



**Access arrangement final decision**  
**APA GasNet Australia (Operations) Pty Ltd**  
**2013–17**

**Part 3: Appendices**

March 2013

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## Shortened forms

Shortened form	Full title
2008-12 access arrangement	Access arrangement for APA GasNet effective from 1 January 2008 to 31 December 2012
2013-17 access arrangement	Access arrangement for APA GasNet effective from 1 January 2013 to 31 December 2017
2018-22 access arrangement	Access arrangement for APA GasNet effective from 1 January 2018 to 31 December 2022
ACCC	Australian Competition and Consumer Commission
access arrangement information	APA GasNet Australia (Operations) Pty Ltd, Access arrangement information, 31 March 2012
revised access arrangement information	APA GasNet, Revised access arrangement information, 9 November 2012
access arrangement submission	APA GasNet Australia (Operations) Pty Ltd, Access arrangement submission, 31 March 2012
revised access arrangement proposal	APA GasNet, Revised access arrangement proposal, 9 November 2012
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMDQ CC	authorised maximum daily quantity credit certificates
APA GasNet	APA GasNet Australia (Operations) Pty Ltd (ACN 083 009 278)
AWOTE	average weekly ordinary time earnings
capex	capital expenditure
CAPM	capital asset pricing model
Code	National Third Party Access Code for Natural Gas Pipeline Systems
CPI	consumer price index
DRP	debt risk premium
ESC	Essential Services Commission (Victoria)
GFC	global financial crisis
GPG	gas powered generation
MRP	market risk premium
NGL	National Gas Law
NGO	National Gas Objective
NGR	National Gas Rules
opex	operating expenditure
ORC	optimised replacement cost

PTRM	post tax revenue model
RAB	regulatory asset base
RFM	roll forward model
RPP	revenue pricing principles
SEAGas	South East Australia Gas
VTs	Victorian transmission system
WACC	weighted average cost of capital
WORM	western outer ring main

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## A Real cost escalation

Real cost escalation is a method for accounting for expected changes in the costs of key factor inputs. Due to market forces, these costs may not increase at the same rate as inflation. A forecast or estimate for labour cost escalators must be arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances.<sup>1</sup>

### A.1 Final decision

The AER's final decision is not to approve APA GasNet's proposed labour cost escalators. Applying the proposed escalators will not result in forecast operating expenditure (opex) and capital expenditure (capex) that is arrived at on a reasonable basis.<sup>2</sup> Nor do they provide the best possible forecasts of opex and capex in the circumstances.<sup>3</sup>

The AER considers APA GasNet's proposed Enterprise Agreement (EA) represents the best forecast possible of labour cost escalations in the circumstances for 2013–14.<sup>4</sup> Following the expiration of APA GasNet's EA the AER considers Deloitte Access Economics' (DAE) forecast of the labour price index (LPI) represents the best possible forecast of labour cost escalations in the circumstances.<sup>5</sup>

**Table A.1 AER determined real cost escalators (per cent)**

	2012	2013	2014	2015	2016	2017
EGWWS labour <sup>6</sup>	2.2	1.5	1.5	1.0	1.0	0.9
Construction labour <sup>7</sup>	1.2	-0.1	0.2	0.5	0.3	0.7

Source: AER analysis.

### A.2 APA GasNet revised proposal

In its revised labour cost escalation proposal APA GasNet proposed the use of its EA for 2013–14 and an average of Deloitte Access Economics (DAE) and BIS Shrapnel forecasts of changes in the labour price index (LPI) for the Victorian electricity, gas, water and waste services (EGWWS) sector for 2015–2017.

APA GasNet engaged BIS Shrapnel and Professor Jeff Borland for advice on labour costs for the 2013–17 access arrangement period. Based on this advice and its own EA, APA GasNet proposed the labour cost escalators in Table A.2.

**Table A.2 APA GasNet revised proposal real cost escalators (per cent)**

	2013	2014	2015	2016	2017
EGWWS labour	1.3	1.5	1.7	1.4	1.5
Construction labour	0.8	1.4	1.6	1.2	1.3

<sup>1</sup> NGR, r. 74.

<sup>2</sup> NGR, r. 74(2)(a).

<sup>3</sup> NGR, r. 74(2)(b).

<sup>4</sup> NGR, r. 74(2).

<sup>5</sup> NGR, r. 74(2).

<sup>6</sup> Labour cost escalations for EGWWS labour applies to all internal labour.

<sup>7</sup> Outsourced labour where specified for capex is assumed to be provided by firms in the construction sector.

## A.3 Assessment approach

The AER used the same assessment approach as for its draft decision. The AER's assessment approach for real cost escalation is set out in appendix C of the AER's draft decision.<sup>8</sup>

In undertaking this assessment the AER considered the following information which it received following its draft decision:

- revised labour cost forecasts from BIS Shrapnel,<sup>9</sup> commissioned by APA GasNet, and DAE commissioned by the AER<sup>10</sup> reflecting updated economic data
- Professor Borland's recommendations commissioned by Envestra, Multinet, SP AusNet and APA GasNet for forecasting the wage price index (WPI)/LPI<sup>11</sup>
- a response report by the Energy Users Coalition of Victoria (EUCV) on the AER's draft decision.<sup>12</sup>

## A.4 Reasons for final decision

The AER's final decision is not to approve APA GasNet's proposed labour cost escalators. The AER considers that applying APA GasNet's proposed escalators will not result in forecast opex and capex that are arrived at on a reasonable basis, or provide the best possible forecasts of opex and capex in the circumstances.<sup>13</sup>

The AER considers DAE's forecast of the LPI represents the best possible forecast of real cost escalations in the circumstances and is arrived at on a reasonable basis. It takes into account that APA GasNet has not provided a productivity adjustment to its labour cost escalation forecasts.

### A.4.1 The choice of labour price measure

In the draft decision the AER rejected APA GasNet's use of productivity adjusted average weekly ordinary time earnings (AWOTE) and applied an unadjusted LPI forecast by DAE.

The AER noted the difficulty in accurately forecasting the change in labour productivity using the standard Australian Bureau of Statistics (ABS) measures of labour productivity for the EGWWS sector as the reason for not applying a labour productivity adjustment.

As in its draft decision, the AER considers in its final decision the best forecast of labour costs to be the one that most accurately measures the change in the labour price adjusted for labour productivity. The AER consider the best forecast of labour cost escalation in the circumstances is DAE's LPI.

### Use of negotiated wage agreements

The AER's final decision is to approve APA GasNet's Enterprise Agreement (EA) to forecast labour cost escalations for the first two years of the 2013–17 access arrangement period. The AER

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<sup>8</sup> AER, *Draft decision, APA GasNet access arrangement proposal for 1 January 2013 – 31 December 2017*, September 2012 Part 3, p. 68.

<sup>9</sup> BIS Shrapnel, *Real labour cost escalation forecasts to 2017 – Australia and Victoria*, October 2012.

<sup>10</sup> Deloitte Access Economics, *Forecast growth in labour costs in Victoria – report prepared for the AER*, 4 February 2013.

<sup>11</sup> Professor Jeff Borland, *Recommendations for methodology for forecasting WPI: report for Envestra Limited, SP AusNet, APA GasNet and Multinet Gas*, October 2012.

<sup>12</sup> Energy Users Coalition of Victoria, *Submission to the AER: AER draft decision and revised applications from Envestra, Multinet and SP AusNet*, January 2013, pp. 30–31.

<sup>13</sup> NGR, r. 74(2).

considers APA GasNet's EA represents the best forecast of labour cost escalations in the circumstances.<sup>14</sup>

In its revised proposal APA GasNet submitted its EA should apply to its real cost escalations for the first two years of the 2013–17 access arrangement period. APA GasNet was in the process of negotiating its EA at the time of the AER's draft decision.

In its draft decision the AER set out its position on the use of APA GasNet's EA. This was contained in the confidential appendix of the AER's draft decision.

The AER must investigate the circumstances of a wage agreement covering a future regulatory control period before it can be satisfied the agreement reasonably reflects the efficient costs of a prudent service provider.<sup>15</sup>

Generally, the AER has concerns with the use of EAs to set real labour cost escalations. The AER considers that, in certain circumstances, a forecast based on a service provider's actual costs is unlikely to represent the best forecast of efficient costs possible in the circumstances.<sup>16</sup> Specifically, the AER holds this concern where it is unclear as to whether using an EA would give the service provider an incentive to minimise its labour costs,

Further, the revenue and pricing principles state that a service provider should be provided with effective incentives to promote economic efficiency with respect to the reference services the service provider provides.<sup>17</sup> The AER considers that, if a service provider negotiates an EA in the knowledge that the AER will use the EA to set its opex and capex forecasts, the incentive to minimise wage rate increases during the access arrangement period is diminished. As such using an EA may promote inefficient wage agreements in the future.

The AER agrees with the Office of Gas and Electricity Markets (OFGEM) that there is a risk in using an EA as compared to using an independent objective measure of labour cost escalations :

If we were to use network companies' pay settlement data, there is a risk that we would reward companies for inefficient wage settlements. We prefer to use data which are comparable but independent of companies' labour costs.<sup>18</sup>

With regard to APA GasNet's EA, the AER considers it is not possible to investigate all the circumstances of the negotiation between the parties. APA GasNet's EA provides for an annual increase of 4 per cent per annum to all wage rates.<sup>19</sup> The AER considers this figure represents both APA GasNet's labour price increases and the productivity gains it will achieve over the EA's life. Beyond this, it is not possible for the AER to assess the change in labour costs as a result of negotiations between the service provider and its staff.

On this basis, the AER's final decision is to accept APA GasNet's proposed use of its EA for the first two years of the 2013–17 access arrangement period as proposed by APA GasNet. The AER has no evidence that suggests that the EA has not been arrived at on a reasonable basis or does not represent the best forecast possible in the current circumstances.<sup>20</sup> Therefore, under r 79 and 91 the

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<sup>14</sup> NGR, r. 74(2).

<sup>15</sup> Australian Competition Tribunal, *Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11 (24 December 2010)*, paragraph 58.

<sup>16</sup> NGR, r. 74(2)(b).

<sup>17</sup> NGL, s. 24(3).

<sup>18</sup> OFGEM, *RIO-T1/GD1: Real price effects and ongoing efficiency appendix*, 17 December 2012, p. 7.

<sup>19</sup> APA GasNet, *APA transmission pipelines (Vic, SA, WA, NT & Qld) Enterprise Agreement 2011 – 2014*, 2012, p. 18.

<sup>20</sup> NGR, r. 74.



AER has no basis on which to conclude that the 4 per cent per annum wage rates are not prudent or not efficient.

However the AER will examine the use of negotiated wage agreements and benchmarked industry wide measures of labour prices as part of its better regulation program of work, specifically development of its expenditure forecast assessment guidelines. Further the AER may assess the interaction between labour price measures and total factor productivity (TFP) for opex and capex.

### Materiality of quality adjusted labour productivity

The AER considers labour prices should be adjusted for labour productivity improvements to show the impact on labour costs. This is because quality adjusted labour productivity measure is the appropriate measure to adjust the LPI. Quality adjusted labour productivity is largely driven by worker productivity and does not include compositional productivity. The AER considers quality adjusted labour productivity to be material based on the AER's analysis of the ABS data and Professor Borland's productivity data.

In the draft decision the AER considered current estimates of the ABS measure of labour productivity in the utilities industry were subject to estimation difficulties.<sup>21</sup> BIS Shrapnel and DAE produced conflicting labour productivity forecasts for the 2013–17 access arrangement period. For these reasons the AER did not apply a matching labour productivity adjustment to the LPI forecasts in the draft decision. However the AER considers that labour productivity and worker productivity improves over time and labour price measures should be adjusted for labour productivity if reasonable data is available.

The EUCV considers, in its submission to the AER's draft decision, that labour cost escalations should be adjusted for labour productivity and that by excluding productivity adjustments on the basis that it is difficult to not be reasonable.<sup>22</sup>

Professor Borland stated any adjustment to LPI for changes in labour productivity should be minimal because the largest share of changes to labour productivity is explained by compositional productivity effects. Consequently the adjusted measure of labour productivity that would be subtracted from forecast changes to LPI is very small.<sup>23</sup>

Professor Borland's empirical analysis of data at the national level is shown in Table A.3.

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<sup>21</sup> AER, *Draft decision, APA GasNet access arrangement proposal for 1 January 2013 – 31 December 2017*, September 2012, Part 3, pp. 72-73.

<sup>22</sup> Energy Users Coalition of Victoria, *Submission to the AER: AER draft decision and revised applications from Envestra, Multinet and SP AusNet*, January 2013, pp. 30–31.

<sup>23</sup> Professor Jeff Borland, *Recommendations for methodology for forecasting WPI: report for Envestra Limited, SP AusNet, APA GasNet and Multinet Gas*, October 2012, p. 9.

**Table A.3 Professor Borland's empirical analysis on the average annual rate of change (per cent)**

	1997-98 to 2009-10 <sup>24</sup>	1997-98 to 2010-2011 <sup>25</sup>
Labour productivity	1.55	1.35
LPI	3.60	3.60
AWOTE	4.55	4.60
CPI	2.90	3.05

Source: Professor Jeff Borland, *Labour cost escalation: Choosing between AWOTE and LPI Report for Envestra Limited*, March 2012

In his analysis Professor Borland considers at the national level the compositional productivity effect can be inferred to be around one per cent by taking the difference between the AWOTE and LPI.<sup>26</sup>

Expanding on Professor Borland's analysis the AER considers the change in quality adjusted labour productivity can be calculated by:

- $\Delta \text{Labour productivity} + (\Delta \text{LPI} - \Delta \text{AWOTE})$

This would imply a quality adjusted labour productivity value between 0.60 using Professor Borland's original data and 0.35 using Professor Borland's updated data submitted in the businesses' initial proposal. The AER notes, however, the AWOTE and the LPI published by the ABS are not from the same source so the two series may not be consistent with each other. Further, the AWOTE may capture wage change due to other factors such as change in average number of hours worked in a week.

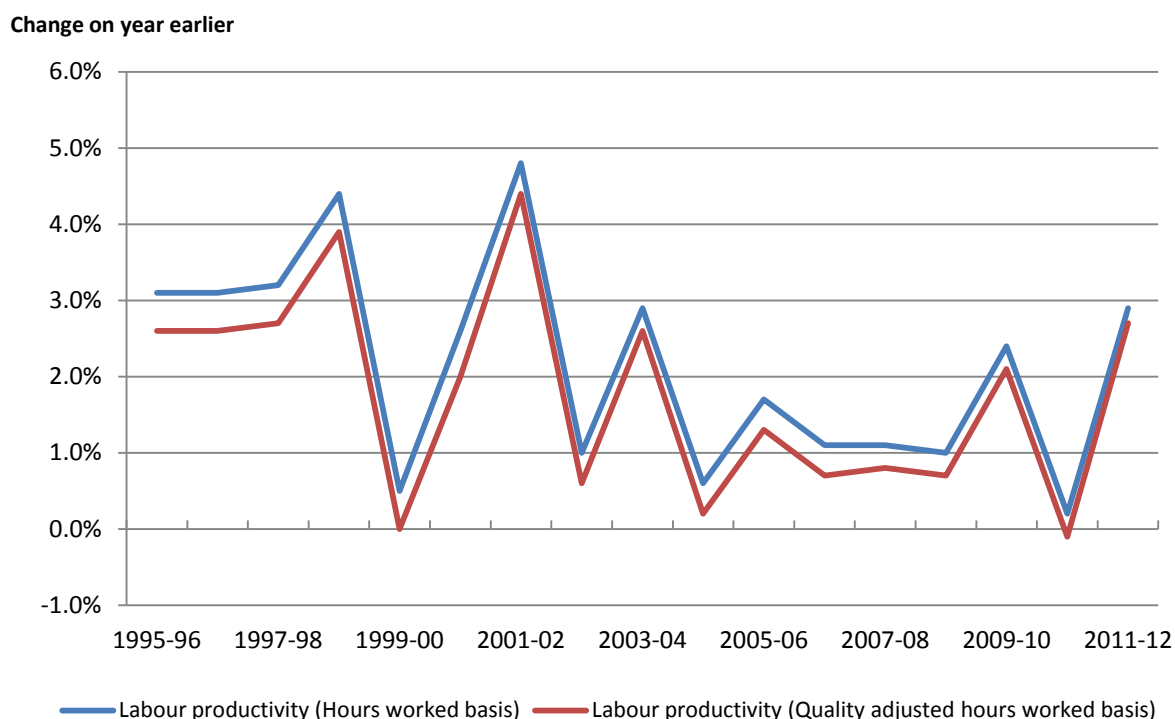
The AER also examined ABS time series data to determine whether worker productivity in the long run makes up a material proportion of labour productivity. The time series trend is illustrated in Figure A.1, which shows the year on year change in labour productivity and quality adjusted labour productivity from June 1996 to June 2012. The ABS data indicates the long-run average quality adjusted labour productivity at the market sector level is 1.78 per cent which makes up a significant proportion of the 2.17 per cent for the long-run labour productivity.

<sup>24</sup> Professor Jeff Borland, *Labour cost escalation: Choosing between AWOTE and LPI Report for Envestra Limited*, March 2012, p. 6.

<sup>25</sup> Professor Jeff Borland, *Labour cost escalation: Choosing between AWOTE and LPI Report for Envestra Limited*, March 2012, p. 12.

<sup>26</sup> Professor Jeff Borland, *Labour cost escalation: Choosing between AWOTE and LPI Report for Envestra Limited*, March 2012, p. 13. Further Professor Borland noted the change in labour productivity and the change in CPI reflects the change in AWOTE.

**Figure A.1 Comparison of market sector labour productivity indexes**



Source: ABS, 5204.0, Table 13 Productivity in the market sector

Based on this ABS data, DAE also considered the overall impact of compositional productivity at the national level is not large. DAE also considers the difference between the two series is decreasing overtime indicating a decline in the growth of compositional productivity.<sup>27</sup>

The ABS time series trend as well Professor Borland's data and DAE's analysis indicates that worker productivity is material, and makes up a material proportion of labour productivity. Further the broad range of positive values also indicates that the measure of worker productivity can vary depending on how it is measured but, based on available information worker productivity, is positive.

### Choice of LPI forecasts

APA GasNet proposed that following the expiration of APA GasNet's 2011–14 EA, the average of DAE and BIS Shrapnel's LPI forecasts to forecast real labour cost escalations should apply.

The AER considers the best labour price measure in the circumstances is an average of DAE and BIS Shrapnel's LPI forecasts. However, the best labour price measure is not the best labour cost measure. The AER considers the choice of the LPI should take into consideration the accuracy of the labour price measure and the use of labour productivity adjustments. APA GasNet's revised proposal does not include an adjustment for labour productivity.

In its draft decision the AER applied DAE's LPI forecasts to set labour cost escalations, although the LPI is a labour price measure and not a labour cost measure. The AER considered DAE's LPI forecasts, which are lower than BIS Shrapnel's forecasts, more closely reflect changes in labour costs.

<sup>27</sup> Deloitte Access Economics, *Productivity measures to adjust LPI and AWOTE*, 8 November 2011, p. 7.

The AER agrees with APA GasNet and Professor Borland that the average of the two forecasts produces a better forecast of the labour price than using either BIS Shrapnel's or DAE's forecast exclusively. This is consistent with the AER's own analysis of six forecast series of LPI where the average had the lowest mean absolute error on three occasions, DAE on two occasions and BIS Shrapnel once.<sup>28</sup>

APA GasNet would be over compensated for labour cost escalations if the AER were to apply the best measure of the LPI without taking into account quality adjusted labour productivity. This is because the AER considers quality adjusted labour productivity to be material at the national level and therefore would have a material impact on total forecast opex and total forecast capex.

The AER's final decision is to not approve APA GasNet's forecast for its labour cost escalations. The AER considers that DAE's LPI forecast for APA GasNet's labour cost escalations should be applied following the expiration of the 2011–14 EA as this will result in the best forecast possible in the circumstances.<sup>29</sup> DAE's LPI forecast, which is lower than the average of DAE and BIS Shrapnel's forecast, would partially offset the over compensation to APA GasNet for not adjusting its labour cost escalations for labour productivity.

The AER considers the difference between DAE's LPI forecast and the average of DAE and BIS Shrapnel's forecast to be a reasonable estimate for quality adjusted labour productivity in the circumstances. It is arrived at on a reasonable basis as it takes into account all relevant data. The AER notes that this number is similar to the AER's analysis of worker productivity from Professor Borland's data and lower than DAE's analysis of worker productivity. The AER considers by using this lower value, the risk of over-adjusting for labour productivity is less likely than if the AER were to adopt the long run average from the ABS quality adjusted labour productivity time series or DAE's forecast of quality adjusted labour productivity. This will result in the best forecast possible in the circumstances.<sup>30</sup>

## A.5 Revisions

The AER proposes the following revisions to make the access arrangement proposal acceptable:

**Revision A.1:** Opex and capex forecasts should be amended to reflect the labour and materials cost forecasts set out in Table A.1.

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<sup>28</sup> AER, *Powerlink Transmission determination 2012–13 to 2016–17: Final decision*, April 2012, p. 54.

<sup>29</sup> NGR, r. 74.

<sup>30</sup> NGR, r. 74.

## B Rate of return

In attachment 5, the AER sets out its key reasons for adopting a rate of return of 7.22 per cent for APA GasNet. This includes its key reasons for adopting a risk free rate of 3.22 per cent and market risk premium (MRP) of 6 per cent. In this appendix, the AER provides a detailed technical analysis of the substantial amount of material presented to it by the Victorian gas businesses on the cost of equity. The AER also expands upon its reasoning in the attachment in some areas.

In this appendix the AER identifies the conclusions that the different consultants (both those commissioned by the Victorian gas businesses and the AER) have presented. To the extent possible, the AER prefers that their reports speak for themselves (in terms of both reasons and conclusions) and has identified the relevant sections in the reports.

In this appendix, the AER:

- Outlines APA GasNet's main arguments on the cost of equity in its revised proposal and provides a map of where those arguments are addressed in this final decision
- Briefly outlines the various cost of equity approaches recommended by different experts.
- Considers the internal consistency of the AER's cost of equity approach, the relevance of "flight to quality" periods, and the discount rates used by market practitioners in takeover valuation reports as surveyed by Ernst & Young.
- Considers whether interest rates are currently "abnormally" low and considers the specific dates of the averaging period proposed by APA GasNet.
- Sets out further detailed analysis on measures of the MRP (including historical estimates, survey evidence, and forward looking estimates).
- Sets out further detailed analysis on dividend growth model (DGM) estimates—both to estimate the MRP and overall cost of equity for regulated businesses
- Considers market commentary and reasonableness checks on the overall rate of return.
- Explores the cost of equity practices of other regulators in Australia, the UK and the US.

### B.1 APA GasNet's main arguments

The main arguments that APA GasNet put to the AER in its revised proposal are identified in Table B.1 below.<sup>31</sup> This decision considers each of these arguments, along with additional relevant material.

**Table B.1** APA GasNet's main arguments

Argument	Considered in this section
AER's decision to adopt a fixed MRP of 6.0 per cent in the draft decision:	Appendix B.3.7
▪ ignores the advice provided by the RBA advice that risk premium on other assets have increased	Appendix B.5.3 and Appendix B.7.2

<sup>31</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, pp.35-38 and 67-69.

<ul style="list-style-type: none"> <li>is inconsistent with increased risk premiums on other assets such as debt</li> </ul>	Appendix B.3.6
<ul style="list-style-type: none"> <li>produces a nominal cost of equity of 9.22 per cent, which is out of step with current estimates of market returns made by market practitioners</li> </ul>	Appendix B.3.2 Appendix B.8
<ul style="list-style-type: none"> <li>results a real return of 6.56 per cent, which is materially below the real long term average return on the market of 8.9 per cent</li> </ul>	
<ul style="list-style-type: none"> <li>is at odds with the approach of jurisdictional regulators to set the cost of capital for regulated entities</li> </ul>	
<ul style="list-style-type: none"> <li>The AER has incorrectly interpreted rule 87.</li> </ul>	Attachment 5.2.1
<ul style="list-style-type: none"> <li>There is a widely accepted negative relationship between the risk free rate and the MRP.</li> </ul>	Attachment 5.3.3 Appendix B.3.3
<ul style="list-style-type: none"> <li>AER's exclusive reliance on long term average MRP, which it has not been demonstrated to be a good forecast of a forward looking MRP.</li> </ul>	Attachment 5.3.3 Appendix B.5
<ul style="list-style-type: none"> <li>Historical data is incapable of supporting AER's assertion that the expected return on the market portfolio has perfectly matched the 231 bps fall in risk free rate over the 19 month period between Amadeus decision and APA GasNet revised proposal.</li> </ul>	Attachment 5 Appendix B.3
<ul style="list-style-type: none"> <li>AER has inconsistently applied the CAPM. There are two legitimate methods for selecting the parameter values in the CAPM: <ul style="list-style-type: none"> <li>Adopt 'spot estimates' of the risk free rate and MRP</li> <li>Adopt long-term averages of the risk free rate and MRP.</li> </ul> </li> </ul>	Appendix B.3.1
<ul style="list-style-type: none"> <li>The AER incorrectly combines the 'spot' risk free rate from method 1 with the long-term average MRP from method 2. Either of the two methods would be appropriate, but mixing the two is not.</li> </ul>	Attachment 5 Appendix B.3.1
<ul style="list-style-type: none"> <li>Ernst &amp; Young's review of independent expert reports indicate AER's cost of equity is too low.</li> </ul>	Appendix B.3.6
<ul style="list-style-type: none"> <li>AER uses an unconditional MRP (as advocated by M&amp;P), however Davis (Jan 2011) stated unconditional MRP has no empirical support.</li> </ul>	Attachment 5.3.3 Appendix B.2.1
<ul style="list-style-type: none"> <li>AER has incorrectly placed little or no weight on all forward looking measures of the MRP which show that prevailing MRP increased as CGS yield has fallen and support a prevailing MRP greater than 6 per cent.</li> </ul>	Attachment 5.3.3 Appendix B.5

- Geometric averages should be afforded no weight. Appendix B.5.1
- Survey evidence cannot be relied upon as the surveys cited by the AER had prevailing RFRs substantially higher than the risk free rate during GasNet's averaging period. Attachment 5.3.3  
Appendix B.5.2
- It is commonly accepted that MRP varies over time, however, the AER's MRP estimates do not change. Attachment 5.3.3
- While the Tribunal accepted a 6 per cent MRP in recent decisions, it does not speak for the validity of a 6 per cent going forward and nothing about the appropriateness of adopting 6 per cent for APA GasNet's averaging period. Attachment 5.3.3

## B.2 Cost of equity approaches recommended by different experts

In the draft decision and attachment 5 of this final decision, the AER noted there is no consensus among experts on the best method to estimate the MRP (or the overall cost of equity). Different experts have different views both on the best method to estimate the MRP, and on the best design and inputs into particular methods. These differences, both in relation to the different methods and different inputs, have a material impact on the resultant MRP and cost of equity results.

APA GasNet submitted 10 consultant reports on the cost of equity issue in its revised proposal. In this final decision, the AER considers views from different experts on the best method to estimate the MRP and cost of equity. These views include:

- advice commissioned by the AER—that is, the approaches preferred by McKenzie and Partington, Lally and CEPA
- views submitted by APA GasNet in support of its initial proposal—that is, the CEG approaches, Capital Research DGM estimates, and NERA regime switching model
- new views submitted by APA GasNet in support of its revised proposal—Gregory and Wright's recommended approaches
- approaches to estimate MRP proposed by other regulated businesses in recent regulatory processes—that is, the VAA implied volatility glide path approach and the SFG method.

