets.

Current Australian Energy Regulator (AER) estimates of required returns on network assets are explicitly based on a regulatory environment in which investors can have significant confidence in the recovery of long-lived investments.[28] For example, recently the AER has significantly relied on empirical estimates of systematic risk taken from its May 2009 cost of capital review. In determining appropriate risk adjustments to the required rate of return in this 2009 review, the AER specifically cited the absence of potential for re-valuations or regulatory optimisation in the energy regulatory regime as a critical determinant of its view that the overall risk profile facing regulated electricity networks was low. In its most recent 2013 review, the AER further lowered its key risk benchmark (equity beta), implying an overall lowering of exposures to systematic business and regulatory risks since 2009. Consistent with this, the AER's expert risk advisors described stranding risks as minimal, based on Australian and AER practice.[29] Further, no AER approved depreciation schedules for networks have taken into account the potential for regulatory write-downs.[30] That is, regulatory stranding risks have not been considered as a relevant factor in either the assessment of required returns, or otherwise recognised in approved regulatory cash-flows.

Introduction of asset base write-downs would overturn these types of regulatory assumptions and require a re-estimation of an appropriate cost of capital.[31] The reality of the need for such a re-estimate is typically acknowledged, even by those parties who have raised the potential for asset write-downs. The follow on consequences, however, are typically left unexplored. Due to the additional required debt and equity risk margin created by the material prospect of write-downs, representing heightened 'regulatory risk', engaging in asset write-downs could easily result in higher, rather than lower, charges.[32]

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26 Pindyck, R. 'Mandatory unbundling and irreversible investment in telecom networks', *MIT Sloan Working Paper* No.4452-03, December 2003.

27 Kolbe, A. and Tye, W. 'Compensation for the risk of stranded assets' in *Energy Policy*, Vol.24, No.12 pp.1025-1050, 1996

28 See AER *Review of the weighted average cost of capital parameters – Final Decision, May 2009 p.249 and AER Equity Beta Issues Paper*, October 2013, p.14 and p.40-41.

29 This analysis was based on an assessment of the risk environment for network in Frontier Economics *Assessing risk when determining the appropriate rate of return for regulated energy networks in Australia*, July 2013 that 'stranding and optimisation risks are minimal for energy networks, a complete contrast to businesses operating in other sectors' (p.4).

30 Biggar, D. '*Updating the Regulatory Asset Base: Revaluation, Roll Forward and Incentive Regulation*', April 2004, p.6

31 AEMC *Final Determination Optimisation of Regulatory Asset Base and Use of Fully Depreciated Assets*, September 2013, p.22, Grattan Institute (2013), Section 4.3, p.24-25 and AER *Explanatory Statement – Rate of Return Guideline*, December 2013, p.33

32 For a discussion on theory and recent regulatory practice underpinning recognition of regulatory risk in cost of capital estimates see QCA Discussion Paper *Risk and the Form of Regulation*, November 2012

The potential for higher charges occurs because of the way regulated revenues are determined under the traditional 'building block' model. Importantly, under this model, the writing down of a proportion of existing asset bases would affect ***both*** the return on capital component (the rate of return) and the return of capital (the depreciation charge) in different ways.

Discussions of asset write-downs often appear to assume that the impact of write-downs would inevitably be ***lower*** regulated charges, representing a kind of regulatory 'free lunch' for consumers.[33] Under the building blocks model whether this would occur is an empirical question of whether the revenue impact of the additional required return on the remaining written-down asset base would be offset by the reduced depreciation charges from the revised regulatory asset base and the avoided return on capital of the written down component. Whether this occurs in turn depends on whether as part of the write-down process network owners are permitted to recover the written-down assets through accelerated depreciation charges or whether they are provided with other forms of financial compensation.

For example, in theory, a regulator could seek to provide direct compensation to future investors for the asymmetrical risk of asset write-downs through adjustments to regulatory cash-flows, allowing payments akin to an 'insurance premium' for future write-downs. However, there are significant issues associated with demonstrating to investors that the quantum of the allowed cash-flow genuinely matches the relevant risks and therefore quantifying the size of such a premium.[34] In addition, regulators have generally criticised conceptually similar self-insurance allowances as lacking a clear empirical basis, and have chosen not to approve them. Moreover, even if implemented, such an approach would not address the impacts on ***existing*** investors who have faced the realisation of an unanticipated negative regulatory risk which past cash-flows or regulatory returns provided no recognition for. Failing to address this would be to proceed on an unrealistic assumption that future investors place no weight on evidence of the actual regulatory risks experienced by existing investors, and instead place greater weight on a regulators non-binding commitment that a write-down was a one-off event.[35]

Discussions of asset write-downs often appear to assume that the impact of write-downs would inevitably be lower regulated charges, representing a kind of regulatory 'free lunch' for consumers.