**Table B.2 Different approaches recommended by different experts**

	Preferred approach	Current / most recent estimate
McKenzie and Partington	Prevailing CGS yield as risk free rate proxy combined with unconditional mean MRP of 6 per cent triangulated using other evidence, such as surveys, DGMs and other market indicators.	prevailing CGS yield and 6 per cent MRP
Lally	Prevailing CGS yield as risk free rate proxy and use a range of evidence to minimise the mean squared error of the MRP estimate. Evidence includes historical excess returns, survey evidence, Siegel approach, DGM analysis, real market cost of equity	prevailing CGS yield and 6 per cent MRP

	and international data	
CEPA	Estimate cost of capital over the life of the asset as in the established UK approach and assume a constant expected cost of equity over the long run.	Values not specified.
CEG	<ol style="list-style-type: none"> <li>1. Use DGMs to directly estimate the cost of equity for comparable firms</li> <li>2. Use DGMs to estimate the cost of equity for the market portfolio and apply within the CAPM to derive a DGM estimate for the MRP</li> <li>3. Estimate the cost of equity by combining a historical average risk free rate with a historical average MRP.</li> </ol>	<p>Nominal market cost of equity 10.4-14.1%</p> <p>Prevailing risk free rate and an MRP of 8.89%</p> <p>A historical average risk free rate of 5.86% and a 6% MRP.</p>
Capital Research	Use DGMs to estimate the MRP, no comment on the risk free rate	An MRP of 9.6%
NERA	<p><u>Initial proposal report:</u></p> <p>Regime switching model and DGM estimates of the MRP. No comment on the risk free rate.</p> <p><u>Revised proposal report:</u></p> <p>Long term historical average risk free rate with historical average MRP.</p>	<p>Regime switching model: an MRP of 8.44%</p> <p>DGM MRP estimates in the range of 7.69-7.72%.</p> <p>Values not specified,</p>
Gregory	<ol style="list-style-type: none"> <li>1. Estimate the expected return on the market directly and use this estimate with the preferred risk free rate in the CAPM.</li> <li>2. Estimate both the risk free rate and the MRP from historically observed data.</li> </ol>	<p>Nominal expected return on the market of 11.31% (with imputation credits adjustment).</p> <p>Historical risk free rate (5% as currently proposed by the Victorian gas distribution businesses) and historical MRP of 6%</p>
Wright	<ol style="list-style-type: none"> <li>1. Assume a constant real market cost of equity</li> <li>2. Combine historical average risk free rate with a historical average MRP</li> </ol>	<p>Real market cost of equity in the range of 7.25-7.5% according to recent Ofgem decisions. Australian rate not specified.</p> <p>Historical risk free rate (5% as currently proposed by the Victorian gas distribution businesses) and historical MRP of 6%</p>
VAA	Prevailing risk free rate with implied volatility estimate of the MRP	<p>Prevailing risk free rate and a 7% MRP</p> <p>(The AER estimated a 10 year MRP of 5.54 per cent after correcting for its concerns discussed in the attachment.)</p>
SFG	Use financial market indicators (implied volatility, dividend yields, credit spreads, ASX price earnings ratio) to estimate MRP, no comment on the risk free rate	No specific MRP estimate but considers these indicators show the current MRP is above 6%

Table B.2 above summarises different views of different experts. After carefully assessing these views, the AER considers its current approach is reasonable and it appropriately reflects prevailing



conditions in the market for funds. Its reasons are set out in attachment 5 and below. The AER's approach most closely resembles the approaches of McKenzie and Partington and Lally.

### B.2.1 McKenzie and Partington's recommended cost of equity approach

McKenzie and Partington considered the current yield on 10 year CGS is a reasonable estimate of the 10 year forward looking RFR. It is possible to invest for ten years at this rate at the current point in time. Thus, it is the natural benchmark with which to compare other investments over a ten year horizon.<sup>32</sup>

In relation to the MRP, they noted the objective should be to estimate the unconditional mean MRP, but supplemented by triangulation and reasonableness checks using alternative approaches in determining the current MRP to be used in regulatory decisions.<sup>33</sup> In the December 2011 MRP report, they considered four areas of evidence: historical excess returns, survey evidence, DGM analysis and other methods (including using international data, credit spreads and implied volatilities). They advised placing weight on historical excess returns and survey evidence: DGM and other methods can be used only as reasonableness checks and need to be interpreted with caution.

They concluded there is little persuasive evidence for deviating from the long standing regulatory consensus of a market risk premium estimate of 6 per cent. If anything, the risk with this estimate is that it may prove to be an overstatement.<sup>34</sup> They remained of this view in their February 2012 report, August 2012 report and the most recent February 2013 report, after having reviewed further materials submitted by regulated businesses.<sup>35</sup>

McKenzie and Partington have also critically evaluated the AER's approach in their February 2013 report. They interpreted the AER's approach as combining an estimate of the current risk free rate with an estimate of the current market risk premium, thus it is an internally consistent approach and consistent with finance theory. They acknowledged the 6 per cent adopted by the AER is not just a choice based on the historical average of the MRP. Rather it is based on a broader set of evidence they reviewed in their December 2011 report.<sup>36</sup>

In their most recent report, McKenzie and Partington considered getting the best estimate of the current risk free rate and the best estimate of the current MRP is the key. They supported the AER's approach of using the prevailing yield on the 10 year CGS and a 6 per cent MRP.<sup>37</sup>

### B.2.2 Lally's recommended cost of equity approach

Lally suggested using a risk free rate prevailing at the commencement of the regulatory period, as this ensures the present value of the regulated business's future cash flows matches its initial investment. He further suggested the risk free rate should be the rate on bonds whose term matches the regulatory cycle (five years) in order to satisfy the present value principle.

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<sup>32</sup> M. McKenzie, and G. Partington, *Review of the AER's overall approach to the risk free rate and market risk premium*, 28 February 2013, pp. 31-32 (McKenzie, and Partington, *Review of the AER's overall approach*, February 2013).

<sup>33</sup> McKenzie, and Partington, *Review of the AER's overall approach*, February 2013, p.20.

<sup>34</sup> M. McKenzie, and G. Partington, *Report to Corrs Chambers Westgarth: Equity market risk premium*, December 2011, pp. 36–37. (McKenzie and Partington, *Equity market risk premium*, December 2011)

<sup>35</sup> M. McKenzie, and G. Partington, *Report to the AER: Supplementary report on the equity market risk premium*, February 2012, p.5. (McKenzie, and Partington, *Supplementary report on the MRP*, February 2012)

M. McKenzie, and G. Partington, *Report to the AER: Review of regime switching framework and critique of survey evidence*, September 2012, pp. 24–25. (McKenzie, and Partington, *MRP: Regime switching framework and critique of survey evidence*, September 2012)

McKenzie, and Partington, *Review of the AER's overall approach*, February 2013, pp.30-32.

<sup>36</sup> McKenzie, and Partington, *Review of the AER's overall approach*, February 2013, p.31.

<sup>37</sup> McKenzie, and Partington, *Review of the AER's overall approach*, February 2013, p.6.

In relation to the MRP, he suggested an approach that minimises the mean squared error (MSE) and this leads to a consideration of the results from a wide range of methods. These methods should include:

- the historical averaging of excess returns (6 per cent)<sup>38</sup>,
- the historical average of excess returns modified for the 'great inflation shock' in the 20th century (4.9 per cent),
- the result from the DGM approach (5.9-8.5 per cent),
- the result from surveys (up to 5.9 per cent),
- evidence from foreign markets as well as other methodologies can also be considered.

Lally noted the median of these approaches (6.0 per cent) provides an appropriate MRP estimate.<sup>39</sup>

Lally's estimated MRP matches the AER's current estimate.<sup>40</sup> The AER also applies a risk free rate prevailing at the commencement of the regulatory period. However, it uses a 10 year risk free rate rather than the 5 year CGS yield as recommended by Lally. By doing so, the AER is likely to estimate a cost of equity higher than that suggested by Lally.<sup>41</sup>

### B.2.3 CEPA's recommended cost of equity approach

CEPA noted there is evidence for a constant expected cost of equity over the long run, in this case it is important to apply a consistent approach. It therefore suggested estimating the cost of capital over the life of the asset as in the established UK approach.<sup>42</sup>

The AER has also commissioned CEPA to consider the valuation reports presented by Ernst and Young. CEPA recommended that the AER should not change its current estimation approach after reviewing these valuation reports and considering various criteria it identified in the report.<sup>43</sup>

As discussed in section B.3.1, the AER considers its current approach has consistently estimated a 10 year forward looking risk free rate and a 10 year forward looking MRP. The evidence has not persuaded the AER that the cost of equity is relatively stable or there is a sufficient negative relationship between the risk free rate and the MRP. The reasons are discussed in sections B.3.2 and B.3.3.

### B.2.4 CEG's recommended approaches (DGM or historical average based approaches)

In both the March and November 2013 reports, CEG proposed three alternative approaches to estimate the cost of equity:

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<sup>38</sup> Lally notes he prefers arithmetic averages. The AER considers arithmetic average and geometric average of historical excess returns in B.2.1 of the draft decision and further in section 11.1B.5.1 of this final decision.

<sup>39</sup> Lally explained as some methods provide estimated ranges rather than point estimates, the mean cannot be determined and therefore the median is considered.

<sup>40</sup> M. Lally, *Review of the AER's methodology for the risk free rate and the market risk premium*, 4 March 2013, p. 33-34. (Lally, *Review of the AER's methodology*, March 2013)

<sup>41</sup> This is because the longer term bonds carry more risk than the shorter term bonds and therefore require higher returns. The 5 year CGS yield is generally lower than the 10 year CGS yield.

<sup>42</sup> CEPA, *Advice on estimation of the risk free rate and market risk premium*, March 2013, pp. 35-36.

<sup>43</sup> CEPA, *Advice on estimation of the risk free rate and market risk premium, report prepared for the Australian Energy Regulator*, 12 March 2013, p. 62. (CEPA, *Advice on estimation of the risk free rate and market risk premium*, March 2013)

- use DGM to directly estimate the cost of equity for comparable firms
- use DGM to estimate the cost of equity for the market portfolio and apply within the CAPM to derive a DGM estimate for the MRP
- Proxy prevailing conditions in the market for funds by combining a historical average MRP with a historical average risk free rate.<sup>44</sup>

CEG's estimated DGM cost of equity combines dividend yield forecasts with estimated dividend per share growth forecasts. This approach assumes that, at any point in time, the market cost of equity is the same for all future years. With the first method, CEG estimated a cost of equity for Australian regulated businesses of between 10.4-14.1 per cent. By applying a prevailing risk free rate, it estimated a prevailing market cost of equity of 10.16 per cent and an MRP of 8.89 per cent from the second method.

CEG's third approach combines an average historical 10 year CGS between 1 July 1993 and 28 September 2012 (5.86 per cent nominal) with a beta of 0.8 and an MRP of 6 per cent. It estimated a nominal cost of equity of 10.66 per cent. This cost of equity estimate can then be crosschecked with the DGM cost of equity estimates derived from the first two methods.<sup>45</sup>

Based on advice from Lally, the AER considers CEG's DGM method overstates a reasonable MRP and cost of equity estimates when the risk free rate is low. The AER's analysis on the use of DGM methods generally, and concerns of CEG's particular DGM method is set out in section B.6.

In section B.3.1, the AER considers using a historical average risk free rate according to the third CEG approach will violate the present value principle. CEG recommended this approach as it suggested the AER has incorrectly combined a spot risk free rate with a long term average MRP. However, as discussed in section B.3.1, the AER has consistently estimated a 10 year forward looking risk free rate and a 10 year forward looking MRP.

## **B.2.5 Capital Research's recommended MRP approach (DGM based approach)**

APA GasNet submitted a Capital Research report which used a DGM to directly estimate the forward MRP in its initial proposal. It did not submit another Capital Research report with its revised proposal. In its March 2012 report, Capital Research suggested the best forward looking MRP was 9.6 per cent, assuming a risk free rate of 3.73 per cent and a net theta of 0.2625.<sup>46</sup>

The AER noted Capital Research's DGM estimate is subject to some limitations as discussed in sections B.2.3 and B.2.4 of the draft decision. As no further Capital Research report was submitted in the revised proposal, the AER does not address Capital Research's DGM estimates again in this final decision.

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<sup>44</sup> CEG, *Internal consistency of risk free rate and MRP in the CAPM*, Prepared for Envestra, SP AusNet, Multinet and APA, , March 2012, p. 49. (CEG, *Risk free rate and MRP in the CAPM*, March 2012); CEG, *Update to March 2012 Report: on consistency of the risk free rate and MRP in the CAPM*, November 2012, p.31. (CEG, *Update to March 2012 Report*, November 2012)

<sup>45</sup> CEG, *Risk free rate and MRP in the CAPM*, March 2012, p. 49.

<sup>46</sup> Capital Research, *Forward Estimate of the Market Risk Premium: Update: A report prepared for the Victorian gas transmission and distribution businesses: APA Group, Envestra, Multinet Gas and SP AusNet*, March 2012, p. 33. (Capital Research, *MRP estimate for the Vic NSPs*, March 2012)

## B.2.6 NERA's recommended cost of equity approaches

In its initial proposal, APA GasNet submitted a report from NERA on the MRP. In that report, NERA proposed estimating the MRP based on a regime switching model. NERA suggested this method would provide the most suitable MRP in prevailing market conditions. The model produced an MRP estimate of 8.44 per cent. The AER raised concerns about the regime switching model in the draft decision. In particular, it considered this model was complex and involves:

- determining the appropriate assumptions of high and low volatility states
- estimating the current probability of being in the high volatility state
- using a Markov chain to roll over this probability
- calculating a short term MRP in relation to the three month bill return
- deriving a forward one year bill rate
- converting the short term MRP to a five year MRP.<sup>47</sup>

The AER is not aware of any regulators that have used a regime switching model in deriving their MRP estimates. In their August 2012 report, McKenzie and Partington noted the available sample size is too small for any meaningful statistical model fitting. NERA's regime switching model is not a good fit of the data and does not provide sensible volatility estimates. Further, the SFG report that reviewed the NERA regime switching model did not provide insights to address this problem.<sup>48</sup>

In its initial report, NERA also calculated DGM estimates of 7.69 and 7.72 per cent based on Bloomberg and I/B/E/S forecasts. However, it considered the regime-switching model provided the most suitable MRP estimate as the model provided an estimate of the MRP in each future year.<sup>49</sup>

APA GasNet submitted another NERA report in the revised proposal. The AER notes the Terms of Reference asked a different set of questions. Therefore, instead of updating its regime switching model and DGM estimates, NERA provided an account of the historical development of the determination of the cost of equity by Australian regulators. It presented evidence such as dividend yield and US regulatory decisions and recommended that current market circumstances warrant a departure from the standard AER approach.<sup>50</sup> It concluded using a long term average risk free rate is appropriate in current market circumstances if the long term historical MRP is used.

It is not clear which of the two approaches is preferred by NERA as the two NERA reports addressed different questions. However, the AER is not persuaded that either approach is appropriate. Dividend yields and the US regulatory decisions do not warrant a change in the AER's current approach. These issues are discussed in sections B.6.4 and B.8.4, respectively. In addition, the AER does not consider it appropriate to use a long term average risk free rate for the reasons discussed in attachment 5.

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<sup>47</sup> NERA Economic Consulting, *Prevailing conditions and the market risk premium: A report for APA Group, Envestra, Multinet and SP AusNet*, March 2012, pp. 24–31. (NERA, *Prevailing conditions and the MRP*, March 2012)

<sup>48</sup> McKenzie, and Partington, *MRP: Regime switching framework and critique of survey evidence*, September 2012, pp. 21–22.

<sup>49</sup> NERA, *Prevailing conditions and the MRP*, March 2012, p.42

<sup>50</sup> NERA, *Estimating the Cost of Equity under the CAPM: Expert report of Gregory Houston*, November 2012, pp.18-30. (NERA, *Estimating the Cost of Equity under the CAPM*, November 2012)

### B.2.7 Gregory's recommended cost of equity approaches

Gregory considers the historical return on equities has a relatively stable mean over time.<sup>51</sup> Therefore, he suggested the AER could adopt one of two approaches:<sup>52</sup>

- Estimate the expected return on the market directly and use this estimate with its preferred risk free rate in the CAPM.
- Make allowance for the exceptional conditions in global government bond markets following the GFC by estimating both the risk free rate and the MRP from historically observed data.

Gregory suggested these approaches to address what he considered were errors in the AER's approach. He compared the AER's approach to those used by UK regulators and found the AER is in error in the assessment of the cost of equity capital for the Victorian Gas Businesses. Gregory considered this is a result of the AER inconsistently applying its approach to estimate the MRP and risk free rate. He suggests that in doing so the AER has combined two different measures of the risk free rate in the CAPM.

The AER considers its approach in estimating the cost of equity is internally consistent as discussed in section B.3.1 below. It estimates a forward looking 10 year risk free rate and MRP, although different methods are used due to the different nature of these parameters.

The cost of equity is inherently unobservable.<sup>53</sup> The AER examined the theoretical and empirical evidence and concluded the evidence does not support a relatively stable cost of equity as discussed in section B.3.1. In the absence of evidence to support a relatively stable cost of equity in the Australian context, the AER is not persuaded that it is appropriate to adopt Gregory's preferred approaches.

### B.2.8 Wright's recommended cost of equity approach (assumed constant cost of equity approach)

Wright considered both the cost of equity and the MRP are inherently unobservable. However he believed regulators have to commit themselves to a particular set of assumptions about these unobservable magnitudes. Two strategies he considered are that regulators can either assume the real market return is stable or the MRP is stable. He suggested regulators should work on the core assumption that the real cost of equity is relatively stable, consistent with Mason, Miles and Wright (2003). As a direct implication of this assumption, the implied MRP must move point by point in the opposite direction of the risk free rate.<sup>54</sup>

Wright suggested the current AER methodology introduces instability into the assumed figure for the real cost of equity. The preferred approach should assume a constant real market cost of equity as adopted by UK regulators. However, if the AER continues to assume a constant MRP, a possible compromise approach would be to combine this with a historical average risk-free rate.<sup>55</sup>

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<sup>51</sup> A. Gregory, *The AER approach to establishing the cost of equity – Analysis of the method used to establish the risk free rate and the market risk premium*, November 2012, pp.4-7. (Gregory, *The AER approach*, November 2012)

<sup>52</sup> Gregory, *The AER approach* November 2012, p.3.

<sup>53</sup> See, for example, S. Wright, *Review of risk free rate and cost of equity estimates: A comparison of UK approaches with the AER*, October 2012, p.2. (Wright, *Review of risk free rate and cost of equity estimates*, October 2012)

<sup>54</sup> Wright, *Review of risk free rate and cost of equity estimates*, October 2012, p. 2.

<sup>55</sup> Wright, *Review of risk free rate and cost of equity estimates*, October 2012, p. 3.

Applying Wright's approach to Australian data, Lally found the estimated MRP series is more stable than the average real market return series.<sup>56</sup> Therefore, the evidence does not currently support Wright's preferred approach. This is discussed in detail in sections B.3.2 and B.3.3. Further, Lally noted Wright in principle agrees with the present value principle and the use of Sharpe-Lintner CAPM.<sup>57</sup>

### B.2.9 VAA's recommended MRP approach (implied volatility glide path approach)

The AER also considers Value Adviser Associates' (VAA's) implied volatility "glide path" approach. APA GasNet did not propose this approach in this review. However, in previous reviews, APA GasNet and other regulated businesses have proposed the AER should have regard to this approach.<sup>58</sup> The VAA approach has been put forward:<sup>59</sup>

- by the Victorian electricity distribution network service providers (noting the which overlap in ownership between these businesses and with the Victorian gas networks) in their 2010 regulatory determination,<sup>60</sup> as well as the 2011 Advanced Metering Infrastructure determination<sup>61</sup>
- by Envestra in the South Australia and Queensland gas access arrangements in 2011.<sup>62</sup>

The AER notes NBN Co. submitted a VAA report for its Special Access Undertaking in September 2012. In this report, VAA suggested it is appropriate to derive a cost of equity by combining a prevailing 10 year risk free rate with a 7 per cent MRP, derived from the implied volatility glide path approach in the CAPM.<sup>63</sup> In the attachment, the AER applied VAA's approach directly to the current volatility data and estimated a current one year MRP of 5.8 per cent. Further, if VAA's approach is corrected for the AER's concerns discussed in the attachment, it produces a current one year MRP of 3.7 per cent.

VAA's approach in estimating the risk free rate coincides with the AER's current approach. The AER considers using a prevailing 10 year CGS rate is reasonable for the reasons discussed in the attachment. It does not consider VAA's implied volatility glide path approach<sup>64</sup> produces an appropriate estimate of the forward looking 10 year MRP as discussed in attachment 5.3.3. However, even if weight were to be given to this approach, it would currently support an MRP estimate below 6 per cent.

<sup>56</sup> Lally found the standard deviation of average real market returns is 1.5 per cent. The standard deviation for the average real government bond yield is 1.4 per cent. For the estimate MRP time series, it is 0.9 per cent. These standard deviations imply the average real market return is considerably more volatile than that for the estimated MRP.

<sup>57</sup> M. Lally, *The present value principle: risk, inflation and interpretation*, 4 March 2013, p.9. (Lally, *The present value principle*, March 2013)

<sup>58</sup> SP AusNet and Multinet, *Envestra draft decision market risk premium submission*, 2 May 2011, p.9

<sup>59</sup> In addition to those listed below, the VAA approach has also been put forward by ETSA (SA electricity transmission) in June 2009, Westnet Energy (WA gas distribution) in December 2009 before the ERA, in a published journal article, and by NBN Co (national telecommunications) in December 2011 before the ACCC. VAA, *Market risk premium: An estimate for 2010 to 2015: Prepared for ETSA*, June 2009; VAA, *Market risk premium: Estimate for January 2010 – June 2014: Prepared for WestNet Energy*, December 2009; S. Bishop, M. Fitzsimmons, and B. Officer, *JASSA The Finsia Journal of Applied Finance*, 'Adjusting the market risk premium to reflect the global financial crisis', May 2011 (Issue 1 2011), pp. 8–14 (Bishop, Fitzsimmons and Officer (2011)); and VAA, *Report on WACC component of NBN Co's Special Access undertaking*, December 2011.

<sup>60</sup> VAA, *Market Risk Premium: Estimate for 2011–2015: Draft*, October 2009; and VAA, *MRP for Vic electricity DNSPs*, July 2010. Note that although labelled as 'draft', the October 2009 report was submitted by the service provider as a finalised report.

<sup>61</sup> VAA, *Market Risk Premium, An update prepared in response to the draft determination by the AER on the Victorian Advanced Metering Infrastructure Review: 2012–15 budget and charges applications*, August 2011.

<sup>62</sup> VAA, *Comments on the Market Risk Premium in Draft Decision by AER for Envestra February 2011*, March 2011 (VAA, MRP for Envestra, March 2011).

<sup>63</sup> VAA, *Report on WACC component of NBN Co's Special Access Undertaking*, September 2012, p.19

<sup>64</sup> The detail of the implied volatility approach is discussed in attachment 5.3.3.



### B.2.10 SFG's recommended MRP approach (three conditioning variable based approach)

In the draft decision, the AER considered the use of other financial market indicators put forward in recent SFG reports. SFG used three financial market indicators as 'conditioning variables' to adjust the MRP estimate around its long run average of 6 per cent.<sup>65</sup>

- Implied volatility—Implied volatility relies on contentious assumptions to derive an MRP estimate.<sup>66</sup> In particular, the AER does not agree with the assumption that the price of risk per unit of implied volatility is constant on theoretical and empirical grounds.<sup>67</sup> This method provides only a short term estimate of the MRP (usually three months, matching the term of the implied volatility measure). Further, the AER is unaware of any settled method to extrapolate to a longer term. Given the relevant MRP is the 10 year forward looking rate, the AER placed limited weight on the MRP estimate derived on this basis.
- Credit spreads—Credit spreads in this context refer to the difference in yields between bonds with high (AAA rated) and low (BBB rated) credit ratings. Similarly, relative credit spreads will differ based on the method chosen to measure the bond yields. McKenzie and Partington noted there is no well developed, reliable or precise way to separate out the effect of changes in the MRP from other effects.<sup>68</sup> Given this key limitation to the credit spread analysis, the AER placed limited weight on this method when determining the 10 year forward looking MRP.
- Dividend yields—Dividend yields in this context is calculated for the entire market, using forecast distributions (dividends) for all firms in a broad share market index divided by the total value of those shares. The dividend yield estimate will differ based on the choice of index, the method of obtaining and aggregating dividend forecasts, and the horizon of those dividend forecasts. The AER considers the key limitation is the unclear relationship (if any) between dividend yield and the 10 year forward looking MRP.<sup>69</sup>

In the revised proposal, SFG agreed with the AER that the literature has not reached the state where there is a consensus about the precise mathematical relationship between each financial indicator variable and the MRP.<sup>70</sup> However, SFG again pointed to indicators such as regulatory risk premiums on debt, ASX dividend yields and ASX price/earnings ratios in support of a higher required return on equity.<sup>71</sup>

SFG's implied volatility indicator is similar to VAA's implied volatility glide path approach discussed above. The AER notes SFG did not present implied volatility data in this most recent report, however, it did present data on the other market indicators. While the AER does not consider implied volatility can provide an appropriate indicator for the forward looking 10 year MRP, it would currently support an MRP estimate below 6 per cent. SFG does not explain why it no longer gives weight to this approach. Attachment section 5.3.3 considers implied volatility analysis in more detail.

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<sup>65</sup> SFG, Market risk premium: *An updated assessment and the derivation of conditional and unconditional estimates: Report for the Victorian electricity distribution businesses*, 20 February 2012, pp. 8–13, 26–30 (SFG, *Conditional and unconditional MRP for the Vic DNSPs*, February 2012).

<sup>66</sup> Further, the appropriate measure of implied volatility is difficult to determine, with different measures (based on different underlying options) producing conflicting figures.

<sup>67</sup> See discussions in AER, *Draft decision: Envestra Ltd: Access arrangement proposal for the SA gas network 2011–2016*, 17 February 2011, pp. 282–283 (AER, *Draft decision: Envestra access arrangement SA*, February 2011).

<sup>68</sup> McKenzie, and Partington, *Equity market risk premium*, 21 December 2011, pp. 30–31.

<sup>69</sup> The AER considered these matter further in section B.2.6 of the draft decision.

<sup>70</sup> SFG, *The required return on equity*, November 2012, p.39.

<sup>71</sup> SFG, *The required return on equity*, November 2012, pp. 42–44.

Price/earnings ratio analysis is in many ways similar to the dividend yield analysis. The fundamental driver is the relationship between the current share price and cash flows—either at the firm level (earnings) or to shareholders (dividends). The AER does not separately discuss price earnings ratio. Section B.6.4 and B.5.3 discuss dividend yield and credit spreads in more detail.

## B.3 Cost of equity issues

There is a general consensus that the cost of equity is not directly observable and therefore a model is required in order to estimate it. The gas distribution businesses acknowledged this fact.<sup>72</sup> This position is similarly acknowledged by Wright<sup>73</sup> and Ernst and Young.<sup>74</sup>

The AER and the Tribunal agree that the Sharpe Lintner CAPM is a well accepted financial model and is appropriate to use in order to estimate the cost of equity. Implicitly, APA GasNet must also consider that the Sharpe Lintner CAPM is a well accepted financial model because it proposed the model, and a requirement of the NGR is that a well accepted financial model must be used.<sup>75</sup> The AER therefore estimates the cost of equity by combining reasonable estimates of each parameter within the CAPM.

The AER determines the cost of equity ( $r_e$ ) using the CAPM formula:

$$r_e = r_f + \beta_e \times MRP$$

where the AER and APA GasNet agree the equity beta estimate ( $\beta_e$ ) is 0.8.<sup>76</sup>

The cost of equity is the key area of disagreement between the AER and APA GasNet.

In this section the AER considers a number of issues that are relevant to the cost of equity as a whole, namely:

- The consistency of the approach
- Is the cost of equity is relatively stable over time?
- Is there is a negative relationship between risk free rate and MRP?
- Flight to quality periods
- State government bond yields
- The appropriate term of the risk free rate and the MRP
- Ernst and Young's analysis of market evidence
- RBA advice.

The AER discusses each of these issues below.

<sup>72</sup> SP AusNet, *Revised Access Arrangement Proposal: Chapter 5 – Rate of return and corporate tax allowance*, 9 November 2012, p. 24; Multinet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 153; Envestra, *Revised Access Arrangement Information, Attachment 9.11 Response to Draft Decision – Rate of return*, 9 November 2012, section 5.2.

<sup>73</sup> Wright, *Review of risk free rate and cost of equity estimates*, October 2012, p.2.

<sup>74</sup> Ernst & Young, *Market evidence on the cost of equity: Victorian gas access arrangement review 2013-2017*, 8 November 2012, p. 7. (Ernst & Young, *Market evidence on the cost of equity*, November 2012)

<sup>75</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 42.

<sup>76</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 35.



### B.3.1 The consistency of the approach to the cost of equity

In attachment section 5.3.2, the AER briefly discusses the importance of consistency with the present value principle and building block model. This section explores these concepts in more detail and also considers other aspects of consistency.

#### Consistency with present value principle

The present value principle is a fundamental principle underlying the building block model and the application of the CAPM.

Lally defines the present value principle in this manner:

The Present Value principle states that the present value of a regulated firm's revenue stream should match the present value of its expenditure stream plus or minus any efficiency incentive rewards or penalties...the Present Value principle applies equally to risk free and risky situations and, in the latter case, requires both a risk free rate and a risk premium that are defined over the regulatory period and based upon conditions prevailing at the start of that period.<sup>77</sup>

In the present context, the present value principle requires that the cost of equity that should apply in the building block model is the cost of equity that is prevailing at the commencement of the access arrangement period and reflects the length of the period.

The AER makes two departures from strict compliance with the present value principle as defined as:

- a short averaging period as close as practically possible to the commencement of the access arrangement period is applied
- a 10 year term is applied.

These departures do not justify the application of a long term average risk free rate. Elsewhere in this appendix the AER discusses the averaging period and the term of the cost of equity.<sup>78</sup>

For this decision, the AER estimates:

- a 10 year forward looking risk free rate
- a 10 year forward looking MRP
- taking into account the economic interdependencies between these parameters
- based on expectations prevailing at the commencement of the access arrangement period.

Accordingly, the AER estimates the prevailing 10 year cost of equity as close as practicably possible to the commencement of the access arrangement period. This cost of equity is, to the extent possible, consistent with the present value principle, the building block model and the CAPM. The AER has formed its estimate using a prevailing estimate of the risk free rate, a prevailing estimate of the MRP and a prevailing estimate of the equity beta. The AER has also considered a possible relationship between the risk free rate and the MRP and whether the cost of equity is stable through time.

The AER also applied the present value principle in forming its estimate of the cost of equity in the draft decision.<sup>79</sup> In its revised proposal, APA GasNet submits material that suggests the AER's

<sup>77</sup> Lally, *The present value principle*, March 2013, pp. 5-6.

<sup>78</sup> See sections 11.1B.4.2 and 11.1B.3.5.

reliance on the present value principle is in error. Advice from Professor Wright, Professor Gregory and CEG provides this suggestion.<sup>80</sup>

Prior to the draft decision, Associate Professor Lally provided advice on the present value principle. That advice focussed on the risk free rate as this was the focus of the AER's questions to him, based on the material submitted by the businesses.<sup>81</sup>

APA GasNet's consultants submit that Lally's advice was too simplistic and did not take into account the effect of risk and inflation.<sup>82</sup>

In response to the advice from Professors Wright and Gregory, and CEG, Lally states:

...in respect of the implications of risk for the Present Value principle, the principle applies equally to risk free and risky situations. In the former case, the risk free rate is defined over the regulatory period and based upon conditions prevailing at the start of that period. In the latter case, both the risk free rate and the risk premium are defined over the regulatory period and based upon conditions prevailing at the start of that period.<sup>83</sup>

Lally concludes that Wright agrees with the present value principle.<sup>84</sup> The central issue from Professor Wright's advice appears to not be with the present value principle itself, but with the preferred application of the CAPM to satisfy that principle.

CEG makes an additional suggestion about the application of the present value principle through time. It suggests that there are two alternative versions of the principle.<sup>85</sup> Lally also identifies this proposal and suggests:

I agree that these two versions of the present Value principle exist, with the first version merely being that one used by a regulator to operationalise the second version.<sup>86</sup>

See section 5.3 of that report for further discussion of this proposal.

## Consistency with the building block model

The NGR prescribe the use of the building block model when the AER is calculating the total revenue allowance.<sup>87</sup> The building block model has a long history in regulation in Australia.<sup>88</sup>

An important principle of the building block model is the present value principle. In a 2011 paper on public utility regulation in Australia, Dr Darryl Biggar explained the origins of the building block model and its goals.<sup>89</sup>

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<sup>79</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Attachments, pp. 82-83.

<sup>80</sup> A. Gregory, *The risk free rate and the present value principle*, 5 November 2012; S. Wright, *Response to Professor Lally's analysis*, 2 November 2012; CEG, *Response to the AER Vic gas draft decisions*, November 2012, pp. 47-51.

<sup>81</sup> M. Lally, *The risk free rate and the present value principle*, 22 August 2012, p. 3.

<sup>82</sup> S. Wright, *Response to Professor Lally's analysis*, 2 November 2012, p. 2; Note that Lally considers also the material on the present value principle submitted by APA GasNet in his report: Lally, *The present value principle*, March 2013

<sup>83</sup> Lally, *The present value principle*, March 2013, p. 16.

<sup>84</sup> Lally, *The present value principle*, March 2013, pp. 16-17.

<sup>85</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 49.

<sup>86</sup> Lally, *The present value principle*, March 2013, p. 13.

<sup>87</sup> NGR r. 76

<sup>88</sup> Biggar, D., *Public utility regulation in Australia: Where have we got to? Where should we be going*, Working paper no. 4, ACCC/AER working paper series, July 2011.

<sup>89</sup> Biggar, D., *Public utility regulation in Australia: Where have we got to? Where should we be going*, Working paper no. 4, ACCC/AER working paper series, July 2011, p. 58. A similar description of the building block model supported by more detailed analysis can be found in Biggar, D., *Incentive regulation and the building block model*, 28 May 2004, pp. 2-21,

Lally states:

...the Building Block model requires use of the risk free rate at the beginning of the regulatory period and therefore the rate should be averaged over a short period as close as practical to the start of the regulatory period. Rates averaged over a much longer historical period would be inconsistent with the Building Block model.<sup>90</sup>

As this decision is consistent with the present value principle, it is also consistent with the building block model.<sup>91</sup>

### Consistency with the Capital Asset Pricing Model (CAPM)

The AER has applied the CAPM consistently. APA GasNet proposed the Sharpe-Lintner CAPM be applied for this decision.<sup>92</sup> The AER accepts that proposal. The AER has also ensured that there is consistency within the CAPM.

The Sharpe-Lintner CAPM is described by the following equation:

$$(1) E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

Where:  $E(R_i)$  is the return on the investment

$R_f$  is the risk free rate

$\beta$  is the equity beta

$E(R_m)$  is the expected market return

The term in the [ ] brackets can also be simplified to:

$$(2) MRP = E(R_m) - R_f$$

Therefore, the Sharpe-Lintner CAPM can be simplified to:

$$(3) E(R_i) = R_f + \beta_i MRP$$

APA GasNet, CEG, Professor Gregory, Professor Wright, SFG and NERA all submit that the AER has inconsistently applied the CAPM by combining a long term average MRP with a spot risk free rate.<sup>93</sup>

The AER disagrees with this characterisation. It relies on a misunderstanding of how the AER determines the MRP. As discussed in attachment 5, the AER does not simply employ a long term average MRP. Conceptually, the AER estimates a 10 year forward looking cost of equity. To do so, the AER determines an estimate of the 10 year forward looking risk free rate and 10 year forward looking MRP.

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accessed on 27 August 2012, <[http://editorialexpress.com/cgi-bin/conference/download.cgi?db\\_name=ACE2004&paper\\_id=133](http://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=ACE2004&paper_id=133)>.

<sup>90</sup> Lally, *The risk free rate and the present value principle*, August 2012, p. 8.

<sup>91</sup> Lally, *The risk free rate and the present value principle*, August 2012, p. 8.

<sup>92</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 36.

<sup>93</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 36; Gregory, *The AER approach*, November 2012, p. 3; Wright, *Review of risk free rate and cost of equity estimates*, October 2012, p. 2; SFG, *The required return on equity*, November 2012, p. 2; NERA, *Estimating the Cost of Equity under the CAPM*, November 2012, p. 5.

For clarity, the AER's application of the CAPM can also be expressed mathematically (Lally discusses this equation in more detail<sup>94</sup>):

$$E(R_j) = R_{f0}^{10} + [E(R_{m0}^{10}) - R_{f0}^{10}] \beta_j$$

Perhaps unsurprisingly as the cost of equity is unobservable, experts disagree on the best method of estimating the expected return on the market ( $E(R_m)$ ). As the MRP is unobservable, experts also disagree on the best method of estimating the MRP. Neither of these points makes the AER's approach inconsistent with the CAPM.

McKenzie and Partington also suggest that the consistency argued for by APA GasNet and its consultants misses the point of the exercise:

The argument of the consultants that the AER approach mixes current and historic estimates of the risk-free rate in the CAPM and the consultants' insistency that whatever is used as the estimate of the current risk free rate should also be used to estimate the market risk premium, rather misses the point. What matters is getting the best estimate of the current risk free rate and the best estimate of the current market risk premium. Using the same estimate of the risk free rate for both provides no assurance whatsoever that the best estimates will be obtained. Such 'consistency' may simply result in giving consistently the wrong estimate.<sup>95</sup>

CEPA concludes the AER's estimate is consistent as the AER calculates the risk free rate and the MRP over the same timeframe.<sup>96</sup> CEPA also suggests the central question for consistency in the CAPM is whether there is a relationship between the risk free rate and MRP.<sup>97</sup>

Lally also concludes, the present value principle informs the application of the CAPM:

...if the regulatory period were five years, the appropriate values for  $R_f$  and  $E(R_m)$  would be the five year rates prevailing at the commencement of the regulatory period and  $\beta_j$  should be defined with respect to the probability distributions for the  $R_j$  and  $R_m$  over the five year period.<sup>98</sup>

Lally finds that a long term average risk free rate is not consistent with the CAPM.<sup>99</sup> He does, however, consider that a long term average estimate of the expected return on the market would be consistent with the CAPM when applied with a prevailing estimate of the risk free rate.<sup>100</sup>

Furthermore, Gregory suggests that the Sharpe Lintner CAPM is a single period model and is therefore incompatible with the multi-period regulatory application.<sup>101</sup> Lally has advised the AER that the Sharpe Lintner CAPM is a single period model and therefore not necessarily consistent with the multi-period regulatory application. However, he also advised:

...this is merely one of many features of the model that simplify reality and recourse to models with more realistic assumptions generally incurs greater difficulties in estimating parameters, thereby requiring a judgment over the trade-off. The AER's preference for a one-period version of the model is universal amongst regulators, overwhelmingly typical of submissions to them, and consistent with most other applications of the CAPM, presumably in recognition of this trade-off.<sup>102</sup>

<sup>94</sup> See, Lally, *Review of the AER's methodology*, March 2013, p. 24.

<sup>95</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 31.

<sup>96</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 7.

<sup>97</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, pp. 6-10

<sup>98</sup> Lally, *The present value principle*, March 2013, p.6.  $R_f$  represents the risk free rate.  $R_m$  represents the expected return on the market.  $R_i$  represents the expected return on the investment.

<sup>99</sup> Lally, *The present value principle*, March 2013, pp. 7-8.

<sup>100</sup> Lally, *The present value principle*, March 2013, p. 10.

<sup>101</sup> A. Gregory, *The risk free rate and the present value principle*, 5 November 2012, p. 5.

<sup>102</sup> Lally, *The present value principle*, March 2013, p. 16.

In any case, APA GasNet has proposed the Sharpe Lintner CAPM in this decision, and the AER agrees with the use of this model.<sup>103</sup>

## Internal consistency

As well as being consistent with the CAPM, the AER applies an approach that employs consistent definitions and logic throughout.

CEG states:

The AER uses the same terminology to mean different things at different places in its decision and logic. Specifically, the AER uses the same terminology to mean different things when applied to the risk free rate and when applied to the MRP.<sup>104</sup>

A misunderstanding of the AER's MRP estimate appears to underlie this suggestion. The AER estimates a 10 year forward looking cost of equity using an estimate of the 10 year forward looking MRP. Lally suggests:

CEG's unwarranted belief that there is an inconsistency may arise because the ten-year risk free rate prevailing at the present time is observable, and therefore requires no comment upon its composition, whilst the ten-year MRP prevailing at the present time is not observable, thereby leading the AER to comment upon its components (which include the annual MRPs expected to prevail in each of the next ten years).<sup>105</sup>

CEG's suggestion may also stem from its consideration that prevailing equity prices can provide a reliable estimate of the prevailing MRP—using DGM models for example.<sup>106</sup> If this were the case, it would be appropriate to use these estimates ahead of others. Equity market prices likely reflect market conditions in the same manner as the market for CGS.<sup>107</sup>

However, the AER does not agree with CEG's view. As discussed in section B.6 below, the AER does not consider DGM estimates to be sufficiently reliable indicators of prevailing MRP estimates. As a result, the AER estimates a prevailing MRP based on a number of different methods, including historical averages.

CEG also states:

The AER also, unsurprisingly given the inconsistency in definitions, adopts inconsistent supporting logic for its definitions. The AER decision employs logic:

- in support of why short run fluctuations in the spot rate for the 10 year CGS must be fully reflected in the risk free rate estimate in the form of recourse to the 'present value principle'; but does not apply the same logic to the determination of the MRP;
- in support of why short term fluctuations in equity market conditions should not be reflected in its long-term cost of equity estimate; but does not apply the same logic to the determination of the risk free rate.<sup>108</sup>

The AER considers that the approach in this decision is consistent with the present value principle. The 'short run fluctuations' that are reflected in the prevailing risk free rate reflect changes in market

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<sup>103</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 36. For further consideration see: Lally, *The present value principle*, March 2013, p. 16; A. Gregory, *The risk free rate and the present value principle*, 5 November 2012, p. 5.

<sup>104</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 6.

<sup>105</sup> Lally, *Review of the AER's methodology*, March 2013, p. 23.

<sup>106</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 8.

<sup>107</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 8.

<sup>108</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 10.

conditions and market prices. If a reliable estimate of the MRP could be generated from market prices it would be reasonable to use this estimate. However, no such estimate exists.<sup>109</sup>

In support of the second dot point, CEG points to evidence in other sections of its advice.<sup>110</sup> Elsewhere in this appendix the AER considers the evidence in CEG's report, and concludes that the approach used in this decision is appropriate. Also, there is insufficient evidence to conclude there are superior alternatives.<sup>111</sup>

CEG also suggests that a period of flight to quality at the time of the APTPPL averaging period provides the clearest example that the AER's approach is inconsistent.<sup>112</sup> The AER considers flight to quality periods below.

### Consistency in flight to quality periods

This section considers the evidence presented to support the suggestion flight to quality periods are increasing the MRP. This suggestion is not well supported and does not provide a sufficient basis to justify departing from the current approach. CEG and SFG have raised concerns that 'flight to quality' periods make the AER's approach for determining the cost of equity unreasonable.<sup>113</sup>

The AER does not consider it has applied the cost of equity in an inconsistent manner by failing to consider flight to quality periods.<sup>114</sup>

Little evidence has been presented supporting the suggestion that flight to quality periods make the AER's approach unreasonable. CEG has not provided a definition of flight to quality periods, nor identified academic literature that does so. In the draft decision the AER attempted to identify a possible definition from academic literature.<sup>115</sup> CEG has not responded to this definition, nor provided its own in response.

The following statement offers an understanding of CEG's position:

...there will be times when market conditions are such that very low spot CGS yields are associated with a normal (or even heightened) spot cost of equity for the market—such that the spot MRP is heightened relative to normal.<sup>116</sup>

It appears CEG suggests there is a negative relationship between the risk free rate and the MRP during flight to quality periods. CEG concludes that such periods make the AER's approach unreasonable:

...if even a very brief flight to quality occurs during a business's averaging period then CGS yields will be pushed down even though the cost of equity (neither spot nor long term forecast) is not similarly pushed down.<sup>117</sup>

On the other hand, SFG states:

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<sup>109</sup> Lally, *Cost of equity and the MRP*, 25 July 2012, pp. 15–18. See appendix B.5 and B.6 for more detail.

<sup>110</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 10.

<sup>111</sup> See attachment 5.3.3 and appendix B.5 for more discussion.

<sup>112</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 10.

<sup>113</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 12; SFG, *The required return on equity*, November 2012, p. 56.

<sup>114</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 14.

<sup>115</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, p. 4.

<sup>116</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 12.

<sup>117</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 14.

...it is well-known, and generally accepted by finance academics and financial market professionals, that periods of historically low government bond yields are caused by a phenomenon known as "flight to quality".<sup>118</sup>

The AER is unable to verify this statement as SFG provides no evidence to support it. Lally also notes this point.<sup>119</sup>

The suggestion APA GasNet, CEG and SFG put forward is also not well supported with evidence. CEG identifies a number of sources of information it suggests may provide evidence of flight to quality periods.<sup>120</sup> These include various debt spreads and dividend yields.<sup>121</sup> Sections B.5.3 and B.6.4 consider the explanatory power of these sources of evidence. The evidence presented is anecdotal and inconclusive.

In any case, it may be true that during flight to quality periods the risk free rate and the MRP falls. It may also be true that this provides some explanation for bond yields that are low by historical comparison. This would not make the AER's approach inconsistent.

Flight to quality periods do not make CGS an inappropriate proxy for the risk free rate; CEG acknowledges this.<sup>122</sup> During such periods the MRP may increase. However, the AER has considered the available evidence on the MRP and concludes that 6 per cent is the best estimate of the 10 year forward looking MRP at this time. The flight to quality theory is one of a number of competing theories about the MRP, some of which suggest there may be a positive relationship.

As the evidence CEG and SFG have presented is anecdotal and inconclusive, it is not sufficient to justify an adjustment to the MRP.

Further, in the draft decision the AER identified a statement by RBA Governor Glenn Stevens that suggested a flight to quality had occurred in the middle of 2012.<sup>123</sup> The AER then identified advice provided by the RBA at around the same time that concluded that CGS yields remained the best proxy for the risk free rate.<sup>124</sup>

As the RBA simultaneously supported the use of CGS yields as a proxy for the risk free rate, the AER's cost of equity could only have been found unreasonable if:

- the MRP was inappropriate
- the AER had not considered any relationship between the risk free rate and the MRP.

In the APTPPL decision the AER considered the evidence before it and concluded an MRP of 6 per cent was appropriate.<sup>125</sup> The AER also considered the possibility of a relationship between the risk

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<sup>118</sup> SFG, *The required return on equity*, November 2012, p. 56

<sup>119</sup> Lally, *Review of the AER's methodology*, February 2013, pp.16-17.

<sup>120</sup> CEG, *Update to March 2012 Report*, November 2012, p. 11-18.

<sup>121</sup> CEG, *Update to March 2012 Report*, November 2012, p. 11-18.

<sup>122</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 14.

<sup>123</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, p. 4.

<sup>124</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, pp. 4-5.

<sup>125</sup> AER, *Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline 2012-13 to 2016-17*, August 2012, p. 21.



free rate and the MRP.<sup>126</sup> There was insufficient evidence of a relationship to suggest the MRP was inappropriate or justify a change of approach.<sup>127</sup>

In this decision the AER has likewise considered the most appropriate estimate of the MRP. The AER has also considered the possibility of a relationship between the risk free rate and the MRP. As was the case in the APTPPL final decision, there is insufficient evidence of a strong relationship to suggest the MRP is inappropriate or justify a change of approach.<sup>128</sup>

### B.3.2 Is the cost of equity stable?

In this section, the AER considers whether the cost of equity is relatively stable over time. In the next section, it considers the evidence on whether there is a negative relationship between the risk free rate and the MRP. APA GasNet referred to the UK consultants report in the revised proposal that suggested the cost of equity is relatively stable over time. Therefore, there is a negative relationship between the risk free rate and the MRP.<sup>129</sup>

The UK consultants engaged by APA GasNet suggested the real cost of equity is relatively stable over time<sup>130</sup>. In addition, CEG and NERA suggested the market cost of equity is more stable than the MRP based upon US regulatory decisions on the cost of equity.<sup>131</sup> The AER commissioned Associate Professor Lally to consider the evidence these consultants presented.

CEPA considered Siegel's research, Gregory and Wright's reports submitted by APA GasNet in the revised proposal and Lally's July 2012 advice to the AER. CEPA found evidence in favour of a stable real long run cost of equity based on:<sup>132</sup>

- Siegel (1998) and Smithers and Co (2003) analysis on US returns data,
- Gregory and Wright's conclusions, and
- Competition Commission's proposition that market returns have a lower volatility than the MRP.

Based on this assumption, CEPA's general approach to the cost of capital is to "utilise long-term estimates for these components based on market evidence". However, it noted:<sup>133</sup>

... this approach would need to be tested with Australian data to ensure that this approach would be fit-for-purpose in AER's context.

The AER has considered all of the consultants' views. The evidence has not persuaded the AER that the cost of equity is relatively stable, for the reason discussed below. Lally notes that if Australian data is used (instead of US data as used by Wright), the conclusions from Wright's analysis are reversed. This suggests the MRP is relatively more stable than the cost of equity.

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<sup>126</sup> AER, Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline 2012–13 to 2016–17, August 2012, p. 23.

<sup>127</sup> AER, Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline 2012–13 to 2016–17, August 2012, p. 23.

<sup>128</sup> See attachment 5.3.3, sections 11.1B.3.3 and B.5.

<sup>129</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 68

<sup>130</sup> Gregory, *The AER approach*, November 2012, pp. 4-7; Wright, *Review of risk free rate and cost of equity estimates*, October 2012, p.12; S. Wright, *Response to Professor Lally's analysis*, 2 November 2012, pp.4-9.

<sup>131</sup> CEG, *Update to March 2012 Report*, November 2012, pp.26-27; NERA, *Estimating the Cost of Equity under the CAPM*, November 2012, pp.26-29.

<sup>132</sup> CEPA, *Advice on estimation of the risk free rate and market risk premium*, March 2013, p.24.

<sup>133</sup> CEPA, *Advice on estimation of the risk free rate and market risk premium*, March 2013, p.24.



Associate Professor Lally noted Wright's view on a relatively stable cost of equity is influenced by the relatively stable time-series of rolling 30-year average market returns for the US from 1831. This evidence does not persuade Lally for the following reasons.<sup>134</sup>

- the concern here is with the cost of equity in Australia, accordingly Australian evidence would be more relevant than US evidence.
- the definition of the MRP used by the AER is the excess of the expected market return over the bond yield rather than the bond return. The time-series behaviours of the bond yield vs bond return series is quite different. For example, in the last few years, bond yields have been very low whilst Wright's figure shows bond returns in recent years to be extremely high.
- since Wright's point is that the expected market return is more stable over time than the MRP, he ought to have reviewed the time-series of MRP estimates.
- Wright refers only to the visual evidence in the figure included in his report. An appropriate statistical test would be the standard deviations for both the average market return series and the estimated MRP series.

When Lally applied Wright's approach using Australian data, he found the estimated MRP series is much more stable than the average real market return series.<sup>135</sup>

Gregory's submission supports a relatively more stable real market cost of equity. It reports the average real returns on equities and the estimated MRP for 19 markets over the period since 1900. Gregory estimated the standard deviation of the real estimated MRPs across these markets. He found it exceeds the standard deviation of the average real market returns (1.66 per cent versus 1.26 per cent). Lally identified two issues with Gregory's observation:<sup>136</sup>

- Firstly, Gregory's standard deviations relate to cross-country variation rather than time-series variation and are therefore not relevant. The comparison of cross-country variations on the estimated MRPs does not provide information on their relative stability over time.
- Secondly, the definition of the MRP used by Australian regulators and more generally is the excess of the expected market return over the bond yield. Instead Gregory has employed the bond return. The time-series behaviours of the two series are quite different.

The relevant section in Associate Professor Lally's report is section 2.

### **B.3.3 Is there a relationship between the risk free rate and MRP?**

APA GasNet submitted several consultant reports in support of a negative relationship between the risk free rate and the MRP, these include:

- CEG's AMP DGM chart
- Wright's indirect evidence
- SFG's argument that the risk free rate and the MRP must be negatively correlated

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<sup>134</sup> Lally, *Review of the AER's methodology*, March 2013, pp.12-13.

<sup>135</sup> Lally found the standard deviation of average real market returns is 1.5 per cent. The standard deviation for the average real government bond yield is 1.4 per cent. For the estimate MRP time series, it is 0.9 per cent. These standard deviations imply the average real market return is considerably more volatile than that for the estimated MRP.

<sup>136</sup> Lally, *Review of the AER's methodology*, March 2013, p.16.

The AER commissioned Associate Professor Lally, Professor McKenzie and Associate Professor Partington and CEPA to consider these submissions.

The AER considered three aspects of this issue: the theoretical argument, the academic research on this topic and the empirical evidence presented by APA GasNet and its consultants. McKenzie and Partington undertook a more comprehensive literature review than what was presented by APA GasNet's consultants. They found there is evidence that supports both views. As a result, the evidence is inconclusive. The evidence has not persuaded the AER that there is a strong negative relationship between the 10 year risk free rate and the 10 year MRP. Therefore it is not sufficiently well established to form the basis for any adjustment.