33 Grattan Institute (2013), Section 4.3, p.24

34 Ergas, H. *Wrong Number: Resolving Australia's telecommunications impasse* (2008), p.89-90

35 A further issue with this cash-flow based approach is that there may be a systematic component to regulatory asset stranding risk. That is, the probability of regulatory stranding may be cyclical (i.e. more prone to occur where the economy is weak, rather than strong, because during such times it could be expected that pressure on policymakers from current infrastructure users who might consider themselves short-run beneficiaries of stranding would be high). This would tend to increase the volatility of expected cash-flows.

5. MODELING THE IMPACTS OF INCREASING REGULATORY RISK ON ELECTRICITY NETWORK REVENUES AND PRICES

To demonstrate the materiality of these different interactions, ENA has undertaken indicative modeling of possible changes against a reference case of depreciation and rate of return revenue components under a range of potential write-down scenarios at an electricity network industry level. The modeling compares the forward-looking depreciation and return on capital building block components across the total estimated regulatory asset base of electricity networks of approximately $92 billion.

To date, no proponents of the consideration of network asset write-downs have specifically identified a preferred magnitude for such write-downs.[36] This analysis therefore examines a range of scenarios. These scenarios have been selected to indicate potential revenue and price impacts, and illustrate the interaction of potential changes to the cost of capital and revised asset values. The scenarios are based on a hypothetical 'once in time' downward adjustment to the regulatory asset value used by the regulator to determine the future return on capital and depreciation.

The cost of capital assumed in the reference case is based on the most recent cost of equity and cost of debt values adopted by the AER for electricity networks in the current regulated environment without stranding risk, in this case the New South Wales transitional determinations concluded in April 2014.[37] The cost of capital applied in each scenario was derived by calculating the new adjusted cost of equity that would be required to deliver an expected return equal to the AER-approved return on equity if investors were to assume that they faced a 1 in 10 chance of the write-down of the magnitude in the scenario occurring. The basis for this approach is the recognition that an equity holder facing a 1 in 10 chance of a substantial reduction in their equity from a write-down in a single year will require ***more*** than the current AER benchmark return to have a reasonable expectation or opportunity of earning at least that AER benchmark return. A worked example and discussion of this approach is set out in ***Appendix A***.

This approach is selected because it provides a transparent and replicable basis for estimating required equity return adjustments, and for clarity around key assumptions. The key inputs to the model and the reasons for these are set out in ***Table 1.***

Table 1: Summary of modeling and risk assumptions

Parameter	Value or assumption	Basis for assumption
Base cost of equity	8.9 per cent	Equal to the AER approved cost of equity for NSW electricity distribution transitional determinations.
Cost of debt	7.1 per cent	Mid-point of AER estimate cost of debt range for NSW electricity distribution transitional determinations.
Investor assumed risk of write-down	1 in 10 year event	Issue of asset write-downs has been repeatedly highlighted in public reports and commentary over 2011-14, with rule changes lodged which would seek to allow for the stranding of existing network assets. This follows opening RAB values being specified or 'locked' into the *National Electricity Rules* over 2006-2007.
Extent of write-downs	5.3 to 20 per cent	See separate **Description of modeled scenarios**.
Incidence of loss from write-down	Equity holders	This is based on an assumption that there is no material prospect of a write-down being permitted to lead to a debt default.

36 The Grattan Institute estimates potential 'excess assets' of $4.9 billion based on some estimates of reductions in peak demand but does not specifically advocate a write-down of this value, see *Shock to the system*, December 2013, p.16

37 See AER Transitional distribution decision (April 2014, see p.37)) applying to NSW distribution networks, which uses the parameters and gearing assumptions set out in the AER's *Rate of Return Guideline* (December 2013).

An alternative way to derive cost of capital estimates for each scenario would be based on recent parameter estimates and methodologies employed by the AER and IPART for applicable Weighted Average Cost of Capitals (WACCs) for electricity networks in the current regulated environment without stranding risk, compared to an unregulated business subject to stranding risks in the electricity market (in this case an electricity generation firm[38]) assuming a consistent risk-free rate of 4.35 per cent.[39] This is the approach that would be the logical consequence of the Grattan Institute's comparison of the two sectors in three recent reports which suggest that the Institute considers that, notwithstanding their different features, networks should be subject to a comparable risk of stranding as existing generation assets, and earn comparable returns.[40]

Adopting this approach introduces the need to make a number range of discretionary assumptions around applicable risk factors (beta) and gearing structures that the 'expected returns' approach outlined above avoids. Using a range of plausible assumptions this approach was examined. In each case it produced results that implied higher required returns on equity, network charges and final prices. As an example, it implied increases in network tariffs of between 13 and 30 per cent, with final electricity charge impacts of between 2.7 and 7.7 per cent. The adoption of the 'expected returns' approach therefore represents a more conservative choice of methodology in estimating required returns than that which is implied by advocates of consideration of asset write-downs.