## Theoretical argument

SFG argued the risk free rate and the MRP must be negatively correlated because any reduction in the risk free rate arises from an increased desire for risk free assets. This change in preference for risk free assets must simultaneously raise the market cost of equity, thereby raising the MRP. Lally noted SFG presented no theoretical analysis that supports this claim. Furthermore, changes in risk free rates may arise from changes in monetary policy, the level of government deficits, the savings rate, or the availability of desirable investment projects in the private sector. None of these phenomena suggest that the MRP should change.<sup>137</sup>

CEPA noted the relationship between the risk free rate and the MRP is difficult to test empirically as the MRP is unobservable and any regressions would rely on developing a robust/consistent time series of investors' expectations. As such, the arguments presented by academics, regulators and companies have tended to be more indirect, and conclusions have therefore been presented in more uncertain terms. As a result, CEPA considered there is not enough evidence to justify making a firm conclusion about the relationship between the risk free rate and the MRP.<sup>138</sup>

Lally noted a negative relationship between the CGS rate and the MRP may be plausible. However the significant issue for regulatory purposes is the strength of this relationship and especially its strength in respect of the ten year risk free rate and the ten year MRP.<sup>139</sup> Ang and Bekaert (2007) only found a negative relationship between short term risk free rates and the equity risk premium. As discussed below, McKenzie and Partington noted such results indicate that predictive regressions might help forecast market returns at a one year horizon, but are little use at a ten year horizon.<sup>140</sup>

## Academic literature

APA GasNet's consultants submitted there is a negative relationship between the risk free rate and the MRP. However, McKenzie and Partington have performed a comprehensive literature review and found there is academic support for both a negative and a positive relationship. They conclude the relation between the MRP and the level of interest rates is an open question and this relation is not sufficiently well established to form the basis for a regulatory adjustment to the MRP<sup>141</sup>.

Among other findings, McKenzie and Partington noted when examining the 10 year CGS yield from the RBA website and the Australian market dividend yield for Datastream's proprietary country

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<sup>137</sup> Lally, *Review of the AER's methodology*, March 2013, pp.16-17.

<sup>138</sup> CEPA, *Advice on estimation of the risk free rate and market risk premium*, March 2013, p.25.

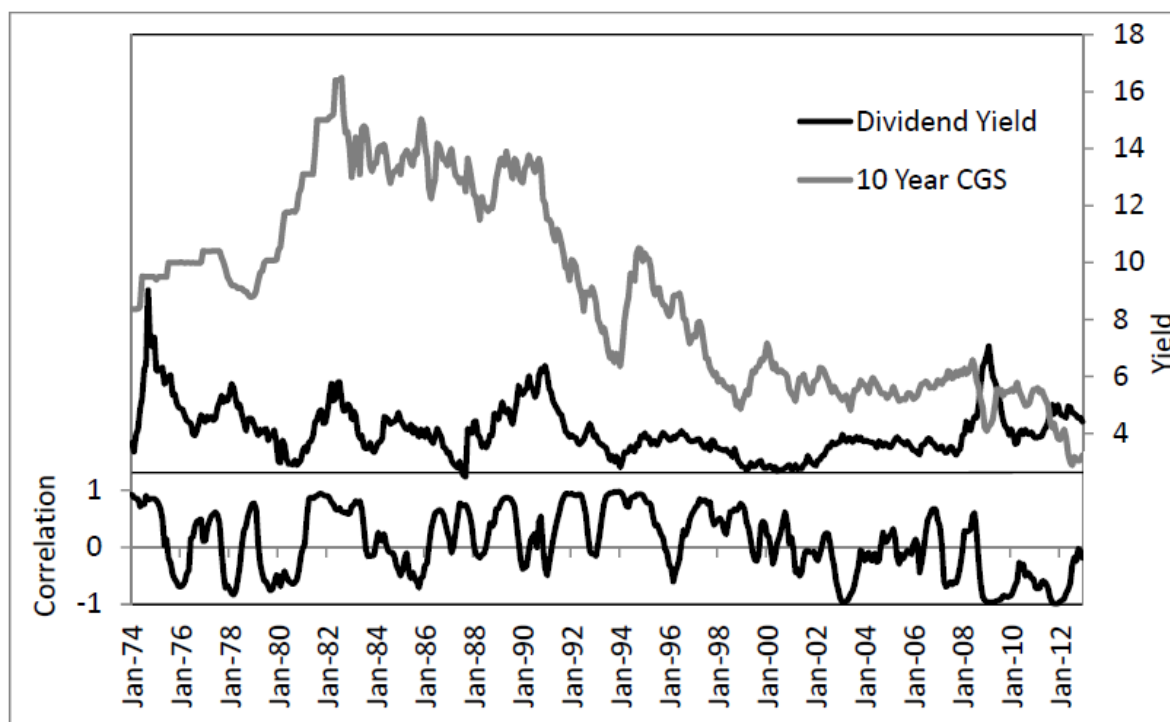
<sup>139</sup> Lally, *Cost of equity and the MRP*, July 2012, p. 7.

<sup>140</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p.26.

<sup>141</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, pp.5-6.

indices, McKenzie and Partington found the 12 month rolling correlation is positive for 55 per cent of the sample and negative for 45 per cent of the sample.<sup>142</sup> This is illustrated in Figure B.1 below.

**Figure B.1 Correlation between 10 year CGS yield and the Australian market dividend yield**



Source: McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p.24.

McKenzie and Partington found the literature in support of a negative relationship includes:

- Campbell and Cochrane (1999), Lettau and Ludvigson (2011), Li (2001), Bansal and Yaron (2004), Bhamra, Kuehn and Strebulaev (2010) all used consumption based models to show people become more risk averse in recessions, which leads to higher expected equity returns.
- Menzly, Santos and Veronesi (2004), Bekaert, Engstrom and Xing (2009), Guvenen (2009), Verdelhan (2010) and Jouini and Napp (2011) explicitly model time variation in the risk parameters and find evidence of counter-cyclical.
- Harvey (1989) and Li (2001) show the US equity risk premia are higher at business cycle troughs than at peaks.
- Ang and Bekaert (2007) find a negative relationship between short term risk free rates and the equity risk premium.
- Henkel, Martin Nardari (2011) estimate the market risk premium is higher during recessions across a range of countries.

McKenzie and Partington found the literature in support of a positive relationship includes:

<sup>142</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, pp.24-25.

- Li (2007) shows a counter-cyclical variation of risk aversion drives a pro-cyclical conditional risk premium.
- Kim and Lee (2008) find investors become more risk averse during boom periods.
- Damodoran (2012) finds there is a positive relationship between interest rates and equity risk premium.
- Amromin and Sharpe (2009) and Amromin and Sharpe (2012) find when investors believe macroeconomic conditions are more expansionary, they tend to expect both higher returns and lower volatility. The data they have used contains information about the revealed preference of actual investors, rather than the mathematical outcomes of a representative agent model, or broad based conclusion from studying aggregated return information.
- Greenwood and Shleifer (2013) find investor expectations are highly positively correlated with past stock returns and the level of the stock market.
- Graham and Harvey (2005) present evidence from surveying managers, which indicated there is a positive correlation between the expected equity risk premium and real interest rates. However, Graham and Harvey (2010) indicate this positive relationship gets weaker post GFC.

McKenzie and Partington also found there was some support in the literature for oscillating relationship (that is, the relationship is at times positive, and at other times negative). Specifically:

- De Paoli and Zabczyk (2009) shows the MRP can be either pro- or counter-cyclical and investors' assessment of future prospects is crucial in determining its behaviour.

McKenzie and Partington's review of the academic literature on the theoretical and empirical evidence on the relationship between the risk free rate and the MRP was more comprehensive than the review of the academic literature in any of the consultant reports submitted by APA GasNet. For this reason, the AER has relied on the conclusion of McKenzie and Partington's report over the conclusion from the reports submitted by APA GasNet.

The relevant section in McKenzie and Partington's report is section 1.3.2.

### **Empirical evidence presented by APA GasNet's consultants**

CEG updated its AMP DGM chart from its March 2012 report in support of a negative relationship between the CGS yield and the estimated MRP. Lally addressed the CEG chart in his report to the AER prior to the draft decision. CEG responded to Lally's criticisms in its November 2012 reports. Lally reviewed CEG's response in its March 2013 reports and he continues to hold the view that CEG's analysis is predisposed to producing such results. This is because it assumes that, at any point in time, the market cost of equity is the same for all future years. This perfect-offset assumption is neither plausible nor do CEG present any evidence in support of it.<sup>143</sup> More details of the CEG chart and the limitation of the DGM is discussed in section B.6.

Wright presented several pieces of indirect evidence in support of a negative relationship between the risk free rate and the MRP. His principal argument is that the risk free rate is pro-cyclical (lowest in depressed economic conditions and highest in favourable economic conditions), while the MRP is

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<sup>143</sup> Lally, *Review of the AER's methodology*, March 2013, pp. 8-12.

counter-cyclical (highest in depressed economic conditions and lowest in favourable economic conditions).

Lally noted the crucial question is not whether the correlation is negative but whether it is sufficiently negative. A negative correlation is not a sufficient condition for the real market cost of equity to be more stable than the MRP. Using the Australian data, Lally found the correlation coefficient between the risk free rate and the MRP needs to be at least -0.76 for the real market cost of equity to exhibit greater stability than the MRP. However, the actual correlation between the two in Australia was only -0.12. He also noted other indirect evidence presented by Wright similarly does not reveal the extent of the correlation. Therefore, it is not sufficient to support the argument that the real market cost of equity is more stable over time than the MRP.<sup>144</sup>

- The relevant section in Associate Professor Lally's report is section 2.

### B.3.4 State government bond yields

The AER has considered the spread between the State government bond yield and the 10 year CGS yield. The increasing spread does not persuade the AER that CGS is an inappropriate proxy for the risk free rate. The AER is also not persuaded by this evidence that the MRP is currently higher than it has been in the recent past.

CEG submitted there is an increasing spread between the prevailing 10 year CGS yield and state government bond yields.<sup>145</sup> However, this is not a unique situation. During the 2009 WACC review, CEG submitted that the fall in CGS yields in the latter half of 2008 coincided with a rise in the required cost of equity. CEG submitted that this outcome was consistent with two possible explanations:

- the yield on CGS is a poor proxy for the risk free rate used to estimate the cost of equity in the CAPM, or
- the yield on CGS is a good proxy for the risk free rate used in the CAPM but the MRP had recently moved in the opposite direction to the yield on CGS.

In support of the first possible explanation, CEG noted the divergence between the yields on CGS and other (zero beta) risk free assets.<sup>146</sup> It submitted this was evidence that CGS were no longer a true reflection of the risk free rate. CEG submitted that this divergence represented a 'convenience yield.' It reflected investors willingness to pay a premium for the 'non-beta' attributes of CGS, which CEG submitted included liquidity.<sup>147</sup>

As part of APA GasNet's revised proposal, CEG again noted widening spreads between State Government bond yields and CGS yields.<sup>148</sup> CEG again appears to consider that liquidity is a major driver of this difference. The AER agrees that CGS are more liquid than State Government bonds. However, the key issue is whether this has made CGS an inappropriate proxy for the risk free rate.

In the WACC review, the evidence did not persuade the AER that CGS were an inappropriate proxy for the risk free rate.<sup>149</sup> Advice from Associate Professor Handley supported this view.<sup>150</sup> While not directly responding to the AER's and Associate Professor Handley's argument from the WACC

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<sup>144</sup> Lally, *Review of the AER's methodology*, March 2013, pp.14-16.

<sup>145</sup> CEG, *Update to March 2012 Report*, November 2012, p. 13.

<sup>146</sup> State Government bonds and Commonwealth Government guaranteed bank debt

<sup>147</sup> AER, Final decision—WACC review, pp.134-136.

<sup>148</sup> CEG, *Update to March 2012 Report*, November 2012, pp.11-13.

<sup>149</sup> AER, Final decision—WACC review, pp.136-140.

<sup>150</sup> Handley, Comments on the CEG report "Establishing a proxy for the risk free rate", November 2008.

Review, it appears that CEG does not consider the greater liquidity of CGS affect its appropriateness as the risk free rate proxy. This is because CEG states in its latest report:

The AER goes on to address the issues that I raised and, in each case, the AER concludes that CGS is nonetheless the best proxy for the risk free rate. However, I did not argue otherwise...<sup>151</sup>

Also, without being conclusive, the higher yields on some State Government bonds may reflect the increased risk of those bonds. For example, the Queensland government lost its AAA rating in February 2009. Lally notes that the rise in the expected rate of return on state government debt might have been due entirely to increases in expected default losses and liquid premium relative to CGS yield. In this case, the MRP would not increase with the debt risk premium.<sup>152</sup>

The relevant section in Associate Professor Handley's report is section 2.1.

### B.3.5 Term of the risk free rate and MRP

In attachment section 5.3.2, the AER noted that there would be further discussion of the term of the cost of equity. This section contains that discussion.

The AER applies a 10 year term for the cost of equity in this decision. APA GasNet proposed the use of a 10 year term and the AER accepts a 10 year term is appropriate. However, the use of a 10 year term is a departure from strict compliance with the present value principle.<sup>153</sup> This section discusses the reasons for using a 10 year term.

The selection of an appropriate term is not straightforward. When determining the term of the risk free rate there are a number of considerations involved. It is important to consider consistency with the present value principle. The AER has also previously considered average debt maturities at time of issuance by regulated businesses.<sup>154</sup> Finally, a 10 year term ensures consistency in this decision between the cost of equity and the cost of debt, including in the calculation of the MRP and DRP. On balance, the AER considers using a 10 year term is appropriate for this decision.

The present value principle is a fundamental element when determining the term of the cost of equity. The AER notes that there are divergent schools of thought on the appropriate term to ensure consistency with the present value principle.

Associate Professor Lally suggests that the AER should use a term that is consistent with the regulatory period when estimating a risk free rate at the start of the period.<sup>155</sup> This suggests the AER should use a 5 year term.

Lally has also advised:

...the particular risk free rate should be the rate whose term matches the regulatory period and this is incompatible with the ten year bonds used by the AER. However, this second issue is much less important than the first issue because the choice of the current ten-year rather than the current five-year risk free rate raises the rate by only about 0.40% (from 2.86 to 3.26%) whilst the use of a historical average ten-year rate rather than the prevailing then-year rate raises it by about 2.60% (from 3.26% to 5.86%).<sup>156</sup>

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<sup>151</sup> CEG, *Response to the AER Vic gas draft decisions: Internal consistency of MRP and risk free rate*, November 2012, p. 14.

<sup>152</sup> Lally, *Cost of equity and the MRP*, July 2012, pp. 8-9.

<sup>153</sup> Lally, *Review of the AER's methodology*, March 2013, p. 33.

<sup>154</sup> AER, *Final Decision: WACC Review*, May 2009, p. 148-149.

<sup>155</sup> Lally, *Risk free rate and present value*, August 2012, p. 16.

<sup>156</sup> Lally, *Review of the AER's methodology*, March 2013, p. 28.



On the other hand, the AER notes that there are arguments in favour of using a longer term to more closely match the life of the assets.<sup>157</sup> Broadly, the argument suggests that regulated assets have long lives and corresponding cash flows. Therefore, the duration of the risk free rate should be as long as is practically possible.

In the WACC Review in 2009, the AER also considered arguments put forward by businesses that common practice was to use long dated financing to manage refinancing risk.<sup>158</sup> This formed an important consideration for the estimation of the DRP using a 10 year term.<sup>159</sup> In contrast, the ERA has recently analysed the average maturity of debt issued by regulated businesses and found this was approximately 5 years.<sup>160</sup> The AER applies a 10 year term for the cost of debt in this decision.

Consistency between the cost of equity and the cost of debt may also be important. This would mean that the MRP and DRP would need to be estimated consistently. In the recent DBNGP matter, the Tribunal supported the ERA's consideration that this consistency is important.<sup>161</sup> The Tribunal considered consistency with the calculation of the DRP to be most important.<sup>162</sup>

In summary, while there are arguments in favour of a shorter term, it is appropriate at this time to continue to use a 10 year term. The AER therefore accepts APA GasNet's proposal. The AER also notes that a 10 year term is likely to provide an estimate of the risk free rate that is above an estimate using a 5 year term. This is a result of the fact that a term premium is generally observed between bonds of different maturities.<sup>163</sup> That is, a bond with a 10 year maturity will generally carry a premium (higher yield) over a bond with a 5 year maturity.

### B.3.6 Ernst and Young's survey of takeover report discount rates

In the revised proposal, APA GasNet submitted a report from Ernst and Young (EY) surveying takeover valuation report discount rates.<sup>164</sup> APA GasNet suggested EY's analysis supported its view that the cost of equity provided by the AER in the draft decision is too low. The AER has considered EY's report, which indicated the prevailing cost of equity is 10.7 per cent. It commissioned CEPA to consider the market evidence presented by EY.

CEPA did not find the evidence presented by EY compelling. Further if anything, it considered the results are more supportive of a short term risk free rate and a 6 per cent MRP.<sup>165</sup> Its analysis of the EY information suggested:<sup>166</sup>

- the credibility of some reports is undermined by unexplained "swings" in estimates over short time horizons;

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<sup>157</sup> A. Damodaran, *What is the riskfree rate? A search for the Basic Building Block*, December 2008, p. 6-7.

<sup>158</sup> AER, *Final Decision: WACC Review*, May 2009, pp. 156-166.

<sup>159</sup> AER, *Final Decision: WACC Review*, May 2009, p. 168.

<sup>160</sup> ERA, *Final Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline, Submitted by DBNGP (WA) Transmission Pty Ltd*, 31 October 2011, pp. 126-130 (ERA, *Final decision: DBNGP access arrangement*, October 2011).

<sup>161</sup> Australian Competition Tribunal, *Application by DBNGP(WA) Transmission Pty Ltd (No 3) [2012] ACompT 14*, 26 July 2012, paragraph 131.

<sup>162</sup> Australian Competition Tribunal, *Application by DBNGP(WA) Transmission Pty Ltd (No 3) [2012] ACompT 14*, 26 July 2012, paragraph 132.

<sup>163</sup> See, for example, Lally, *The present value principle*, February 2013, p. 12.

<sup>164</sup> Valuers estimate the value of takeover target firms by applying discount rates to discount future cash flows. Ernst and Young compiled the discount rates in these valuation reports and presented the 2012 average as market evidence on the prevailing market cost of equity.

<sup>165</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p.50.

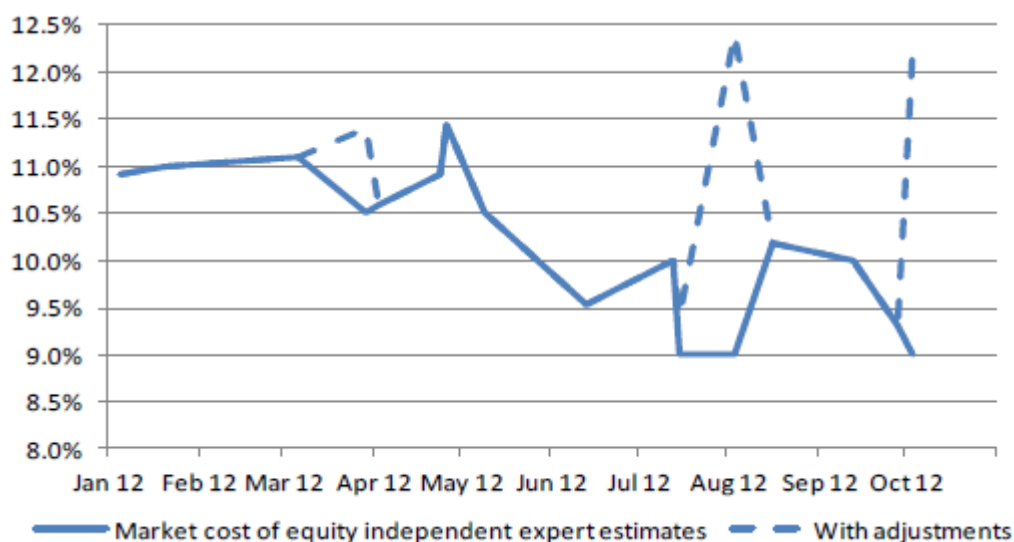
<sup>166</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p.50.

- there is a strong time trend—more recent studies should be considered more relevant—cost of equity discount rates decrease over 2012 and so the latest discount rates are lower than the 2012 average presented by EY;
- modal estimates of the individual parameters indicate the discrepancy between the valuers and AER is less marked; and
- the analysis of the KPMG Consolidated Media Holdings report shows how important each report's idiosyncrasies are.

CEPA did not consider the data presented by EY represented direct empirical evidence. It agreed that the appropriate regulatory approach should utilise cross-checks, such as EY's analysis of takeover reports. However, any adjustment should be justified and based on criteria. It found neither Grant Samuel nor Deloitte made an appropriate justification for their adjustments.<sup>167</sup> Further, the credibility of some findings of expert reports is hard to understand.<sup>168</sup>

As 2012 reports are a focus for the EY review, CEPA identified a useful check would be looking at how the market cost of equity implied by independent experts changes over the ten months to October 2012 (as analysed by EY).<sup>169</sup> CEPA's analysis is replicated in Figure B.2 below. Figure B.3 shows the relevant estimates of the risk free rate and MRP. There is a general downward trend of the independent expert cost of equity estimates since the start of 2012. Contrary to the relatively stable cost of equity concept submitted by APA GasNet, most valuers do change their cost of equity estimates over time (based on their underlying risk free rate and MRP assumptions), which resembles the downward movement of the prevailing risk free rate across 2012. Their cost of equity estimates are generally below 10 per cent in the second half of 2012. Therefore, comparing AER's cost of equity determined in the draft decision (which was made in September 2012) with the 2012 average is not comparable.

**Figure B.2 Takeover valuation report estimates of the cost of equity in 2012**



Source: CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p.47.

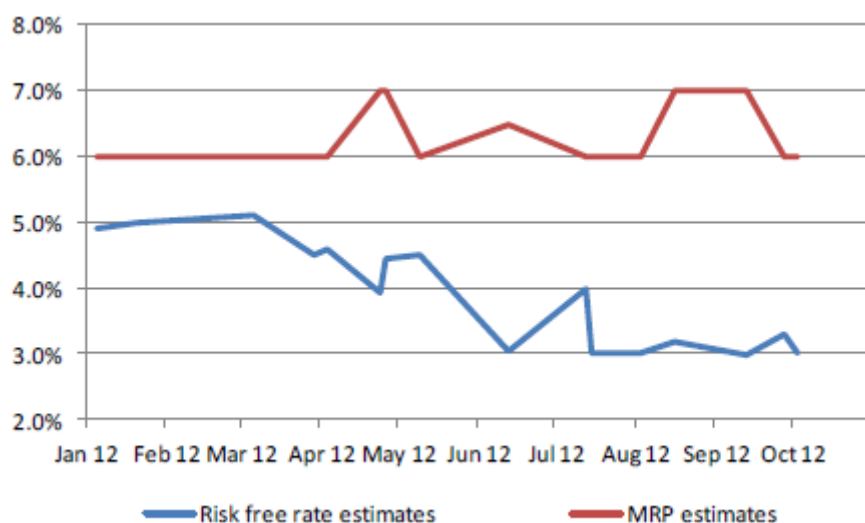
<sup>167</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p.44.

<sup>168</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p.44.

<sup>169</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p.47.



**Figure B.3 Takeover valuation report estimates of the risk free rate and MRP in 2012**



Source: CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p.47.

CEPA also examined other direct market evidence such as trading multiples and share prices of the regulated utility firms. The trading multiples would be expected to fall if the AER's approach in the draft decision produced a rate of return that is too low. However, CEPA noted the trading multiples continued to rise over this period. Similarly, CEPA found the share price of these regulated utility firms stayed stable (if not increasing) after the AER released its draft decision. Share price of regulated utility firms is likely to decrease sharply if the AER's draft decision results in a return that is unreasonably low for these businesses. However, this is not the case.

The AER has considered EY's report and CEPA's advice. It concludes EY's analysis, which recommended a prevailing 10.7 per cent cost of equity estimate based on 17 independent expert reports in 2012 provides limited value.

Further to the above conclusion, the AER notes that there may be concerns with the approaches typically taken by valuers in estimating discount rates. Damodaran's 2008 report supported the use of the current risk free rate even if the rates deviate from what people regard as "normal". He identified three potential problems associated with analysts bringing in their 'idiosyncratic views on interest rates':<sup>170</sup>

- "Normal" is in the eye of the beholder, different analysts make different judgments on what comprise that number.
- Use a "normal" risk free rate, rather than the current interest rate, will have valuation consequences. Applying a higher risk free rate than the current rate may over value a company.
- Interest rates generally change over time due to changes in the underlying fundamentals. Making adjustments to the current rate, without also adjusting the fundamentals that caused the current rate will result in inconsistent valuation.

The relevant section in Damodaran's report is *Common (and dangerous) practices* section.

<sup>170</sup> Damodaran, A, *What is the riskfree rate? A search for the Basic Building Block*, Stern School of Business, New York University, December 2008, p.26.

### B.3.7 RBA advice

In this decision and the draft decision the AER refers to advice provided by the RBA that suggests that CGS yields remain the best proxy for the risk free rate in Australia.<sup>171</sup> APA GasNet also considered the RBA advice and concluded that it provided a prima facie case for questioning whether the MRP prevailing during the agreed averaging period is above its historical average.<sup>172</sup> Similarly, in advice to APA GasNet, CEG considers the RBA letter and concludes:

The draft decision refers to these letters as support for rejecting arguments that CGS is not the best proxy for the risk free rate. However, in my view, these letters provide support for my core contention which is that the factors driving down CGS yields cannot be presumed to be driving down equity yields.<sup>173</sup>

The AER does not agree with CEG's interpretation of the RBA letter. The central area of contention relates to this section of the RBA letter:

I therefore remain of the view that CGS yields are the most appropriate measure of a risk-free rate in Australia.

That said, market risk premia are unlikely to be stable through time. While it is a reasonably simple matter to infer changes in debt risk premia from market prices, it is less straightforward to do so for equity premia. In making use of a risk-free rate to estimate a cost of capital, it is important to be mindful of how the resulting relativity between the cost of debt and that of equity can change over time and whether that is reasonable.<sup>174</sup>

In the draft decision, the AER referred to the last two sentences of this quote and concluded:

...the RBA cautioned against directly equating changes in the cost of debt with changes in the cost of equity...Consistent with this advice from the RBA, the AER is mindful of the relative positions of the cost of debt and cost of equity set in this decision. The AER considers that, since the cost of equity exceeds the cost of debt, this check indicates that the AER's estimates are reasonable.<sup>175</sup>

In this decision, the AER has extensively reviewed material on the stability of the market risk premia over time. The AER's conclusions can be found in sections B.3.2 and B.5. In any case, what is clear from the RBA letter is that CGS yields remain a good proxy for the risk free rate in Australia.<sup>176</sup> Elsewhere in this decision, the AER considers the evidence on MRP estimates and concludes that 6 per cent is the best estimate of the MRP at this time.<sup>177</sup>

## B.4 Risk free rate issues

In this section the AER consider a number of risk free rate specific issues, namely:

- Are interest rates abnormally low?
- The averaging period

These issues are considered below.

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<sup>171</sup> See attachment 5 and AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B.1.2.

<sup>172</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 60.

<sup>173</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 28

<sup>174</sup> RBA, *Letter to the ACCC: The CGS market*, July 2012, pp. 1-2.

<sup>175</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix, p. 66.

<sup>176</sup> RBA, *Letter to the ACCC: The CGS market*, July 2012, p. 1.

<sup>177</sup> See attachment 5.

### B.4.1 Are interest rates abnormally low?

As discussed briefly in attachment 5.3.2 above, while interest rates are currently low by historical comparison with recent decades, there is insufficient evidence to suggest they are "abnormally" low. This section discusses in more detail why the AER reaches this conclusion.