DESCRIPTION OF MODELED SCENARIOS

Base case or 'no change' – This baseline is based on no asset write-downs and draws its key assumptions from the most recent cost of capital estimates and parameters approved by the AER in recent electricity network determinations and guidelines.

Scenario A 'Significant network write-down' – This assumes a write-down of around 5 per cent of electricity network assets. The write-down applied in this scenario is based on an estimate contained in the Grattan Institute ***Shock to the system*** report, which suggested its analysis had identified $4.9 billion of 'excess assets'.[41] It should be noted that a write-down of this scale is approximately the economic equivalent to instantaneously setting the entire value of electricity distribution network assets across South Australia, Tasmania and the ACT to zero.

Scenario B 'Large network write-down' – This assumes a write-down of 10 per cent of the total value of electricity network assets (or $9.2 billion). A write-down of this scale is approximately the economic equivalent of instantaneously stranding the entire value of electricity distribution network assets across both Victoria and Tasmania.

Scenario C 'Massive network write-down' – This scenario assumes a write-down of 20 per cent of the total value of network assets (or nearly $20 billion). A write-down of this magnitude is approximately economically equivalent to setting the economic value of ***every*** electricity transmission network asset across the National Electricity Market to zero.

38 See: IPART *Fact Sheet – WACC Update* (February 2014) and AER Rate of Return Guideline (December 2013)

39 The cost of capital assumed in this alternative approach (7.85 per cent) is the midpoint of the range identified by the AER in its most recent transitional distribution decision, April 2014, see p.37, applying to NSW distribution networks, which uses the parameters and gearing assumptions set out in the AER's *Rate of Return Guideline*, December 2013, using a risk-free rate of 4.35 per cent and a derived debt risk premium of 2.8 per cent.

40 See Grattan Institute *Shock to the system*, December 2013 p.13-16 and Grattan Institute *Putting the customer back in front*, December 2012, Section 3. The risk free rate is based on the average of the 10 year Commonwealth bond over April 2014.

41 Grattan Institute *Shock to the system*, December 2013, p.16

Critically, this modeling examines a hypothetical scenario in which no provision was made for networks to otherwise recover written-down assets through increased depreciation allowances.[43] Therefore, the modeling is focused on the question of the impacts where offsetting depreciation or other compensation is not provided.

The modeling approach compares the required revenues (consisting of return on capital and straight line depreciation building block components) that would apply in each scenario compared with the 'no write-downs' reference case.[44] The impacts in these scenarios vary based on the magnitude of any stranding. The results of this modeling are provided in ***Table 2*** below.

Based on the modeling a number of specific observations can be made.

» **Significant regulatory asset write-downs will generate *higher*, rather than lower, tariffs.** Under a scenario of a write-down of around 5 per cent of the regulatory value of network assets (*Scenario A*), due to the revenue impacts of an increased required rate of return exceeding the 'savings' of avoided depreciation charges and returns on written-down assets components, electricity consumers would be likely to face increased charges of around $41 per household per year initially or a total of nearly $200 per household over a five year regulatory period.

» **Increasing the scale of the write-downs does *not* automatically lead to tariff falls.** Even under a larger write-down of 10 per cent of current electricity network assets ***no*** savings eventuate for ordinary consumers due to the higher offsetting required return on existing and future capital. In fact, consumers still face higher overall charges (of around $36 per year initially or around $165 over five years in *Scenario B*).[45]

Table 2: Results of scenario analysis of asset write-down on Australian electricity networks

Scenario	Assumed cost of capital (%)	Total depreciation allowances ($m p.a.)	Total return on capital allowance ($m p.a.)	Total required revenue ($m p.a.)	Approximate per household tariff impact ($ p.a.)[42]
Base case 'no change'	7.82	2 046	7 202	9 248	-
A - 'significant write-down' (5.3% write-down)	8.81	1 938	7 680	9 617	**+41**
B- 'larger write-down' (10% write-down)	9.33	1 842	7 731	9 573	**+36**
C – 'massive write-down' (20% write-down)	10.44	1 637	7 688	9 326	**+9**

42 Household cost estimates are based on the annual change in revenue requirement, divided by Australian Bureau of Statistics estimates of the number of Australian households.