There are references in APA GasNet's revised proposal, and in CEG and SFG's reports, that suggest that CGS yields and/or the cost of equity are likely to return to 'normal'. For example, APA GasNet states:

...an anticipated return to more normal market conditions that should see an increase in some cost of capital parameters, in particular the risk free rate.<sup>178</sup>

This position finds support in the advice from CEG.<sup>179</sup>

The AER is unable to discern precisely what APA GasNet and CEG consider normal to mean. As McKenzie and Partington suggest, determining whether something is normal, or not, is a relative statement.<sup>180</sup>

McKenzie and Partington considered the question of whether CGS yields are abnormally low. They did not find that there was reason to describe current CGS yields as abnormally low. They state:

What history reveals is that current Australian bond yields rates are low, but not abnormally so, particularly when compared to the first seventy or so years of the twentieth century.<sup>181</sup>

They also state:

The evidence provided by the data suggests that the history of interest rates over the last few decades is not truly representative of the long run in this market. For both the U.S., UK and Australian markets, evidence exists which suggests that bond yields were stable (and possibly even falling) in the long run. The history of data over the last few decades is anomalous and the high interest rates observed during this period are clearly not representative of the longer time series. As such, one conclusion may be that the current environment is nothing more than a return to the 'normal' long run interest rate regime. On the other hand, it could be argued that there is a new normal and the GFC represents a true regime shift for global financial markets. It is difficult to determine whether this is the case or not - only in the fullness of time will we be able to comment on this with any certainty.<sup>182</sup>

McKenzie and Partington investigate various sources of historical yields and conclude that very long term nominal yields have been 5.5 per cent as reported by Dimson, Marsh and Staunton, and 5.65 per cent as reported in Brailsford et al. (2012).<sup>183</sup> However, the difference between the long term average and the prevailing yield is less pronounced if the high interest rate period is excluded.<sup>184</sup> They find the average return over the period 1883 to 1972 is 4.23 per cent using the Brailsford et al. (2012) data.<sup>185</sup> The risk free rate in this decision is 3.22 per cent. While the current yield is less than these long term averages, it is not clear it is unusually low.

The McKenzie and Partington report also presents the following figure from Brailsford et al (2012).<sup>186</sup>

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<sup>178</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 78.

<sup>179</sup> CEG, *Update to March 2012 Report*, November 2012, p. 32.

<sup>180</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 7.

<sup>181</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 8.

<sup>182</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 5.

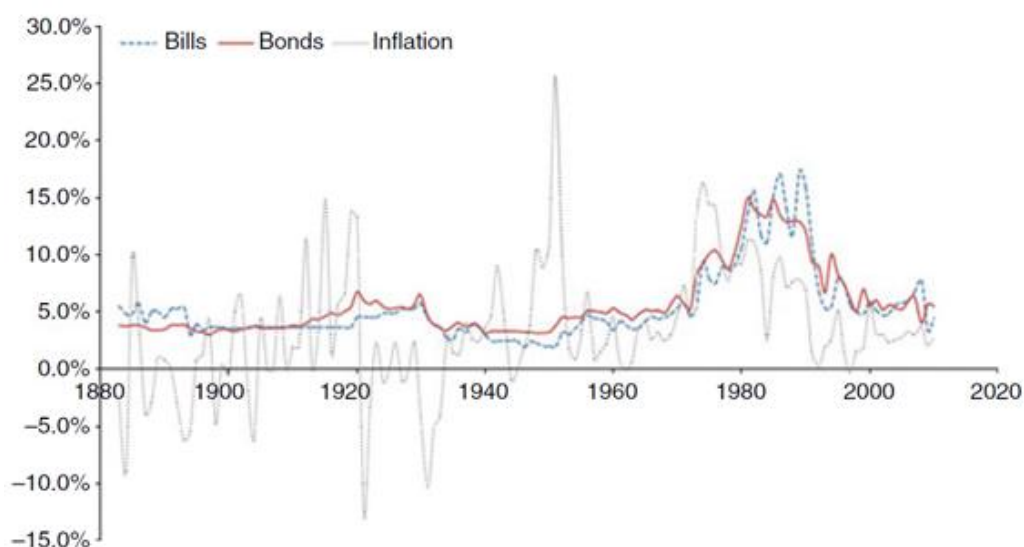
<sup>183</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 13.

<sup>184</sup> McKenzie and Partington consider the period beginning about the 1970s and returned towards more normal levels about the start of the current century. McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 8.

<sup>185</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 13.

<sup>186</sup> McKenzie and Partington, *Review of the AER's overall approach*, February 2013, p. 13.

**Figure B.4 Bond yields, bill yields and inflation rates over time**



The figure shows two important things clearly:

- Yields in the 1970s and 1980s were exceptionally high by comparison with historical rates.
- Yields have remained elevated (depressed) for long periods before falling (increasing).

There is no clear evidence that CGS yields are currently abnormally low. The AER has considered the stability of the cost of equity and the interaction between the risk free rate and MRP in forming the cost of equity in sections B.3.2 and B.3.3 above.

At this point the AER notes that in the EnergyAustralia matter, the Tribunal considered the normality of interest rates.<sup>187</sup> The AER considers the relevance of the EnergyAustralia matter in more detail in the draft decision.<sup>188</sup> In discussing the EnergyAustralia matter, SFG and CEG do not engage with the AER's comments in the draft decision<sup>189</sup>. Accordingly, this section does not repeat that discussion.

The applicability of forward interest rates was also considered in the EnergyAustralia matter. In the draft decision, the AER considered this issue and concluded that there are both in principle and practical difficulties with using forward interest rates in determining the risk free rate.<sup>190</sup> As no submissions were made on this point, that discussion is also not repeated here.

## B.4.2 Averaging period

In attachment 5.3.2 the AER noted that there would be further discussion of APA GasNet's averaging period in this appendix. This section contains that discussion.

<sup>187</sup> See for example, Australian Competition Tribunal, *Application by EnergyAustralia and Others (includes corrigendum dated 1 December 2009)* [2009] ACompT 8, 12 November 2009, paragraph 91.

<sup>188</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix, pp. 17-19.

<sup>189</sup> SFG, *The required return on equity*, November 2012, pp. 53-54; CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 19; CEG, *Update to March 2012 Report*, November 2012, pp. 24-25. CEG suggests the AER did not apply the logic from its discussion of the EnergyAustralia matter to the MRP. This decision considers the consistency of the AER's approach in section B.3.1.

<sup>190</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, pp. 21-23.

As discussed at section B.3.1 above, the present value principle requires the prevailing risk free rate to be estimated on the first day of the access arrangement period. The AER makes a pragmatic departure from strict compliance with this principle. The AER allows discretion to regulated businesses in the selection of the averaging period, subject to three principles:

- the averaging period must be short (i.e. at least 10 and not more than 40 business days)
- the averaging period must be as close as practicably possible to the commencement to the access arrangement period the averaging period must be nominated in advance.

The draft decision contained a detailed discussion of the correspondence between the AER and APA GasNet on this topic.<sup>191</sup> The AER agrees with APA GasNet's proposed method for determining the averaging period used to estimate the risk free rate and debt risk premium. APA GasNet proposed the same risk free rate averaging period method be used to estimate the cost of equity and the cost of debt. The method involves three steps:

1. At the time of publishing APA GasNet's proposal the AER will publish an indicative timetable for decisions.
2. The AER will notify APA GasNet, 20 business days in advance of the release of its draft decision on the revisions to the VTS AA, of the date on which that draft decision is expected to be released, and the date on which the Final Decision is expected to be released.
3. Not later than 10 business days following the AER's notification, APA GasNet undertakes to advise the AER of its nominated averaging period. The APA GasNet averaging period will be for a period commencing after the expected release date of the draft decision and ending not later than 15 business days before the expected release of the Final Decision. The advice will specify the term of the averaging period which must be at least 10 and not more than 40 business days.<sup>192</sup>

This range of acceptable dates (not before the expected release of the draft decision; not later than 15 business days before the expected release of the final decision) is the condition the AER applies to determine if the proposed averaging period is as close as practicably possible to the commencement of the access arrangement period. This allowed APA GasNet to nominate an averaging period in a broad window.<sup>193</sup>

Table B.3 below shows that the Victorian gas businesses proposed different averaging periods. However, each period proposed by the Victorian gas businesses adhered to the above conditions. The AER is indifferent to the particular averaging period that is chosen by the businesses, so long as it is consistent with the principles outlined above. The AER understands that regulated businesses generally manage their borrowing and hedging arrangements around the nominated averaging period, in order to reduce their exposure to interest rate risk. CEG acknowledges this understanding in its report.<sup>194</sup>

As a result of the different averaging periods, the risk free rate varies somewhat between each business. The variation also affects the cost of debt. The AER considers that the estimate of the MRP applied in this decision (6 per cent) is appropriate for APA GasNet's averaging period. Similarly, the AER considers a 6 per cent MRP to be appropriate for each of the averaging periods identified below.

<sup>191</sup> AER, *Draft decision: Access arrangement draft decision: APA GasNet Australia (Operations) Pty Ltd 2013-17*, September 2012, Appendix B, pp. 1-3

<sup>192</sup> APA GasNet, *Access Arrangement Submission—Confidential appendix D-6*, March 2012, p. 288. APA GasNet subsequently informed the AER that the material in appendix D-6 is not confidential. APA GasNet, *Information Request—Disclosure of Confidential Information No. 5*, August 2012.

<sup>193</sup> The draft decision was due to be released on 12 September 2012 with the final decision expected to be released on 13 March 2013.

<sup>194</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 19.

**Table B.3      Averaging periods**

Business	Averaging period	Risk free rate
APA GasNet	13 Sep - 26 Sep	3.22
Multinet	24 Oct - 20 Nov	3.12
SP AusNet	12 Nov - 7 Dec	3.14
Envestra	31 Jan - 20 Feb	3.53

## B.5 Market risk premium issues

In the attachment, the AER presented its considerations on why an MRP of 6 per cent is commensurate with prevailing conditions in the market for funds. The AER also noted that some matters would be addressed, or addressed in more detail, in the appendix.

In this section, the AER addresses:

- concerns raised by some consultants on the use of arithmetic averages of historical excess returns
- SFG's concerns on the use of survey evidence
- SFG's credit spread analysis.

### B.5.1 Arithmetic average vs. geometric average

In the draft decision, the AER explained the difference between arithmetic averages and geometric averages. It concluded the arithmetic average of the data was an overestimate of the relevant benchmark and the best estimate of historical excess returns over a 10 year period was likely to be somewhere between the geometric and arithmetic averages of annual excess returns.<sup>195</sup> Section B.2.1 of the draft decision discusses the AER's considerations in detail.

Nothing in the revised proposal has persuaded the AER to change from this view. Therefore, the AER still holds the position in the draft decision. In this appendix, the AER addresses the further concerns raised by SFG in a report submitted by APA GasNet in the revised proposal.

In a report prepared by SFG in the Roma to Brisbane Pipeline process, SFG submitted it was wrong to place any reliance on geometric averages and to the extent that reliance is (incorrectly) placed on geometric averages, the resulting MRP estimate is downwards biased. SFG presented a Harvard Business School case note in support of this position.<sup>196</sup>

The AER sought advice from McKenzie and Partington on the SFG report and Harvard Business School case note. In their February 2012 supplementary MRP report, McKenzie and Partington

<sup>195</sup> Corrs Chambers Westgarth, *Appendix B – market risk premium, the Australian Energy Regulator's submissions*, 11 November 2011, pp. 17–18.

<sup>196</sup> SFG, *Market risk premium, Report for APT Petroleum Pipelines Ltd*, 11 October 2011, p. 16 (SFG, *MRP for APTPL*, October 2011).



explained the Harvard case study 'assumes away the source of bias in arithmetic averages'.<sup>197</sup> The AER does not consider it is appropriate to assume no uncertainty about the mean of the distribution when analysing historical excess returns. According to Blume (1974), the one year returns are assumed to be normally distributed random variables, therefore the arithmetic average of these one year returns would also be a random variable<sup>198</sup>. (For example, let  $R_t$  represent a one year return,  $R_t$  is an independent normally distributed random variable, then the arithmetic average of these one year returns is also random variables  $(R_1+R_2+R_3...)/N$ .) Whereas the Harvard case study takes the expectation of these one year returns when calculating arithmetic average, by doing so, it turns the arithmetic return into a constant (ie.  $E[(R_1+R_2+R_3...)/N]$ ). Therefore, the Harvard Business School case assumes away the bias created as a result of taking arithmetic average of random variables. Accordingly, the AER did not find SFG's view persuasive.

In the revised proposal, SFG again renewed its view by presenting the Harvard Business School Case and argued the calculation of an arithmetic average does not in fact require any assumption about the mean being known exactly. Nor does the calculation of a geometric average.<sup>199</sup> The AER does not contend that the calculation of an arithmetic average or a geometric average requires the mean being known exactly. As discussed above, the AER only notes the arithmetic average calculation in Harvard Business School case takes the expectation of the arithmetic average of the one year returns, which are random variables, thereby assumes away the source of bias in the arithmetic average. SFG has not presented any new arguments that persuade the AER to change from this view.

SFG further submitted the Harvard Case Study has been used by leading business schools for over 20 years and no error has ever been raised in relation to its conclusion that the arithmetic mean is an appropriate estimate of the expected return and the geometric mean is not.<sup>200</sup> It appears that SFG is suggesting that there is no debate in the academic literature on the use of arithmetic or geometric averages. Clearly this is not the case, as McKenzie and Partington's report makes evident.<sup>201</sup> That said, it is reasonably well recognised in the academic literature that if the one year historical excess returns are variable, then the arithmetic average of one year historical excess returns overstates the arithmetic average of historical excess returns for a term greater than one year.<sup>202</sup>

## B.5.2 Surveys

In the draft decision, the AER considered McKenzie and Partington's detailed analysis of survey evidence on the MRP. Specifically, McKenzie and Partington applied the Tribunal's criteria on survey evidence. They also explained how triangulation across surveys enhanced their confidence in survey results. The AER discussed these in section B.2.2 of the draft decision.

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<sup>197</sup> In the Harvard case study, it assumes the probability of distribution is known. Since there is no uncertainty about the arithmetic mean of the return, the probably of measuring the MRP as discussed in the MRP section largely goes away. See further discussion at: M. McKenzie and G. Partington, *Report to the AER*, Supplementary report on the equity market risk premium, 22 February 2012, pp. 5–6 (McKenzie and Partington, *Supplementary report on the MRP*, February 2012).

<sup>198</sup> Blume, "Unbiased estimators of long-run expected rates of return", *Journal of the American Statistical Association*, September 1974, Volume 69, Number 347, Applications Section, p.634

<sup>199</sup> SFG, *The required return on equity*, November 2012, p.21.

<sup>200</sup> SFG, *The required return on equity*, November 2012, p.22.

<sup>201</sup> McKenzie and Partington, *Equity market risk premium*, December 2011, pp.10-12

<sup>202</sup> See: Blume, "Unbiased estimators of long-run expected rates of return", *Journal of the American Statistical Association*, September 1974, Volume 69, Number 347, Applications Section, pp.634-638. Indro, D.C. and Lee, W.Y. "Biases in arithmetic and geometric averages as estimates of long-run expected returns and risk premia", *Financial Management*, 26, 1997, pp.81–90; Dimson, E., Marsh, P. and Staunton, M. "Global Evidence on the Equity Risk Premium", *Journal of Applied Corporate Finance*, 15, 2003, pp. 27 - 38; Hathaway, N. *Australian Market Risk Premium*, Capital Research Pty Ltd. 2005 and Campbell, J. "Estimating the Equity Risk Premium", Working Paper 13423, *NBER Working Paper Series*, September, 2007

No new information in APA GasNet's revised proposal has persuaded the AER to change from this view. Therefore, the AER maintains its position from the draft decision that survey evidence should be considered. In this appendix, the AER addresses the further concerns raised by SFG in a report submitted by APA GasNet in the revised proposal.

SFG submitted that this MRP varies over time with changes in prevailing conditions in the market for funds. Therefore the survey evidence is only reliable when respondents are asked what they actually do and it is timely in the sense that their response is unlikely to have changed since the survey was conducted.<sup>203</sup>

Asher and Fernandez et al. have recently published their 2012 survey results for surveys conducted in March 2012 and June 2012, respectively. These surveys explicitly asked the respondents what MRP they use not what they "think". In this sense, the AER considers the recent Asher and Fernandez et al. surveys satisfy SFG's criteria discussed above. As noted in the attachment, these two recent surveys indicate the MRP is currently below 6 per cent.

Further, Lally also supported the use of survey evidence and suggested the recent Fernandez survey is the most relevant survey evidence. In addition, he noted the average of 5.9 per cent in the Fernandez survey should be considered as an upper bound. This is because some respondents to this survey might have provided responses for an MRP defined against bills. The AER's MRP estimate is defined against bonds and bond yields both currently and typically exceed bill yields. Therefore, the estimates provided by respondents who define the MRP against bills will be too high.<sup>204</sup> In addition, the AER notes the Asher survey explicitly asked the respondents for an MRP with regard to 'government bonds of the same term' and it reported survey responses on both the respondents expected 1 year MRP and expected 10 year MRP.<sup>205</sup> This addresses SFG's concern that the MRP estimates respondents should correspond to the term of the respondents' risk free rate.<sup>206</sup>

### B.5.3 Credit spreads

Credit spreads, in this context, refer to the ability to predict changes in the market risk premium from movements in observable debt premiums.<sup>207</sup> Specifically, SFG proposed that the market risk premium cannot move independently of the debt risk premium.<sup>208</sup> CEG also proposed a similar line of reasoning.<sup>209</sup>

The AER considered the use of credit spreads to inform the forward looking MRP. However, there is no consensus in academic literature on the direction or magnitude of the relationship between observed credit spreads and the MRP. The lack of academic consensus on the direction of any relationship casts doubt on the reliability of drawing any conclusions on the MRP from observable debt premiums. Moreover, the inability to reliably quantify the magnitude of any relationship limits its usefulness in a regulatory framework. For these reasons, the AER has given limited weight to credit spreads when estimating the MRP.

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<sup>203</sup> SFG, *The required return on equity*, November 2012, p.30

<sup>204</sup> Lally, *Review of the AER's methodology*, March 2013, p.30.

<sup>205</sup> Asher, *Equity risk premium survey 2012: results and comments*, *Actuaries Australia*, July 2012, issue 171, p. 28

<sup>206</sup> SFG, *The required return on equity*, November 2012, p.31

<sup>207</sup> SFG, *MRP for APTPL*, October 2011, p. 11.

<sup>208</sup> SFG, *The required return on equity*, November 2012, pp. 12, 35–45.

<sup>209</sup> Specifically, CEG stated that given increasing risk premiums on low risk assets, there is no plausible basis for concluding that risk premiums on riskier equity assets have remained constant. CEG, however, stated previously that it is a well accepted empirical fact that spreads between government bonds (that is, low risk assets) and others assets are explained by more than just differences in risks. CEG, Update to March 2012 report, p. 13; CEG, *Establishing a proxy for the risk free rate – A report for the APIA, ENA and Grid Australia*, 17 September 2008, p. 5.



For the following reasons, the AER has also given limited weight to SFG's and CEG's analysis (in support of using credit spreads to inform the MRP):

- For the cost of equity, expected cash flows (and not required returns) adjust to reflect changes in the level of default risk.
- SFG have compared promised debt returns with expected equity returns, and post-tax debt returns with pre-tax equity returns. Comparisons of debt and equity returns, however, should be made on a consistent basis.

The AER discusses these reasons, including the lack of academic and empirical evidence, in greater detail below.

### **Lack of academic consensus and empirical evidence that observed debt premiums can predict the MRP**

The relationship between observable debt risk premiums and unobservable equity risk premiums is complex. As discussed in attachment 5.3.3, there is no consensus in academic literature on the direction or magnitude of this relationship.

McKenzie and Partington, in a report prepared for the AER, also provided a comprehensive review of the academic literature on this issue. In regard to the relationship between debt and equity risk premiums, McKenzie and Partington concluded that:<sup>210</sup>

[T]here are competing theoretical and empirical models which support both positive and non-positive relations between the debt risk premium and the equity risk premium. There is no clear consensus, but the weight of evidence may somewhat favour a non-positive relation. What is clear, given the mixed evidence, is that the relation is not strong and stable.

The above analysis, including the summary included in the McKenzie and Partington report, demonstrates that the relationship between debt and equity premiums is complex and unresolved. For these reasons, the AER has given limited weight to the analysis provided by SFG and CEG.

### **Default spreads can move independently of the MRP**

The AER considers default spreads can move independently of the MRP. McKenzie and Partington explained that for the cost of debt, the DRP captures changes in default risk. There is, however, no corresponding default risk adjustment in the CAPM. Instead, for the cost of equity, expected cash flows adjust to reflect changes in the level of default risk. The required return on equity, therefore, does not necessarily change given a change in default spreads.<sup>211</sup>

The explanation above is particularly important in the context of SFG's and CEG's assumption that increases in default spreads must correspond with a higher MRP. On the basis of the McKenzie and Partington report, it appears that SFG's and CEG's fundamental assumptions are incorrect. The relevant section in McKenzie and Partington's report is section 1.

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<sup>210</sup> M. McKenzie and G. Partington, *The relationship between the cost of debt and the cost of equity*, March 2013, p. 10.  
(McKenzie and Partington, *Relationship between cost of debt and cost of equity*, March 2013)

<sup>211</sup> McKenzie and Partington, *Relationship between cost of debt and cost of equity*, March 2013, pp. 6–7.

## Comparability of debt and equity returns

Setting aside the lack of consensus on the relationship between debt and equity premiums, comparisons between the relative costs of debt and equity should still be considered with caution. In particular, to the extent that debt and equity returns are compared, it is important comparisons be made on a consistent basis. For example, the return on equity estimated by the AER is an expected return, while the return on debt is a promised return. Additionally, the return on equity estimated by the AER is a post-tax measure, while the return on debt is a pre-tax value. The need to compare estimates on a consistent basis is supported by McKenzie and Partington.<sup>212</sup>

The need for adjustments is discussed in greater detail in section B.7.2. It is notable, however, that SFG do not make any adjustments when comparing promised debt returns to expected equity returns.<sup>213</sup> This underestimates the existing spread between regulatory debt and equity returns. In contrast, it is likely to lead to overstated expectations of any increases in the MRP inferred from relative debt premiums.<sup>214</sup> This is because promised returns will be greater than expected returns, and pre-tax returns greater than post-tax returns.

## B.6 Dividend Growth Model

In both the initial proposal and the revised proposal, APA GasNet submitted consultant reports that derived DGM based MRP estimates. In the revised proposal, APA GasNet proposed an MRP estimate of 8.72 per cent based on CEG's updated DGM estimate and APA GasNet's actual risk free rate.<sup>215</sup> In attachment 5, the AER considers the use of DGM to estimate the prevailing MRP and noted it would discuss further considerations on the DGM in the appendix. This appendix considers four aspects of the dividend growth model:

- use of the dividend growth model to estimate the MRP
- use of the dividend growth model to estimate the cost of equity
- the dividend growth model as a source of evidence of a negative relationship between the risk free rate and the MRP, and
- dividend yields (which are a key input into the DGM constructed by CEG)

### B.6.1 Dividend growth model estimates of the market risk premium

APA GasNet submitted DGM based MRP estimates derived by CEG, Capital Research and NERA in its initial proposal. However, in its revised proposal, only an update of DGM based MRP estimates from CEG was submitted. The AER considers DGM analysis can provide some information on the expected MRP, but it is subject to a number of limitations.

In response to APA GasNet's revised proposal and CEG's updated cost of equity submission, the AER commissioned and received a further report from Associate Professor Lally on the dividend

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<sup>212</sup> McKenzie and Partington, *Relationship between cost of debt and cost of equity*, March 2013, p. 21.

<sup>213</sup> For example, SFG fail to consider the impact of promised debt returns versus expected equity returns when comparing the returns available to non-resident investors. SFG, *The required return on equity*, November 2012, p. 14.

<sup>214</sup> For clarity, the return on equity estimated by the AER is an expected return, while the return on debt is a promised return. The AER is not suggesting adjustment to these estimates for the purpose of calculating the AER's overall rate of return estimate. If comparisons between debt and equity returns are being made, or inferences drawn from comparisons, then the corresponding estimates should reflect a consistent basis.

<sup>215</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 69.

growth model. In the February 2013 DGM report, Lally found CEG's DGM approach is subject to the following problems:<sup>216</sup>

- CEG's conventional DGM approach will overestimate the MRP when the risk free rate is low, because the DGM assumes that the market cost of equity never changes over time, and therefore that any changes in the MRP and the risk free rate are perfectly offsetting.
- The DGM estimates assume equity prices are equal to the present value of future dividends and therefore that the market's expectation of the growth rate in dividends both exists and is rational. If this expected growth rate does not exist or is not rational, then an analyst could not hope to accurately estimate it and therefore could not hope to accurately estimate the market's discount rate. CEG's observation that the CGS yield might also not be rational is not only irrelevant to this point but would in any case nets out in the MRP estimate.
- DGM is prone to errors in the presence of both short term and long term changes in the market's earnings retention rate. CEG does not contest this point.
- In relation to Lally's previous point that CEG's formula for the market cost of equity is mathematically wrong, CEG neither contest this point nor does it correct it in its latest paper.
- CEG's argument that the long run growth rate in the dividends per share of existing firms matches that for GDP, because new firms are funded from the dividends paid by existing firms, is not valid. CEG's argument that the expected growth rate in dividends per share for existing companies might initially be larger than the expected GDP growth rate and then converge on a rate lower than that for GDP, so that the resulting MRP estimate approximates that provided by them, is valid in principle but CEG does not supply any analysis in support of this argument.

Aside from the CEG, Capital Research, NERA and Associate Professor Lally all recommended the use of DGM analysis in estimating a forwarding looking MRP, although to a different degree. The DGM estimates derived by CEG, Capital Research and NERA support an MRP estimate significantly above 6 per cent.<sup>217</sup> Lally estimated a prevailing DGM based MRP in the range of 5.9-8.4 per cent<sup>218</sup>. As noted in attachment 5.3.3, the AER considers DGM based analysis of the MRP can provide some information on the expected MRP. However, due to the sensitivity of results to input assumptions in the model, it considers the DGM estimates should be treated with caution. This view is also consistent with McKenzie and Partington's recommendation.<sup>219</sup>

Capital Research's DGM analysis demonstrated the DGM analysis can be very sensitive to the assumptions made. In the February 2012 report, Capital Research estimated an implied MRP range of 6.6 to 7.5 per cent. In estimating this range, it assumed a compound average growth rate of 7 per cent based on analysts' forecasts, and a theta value of between 0 and 0.5.<sup>220</sup> It also illustrated an increase of 0.5 in the theta assumption translates to a 0.8 to 1.2 per cent increase in the implied MRP.<sup>221</sup> Further, in the March 2012 report, just one month apart, Capital Research updated this

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<sup>216</sup> M. Lally, *The dividend growth model*, February 2013, pp.20-21.

<sup>217</sup> CEG, *Update to March 2012 Report*, November 2012; Capital Research, *Forward estimate of the market risk premium: update*, March 2012; NERA, *Prevailing conditions and the MRP*, March 2012;

<sup>218</sup> Lally, *The dividend growth model*, March 2013, p. 22

<sup>219</sup> McKenzie and Partington, *Equity market risk premium*, December 2011, p. 27.