43 This assumption is adopted because were networks simply permitted to increase depreciation charges to compensate for the impact of asset write-downs occurring all that would have occurred is a shift in the *time profile* of recovery of network assets, and no modeling is required to conclude that consumers as a whole would be neither better nor worse off (see Section 7). Asset write-down proposals reviewed to date do not appear to advocate or assume this outcome. 'An Expository Note on Depreciation and Profitability under Rate-of-Return Regulation', Richard Schmalensee, *Journal of Regulatory Economics,* 1(3), 1989, 293-298

44 An asset life assumption of 45 year was adopted, based on the median values published by the AER in its published Post-tax Revenue Model. A simple straight line depreciation approach is assumed.

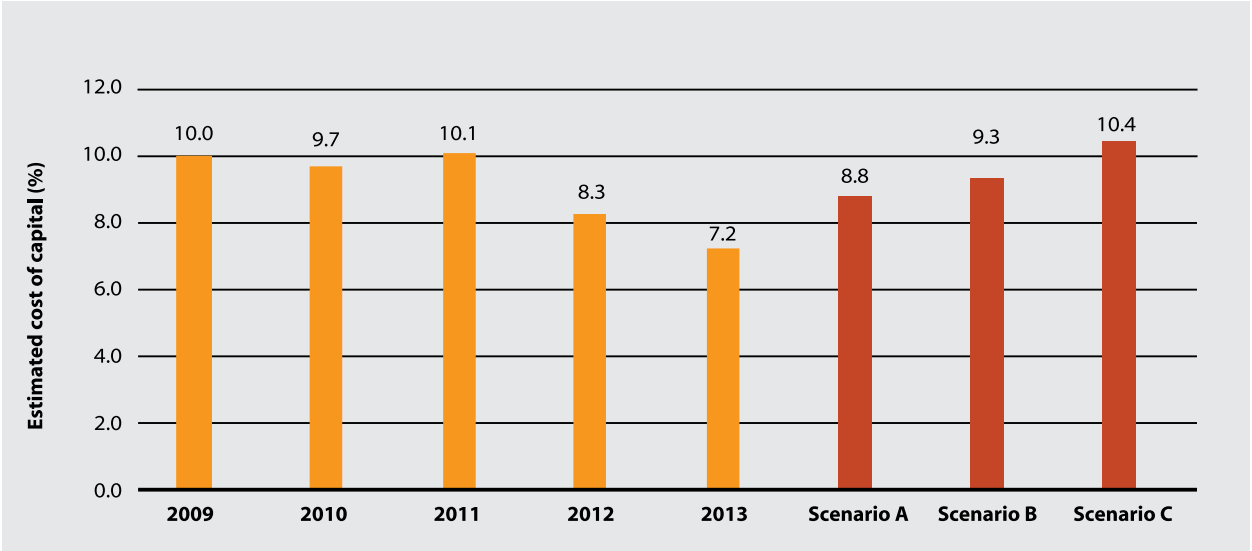
45 All scenarios represent a highly conservative assessment of potential cost of capital impacts because a regulator, following an asset write-down event, would be required for a significant period to offer *more* than the efficient cost capital of a benchmark competitive firm as a means of credibly signaling that the asset write-down event would not be repeated.

- **Even extremely large write-downs do not achieve price falls.** Dramatically increasing the magnitude of asset write-downs still fails to result in real price reductions. Once the increased risk premium needed to attract ongoing investments is taken into account, following an implausibly large asset write-down event, households would ***still*** face increased network charges of around $9 per year initially, or a total of around $31 over a five year regulatory period (*Scenario C*).
- **Write-downs would reverse existing downward pressures on cost of capital and prices.** Exposing electricity networks to the risk of asset value write-downs would increase the regulatory cost of capital, effectively reversing years of downward pressures on electricity prices arising from declines in regulatory estimates of the cost of equity.

This impact is illustrated in ***Figure 5***, which compares the median AER return on capital estimates for networks over 2009-2013 with the estimated required return on capital applicable under the three scenarios. Putting this in context, asset write-downs of the type modeled would return cost of capital levels close to or exceeding the estimates made by the AER during the very peak of the Global Financial Crisis. The higher returns on capital assessed during 2009-2010 were a very significant driver of higher network charges, but average approved returns on capital have fallen very substantially since.

- **Even a *small increase* in the future cost of capital resulting from write-downs would completely offset any notional 'savings' from write-downs.** Based on the analysis undertaken, it is indicatively estimated that an increase of only 50 basis points (or 0.5 per cent) to the average required cost of capital would be sufficient to offset all of the notional savings of a 5 per cent write-down of Australia's electricity networks.[46]

FIGURE 5: COMPARISON OF MEDIAN AER APPROVED RETURN ON CAPITAL WITH SCENARIO ASSUMPTIONS



46 Indicative estimate based on outputs of *Scenario A*.

6. ESTIMATING BROAD IMPACTS ON ELECTRICITY NETWORK AND FINAL PRICES FROM ASSET WRITE-DOWNS

Based on the analysis, it is evident that asset write-downs have the potential to raise, not lower, network and final electricity costs. This is consistent with international evidence drawn largely from revised concession agreements in developing countries which indicates that required tariff increases of around 4 per cent can easily result from an increase in the cost of capital of a single percentage point (or 100 basis points).[47]

Based on the analysis, it is evident that asset write-downs have the potential to raise, not lower, network and final electricity costs.