<sup>220</sup> Capital Research, *Forward estimate of the market risk premium: Update: A response to the draft distribution determination by the AER for Aurora Energy Pty Ltd*, February 2012, pp. 19–23 (Capital Research, *MRP estimate for the Aurora determination*, February 2012).

<sup>221</sup> Capital Research, *MRP estimate for the Aurora determination*, February 2012, Table 2, p.21.

estimate to 9.6 per cent (an increase of more than 2 per cent) with a more recent risk free rate and a net theta value of 0.2625.<sup>222</sup>

The AER also notes Capital Research has derived negative MRP estimates from DGM analysis for the period 1980–2004 in its 2005 report. Capital Research suggested a negative result is ‘nonsense’.<sup>223</sup>

Similarly, the CEG AMP method was producing MRP estimates at or below zero per cent back in 1994. Lally identified this problem in its July 2012 report. CEG accepted Lally’s criticism and has revised the chart using 10 year inflation indexed CGS yields. This leads to a new time series of MRP estimates that is free of the implausible zero values.<sup>224</sup> However, Lally further noted even with this revision, the MRP estimates are still subject to the problem that they will be too extreme when the risk free rate is extreme. The AER notes the revised CEG chart was still producing an MRP close to 2 per cent back in 1994.

### Bias in the dividend growth model estimates

In the July 2012 report, Lally noted other problems with the DGM analysis:

- At a given time, the estimated cost of equity for the market is assumed to be the same for all future years. This ‘perfect offsetting’ hypothesis is implausible.
- The method assumes the current value of the market matches the present value of future dividends. If the current value of the market is below the present value of future dividends, then the resulting estimate of the market risk premium will be too high.
- Short term fluctuations in the market’s earnings retention rate have a significant impact on the estimates. The DGM method does not account for these changes.<sup>225</sup>

In addition to the above limitations, Lally identified two further problems with the DGM MRP estimate derived by CEG:

- By using the historical dividend yield, CEG ignores the (1+g) term in deriving the market cost of equity.
- It is inappropriate for CEG to set the dividend growth to the long term GDP growth. By making such an assumption, the expected long term growth rate in all dividends from all companies would exceed that for gross domestic product. This outcome is logically impossible.<sup>226</sup>

Lally considered the net effect of these two problems is to overestimate the MRP by about 1 per cent. This overestimation is additional to the limitations discussed above.<sup>227</sup>

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<sup>222</sup> Capital Research, *Forward estimate of the market risk premium: Update: A report prepared for the Victorian gas transmission and distribution businesses: APA Group, Envestra, Multinet Gas and SP AusNet*, March 2012, p. 33 (Capital Research, *MRP estimate for the Vic NSPs*, March 2012).

<sup>223</sup> Capital Research, *Australian market risk premium*, January 2005, pp. 31–32.

<sup>224</sup> CEG, *Update to March 2012 Report*, November 2012, pp.17-18.

<sup>225</sup> Lally, *Cost of equity and the MRP*, 25 July 2012, pp. 15–18.

<sup>226</sup> Lally, *Cost of equity and the MRP*, 25 July 2012, pp. 18–20.

<sup>227</sup> Lally, *Cost of equity and the MRP*, 25 July 2012, p. 20.

## Conclusion

Based on the above considerations, the AER considers DGM estimates should be treated with caution when estimating the appropriate MRP. While DGM analysis is producing high MRP estimates, it was producing MRP estimates below 6 per cent prior to 2008. In addition, the AER's preferred MRP estimate of 6 per cent falls in the DGM MRP estimation range calculated by Lally.

Further, some fund managers believe the DGM MRP estimates in the US provide a lower bound while the DGM estimates in Australia represent an upper bound for developed capital markets.<sup>228</sup> Based on this observation, the AER considers Australian DGM estimates might be somewhat anomalous. It does not consider Australia has the highest market risk across all the developed countries.

The relevant sections in Associate Professor Lally's report are sections 2 to 7.

### B.6.2 Dividend growth model estimates of the cost of equity

A DGM can also be used to derive overall cost of equity estimates, rather than MRP estimates. CEG estimated a DGM based nominal cost of equity for regulated businesses in the range of 10.4 - 14.1 per cent and a DGM nominal cost of equity for the market of 10.16 per cent.<sup>229</sup> However, none of the Victorian gas businesses proposed this approach. Therefore the AER does not discuss this approach extensively here. It notes using DGM to estimate the cost of equity is subject to similar limitations as using DGM to estimate MRP.

In the July 2012 report, Lally noted if the DGM approach is applied to individual firms, then this DGM approach is subject to additional problems, such as:<sup>230</sup>

- greater exposure to fluctuations in the earnings payout rate,
- incentives for the firms in question to manipulate their earnings payout rate, and
- implicitly (and wrongly) assumes that the entire firms' activities are regulated.

### B.6.3 DGM as evidence of negative relationship between the risk free rate and MRP

The AER considered CEG's chart on the AMP method estimate of the return of equity and MRP relative to 10 year CGS rates, which featured in both APA GasNet's initial and revised proposals. The most recent chart is reproduced in Figure B.5 below. Lally has considered CEG's DGM chart in both his July 2012 report and March 2013 report.

The AER has considered CEG's and Lally's view. As noted above, the MRP estimate based on DGM was slightly above 2 per cent in 1994 and was below 6 per cent for the entire pre-GFC period. The AER is not aware of any proposals submitted by the businesses or their consultants prior to the GFC that the MRP should be below 6 per cent. CEG's chart has not persuaded the AER that there is sufficient empirical evidence of a negative relationship between the risk free rate and the MRP.

CEG estimated the return of equity time series by first estimating the prevailing cost of equity (the red line) and then calculating the MRP (the green line) by subtracting the prevailing 10 year CGS yield at

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<sup>228</sup> RARE Infrastructure, *RARE cost of capital*, September 2012, p.9.

<sup>229</sup> CEG, *Update to March 2012 Report*, November 2012, p.31.

<sup>230</sup> Lally, *Cost of equity and the MRP*, July 2012, p.3.

any point in time (the blue line).<sup>231</sup> The red line is relatively stable over time. As the risk free rate (blue line) varies over time, subtracting the blue line from the red line thus creates the appearance of a strong negative correlation between the risk free rate (green line) and MRP (blue line).

Lally identified this problem in his recent reports. Lally found the CEG AMP method uses a perfect offset assumption<sup>232</sup> and thus generates results showing a stable cost of equity over time.<sup>233</sup> In his July 2012 report, Lally described CEG's chart as being 'predisposed' to the result that it displays.<sup>234</sup> Both CEG and Lally agreed the assumption of a constant cost of equity is unavoidable when applying the DGM. Lally noted such disadvantages must be recognised and this 'perfect offset assumption' problem is particularly significant when the risk free rate is high or low.<sup>235</sup>

Given the perfect offset assumption is a well accepted disadvantage of the DGM, the AER considers this chart does not present a persuasive empirical evidence of a negative relationship between the prevailing market risk premium and the prevailing risk free rate. Additionally, because CEG's AMP method is based on the DGM model, the model's general limitations (outlined in section B.6.1 above) also apply to this analysis.

In the July 2012 report, Lally pointed out CEG's AMP method produced an MRP estimate of zero in 1994—an 'implausible' result. Combining these points, Lally concluded:<sup>236</sup>

Thus, if the perfect-offset hypothesis should be rejected in 1994 when the risk free rate was unusually high, it should also be rejected in 2012 when the risk free rate was unusually low.

CEG accepted Lally's criticism and has revised the chart using 10 year inflation indexed CGS yields, which leads to a new time series of MRP estimates that is free of the implausible zero values.<sup>237</sup> However, Lally noted even with this revision, the MRP estimates are still subject to the perfect offset assumption that leads to predetermined outcome. Such a position does not hold unless the MRP and the risk free rate have a perfectly negative relationship. CEG neither presented evidence to support this assumption nor even claimed it to be true.<sup>238</sup>

The relevant section in Associate Professor Lally's report is section 2.

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<sup>231</sup> CEG, *Internal consistency of risk free rate and MRP in the CAPM: Prepared for Envestra, SP AusNet, Multinet and APA*, March 2012, pp. 20–32 (CEG, *Risk free rate and MRP in the CAPM*, March 2012).

<sup>232</sup> By applying the AMP method, CEG assumed the market cost of equity at any point in time is the same for all future years. If, for example, the current risk free rate were very low, then the MRP would assume to be very high by an exactly offsetting amount.

<sup>233</sup> Lally, *Cost of equity and the MRP*, July 2012, pp. 9–12, 15.

<sup>234</sup> Lally, *Cost of equity and the MRP*, July 2012, p. 11.

<sup>235</sup> Lally, *The dividend growth model*, March 2013, p.8-9.

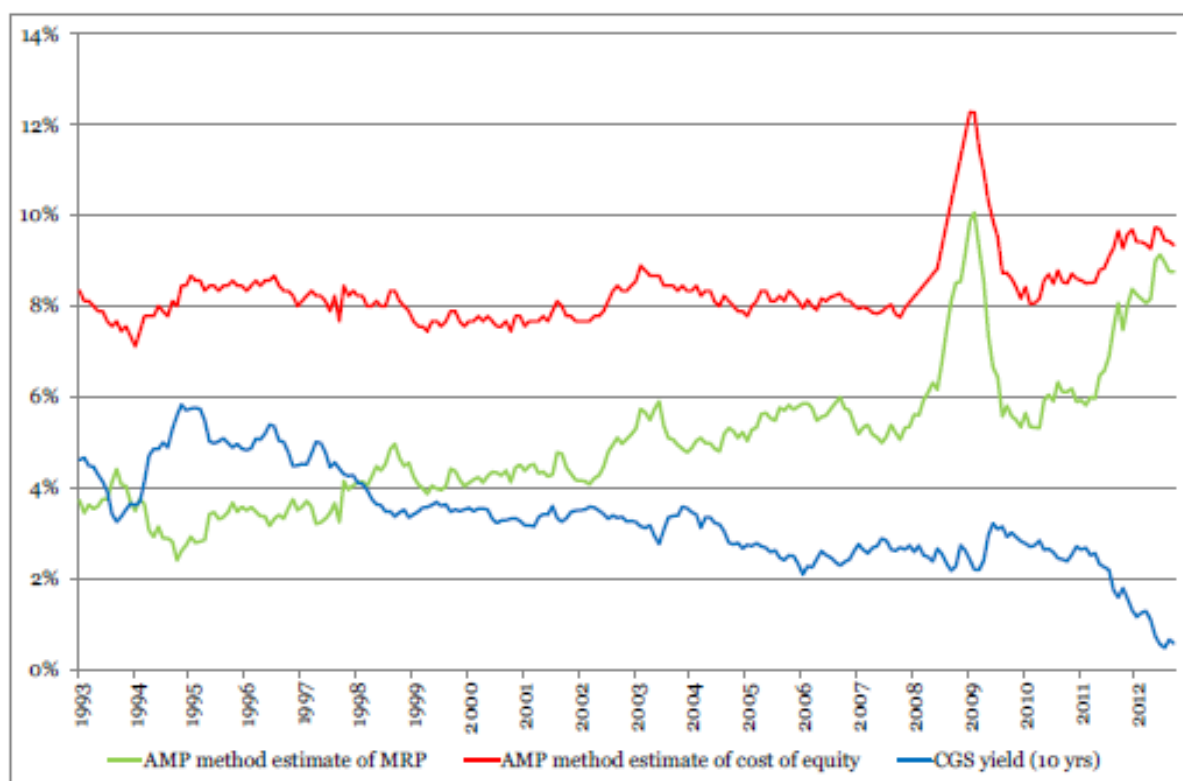
<sup>236</sup> Lally, *Cost of equity and the MRP*, July 2012, p. 15.

<sup>237</sup> CEG, *Update to March 2012 Report*, November 2012, pp.17-18.

<sup>238</sup> Lally, *Cost of equity and the MRP*, July 2012, pp. 7-8.



**Figure B.5 CEG AMP method estimate of Return on Equity and MRP relative to 10 year CGS yields**



Source: CEG, *Update to March 2012 Report*, November 2012, Figure 7

#### B.6.4 Dividend yields

Dividend yields refer to the current observable dividends for all shares in a broad based market index divided by the current price of all shares in that index. The dividend yield is thus a simple indicator for prevailing level of risk aversion.

CEG, NERA and SFG have all referred to the recent increase in dividend yield as an indication of heightened MRP in their most recent reports.<sup>239</sup> As noted by CEG, dividend yield on listed equities can be used to arrive at a MRP estimate by way of a DGM.<sup>240</sup> The AER considers the dividend yields are closely related to the DGM estimates. The high DGM based MRP or cost of equity estimates submitted by APA GasNet's consultants are the result of the current high current dividend yield.

The AER considers the evidence of a relationship between the dividend yield and the MRP is insufficient. McKenzie and Partington conducted a broader consideration of the academic literature in their February report. They found the relationship between the dividend yield and the MRP is still a developing area of research and the literature does not indicate this relationship is statistically reliable.<sup>241</sup>

The AER considers the underlying mechanism relating dividend yields and the MRP (as presented by CEG, NERA and SFG) is not persuasive. They appear to overlook other factors that could result in a

<sup>239</sup> CEG, *Update to March 2012 Report*, November 2012, p.15; NERA, *Estimating the Cost of Equity under the CAPM*, November 2012, pp.24-25; SFG, *The required return on equity*, November 2012, p.43

<sup>240</sup> CEG, *Update to March 2012 Report*, November 2012, p.15

<sup>241</sup> McKenzie, and Partington, *Supplementary report on the MRP*, February 2012, p. 23.

higher observed dividend yield even when the MRP was unchanged (or lower).<sup>242</sup> McKenzie and Partington noted the dividend yield calculation does not account for expectations about capital gain or loss. So, a change to expect relatively more of the total return from dividends instead of capital appreciation would also result in a higher dividend yield, even if the MRP did not change.<sup>243</sup>

## B.7 Other considerations

In this section the AER considers some other considerations, namely:

- market commentary
- reasonableness checks

These considerations are discussed below.

### B.7.1 Market commentary

The AER has considered the material submitted by APA GasNet and the other Victorian gas businesses on the opinions of investors, fund managers and credit rating agencies. This section discusses that material.

#### Investors and fund managers

The Victorian gas distribution businesses submitted that there are concerns in the investment community about the AER's recent cost of capital decisions.<sup>244</sup> The statements highlighted were submitted to the AEMC as part of its recent rule change process and provide insights into the opinions of investors about regulatory decisions.<sup>245</sup>

This submission included the following statement from Paradise Investment Management Pty Ltd:

...the current low risk free rate in the form of the 10 year bond yield is a function of the heightened level of uncertainty that exists in the market at the moment which in turn should be reflected by a higher equity risk premium. There is ample evidence of this higher equity risk premium in the current subdued activity levels in the primary and secondary issuance markets. Additionally, there is also a fair argument that the Australian 10 year bond yield is being artificially subdued by high levels of foreign buying given its place in the increasingly scarce pool of AAA rated securities.<sup>246</sup>

Similarly, the submission included a statement from RARE Infrastructure:

Regulators need to ensure returns are sufficient for companies to attract capital, both debt and equity, to expand networks to meet customer requirements. Global Funds like RARE have a choice whether to invest in regulated assets in Australia. Despite RARE liking the Australian regulatory framework, if allowed returns are insufficient to compensate us for the risk, we will invest our clients' capital elsewhere in the world.<sup>247</sup>

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<sup>242</sup> Other techniques build on the dividend yield approach in an attempt to address these shortcomings. The DGM projects dividend movements beyond the immediate dividend forecast horizon. The SFG 'market based' assessment using dividend yields combines the dividend yield with a forecast for capital gain/loss.

<sup>243</sup> McKenzie, and Partington, *Supplementary report on the MRP*, February 2012, pp. 12–13.

<sup>244</sup> SP AusNet, *Revised Access Arrangement Proposal: Chapter 5 – Rate of return and corporate tax allowance*, 9 November 2012, pp. 30–32; AER, *Draft decision: Access arrangement draft decision: Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd*, September 2012, pp. 159–161; Envestra, *Revised Access Arrangement Information, Attachment 9.11 Response to Draft Decision – Rate of return*, 9 November 2012, section 5.4.

<sup>245</sup> SP AusNet, *Revised Access Arrangement Proposal: Chapter 5 – Rate of return and corporate tax allowance*, 9 November 2012, p. 30.

<sup>246</sup> SP AusNet, *Revised Access Arrangement Proposal: Chapter 5 – Rate of return and corporate tax allowance*, 9 November 2012, pp. 30–31.

<sup>247</sup> SP AusNet, *Revised Access Arrangement Proposal: Chapter 5 – Rate of return and corporate tax allowance*, 9 November 2012, p. 32.



The AER has given consideration to this feedback when forming this final decision. Elsewhere in this decision careful consideration is given to many of the issues identified in this feedback. For example, section B.4.1 considers the suggestion that the 10 year bond yield is artificially subdued. Similarly, section B.5 considers the MRP in detail. Elsewhere in this appendix the possibility of a negative relationship between the risk free rate and the MRP is also considered.

## Credit rating agencies

Envestra submitted reports from two credit rating agencies on the Victorian gas review draft decisions. These reports were from Standard & Poor's and Moody's.<sup>248</sup> The AER considers these reports in this section.

On face value, these reports may appear to predict dire consequences from the AER's draft decision approach on the cost of equity for the Victorian gas businesses. However, upon examining these reports more closely, this is not the case. Rather, these statements are more circumspect than they might seem and would apply equally to any reduction in the rate of return. Below, we explain in detail why this is the case. Credit ratings are also discussed in more detail in appendix D of this decision.

Envestra made the following statement about the Moody's report:

Moody's in its report on the Draft Decisions released on 1 October was more direct [than Standard & Poors], stating that the Draft Decisions for Envestra would be "credit negative" if they were to be made final.<sup>249</sup>

Firstly, the AER notes Moody's does not say the AER's rate of return is not commensurate with prevailing conditions in the market for funds or the risks in providing reference services. Rather, Moody's says the draft decision approach is "credit negative". These two concepts are very different.

The AER understands that any reduction in the regulatory rate of return would be credit negative. Moody's appears to rank specific events as credit positive, negative or neutral. These events are combined into Moody's outlook which can either be positive, negative, stable or developing.<sup>250</sup> The fact that a lower regulator cost of equity means a lower revenue allowance is, all else the same, necessarily credit negative.<sup>251</sup>

As Moody's notes, the actual impact of that event on the credit rating is dependent on a number of factors:

Furthermore, while Moody's suggests the Envestra's draft decision would be credit negative, it also suggests:

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<sup>248</sup> Standard & Poor's, *Industry Report Card: Australian And New Zealand Network Utilities Maintain Stable Credit Quality*, 14 November 2012; Moody's, *Proposed Tariff Reductions for Australia's Gas Distributors Are Credit Negative*, 1 October 2012.

<sup>249</sup> Envestra, *Letter to the AER - Market reaction to draft decisions*, 29 November 2012, p. 1.

<sup>250</sup> Moody's, *Rating Symbols and Definitions*, January 2013, p. 34.

<sup>251</sup> Further, as Moody's notes, the actual impact of that event on the credit rating is dependent on a number of factors: "Notwithstanding the draft decision's material cut, the actual credit effects depend on the ability of the distribution companies to manage their costs in response to the final tariff cut. For instance, we expect the companies to lock in a lower base interest rate for the next five years using swaps and reduce their interest costs relative to the last regulatory period ending in 2012. In addition, we expect these companies to have some capacity to manage their operating costs and capital expenditure. Their obligation to maintain network reliability ultimately constrain their ability to reduce costs. Therefore, a 23% cut in tariffs in the regulator's final revenue decision would be credit negative for Energy Partnership Gas." Moody's, *Proposed Tariff Reductions for Australia's Gas Distributors Are Credit Negative*, 1 October 2012, p. 2.

Despite the sector's high financial leverage compared to industrial companies, its predictable revenue stream provides visibility to a utility's ability to service its debt in the long run and underpins its investment-grade credit profile.

Envestra highlighted the following statement from the Standard & Poor's report:

The allowed WACC is significantly lower compared to the levels allowed in the past. This is mostly due to the fact of a lower risk-free rate prevailing in the market. While the impact of a lower risk-free [sic] is mitigated through a typical interest rate hedge reset, which coincides with the regulatory reset, we believe the proposed return on equity may not reflect current market conditions and may not be adequate for equity investors. As a result, the perceived lower rate of return for equity may reduce shareholders' long-term commitment.<sup>252</sup>

As a market participant, Standard and Poor's view that the cost of equity in the draft decision may not reflect market conditions is a relevant consideration. But Standard and Poor's view is one of many competing and divergent views between various market participants and academic experts. As Standard & Poor's does not provide reasons for its view, it is difficult for the AER to assess the basis of their position.

Further, while Standard & Poor's suggest the cost of equity in the draft decision may be too low, they do not quantify this statement. Specifically, they do not indicate what cost of equity they consider would be appropriate, nor whether they consider the cost of equity to be as high as APA GasNet and the other Victorian gas businesses have proposed.

## B.7.2 Reasonableness checks

In attachment 5, the AER evaluates the evidence on each WACC parameter individually. It also takes into account the interdependencies between WACC parameters where relevant. In this section the AER evaluates the overall rate of return derived from the individual WACC parameter values. The AER considers its determined overall rate of return is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services.<sup>253</sup> In turn, the AER considers this overall rate of return provides a reasonable opportunity for APA GasNet to recover at least its efficient costs.<sup>254</sup>

In this appendix, the AER examines:

- assets sales
- trading multiples
- broker WACC estimates
- recent decisions by other regulators and the AER
- recent decisions by overseas regulators
- the relationship between the cost of equity and the cost of debt
- cash flow analysis.

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<sup>252</sup> Standard & Poor's, *Industry Report Card: Australian And New Zealand Network Utilities Maintain Stable Credit Quality*, 14 November 2012, p. 3.

<sup>253</sup> NGR, r. 87(1).

<sup>254</sup> NGL, s. 24

## Recent regulated asset sales

For recent transactions of regulated assets, for which relevant data is available, the AER compares the market value (i.e. the sale price) with the book value (i.e. the regulatory asset base).

Over the past few years, regulated assets have generally been sold at a premium to the RAB. If the market value is above the book value, this may imply that the regulatory rate of return is above that required by investors. Conversely, when the market value is below the book value, this may imply that the regulatory rate of return is below that required by investors.

Caution must be exercised before inferring that the difference indicates a disparity in WACCs, particularly where the difference is small. A range of factors may contribute to a difference between market and book values. A RAB multiple greater than one might be the result of the buyer:<sup>255</sup>

- expecting to achieve greater efficiency gains that result in actual operational and capital expenditure below the amount allowed by the regulator
- increasing the service provider's revenues by encouraging demand for regulated services
- benefiting from a more efficient tax structure or higher gearing levels than the benchmark assumptions adopted by the regulator, and growth options
- expecting to achieve higher returns if regulation is relaxed.<sup>256</sup>

The AER considers that the above list is not exhaustive. SFG have provided alternative explanations of the sale price in excess of the RAB.<sup>257</sup>

Regulated asset sales in the market are also infrequent allowing limited opportunity to conduct this analysis. This is of particular relevance at present as the AER is setting a lower overall rate of return than in previous decisions. While asset sales in the future may reflect changes to the overall rate of return that are occurring at present, sales that have already occurred will not.

Regulated asset sales do, however, provide a useful real-world indication of whether market participants consider the AER's benchmark WACC to be, broadly speaking, reasonable. The consistent positive trend as discussed below provides evidence that the AER's WACC approach is not unreasonable.

Further, CEPA consider the Market Asset Ratio [RAB multiple] to be a well established tool used by equity analysts to compare allowed and actual returns on capital.<sup>258</sup>

Deloitte also confirm that a commonly used industry rule of thumb for valuing regulated assets is the RAB multiple.<sup>259</sup>

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<sup>255</sup> Each of these reasons assumes the purchasing firm is making a rational purchasing decision. Another reason for a RAB multiple greater than one might be that the purchasing firm misjudged the value of the target assets and paid too much for those assets. Each transaction considered by the AER involved sophisticated investors with significant knowledge of the industry. Accordingly, the AER does not consider it likely that the RAB multiples greater than one result from poor valuations of the target assets.

<sup>256</sup> Grant Samuel & Associates Pty Limited, *Financial Services Guide and Independent Expert Report in relation to the Recapitalisation and Restructure of Babcock and Brown Infrastructure*, 9 October 2009, p. 77 (Grant Samuel, *Expert report: Babcock and Brown Infrastructure*, October 2009).

<sup>257</sup> SFG, *The required return on equity: Response to AER Victorian gas draft decisions*, 7 November 2012, p. 47.

<sup>258</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, February 2013, p. 51.

<sup>259</sup> Deloitte, *Determining the fair value of Australia's water infrastructure assets*, March 2010, p. 11.

In theory, where the WACC applied is the same as the regulatory return determined and the regulator and market have the same view as to the costs of operating the regulated asset, the RAB multiple should be one.

The RAB multiples from each of these transactions, together with the transactions discussed above, are summarised in Table B.4 from most recent to least recent.

**Table B.4 Selected acquisitions – RAB multiples**

Date	Acquirer	Entity/Asset acquired	RAB multiple (times)
Dec 2012	State Grid Corp of China	41.1% of ElectraNet SA	1.29
Dec 2011	Marubeni Corp/RREEF	Allgas	1.20
Dec 2011	Marubeni Corp/RREEF	Allgas	1.02
July 2011	ATCO	25.9% of West Australian Gas Networks	1.20
July 2011	DUET	20% of Multinet Gas	1.13
July 2011	DUET	20% of Dampier to Bunbury Natural Gas Pipeline	0.95 <sup>260</sup>
Dec-06	APA	Directlink	1.45
Oct-06	APA	Allgas	1.64
Aug-06	APA	APA GasNet	2.19
Apr-06	Alinta	AGL Infrastructure assets	1.41-1.52
Mar-06	APA	Murraylink	1.47

Source: DUET<sup>261</sup>, APA<sup>262</sup>, Grant Samuel, AER calculations.

In December 2012, Powerlink sold its share of ElectraNet SA to the State Grid Corporation of China.<sup>263</sup> The 41.1 per cent stake was purchased at a RAB multiple of 1.29.<sup>264</sup> The AER notes that this is a recent sale which makes it relevant as a cross check.

<sup>260</sup> Dampier to Bunbury Natural Gas Pipeline (DBNGP) presents an unusual case because it is 96% contracted until 2016 under shipper contracts. As the Economic Regulation Authority (ERA) of Western Australia states, these contracts 'are substantially independent of the access terms and reference tariffs established under the access arrangement for the DBNGP.' ERA, *Final decision: DBNGP access arrangement*, October 2011, p. 14. For this reason the DBNGP RAB multiple appears to be not driven by regulatory rates of return and does not provide a useful comparison for RAB multiples analysis.

<sup>261</sup> DUET, *ASX announcement: Presentation to Macquarie Retail Adviser Network*, 19 January 2012, p. 3, viewed 9 February 2012, <<http://www.asx.com.au/asxpdf/20120119/pdf/423tx0cd2v7qq3.pdf>>.