An indicative assessment of the potential network and final price impacts as a result of Scenarios A, B and C against a range of estimates of average network and final electricity bills for a number of Australian states is set out in ***Table 3***.

This broad analysis makes clear that a number of the write-down scenarios have the potential to materially increase electricity network tariffs above current levels. In all included jurisdictions asset write-down proposals have the potential to also have a significant impact on final electricity bills.

In considering the indicative impacts set out in ***Table 3***, it is important to take into account that due to the modeling approach adopted, a number of factors are ***not*** incorporated in the estimates of required network revenues and final electricity bill impacts.

Table 3: Indicative impacts of write-down scenarios on network charges and household bills[48]

State	Current average network charge ($ p.a.)	Potential new network charge ($ p.a.)	Change in network charge (%)	Current annual final electricity bill ($ p.a.)	Change in final bill (%)
New South Wales	1069	**1078-1110**	**0.8-3.8**	2021	**Up to 2.0**
Queensland	836	**845-877**	**1.0-4.8**	1731	**Up to 2.3**
South Australia	636	**645-677**	**1.3-6.4**	2162	**Up to 1.9**
Victoria	595	**604-636**	**1.4-6.8**	1685	**Up to 2.4**

47 Guasch, J. Laffont, J.J and Straub, S. 'Renegotiation of Concession Contracts in Latin America', World Bank Policy Research Paper 3011, April 2003, p.3-4

48 *AER Annual Report on the Performance of the Retail Energy Market* (February 2014), Ernst & Young *Electricity network services: long-term trends in prices and costs*, June 2014. ENA Analysis.

These are:

- **Exclusion of higher required return on new capital investment.** The model does not seek to take into account the impact of the higher required return on ***new*** network investment, as opposed to ongoing financing of existing assets. This approach is adopted due to the lack of a clear basis, or utility sector precedents, from which to estimate possible revisions to future network investments that would be likely to occur under the extraordinary circumstances of a planned regulatory write-down of asset values.

  However, as an illustration of the magnitude of the potential effect, applying the financing costs assumed in ***Scenario A*** (8.81 per cent, the lowest of any scenarios) to average capital expenditure of $6.7 billion per annum across eastern Australian states would result in consumers bearing nearly $660 million in additional charges just to fund required new investment over the next decade.[49] Depending on the scenario chosen, the impact of taking into account increased financing costs relating to new capital investment can be extremely significant, ranging up to around $1.8 billion over a decade. These additional costs would have a flow through impact to consumer charges, increasing annual bills by between $7 and $20 per annum.

- **Exclusion of 'substitution' impacts.** The approach does not seek to assess the impacts of likely substitution from long-lived capital assets to immediately recoverable operating costs (this issue is discussed further in ***Section 8***).

- **Exclusion of likely increased debt costs and financeability adjustments.** The modeling does not fully account for the material financeability impacts of asset write-downs. The implementation of any of the write-down scenarios and consequent reduction in the realisable equity value to shareholders could reasonably be expected to have significant negative consequences for credit availability and the financeability metrics of the network and industry concerned. Degradation of credit metrics of networks that would result from write-downs could be expected to increase the cost of debt, result in a lower credit rating, and constrain access and ability to deploy to debt capital.

  As an indicative illustration of the materiality of these effects, if a lower credit rating resulted in an increase of 50 basis points this could increase benchmark refinancing costs required to be borne by consumers by over $270 million over a ten year period.[50] To provide a point of comparison around the potential magnitude of increased financing costs arising from shifting between credit ratings, the median difference between A and BBB rated non-financial corporate bonds over the past two years was around 130 basis points.[51]

  Fully quantifying the likely impact of these financeability concerns in advance of their occurrence is not possible, but this does not mean that their impact is immaterial. Financeability concerns arising from low revenue determination outcomes in the United Kingdom energy and water utility sectors have in the past led to upward adjustments to network prices for the explicit purpose of maintaining utilities capacity to efficiently access capital.

Each of these three factors would tend to ***increase*** overall estimated electricity network tariff and pricing outcomes. This means that the network tariff and price outcomes in ***Table 3*** can be interpreted as conservative lower bound estimates of the range of possible outcomes.

49 Annual estimate derived from reported capital investment in the period 2008-09 to 2012 reported in published AER annual Regulatory Information Notice data (excluding NT and Western Australia).

50 This is based on the AER assumed gearing ratio (60%), an average 10 year term of debt applied to the electricity networks total RAB of around $92 billion. This calculation excludes increases in financing charges for new investment.

51 Calculated based on *Reserve Bank of Australia Aggregate Measures of Australian Corporate Bond Spreads and Yields - F3*, based on the median value of the 24 month period to June 2014 of series FNFCA10M and FNFCBBB10M.

7. RISK-SHARING ISSUES UNDER ASSET WRITE-DOWN PROPOSALS

At its heart, a regulatory framework is a risk sharing agreement, with regulatory rules and practice defining the type and nature of risk borne by various parties, including current and future consumers, equity investors and debt providers. Asset write-down proposals essentially recommend a re-allocation of these risks. Efficient risk allocation may minimise the level of total risk, however, a re-allocation of these risks can only transfer risks. It cannot eliminate risks ***per se***.[52]

To illustrate, write-downs without any form of compensation effectively result in current equity investors bearing an unanticipated risk, but this measure would increase the long-term required return on capital from future investors. This means that future consumers will bear increased financing costs, while existing consumers would receive any short-term benefit.

A write-down approach which provided electricity networks with an opportunity to accelerate depreciation on assets to be written-down could mean future consumers would not face increased financing costs and would benefit from depreciation charges that were lower than otherwise. These benefits would be effectively secured, however, by increased shorter term charges for current consumers. Such accelerated depreciation arrangements would leave networks in financial net present value terms no worse off than current policies.[53] Where technological or competition risks are increasing there are sound economic arguments for regulators to approve a higher depreciation allowance, in contrast to a policy of deliberately stranding existing assets.[54]

Several write-down proposals have raised the potential need for taxpayer compensation. Such proposals represent a one-off transfer of risk from current consumers, or equity investors, to current (and potentially future) taxpayers. Given this reality of risk transference, policy proposals for asset write-downs need to be critically assessed for their distributional and inter-generational impacts across a diverse set of groups.[55] A further point to note is that in the case of state-owned networks there is a near identity between the affected classes of current consumers and taxpayers who would be affected by compensation. As a general observation, it is not obvious on what criteria policymakers could easily justify approaches that merely shifts risks and costs between current and future consumers, nor is it evident that such approaches are consistent with the long-term interests of consumers.

At its heart, a regulatory framework is a risk sharing agreement, with regulatory rules and practice defining the type and nature of risk borne by various parties, including current and future consumers, equity investors and debt providers.

52 Poole, E. et al. 'Public Infrastructure: A framework for decision-making', Paper for Reserve Bank 2014 Conference *Financial flows and infrastructure financing*, March 2014, p.12

53 The impact of increased depreciation charges on future network demand, however, could leave electricity networks facing an increased level of demand or substitution risk. See QCA Information Paper *Financial Capital Maintenance and Price Smoothing*, February 2014, p.vi

54 Crew, M. and Kleindorfer, P. 'Economic Depreciation and the Regulated Firm under Competition and Technological Change', *Journal of Regulatory Economics*, 4(1), 1992, 51-61

55 IPART *Financeability tests in price regulation – Draft decision*, August 2013, p.15 and p.22

8. ASSESSING THE ECONOMIC EFFICIENCY CONSEQUENCES OF ASSET WRITE-DOWNS

Asset write-downs would also risk undermining other wider economic efficiency objectives, to the detriment of consumers.

Implementation of any asset write-down proposal would be likely to lead to a significant pause in electricity network investment. Networks facing the uncertainty of write-down would be likely to cancel or defer significant non-discretionary capital investment. This investment pause would impact on the timing and nature of capital investments, undermining dynamic efficiency objectives through interruption of planned and sequenced network investments. Regulatory disallowances of sunk investments would also be likely to have an enduring impact on investment over long periods. Peer-reviewed studies of investment patterns following a sequence of partial disallowances in the regulated US nuclear power generation sector (amounting to US$19 billion) have shown enduring negative investment impacts over a 20 year period.[56]

An asset write-down would clearly result in different prices for network usage. While these prices may be different, however, there is no reason to assume that they would promote a more efficient use of, and investment in, network assets. Rather, write-downs would affect incentives to invest in more complex and long-lasting ways, by impacting on future network investment and expenditure decisions. For example, the risk of future asset stranding would be likely to change the mixture of operating and capital cost investments to lower the risk of stranding, leading to the installation of shorter-lived assets, or assets requiring a greater level of operating rather than capital costs. While this may be an efficient firm-level response to minimise the regulatory risk of future stranding, there is no ***a priori*** reason to suggest such changes would represent the achievement of an optimal mixture of investments or asset decisions to minimise long-term service costs for consumers.