<sup>262</sup> APA Group, *ASX announcement: Completion of the sale of 80% of Allgas*, 16 December 2011, viewed 10 January 2012, <<http://www.asx.com.au/asxpdf/20111216/pdf/423b5mnt9sqvzh.pdf>> (APA Group, *ASX announcement on sale of Allgas*, December 2011).

<sup>263</sup> ElectraNet, *Sale of ElectraNet shareholding*, 30 November 2012 <http://www.electranet.com.au/media-centre/media-archive/2012/sale-of-electranet-shareholding/>

<sup>264</sup> Macquarie, *APA Group: EPIC pipeline of growth*, 5 December 2012, p. 7.

In particular, this sale has occurred after the ElectraNet draft decision. The method for determining the rate of return was not in dispute in the draft decision. So, the purchaser could predict with reasonable certainty the approach the AER would take in its final decision. The indicative return on equity in the draft decision was below 8 per cent.

Additionally, the approach in the ElectraNet draft decision was very similar to the approach taken in the Victorian gas businesses.<sup>265</sup> Therefore this ElectraNet RAB multiple is relevant as a cross check for the Victorian gas businesses. That said, the AER recognises that there may have been special circumstances surrounding this sale, given it was purchased by a sovereign owned entity.

In December 2011, APA divested 80 per cent of its holding of APT Allgas (a gas distributor in South East Queensland) to Marubeni Corporation and RREEF; each acquiring 40 per cent equity stakes.<sup>266</sup>

APA stated that net funds released from the sale were \$477 million after transaction costs and the net enterprise value was \$526 million.<sup>267</sup> Applying a RAB value, estimated at the sale date, to this enterprise value produces a multiple of 1.20.

This transaction involved the sale of both regulated and unregulated assets. Accordingly the RAB multiple may overstate the premium on the regulated assets as unregulated assets generally require a higher cost of capital.<sup>268</sup>

APA also stated that the sale price was in line with the book value of the assets. The gross sale price was \$500.9 million, with the book value of assets sold at \$488.8 million.<sup>269</sup> This equates to a multiple of 1.02. These multiples can be considered the upper and lower bound estimates of the RAB multiple for this transaction.

In July 2011, DUET sold its 25.9 per cent stake in West Australian Gas Network (WAGN) to ATCO Ltd in return for a 20 per cent interest in the Dampier to Bunbury pipeline (DBP) and a 20.1 per cent interest in Multinet.<sup>270</sup> These transactions were at multiples of 1.20, 0.95 and 1.13 respectively.

In October 2010, Envestra purchased Country Energy's NSW gas network at a multiple of 1.25 times the 2010 RAB.<sup>271</sup> Further details on this transaction can be found in the AER's draft decision for the QLD/SA gas distribution networks.<sup>272</sup>

Other historical sales have been at premiums of between 20 and 119 per cent to the regulated asset base.<sup>273</sup>

As Grant Samuel has previously explained, listed infrastructure entities should theoretically trade at, and be acquired at, 1.0 times the RAB.<sup>274</sup> However, nearly all recent asset sales have been transacted at RAB multiples of greater than one.

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<sup>265</sup> The AER was bound to apply the 6.5% MRP and 0.65 gamma from the 2009 WACC review for the ElectraNet determination, as this is a transmission business.

<sup>266</sup> APA Group, *ASX announcement on sale of Allgas*, December 2011

<sup>267</sup> APA Group, *ASX announcement on sale of Allgas*, December 2011

<sup>268</sup> Allgas is a holding company that also owns the unregulated Moura pipeline and the Gatton-Gympie easement.

<sup>269</sup> Net proceeds after transaction costs was \$478.4 million, with transaction costs of \$22.5 million and a gain on sale of \$12.1 million. APA Group, *Interim Financial Report for the half year ended 31 December 2011*, 22 February 2012, p. 3.

<sup>270</sup> DUET, *ASX announcement: Completion of AET&D sale process*, 29 July 2011, viewed 9 February 2012, <<http://www.asx.com.au/asxpdf/20110729/pdf/420312nw1jxhdv.pdf>>

<sup>271</sup> AER, *Final decision: Country Energy Gas Pty Ltd: Access arrangement proposal for the Wagga Wagga natural gas distribution network, 2010–2015*, March 2010 and Envestra, *ASX announcement: Envestra's to acquire NSW gas networks - Market presentation*, 26 October 2010, pp. 3, 6–7, viewed 10 January 2012, <<http://www.asx.com.au/asxpdf/20101026/pdf/31tcv1nblp4xqc.pdf>>.

<sup>272</sup> AER, *Draft decision: Envestra access arrangement SA*, February 2011, p. 63.

<sup>273</sup> Grant Samuel, *Expert report: Babcock and Brown Infrastructure*, October 2009, p. 78.

Acquisition premiums have been substantial and are, as a result, unlikely to be solely explained by the factors noted above. This suggests that the regulated rate of return has been at least as high as the actual cost of capital faced by regulated businesses. Moreover, the consistency of the numbers across many transactions lends support to the conclusion that the regulated rate of return has been at least consistent with the efficient rate of return.

The AER notes that it is not possible to use RAB multiples analysis as an input when assessing individual parameters. The AER does not place any weight on this analysis during that process.

Recent regulated asset sales analysis provides a degree of confidence that the approach used in calculating the rate of return is reasonable. The AER has maintained a largely consistent approach to the calculation of the rate of return since the WACC review and that approach has been maintained for this decision.<sup>275</sup> This suggests the AER's approach in this decision will also provide APA GasNet with a reasonable opportunity to recover efficient costs.

## Trading multiples

A comparison of the asset value implied by share prices against the regulatory asset base—often expressed as a 'trading multiple'—also provides insight into the required rate of return.<sup>276</sup>

As with regulated asset sales, a trading multiple above one may imply that the market discount rate is below the regulated WACC. The AER acknowledges there are other factors which may explain a trading multiple above one.<sup>277</sup> The same cautions with interpreting the results of the regulated asset sales approach apply to trading multiples. In addition, this assessment relies on the assumption that share prices reflect the fundamental valuation of the company.

Recent broker reports have identified RAB trading multiples.<sup>278</sup> These multiples are consistently greater than one, as shown in Table B.5 to Table B.8. None of these multiples are less than or equal to one. In particular, the trading multiples have not changed significantly since the draft decision.

**Table B.5 JP Morgan trading multiples**

Date of report	Company	2010–11	2011–12	2012–13
16 January 2013	DUET	1.26	1.18	1.20
16 January 2013	ENV	1.20	1.25	1.29
16 January 2013	SKI	1.26	1.22	1.27

<sup>274</sup> Grant Samuel, *Expert report: Babcock and Brown Infrastructure*, October 2009, p. 77.

<sup>275</sup> Changes have been made to the value of gamma, the value of the MRP and the estimation approach for the DRP.

<sup>276</sup> The AER has not made any calculations of its own in this section. Trading multiples have only been stated where they could be identified in an external report. The AER does not have specific information regarding the precise nature of the brokers' calculations.

<sup>277</sup> CEPA have identified factors which may result a trading multiple above one - expectations of earnings from incentives and efficiencies; an actual cost of capital that is below the allowed cost; and wider stock market or M&A activity. The AER considers that this list is not exhaustive. CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, February 2013, p. 53.

<sup>278</sup> The AER has reported trading multiples from reports published from August 2012—noting that the brokers do not always provide these figures. Where possible, trading multiples for the previous year have also been presented to provide context, but only for those broker reports where a recent update was available.

16 January 2013	SPN	1.21	1.20	1.24
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Source: JP Morgan<sup>279</sup>

**Table B.6 Macquarie trading multiples**

Date of report	Company	2011	2012
29 November 2012	DUET	1.14	1.23
29 November 2012	SKI		1.34
6 December 2012	SPN	1.16	1.16

Source: Macquarie Group<sup>280</sup>

**Table B.7 Credit Suisse trading multiples**

Date of report	Company	2012	2013
12 February 2013	DUET	1.15	1.19
12 February 2013	ENV	1.35	1.43
12 February 2013	SKI	1.39	1.39
12 February 2013	SPN	1.14	1.18

Source: Credit Suisse<sup>281</sup>

**Table B.8 Bank of America Merrill Lynch trading multiples**

Date of report	Company	2012	2013
19 October 2012	DUET	1.20	
23 August 2012	ENV	1.10	
5 February 2013	SKI	1.25	1.27
9 November 2012	SPN	1.15	

Source: Bank of America Merrill Lynch<sup>282</sup>

<sup>279</sup> JP Morgan, *Utilities 2013 Outlook: Regulatory Risks Recede*, 16 January 2013, pp. 54, 58, 61, 64.

<sup>280</sup> Macquarie, *Macquarie Marquee Ideas: The forgotten yield play*, 6 December 2012, p.3; Macquarie, *SP AusNet: ElectraNet underwriting the value*, 29 November 2012, p. 2.

<sup>281</sup> Credit Suisse, *Regulated Utilities Monthly, Sector review*, 12 February 2013, p. 10; Credit Suisse, *Regulated Utilities Monthly, Sector review*, 7 November 2012, p. 14.

<sup>282</sup> Bank of America Merrill Lynch, *Spark Infrastructure Group: Sparkling performance unlikely to continue*, 5 February 2013, p. 1; Bank of America Merrill Lynch, *Australian Utilities: Moving to a lower WACC world*, 19 October 2012, p. 6; Bank of



Further, CEPA highlight the range of trading multiples in their sample, with a minimum of 1.10, and suggest that there is outperformance by these companies. CEPA also states that the degree to which there is outperformance on the cost of equity is unclear. But this suggests that the rates are not too low.<sup>283</sup>

Finally, Spark Infrastructure recently released a *Fact Book* showing an unadjusted trading multiple of 1.34 as at 24 February 2012. The *Fact Book* reports that this decreases to 1.10 when adjusted for total revenue excluding customer contributions.<sup>284</sup>

There are also other listed entities that hold regulated assets, such as APA and Hastings Diversified Utilities Fund. These companies are not conducive to RAB multiples analysis because they have a diverse portfolio of assets, sometimes unregulated, which makes it difficult to isolate the RAB.

Each of these figures cannot be considered definitive without careful consideration of the assumptions and methodologies used. They do, however, provide a useful insight into whether market analysts, and indeed industry analysts, consider the AER's benchmark WACC is appropriate. Importantly, each multiple is calculated after the GFC and also after the AER's WACC review.<sup>285</sup>

The consistently high multiples shown above suggest the regulatory rate of return has been at least as high as the actual cost of capital, and may have been in excess of it. The conclusion then is that the AER's approach to setting WACC parameters provides a degree of confidence that the rate of return has been reasonable. It also provides a degree of confidence that the rate of return has allowed service providers a reasonable opportunity to recover at least efficient costs.

As with recent regulated asset sales, the AER notes that it is not possible to use RAB trading multiples analysis as an input when assessing individual parameters. The AER does not place any weight on this analysis during that process.

However, recent regulated asset sales analysis may provide a degree of confidence that the approach used in calculating the rate of return is reasonable. The AER has maintained a largely consistent approach for calculating of the rate of return since the WACC review and that approach has been maintained for this decision.<sup>286</sup> This suggests the AER's approach in this decision will also provide APA GasNet with a reasonable opportunity to recover efficient costs.

## Broker reports

Equity analysts publish broker reports on listed companies operating regulated energy networks in Australia. These reports generally include WACC estimates along with a range of information, including analysis of current financial positions and forecasts of future performance.

In several previous decisions, the AER has used the WACC estimates from those broker reports as a reasonableness check on the rate of return determined by the AER through its detailed assessment of each individual parameter. In the *Envestra* matter, the Tribunal noted the reasons put forward by Envestra that the use of broker WACC estimates was an unreliable methodology. In response, the Tribunal stated:

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<sup>283</sup> America Merrill Lynch, *SP Ausnet: Re-iterating 7.7% 2013 divi, growing at 2%*, 9 November 2012, p. 5; Bank of America Merrill Lynch, *Envestra Limited, Earnings review, Flat divi in FY13*, 23 August 2012, p. 5.

<sup>284</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, February 2013, p. 54.

<sup>285</sup> Spark Infrastructure, *2012 Fact Book*, 27 February 2012, p. 9.

<sup>286</sup> While the WACC review has no legal standing under the NGL or NGR, the AER has maintained a largely consistent approach across gas and electricity decisions since the WACC review final decision was published.

Changes have been made to the value of gamma, the value of the MRP and the estimation approach for the DRP.

It is fair to note that, as to those matters, the AER largely recognised the possible reasons why broker estimates might be unreliable and sought to make adjustments in that light. More importantly, the Tribunal accepts the AER submission that it did not estimate the WACC or the DRP by reference to the broker reports. It used them as a “useful reasonableness check” that its WACC estimate did not produce results which did not broadly accord with a range of market opinions concerning firms that are a reliable proxy to the benchmark firm. Its use of the broker reports was thus an “output” test of the nominal vanilla WACC rather than an input into its calculation of the WACC.<sup>287</sup>

The Tribunal emphasised that its finding that the AER’s use of broker WACC estimates did not fall into reviewable error was in the context of the ‘limited use’ to which the AER applied the broker WACC estimates.<sup>288</sup>

Consistent with its approach in previous decisions, the AER uses broker WACC estimates as a reasonableness check on the overall rate of return.

The limitations of the use of broker WACC estimates include:

- the broker reports generally do not state the full assumptions underlying their analysis, or provide thorough explanations of how they arrive at their forecasts and predictions. As such, caution should be exercised in the interpretation of these broker reports<sup>289</sup>
- the five listed companies considered undertake both regulated and unregulated activities, which are assessed by the brokers in aggregate. However, only the regulated activities are directly relevant to the risk in providing reference services. It is generally considered that the regulated activities of the firms—operation of monopoly energy transmission and distribution networks—tends to be less risky than the unregulated activities they undertake in competitive markets. As the regulated activities tend to be less risky, the return required on these activities could be expected to be less than the return required by these firms as a whole.<sup>290</sup> This means that the overall WACC estimate implied by broker reports may overstate the rate of return for the benchmark firm
- it is generally not clear what assumptions the brokers have relied upon when developing their WACC estimate. Further, variation in WACC estimates suggests that these assumptions are not consistent across the different brokers
- the broker reports do not always provide sufficient information for the AER to calculate a nominal vanilla WACC estimate. Only those brokers who report the WACC in nominal vanilla form or provide sufficient detail to enable conversion to this form were considered. These figures are not necessarily precise estimates of the broker’s nominal vanilla WACC, since the AER has relied on its interpretation of the information provided
- Based on this analysis, Table B.9 sets out the range for the broker WACC estimates (converted to a nominal vanilla WACC) which is 7.38-10.02 per cent.<sup>291</sup> The nominal vanilla rate of return determined by the AER for APA GasNet in this final decision is 7.22 per cent. This is approximately 15 basis points below the range of the broker WACC estimates.

<sup>287</sup> Australian Competition Tribunal, *Application by Envestra Ltd (No 2)[2012] ACompT 3*, 11 January 2012, paragraph 166.

<sup>288</sup> Australian Competition Tribunal, *Application by Envestra Ltd (No 2)[2012] ACompT 3*, 11 January 2012, paragraph 167.

<sup>289</sup> In particular, the AER considers that the price and dividend forecasts from these reports do not constitute a sufficiently reliable basis for calculation of an overall rate of return. However, the broker reports do often report discount rates, which are equivalent to the broker’s estimate of the WACC for the company.

<sup>290</sup> Associate Professor Lally makes this point in relation to dividend growth model (DGM) estimates of the cost of equity which are based on listed regulated energy networks. That is, he states that as the unregulated activities tend to be higher risk, the estimated cost of equity (based on data which takes into account the entirety of the firm’s activities) will tend to overestimate that for its regulated activities. Lally, *Cost of equity and the MRP*, July 2012, p. 14.

<sup>291</sup> The table presents broker reports from August 2012 to February 2013.

The lower bound of the broker WACC estimates have decreased by 38 basis points since the draft decision. This is due to lower WACCs in more recent broker reports, in part reflecting lower risk free rate assumptions. The upper bound was calculated from a report dated 24 October 2012 and excluding this report the upper bound would reduce by 50 basis points to 9.52%. Excluding the next highest broker report reduces the upper bound further to 9.30%. This is also the upper bound when referencing broker reports from November 2012 to February 2013.

The AER considers that broker WACC estimates do not demonstrate that the overall rate of return, which is based on analysis of individual parameters, is not commensurate with prevailing conditions in the market for funds and the risk involved in providing reference services. For the reasons outlined in the specific parameter sections above, the AER is satisfied this is the case. The broker WACC technique is subject to known limitations and inherent imprecision. Further, the review of broker WACCs is the only aspect of the overall reasonableness check that has indicated a potential concern.

**Table B.9 Broker WACC estimates (per cent)<sup>a,b</sup>**

Measure	Minimum	Maximum
Broker headline post-tax WACC	6.20	8.60
Calculated nominal vanilla WACC	7.38	10.02

Source: AER calculations.

a Issuers of broker reports considered: Credit Suisse, Goldman Sachs, JP Morgan, Deutsche Bank.

b Regulated energy networks evaluated in broker reports: APA, DUET Group, Envestra Limited, Spark Infrastructure Group, SP AusNet.

## Recent decisions by other regulators and the AER

The AER reviews a range of returns it approved for other gas and electricity service providers and also the rates of return in recent decisions by other Australian regulators. This provides a test of the reasonableness of the rate of return in this determination. Recent rate of return values set by the AER since the WACC review are lower than those previously provided. However, recent decisions by other regulators suggest that these values—and 7.22 per cent in this case—are reasonable.

The rate of return range applied by the AER in recent decisions for other gas and electricity service providers is 7.31 to 10.43 per cent.<sup>292</sup> This range covers gas and electricity decisions made by the AER since the WACC review was completed in 2009 and includes the Roma to Brisbane final decision.

The AER has also considered recent decisions by other regulators giving a rate of return range from 5.78 to 8.65 per cent (converted to nominal vanilla form).<sup>293</sup> The decisions reviewed are shown in

<sup>292</sup> AER, *Final Decision: APTPL access arrangement*, August 2012; AER, *Final Decision: Aurora distribution determination*, April 2012; AER, *Final Decision: Powerlink Transmission determination 2012–13 to 2016–17*, April 2012; AER *Final Decision: Victorian distribution determination*, October 2010, p. 519; AER, *Final Decision: Queensland electricity distribution network service providers: Distribution determination 2010–11 to 2014–15*, May 2010, p. 267; AER, *Final decision: N. T. Gas access arrangement proposal for the Amadeus gas pipeline 2011–2016*, July 2011, p. 80; Australian Competition Tribunal, *Envestra: Annexure A (Part 2), Amended Access Arrangement*, February 2012, p. 13; Australian Competition Tribunal, *APT Allgas: Annexure A, Amended Access Arrangement*, February 2012, p. 17; Australian Competition Tribunal, *NSW Gas Networks: Annexure A, Amended Access Arrangement*, June 2011, p. 18; Australian Competition Tribunal, *ActewAGL Gas Distribution Network: Order*, September 2010, p. 2.

<sup>293</sup> Essential Service Commission of South Australia (ESCOSA), *Final Advice: Advice on a Regulatory Rate of Return for SA Water*, February 2012, p. 50; Queensland Competition Authority, *Final Report: SunWater Irrigation Price Review: 2012–17*, Volume 1, May 2011, p. 503; Essential Service Commission of Victoria (ESCV), *Vline access arrangement final decision*, June 2012, p. 208. Independent Pricing and Regulatory Tribunal (IPART), *Water – Final report: Review of*

Table B.10 and have been taken from those made in the last 12 months. The WACC of 7.22 per cent applied for APA GasNet falls within this range. This suggests that the rate of return for this determination is reasonable and in line with regulatory decisions that have been made in the past year.

**Table B.10 Recent decisions by Australian regulators (per cent)**

Regulator	Decision	Date	Nominal vanilla WACC
ESCOSA	Advice on a regulatory rate of return for SA Water – Final decision	Feb 2012	8.07
QCA	SunWater – Final decision	May 2012	7.49
ESCV	V/Line Access Arrangement – Final Decision	Jun 2012	8.65
IPART	Sydney Catchment Authority – Final decision	Jun 2012	8.16–8.38 <sup>a</sup>
IPART	Sydney Water Corporation – Final decision	Jun 2012	8.16–8.38 <sup>a</sup>
ERA	Western Power – Final decision	Sep 2012	5.78
QCA	Seqwater - Draft decision	Dec 2012	5.86

Notes: For comparative purposes, all WACCs have been converted to the nominal vanilla WACC formulation consistent with the AER's reported figure for APA GasNet (which excludes debt raising costs).

(a) Ranges are presented for recent decisions by the IPART where the point estimate (real post-tax or real pre-tax) was not sufficiently disaggregated to allow precise conversion to the correct formulation (nominal vanilla WACC).

The AER does not agree with SFG's position that there is circularity in considering the AER's recent decisions against its current decision.<sup>294</sup> Rather recent decisions are more likely to reflect similar market conditions.

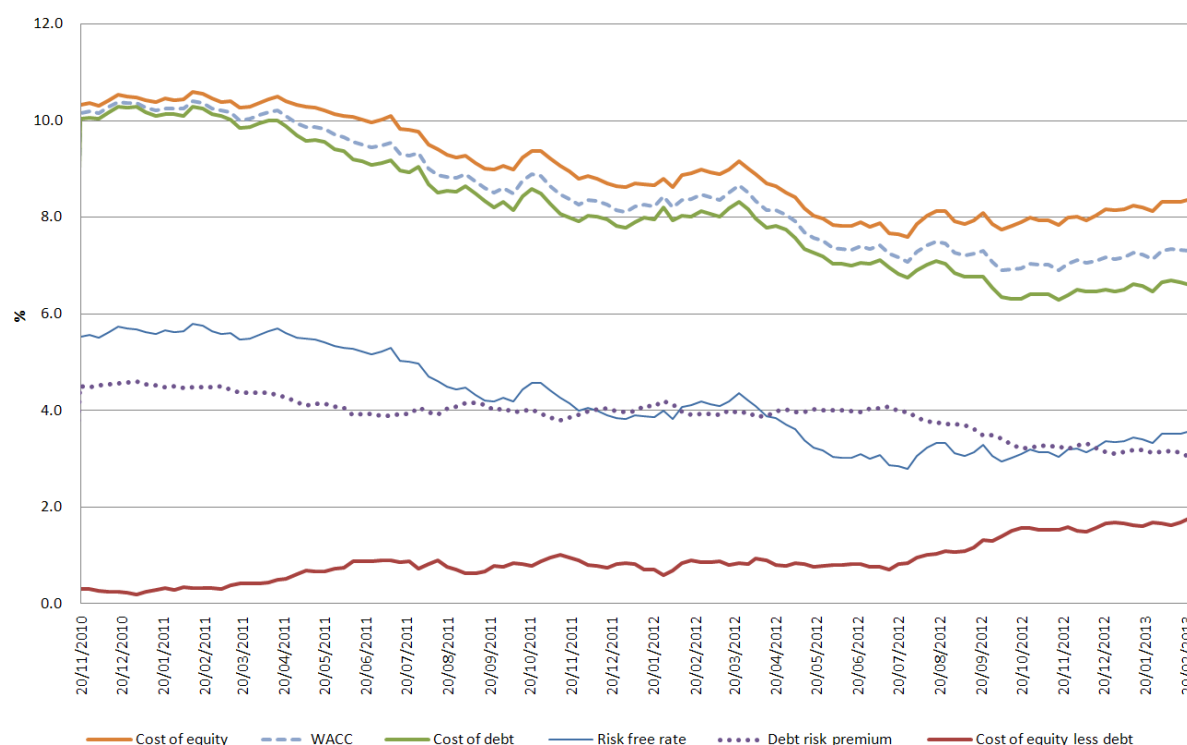
### Cost of equity versus the cost of debt

Equity investors are residual claimants on a firm's assets in the event of default. It is typically expected, therefore, that equity investments are riskier than debt investments, and that the cost of equity should exceed the cost of debt. This relationship has held in all of the AER's WACC decisions to date, as shown in Figure B.6.

prices for Sydney Water Corporation's water, sewerage, drainage and other services: From 1 July 2012 to 30 June 2016, June 2012, pp. 198, 204; IPART, *Water – Final report: Review of prices for Sydney Catchment Authority: From 1 July 2012 to 30 June 2016*, June 2012, pp. 90, 118, 123; ERA, *Final decision on proposed revisions to the access arrangement for the Western Power network* submitted by Western Power, 5 September 2012, p. 241. QCA, *Draft Report: Seqwater Irrigation Price Review: 2013–17*, Volume 1, December 2011, p. 259.

<sup>294</sup> SFG, *The required return on equity: Response to AER Victorian gas draft decisions*, 7 November 2012, p. 51.

**Figure B.6 Comparison between the AER's estimates of the costs of debt and equity**



Source: AER analysis.

Note: The cost of debt in the above chart is estimated using the paired bonds approach adopted in this decision. The specific bonds reflect those used in the AER's recent final decision for Powerlink. This chart would not change materially if the paired bonds sample were updated. The start date for the chart reflects the availability of bond data required to implement this approach. Further details of the AER's approach to estimating the cost of debt are in section 5.3.5 of the attachment.

The relationship between debt and equity returns, however, is more complex than any simple heuristic implies. For example, as discussed previously in this appendix (section B.5.3), the size and strength of any relationship between debt and equity premiums is inconclusive. Notably, no academic consensus exists on the extent of any such relationship.

Comparisons between the relative costs of debt and equity, therefore, should be considered with caution. In particular, to the extent that debt and equity returns are compared as an overall reasonableness check, it is important that comparisons between the costs of debt and equity are made on a consistent basis. In the context of debt and equity returns, two primary factors are relevant:

- promised versus expected returns
- pre-tax versus post-tax returns.

This section also discusses recent market evidence of observed debt issuances, and compares these to the allowed regulatory returns on debt and equity.

### ***Promised versus expected returns***

The return on equity estimated by the AER is an expected return, while the return on debt is a promised return. That is, debt returns are calculated based on promised cash flows (or coupons),

while equity returns reflect market expectations of returns. SFG, in a report commissioned by the Victorian gas networks, support this view.<sup>295</sup>

If conclusions are to be drawn from the relative spread between debt and equity premiums, however, any comparisons must be made on a consistent basis. McKenzie and Partington make this point in their recent report.<sup>296</sup> In particular, McKenzie and Partington demonstrated that when comparing promised and expected returns, it is not unreasonable for the promised return on debt to exceed the expected return on equity.<sup>297</sup>

The importance of comparing debt and equity premiums on a consistent basis is that any adjustments will widen the spread between the two premiums. That is, promised returns will always exceed expected returns. As such, if the return on debt was adjusted to reflect an expected return, the return would fall. The corresponding spread, therefore, would increase. This provides the AER with some comfort that the current spread between its allowed returns on debt and equity are reasonable.

### ***Pre-tax returns versus post-tax returns***

The AER estimates the cost of debt as a pre-company tax measure. Conversely, the AER estimates the cost of equity on a post-company tax basis. This reflects the relevant financing costs faced by the benchmark firm.<sup>298</sup>

Consistent with the comparison of promised and expected returns, the AER considers that any conclusions based on the spread between allowed regulatory debt and equity premiums should be made on a consistent tax basis. The aforementioned McKenzie and Partington report also supports the need to compare estimates on a consistent basis.<sup>299</sup>

Similar to the impact of adjusting promised and expected returns, any adjustments to compare pre-tax and post-tax returns will widen the spread between the debt and equity premiums. That is, pre-tax returns will always exceed corresponding post-tax returns. This provides the AER with some comfort that the current spread between its allowed returns on debt and equity are reasonable.