In circumstances in which network businesses either restricted non-discretionary capital expenditure, or altered the mixture of capital and operating costs to minimise their future exposure to write-downs, there would also be material consequences for future operating costs. Both of these circumstances would be expected to lead to an increase in required operating costs (for example, through increased monitoring and maintenance costs, resulting from a lower level of capital expenditure asset replacement or renewal). In the absence of any other factors, this substitution effect could be expected to increase network charges.[57]

Networks rapidly substituting operating for capital expenditure would be likely to lead to a 'price shock' for consumers, because operating costs are recovered in full from current consumers within each regulatory period. By contrast, the costs of long-lived capital network investments are typically recovered over 30-40 years from both current and future consumers. This particular impact is additional to any of the network or final price outcomes estimates detailed in this analysis. It is difficult to quantify because the existence and scope of these substitution possibilities will only be known with any certainty by network owners, and will differ according to the characteristics of each electricity network.

A further issue relevant to the implementation of any regulatory asset write-down is that it would clearly re-open the issue of the economically appropriate level of the new asset base. That is, it cannot be presumed without evidence that a value ***lower*** than the existing level is unambiguously more efficient than an alternative well-founded value. In these circumstances, there would be potentially strong arguments to revisit the original asset valuation processes undertaken for the most part in the late 1990s, to establish a satisfactory basis for a view of whether they represented an economically efficient starting point for price and revenue setting purposes. There is certainly evidence to suggest that electricity distribution networks operate a significant range of assets that were not actually recognised in original asset valuation processes. There are credible economic efficiency arguments to recognise and incorporate any evidence of undervaluing the current regulatory asset base in any reassessment of regulatory asset values. This issue is one illustration of the complexity and ambiguity created by re-opening asset bases, the recognition of which is a key rationale for predictable roll-forward approaches based on the value of past investments.

These issues would be critical policy considerations for rule or policy makers examining these proposals, due to the ***National Electricity Law*** objective, centering on the long-term interests of consumers, being clearly an economic efficiency-based objective, and directing consideration to issue of ensuring efficient investment in, and operation and use of electricity services.[58]

56 Lyon, T and Mayo J. 'Regulatory opportunism and investment behavior: Evidence from the U.S. electric utility industry', *RAND Journal of Economics* (2005), 36(3), 628–44

57 Biggar, D. '*Updating the Regulatory Asset Base: Revaluation, Roll Forward and Incentive Regulation*', April 2004, p.12

58 *National Electricity (South Australia) (New National Electricity Law) Amendment Bill 2005* - Second Reading Speech, and see also National Electricity Law, s.7.

9. CONCLUDING COMMENTS

Recent proposals for regulatory asset value write-downs have been advanced without adequate consideration of their probable consequences for the long-term interests of electricity consumers. These proposals fail to examine the significant benefits to current and future consumers arising from a credible, stable, and predictable regulatory regime which allows for the low-cost financing by debt and equity providers of multi-billion dollar electricity network investments. The consequences of disrupting this consciously designed and understood part of the regulatory bargain would be extremely significant.

These consequences include the potential to lead to material increases, rather than falls, in electricity network tariffs and final bills. This analysis illustrates this outcome across a range of scenarios using a set of extremely conservative assumptions that exclude a number of likely additional sources of upward pressures on prices arising from the risk of any regulatory stranding event.

From an economic efficiency perspective, likely impacts of regulatory stranding include distorting efficient investment patterns, promoting inefficient substitution between capital and operating costs, increased volatility in network charges faced by consumers, and the introduction of a new regulatory risk margin that would be required to be paid to capital providers in the network infrastructure sector. Nor would these consequences necessarily be confined to the electricity network sector. A regulatory asset write-down would also likely impact on regulatory and sovereign risk assessments across the broader Australian infrastructure sector.

It is in recognition of these consequences and from experiences in international and Australian regulatory practice to date that governments, energy rule-makers and regulators over the past decade have chosen to systematically reject approaches that allow for periodic or one-off regulatory stranding of the kind proposed.

Increasing technological, competitive and commercial developments may bring legitimate policymaker focus on potential areas of regulatory evolution. Regulatory asset write-downs, however, represent a 'dead-end' for consumers and regulatory policy makers, rather than a viable regulatory policy tool. Rather, the focus should be on maximising the benefit to consumers through maintaining the capacity of regulated electricity networks to efficiently finance new and existing investments, while ensuring the regulatory framework contains the right flexibility and incentives to provide for networks to participate in delivering valued services for consumers in the future.

APPENDIX A METHODOLOGY FOR RE-ESTIMATING REQUIRED COST OF CAPITAL

The cost of capital applied in each of the three scenarios was derived by calculating an adjusted cost of equity that would be required to deliver an expected return equal to the AER-approved return on equity were investors to assume that there existed a 1 in 10 chance of a write-down of the magnitude assumed in each scenario occurring.

The basis for this approach is the recognition that an investor or equity holder facing a 1 in 10 chance of a substantial reduction in their equity from a write-down in a single year will require ***more*** than the current AER benchmark return to have a reasonable expectation or opportunity that they will earn at least that AER benchmark return. This approach was chosen because it provides a transparent and replicable basis for estimating required equity return adjustments, and for clarity around key assumptions. Similar probability-weighted approaches to estimating returns adjustment have been recognised by regulatory bodies, and previously used by a range of regulatory advisors and academic commentators to examine issues relating to accounting for stranding risks.[59]

ESTIMATING THE REQUIRED RETURN ON EQUITY – WORKED EXAMPLE

The approach used to estimate the required return on equity under each scenario is based on calculating the required annual return that would be necessary over a defined period of time to deliver a probability-weighted return at least equal to the AER's most recent cost of equity estimate.

For example, suppose a regulator determines that a required return on equity under current regulatory settings is 9 per cent. This means that prices and revenues must be set such that the ***ex ante*** or ***expected*** return is 9 per cent. Suppose that the electricity network, consistent with AER gearing benchmarks consists of 40 units of equity capital and 60 units of debt capital, and that there is a 1 in 10 probability in any given year of a write-down of 10 per cent of the value of the network. If a write-down occurs, assets fall to 90 units. Assuming that default on debt is avoided, and that shareholders bear the cost of the write-down, equity falls to 30 units. That is, equity holders have incurred a single year loss of 25 per cent.

For an expected return of 9 per cent to be maintained the follow equation would need to be solved for:

9 per cent = (0.90 * ×) + (0.1*-25)

where × is the equity return required when stranding does not occur, and 0.9 represents the probability of no equity loss from write-down, and 0.1 refers to the risk of an equity loss (in this example, of -25 per cent).

9 per cent = 0.9× - 2.5
11.5 per cent = 0.9×
× = 12.78 per cent

That is, the regulator should set prices so that the regulated firm can earn a return on equity of 12.78 per cent. Under these assumptions, 9 years in 10 equity holders keep that higher return, while 1 year in 10, they lose 25 per cent. Their true expected return in these circumstances is then equal to 9 per cent.

59 See for example, Federal Energy Regulatory Commission *Alaska Natural Gas Transportation System (Incentive Rate of Return), Docket No. RM78-12, Notice of Delegate Report and Order Directing Tariff Filing*, February 1979 [61] and Kolbe, A. and Tye, W. *'It ain't in there: The cost of capital does not compensate for stranded cost risk'* and 'Compensation for the risk of stranded assets' in Energy Policy, Vol.24, No.12 pp.1025-1050, 1996 and CEG *Rewarding Risk on Next Generation Assets,* November 2008, p.4.

APPLICATION TO SCENARIO MODELING AND ASSUMPTIONS

The above approach was used to derive adjusted required returns for the three scenarios, resulting in the return on equity assumptions detailed in ***Table 4*** below. Note that in all scenarios the cost of debt is unchanged from prevailing AER estimates. This is a highly conservative assumption given write-downs would be likely to resulting in a material re-rating of corporate debt and financial metrics of network businesses. This is discussed further in Section 6.

Table 4: Modeling and risk assumptions

Parameter	Value or assumption	Basis for assumption
Base cost of equity	8.9 per cent	Equal to the AER approved cost of equity for NSW electricity distribution transitional determinations in April 2014.
Required return on equity – Scenario A	11.37 per cent	Calculated consistent with above methodology and an assumed write-down of 5.3 per cent.
Required return on equity – Scenario B	12.67 per cent	Calculated consistent with above methodology and an assumed write-down of 10 per cent.
Required return on equity – Scenario C	15.44 per cent	Calculated consistent with above methodology and an assumed write-down of 20 per cent.
Cost of debt	7.1 per cent	Mid-point of AER estimate cost of debt range for NSW electricity distribution transitional determinations.
Investor assumed risk of write-down	1 in 10 year event	The issue of asset write-downs has been repeatedly highlighted in public reports and commentary over 2011-14, with rule changes lodged which would seek to allow for the stranding of existing network assets. This follows opening RAB values being specified 'locked' into the *National Electricity Rules* over 2006-2007.
Extent of write-downs	5.3, 10 and 20 per cent	See separate discussion of scenarios.
Incidence of loss from write-down	Equity holders	This is based on an assumption that there is no material prospect of a write-down being permitted to lead to a debt default.

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