### ***Market evidence***

Notwithstanding the complexity of the relationship between debt and equity returns, the AER has compared the allowed regulatory returns on debt and equity against recent market evidence. This includes two debt issuances from the APA Group. The AER, however, considers that the available market evidence is of limited use for regulatory purposes. That is, they are useful as a broad cross-check only.

Specifically, in September 2012, the APA Group completed the issuance of \$515 million of subordinated notes in Australia. This hybrid capital was issued at 450 basis points above the BBSW. Shortly thereafter, in November 2012, the APA Group raised £350 million of debt financing in the UK. The APA Group swapped this debt into AUD at an average fixed rate of 7.36 per cent. Envestra

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<sup>295</sup> Specifically, as SFG stated, using expected debt yields implies that debt investors in the benchmark firm should expect a return that is materially lower than the allowed return on debt (because there is a material chance the revenue the regulator has allowed will be insufficient to pay what has been promised to those debt holders). However, a determination that resulted in there being a material chance that the revenue the regulator has allowed will be insufficient to pay what has been promised to those debt holders would likely be inconsistent with the NGL. SFG, *The required return on equity: Response to AER Victorian gas draft decisions*, 7 November 2012, p. 38.

<sup>296</sup> McKenzie and Partington, *Relationship between cost of debt and cost of equity*, March 2013, p. 21.

<sup>297</sup> McKenzie and Partington, *Relationship between cost of debt and cost of equity*, March 2013, p. 8.

<sup>298</sup> For clarity, both the cost of debt and equity are estimated on a pre-personal tax basis.

<sup>299</sup> McKenzie and Partington, *Relationship between cost of debt and cost of equity*, March 2013, p. 21.



highlighted both these issuances as evidence that recent allowed regulatory returns on equity were too low.<sup>300</sup>

The AER considers that while market evidence can provide an important cross check, the financing costs of a single entity should not be considered to be reflective of either the market as a whole, or the benchmark regulatory firm. This is consistent with the Tribunal's direction regarding the estimation of the debt risk premium.<sup>301</sup> It is also notable that the term of the UK debt financing was 12 years and carried a BBB credit rating. This compares to the benchmark term of 10 years and a BBB+ rating.

Additionally, the yields on hybrid forms of capital depend heavily on the characteristics of the product itself. While the corresponding yields should fall between the issuers respective costs of debt and equity, hybrid financing can be structured to have greater debt, or greater equity features. Further complicating where along the spectrum of debt and equity yields hybrid financing should be is the correlation with the market itself. As put by Macquarie Research, hybrids perform like debt when equity markets perform well, and perform like equity when equity markets perform poorly.<sup>302</sup> In this context, it may not be unreasonable that the yield on the hybrid debt is near the return on equity estimated by the AER (as proposed by Envestra).<sup>303</sup> The preceding discussion on the cost of debt versus equity is also relevant, inasmuch as comparisons are made between promised debt yields and expected equity returns.

Finally, comparisons between the cost of debt and equity implicitly assume that both debt and equity markets are efficiently priced. In practice, this may not be the case. For example, to the extent that relative spread between the allowed regulatory returns on debt and equity is considered to be too narrow, this may reflect an overly conservative estimate of the regulatory cost of debt.

## SFG's lower bound

SFG proposes a lower bound estimate on the return that investors might reasonably expect from an investment in comparable firms. It concludes that a lower bound on the return including imputation credits is 10.5 per cent.<sup>304</sup> This consists of a dividend yield of 7 per cent, a growth rate of 2.5 per cent and an allowance for the value of imputation credits.<sup>305</sup>

This lower bound estimate appears to be a simple dividend growth model (DGM). The AER considers DGMs in more detail in section B.6 and concludes that they are highly sensitive to the assumptions made and inputs used. Indeed Lally considers it appropriate to develop a range of estimates from DGM models as a result of these uncertainties.<sup>306</sup>

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<sup>300</sup> Envestra, *Letter to Andrew Reeves*, 21 August 2012.

<sup>301</sup> Australian Competition Tribunal, *Application by United Energy Distribution Pty Limited [2012] ACompT 1*, 6 January 2012, paragraph 429; Australian Competition Tribunal, *Application by Envestra Limited (No 2) [2012] ACompT 3*, 16 January 2012.

<sup>302</sup> Macquarie Investment Management, *Hybrid securities: Lured by yield, Investment perspectives*, Issue 6.

<sup>303</sup> Specifically, the return on equity in this decision is 7.94 per cent. In comparison, the corresponding yields on the APA Group bond and hybrid capital are approximately 7.64 and 7.36 per cent respectively. (The yield of 7.64 per cent on the hybrid issuance is likely to be a slight underestimate, as the margin of 450 basis points was quoted relative to the BBSW). For clarity, the APA Group yields have been estimated using the same risk free rate used to estimate the return on equity for this final decision.

<sup>304</sup> SFG, *The required return on equity*, November 2012, p. 18.

<sup>305</sup> SFG, *The required return on equity*, November 2012, p. 18.

<sup>306</sup> Lally, *The dividend growth model*, March 2013, p. 4.



Moreover, the AER has considered industry specific DGMs in the past and raised concerns about the appropriateness of the dividend yields from these businesses for DGMs.<sup>307</sup> SFG has not dealt with these concerns.

In conclusion, the AER does not regard SFG's lower bound as a reasonable lower bound estimate.

## B.8 Regulatory practice

APA GasNet and its consultants have noted the approaches adopted by IPART, and US and UK regulators. It suggested the recent IPART decision demonstrates the need for a higher MRP.<sup>308</sup>

In addition to IPART's approach (and UK and US regulatory practice), the AER has also considered recent regulatory decisions made by other Australian regulators. There is no consensus among regulators on how to estimate the cost of equity. The AER acknowledges that the cost of equity adopted in this decision is lower than rates adopted by some overseas regulators, and by IPART, in recent decisions. However, the AER also points out that, to its knowledge, no Australian or overseas regulator adopts the specific approach proposed by APA GasNet. In contrast, some Australian regulators adopt very similar approaches to the AER. And furthermore, the cost of equity adopted by some other Australian regulators in recent decisions is lower than that determined by the AER in this decision.

### B.8.1 ERA and QCA

APA GasNet's consultants have compared the AER's approach with those of IPART, the UK regulators and the US regulators. However, none of them noted the approach adopted by the Economic Regulation Authority of Western Australia (ERA) or the Queensland Competition Authority (QCA). The ERA's and QCA's approaches to the cost of equity are very similar to the AER's approach.

The ERA released its most recent final decision in September 2012 for Western Power. In this decision, ERA used a 5 year term for both the risk free rate and the MRP. It estimated a nominal risk free rate of 2.52 per cent based on Western Power's nominated averaging period, a MRP of 6 per cent and an equity beta of 0.65. This produced a nominal after tax cost of equity of 6.42 per cent and a nominal vanilla WACC of 5.78 per cent. ERA applied no uplift to this final WACC figure.<sup>309</sup>

The ERA adopts a 5 year term for both the risk free rate and the MRP, as it is consistent with the present value principle. In estimating the MRP, the ERA considers an MRP of 6 per cent is appropriate based on its own historical analysis of the MRP using 5 year as the term of the nominal risk free rate, survey evidence and current Australian regulatory practice. Further the ERA was not convinced that Western Power and its consultant (CEG) had provided convincing arguments to support an upwards adjustment to the estimate of the MRP when the observed yields on CGS are at historically low levels.<sup>310</sup> The AER considers ERA's recent decisions are relevant as they are made under a similar regulatory framework and both estimate an allowed rate of return for regulated energy businesses. The AER notes it uses a 10 year term for both the risk free rate and the MRP instead of a

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<sup>307</sup> AER, *Final decision: Envestra Ltd access arrangement proposal for the SA gas network 2011–2016*, June 2011, p. 158.

<sup>308</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, pp.63-66

<sup>309</sup> ERA, *Final decision on proposed revision to the access arrangement for the Western Power Network*, 5 September 2012, pp.241-242.

<sup>310</sup> ERA, *Final decision on proposed revision to the access arrangement for the Western Power Network*, 5 September 2012, pp.305-381.

5 year term as adopted by the ERA. By adopting a 10 year term, and a 0.8 equity beta, the AER's approach estimates a higher cost of equity than the ERA.<sup>311</sup>

The QCA released its most recent draft decision in December 2012 for Seqwater. The QCA estimated a nominal risk free rate of 2.55 per cent based on the annualised four year CGS averaged over 20 trading days. An MRP of 6 per cent was mandated in the Ministerial Direction for the 2012-13 GSC review. Combining these with an equity beta of 0.55, it produced a nominal after tax cost of equity of 5.85 per cent and a nominal vanilla WACC of 5.86 per cent. The QCA did not make any adjustments to this final WACC figure.<sup>312</sup> Similarly, the AER notes by adopting a 10 year term for the risk free rate, and a 0.8 equity beta, it produces a higher cost of equity estimate than the QCA. While QCA's decision is for a water network, the water network and energy network industries are of comparable risk.<sup>313</sup>

## B.8.2 IPART

In attachment section 5.3.2, the AER noted that there would be further discussion of IPART's approach to determining the rate of return in appendix B. This section contains that discussion.

The AER concludes that recent IPART decisions indicate other regulators have made allowance for the possibility of an inverse relationship between the risk free rate and the MRP. However, it is not exactly clear how IPART do so. Furthermore, IPART's approach is considerably different to the AER's approach, and likewise to that proposed by APA GasNet in its revised access arrangement proposal.

IPART's approach to setting the WACC has many similarities with the AER's, but it also has some important differences. Importantly, IPART's approach is to determine a WACC range that it considers appropriate before determining a point estimate from within that range.<sup>314</sup> This is very different from the AER's approach which is to determine a WACC point estimate from the underlying parameters.

In the Sydney Desalination Plant final decision for example, IPART estimated a WACC range (real pre-tax) of 5.1 per cent to 6.9 per cent.<sup>315</sup> The boundaries of this range was based on IPART's point estimate or range for each parameter. In setting the limits of this range IPART adopted a prevailing risk free rate point estimate (not a long term historical average) and a 5.5–6.5 per cent MRP range. IPART then selected a point estimate of 6.7 per cent.<sup>316</sup> IPART's point estimate was therefore 80 basis points above the mid-point of the calculated WACC range. IPART state:

We determined the values for the parameters of the WACC based on market conditions over the 20 days to 28 October 2011. The risk free rate and debt margin have been affected by market volatility and the prolonged weak market following the credit crisis of 2008. The change in these factors has potentially created a disparity between these parameters (for which we use short term average data) and the market risk premium (for which we use long term average data).

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<sup>311</sup> This is because the longer term bonds carry more risk than the shorter term bonds and therefore require higher returns. The AER notes the 5 year CGS yield is normally lower than the 10 year CGS yield.

<sup>312</sup> QCA, *Draft report Seqwater irrigation price review 2013-17*, Volume 1, December 2012, p.259.

<sup>313</sup> AER, *Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline 2012–13 to 2016–17*, August 2012, p. 87.

<sup>314</sup> See for example, IPART, *Final Report - Review of water prices for Sydney Desalination Plant Pty Limited - From 1 July 2012*, December 2011, p. 80.

<sup>315</sup> IPART, *Final Report - Review of water prices for Sydney Desalination Plant Pty Limited - From 1 July 2012*, December 2011, p. 80.

<sup>316</sup> IPART, *Final Report - Review of water prices for Sydney Desalination Plant Pty Limited - From 1 July 2012*, December 2011, p. 80.

However, the effects of this disparity are mitigated by our decision to use a point estimate of 6.7%, which is 80 basis points higher than the midpoint of our estimated WACC range. In doing so we had strong regard to the calculated WACC using longer term averages for market parameters.<sup>317</sup>

CEG highlights this statement in its discussions of IPART's approach.<sup>318</sup> SFG highlight similar statements from the same decision as well as IPART's review of electricity retail and generation prices.<sup>319</sup> Both CEG and SFG acknowledge that IPART do not rely on a long term historical average risk free rate explicitly.<sup>320</sup> Indeed, SFG note the following statement by IPART:

Rather than adjusting the risk free rate or revaluing the MRP, we make a judgment when selecting the WACC point estimate from within the range.<sup>321</sup>

This differs from what APA GasNet stated was acceptable in its revised proposal.<sup>322</sup> APA GasNet did not suggest a WACC range be determined with a point estimate selected by the AER. APA GasNet suggested it would accept a long term average risk free rate used determinatively.<sup>323</sup>

On the issue of the risk free rate and MRP relationship, IPART states:

We note that there may be an inconsistency between using short term data for the risk free rate and using long term data for the MRP. As stakeholders have noted, there may be an inversely proportional relationship between the MRP and the risk free rate.<sup>324</sup>

Firstly, the AER notes that it estimates a 10 year forward looking MRP and combines that with a 10 year forward looking risk free rate.<sup>325</sup> Conceptually, there is no inconsistency with that approach.

Secondly, IPART, as an independent regulator, is entitled to form its own view on the strength of evidence of an inverse relationship between the risk free rate and MRP. The AER, as an independent regulator, is also entitled to form its view on the matter. McKenzie and Partington's review of the theoretical and empirical evidence on this matter is, to the AER's knowledge, more comprehensive than that contained in any of the consultant reports submitted by the Victorian gas businesses, or considered as part of IPART's recent decisions. Therefore, the AER's view in this regard has been strongly influenced by the work of McKenzie and Partington.

Shortly prior to the release of this decision IPART released its draft decision for Hunter Water.<sup>326</sup> In this decision IPART estimated a real post-tax WACC of 4.2 per cent.<sup>327</sup> Converted into a nominal vanilla WACC form this is approximately 6.9 per cent. The approach IPART used in its decision appears to be broadly consistent with that discussed above from the Sydney Desalination Plant and Electricity Retail Prices decisions. However, given the timing of the decision, the AER has not considered the approach in detail.

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<sup>317</sup> IPART, *Final Report - Review of water prices for Sydney Desalination Plant Pty Limited - From 1 July 2012*, December 2011, p. 80.

<sup>318</sup> CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 55.

<sup>319</sup> SFG, *The required return on equity*, November 2012, pp. 52-63.

<sup>320</sup> SFG, *The required return on equity*, November 2012, p. 60; CEG, *Response to the AER Vic gas draft decisions*, November 2012, p. 55.

<sup>321</sup> SFG, *The required return on equity*, November 2012, p. 55.

<sup>322</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 70.

<sup>323</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 70.

<sup>324</sup> IPART, *Final Report - Changes in regulated electricity retail prices from 1 July 2012*, June 2012, p. 52

<sup>325</sup> See attachment 5.1.2 for more detail.

<sup>326</sup> IPART, *Draft Report - Hunter Water Corporation: Prices of water, sewerage stormwater drainage and other services from 1 July 2013 to 30 June 2017*, March 2013.

<sup>327</sup> IPART, *Draft Report - Hunter Water Corporation: Prices of water, sewerage stormwater drainage and other services from 1 July 2013 to 30 June 2017*, March 2013, p. 182.

### B.8.3 UK

There are a number of regulators in the United Kingdom, including Ofgem, Ofwat and Ofcom. The Competition Commission is the review body to which parties can appeal decisions by these regulators. Each regulator takes a slightly different approach to estimating the cost of capital, although there are many similarities between them.

There are a number of important differences between the approach the AER uses to set the cost of equity and the approaches used by regulators in the UK. These include:

- the term of the cost of equity
- the risk free rate proxy
- the use of cross-checks.

Regulators in the UK tend to apply a term that is equal to the life of the assets.<sup>328</sup> This has important implications for the way the cost of equity is determined. CEPA states:

First, when thinking about whether the approach is commensurate with prevailing conditions in the market depends in part on the time horizon being considered. AER has tended to focus on a ten year time horizon while UK regulation has tended to focus on the life of the asset under consideration. This latter approach is a significantly longer time horizon and consequently can lead to different views about how markets operate – for example, the degree of mean reversion.<sup>329</sup>

The AER and APA GasNet agree that a 10 year term is appropriate for this decision.<sup>330</sup> Therefore, the relevance of the long term approaches used in the UK must be considered in this context.<sup>331</sup>

Regulators in the UK often have as a starting position that the cost of equity is relatively stable through time.<sup>332</sup> The work of Wright, Mason and Miles informs this position.<sup>333</sup> These authors found that the cost of equity is relatively stable through time when compared to the MRP.<sup>334</sup> Elsewhere in this appendix the AER considers the stability of the cost of equity in more detail.<sup>335</sup> There is not sufficient evidence to support the conclusion that the cost of equity is relatively more stable over time than the MRP.<sup>336</sup> Indeed, Lally concluded that in an Australian context, the evidence suggests that the MRP is relatively more stable than the cost of equity.<sup>337</sup>

Regulators in the UK also tend to use a different proxy for the risk free rate compared to the AER. Generally, the yield on index-linked gilts (ILG) is used.<sup>338</sup> This is a security similar to the Indexed CGS in Australia. In the UK, there is a legislative requirement for pension funds to hold ILGs.<sup>339</sup> Coupled with the quantitative easing that has been employed by the central bank in the UK, regulators have

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<sup>328</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 3.

<sup>329</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 3.

<sup>330</sup> See section B.3.5 for further discussion.

<sup>331</sup> While APA GasNet did not propose a long term historical average risk free rate in its revised proposal, it did state that it would accept a long term historical average if the AER considered this appropriate. APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 70.

<sup>332</sup> See, for example, Ofgem, *Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial Issues*, March 2011, p. 33;

<sup>333</sup> S. Wright, R. Mason and D. Miles, *A study into certain aspects of the cost of capital for regulated utilities in the U.K.*, Smithers and Co, 13 February 2003.

<sup>334</sup> S. Wright, R. Mason and D. Miles, *A study into certain aspects of the cost of capital for regulated utilities in the U.K.*, Smithers and Co, 13 February 2003, p. 4.

<sup>335</sup> See section B.3.3 above.

<sup>336</sup> See section B.3.3 above.

<sup>337</sup> Lally, *Review of the AER's methodology*, March 2013, p. 13.

<sup>338</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 21.

<sup>339</sup> Competition Commission, *Bristol Water plc Price Limits Determination - Final Determination - Appendixes*, 2010, p. N15.

been concerned that the market for ILGs is distorted.<sup>340</sup> The AER does not hold similar concerns that the nominal CGS market is distorted.<sup>341</sup> Accordingly, the AER continues to apply a prevailing risk free rate. This position is based on advice from the RBA and the Treasury and AOFM.<sup>342</sup>

Further, until recently, estimates of the risk free rate in UK regulatory decisions have approximately followed the prevailing yield downwards.<sup>343</sup> Only in recent years has there been a large departure from the observed yield.

Finally, regulators in the UK also use cross-checks in a significant way. Generally, the CAPM is applied and cross-checked against other cost of equity models, RAB multiples and regulatory precedent.<sup>344</sup> APA GasNet has highlighted UK regulators' use of a relatively stable cost of equity, but it has not highlighted UK regulators' use of RAB multiples.<sup>345</sup> This is despite both elements being integral to UK regulators' overall approach to the cost of equity. In contrast, APA GasNet's consultant (SFG) has criticised the AER's use of RAB multiples.<sup>346</sup> RAB multiples suggest the AER's approach in this decision is reasonable.<sup>347</sup>

With these differences in mind, the cost on equity allowed by Ofgem in its most recent decision was higher than the AER allows in this decision. In the RIIO-GD1 Final decision Ofgem allowed a real post-tax cost of equity of 6.7 per cent.<sup>348</sup> In this final decision the AER applies a real post-tax cost of equity of 5.39 per cent. The AER acknowledges that the cost of equity allowed in this decision is lower than recent decisions in the UK. However, these differences must be considered in the context of the differing approaches. In that context, the AER considers the cost of equity in this decision is appropriate when compared with returns allowed in the UK.

As Ofgem is the equivalent energy regulator in the UK this section considers its approach in more detail.

## Ofgem

Britain's energy regulator, Ofgem, employs a different approach to setting the rate of return compared to the AER. This difference of approach makes it difficult to make a meaningful comparison of Ofgem's approach with the AER's. This section considers Ofgem's approach and highlights some of the significant differences in the approach to setting the rate of return.

Ofgem has refined the building blocks approach to setting price controls under a regime labelled 'RIIO (Revenue = Incentives + Innovation + Outputs)'.<sup>349</sup> Under the RIIO framework, Ofgem sets its price controls for a period of eight years. In December 2012 it issued the final decision documents for the first application of its RIIO price controls.<sup>350</sup>

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<sup>340</sup> See for example A. Gregory, *The expected cost of equity and the expected risk premium in the UK*, Review of Behavioral Finance, 3: 1-26, (2011), p. 4.

<sup>341</sup> See attachment 5.3.2 for further discussion.

<sup>342</sup> See attachment 5.3.2 for further discussion.

<sup>343</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 22.

<sup>344</sup> CEPA, *Australian energy regulator: Victorian gas networks market evidence paper*, March 2013, p. 21.

<sup>345</sup> APA GasNet, *Revised Access Arrangement Proposal*, 9 November 2012, p. 63-64.

<sup>346</sup> SFG, *The required return on equity: Response to AER Victorian gas draft decisions*, 7 November 2012, pp. 48-50.

<sup>347</sup> See section B.7 for further discussion.

<sup>348</sup> This becomes 6.2 per cent if an equity beta of 0.8 is applied. Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 22.

<sup>349</sup> Ofgem, *RIIO: a new way to regulate energy networks - final decision*, October 2010.

<sup>350</sup> Ofgem, *RIIO-GD1: Final Proposals - overview*, December 2012 and Ofgem, *RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas*, December 2012.

In its price controls, Ofgem sets the allowed return (cost of capital) on a real vanilla basis, while the RAB is calculated on historic cost basis and uplifted for inflation. Ofgem considers its allowed return in the context of the entire price control package. It sets the allowed return such that it reflects Ofgem's assessment of the businesses' cash flow risk. This means that, where there is material difference in cash flow risk, Ofgem may set different allowed rates of return for companies within the same sector.<sup>351</sup> Ofgem's cash flow risk assessment consists of qualitative and quantitative comparisons of:

- the businesses to each other;
- the sectors (electricity transmission, electricity distribution, gas transmission, gas distribution) to each other; and
- the price control that is being set to the one that is currently in place.

Ofgem then tests the overall reasonableness of its allowed return in the context of the entire price control package by assessing financeability and the return on regulatory equity (RoRE).<sup>352</sup> Below are some of the significant areas of difference in Ofgem's approach to the components of the WACC and the cross-checks that it applies:

- Gearing—Ofgem sets the gearing component of the WACC on a notional basis. The decision is based on Ofgem's cash flow assessment, and cross-checked against financeability assessment, RoRE assessment, regulatory precedent, and the businesses' actual gearing.<sup>353</sup>
- Cost of debt—Ofgem sets the cost of debt component of the WACC by taking the 10 year trailing average of two indices, and deflating them by expected inflation.<sup>354</sup>
- Cost of equity—In the initial (strategy) stage of its price control review, Ofgem seeks consultants' advice in order to derive a range for the cost of equity.<sup>355</sup> Ofgem uses the consultants' advice informatively, rather than deterministically, and also carries out its own analysis.<sup>356</sup> The range reflects long term estimates of the risk free rate and MRP. The specific cost of equity and, therefore, the beta are chosen from within the range following Ofgem's cash flow risk assessment. Ofgem may set different cost of equity allowances for businesses within and across sectors, if it identifies material cash flow risk differences.
- Cash flow risk assessment—Ofgem's cash flow risk assessment covers a number of factors and places particular emphasis on the ratio of allowed capex to (opening) RAB when attempting to differentiate between the relative risk of businesses within and across sectors. It considers that this ratio best captures systematic risk, as represented in the CAPM framework by the asset beta.<sup>357</sup>
- RoRE assessment—Ofgem's RoRE assessment provides an estimate of the rewards and penalties that are built into the price control package by assessing the impact of variations in expenditure from the allowance, as well as additional cash flows (or penalties) associated with outperforming (underperforming) the regulator's benchmark on various incentives and output measures.

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<sup>351</sup> Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 13.

<sup>352</sup> Ofgem, *RIIO: a new way to regulate energy networks - final decision*, October 2010, p. 40.

<sup>353</sup> Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 21.

<sup>354</sup> That is, Ofgem sets an overall cost of debt allowance, without specifying the risk-free rate and DRP.

<sup>355</sup> Ofgem, *Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues*, 31 March 2011, p. 31-35.

<sup>356</sup> For example, Ofgem's consultants for the strategy phase for RIIO-T1 and GD1 advised on a range of 3.8-6.3%, while Ofgem decided to go with a range of 6.0-7.2%.

<sup>357</sup> Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 14.



- Financeability assessment—Ofgem has a duty to ensure that its decisions allow efficient companies to raise finance (the 'financeability duty').<sup>358</sup> This is at the core of Ofgem's approach to financeability testing. The assessment, however, also provides a cross-check to ensure that the allowed return is appropriate for the cash flow risks that the businesses would be exposed to during the price control period.

#### B.8.4 US

The AER acknowledges its current cost of equity estimate is lower than the recent return on equity allowed in US regulatory decisions, as noted in the CEG submission.<sup>359</sup> However, the AER notes the US regulatory decisions are not directly comparable to those of the AER's for the reasons discussed below.

FERC and the other US regulators use DGM as the US has better available proxy data, while Australian regulators do not have access to such information. This view is supported by NERA in a submission to ESCOSA in 2005.<sup>360</sup>

The problem with using DCF analysis to estimate the cost of equity is that it requires one to know, or estimate, investors' forward looking expectations of future dividends (and dividend growth). In most capital markets there are relatively few independent forecasts of future earnings and, consequently, there is a high level of statistical uncertainty surrounding DCF projections of the cost of equity for a particular company. However, in the US there is a very deep market for analysts' projections of company's future earnings. (In this regard it is illustrative to note that between 2001 and 2004 70 US regulated electricity distribution companies had their return on equity set.)

Given this, US regulators have available to them extra information on investors' forward-looking expectations than Australian regulators do not. Unsurprisingly, US regulators take advantage of this when estimating the cost of equity.

This issue is similarly noted by NERA in its equity beta report in 2007:<sup>361</sup>

Given the maturity and size of the US financial sector, decisions on the required rate of return on equity are based on the testimony of financial experts that typically present market evidence on the appropriate sample of companies as well as the suitability of accepted approaches for determining the required return on equity from available market data.

...

In the US, there is sufficient information on investors' expected future earnings to apply 'discounted cash flow' (DCF) analysis to estimate the expected rate of return on equity directly.

The AER further notes the US regulators sometimes deliberately set a constant cost of equity as the stability in rate of return allowance is their goal. For example, NECG:<sup>362</sup>

Stability in rate allowance is sometimes an explicit goal of the regulator. The California Public Utilities Commission notes: we consistently consider the current estimate and anomalous behaviour of interest rates when making a final decision on authorizing a fair ROE. In PG&E's 1997 cost of capital proceeding we stated "Our consistent practice has been to moderate changes in ROE relative to changes in interest rates in order to increase the stability of ROE over time." That consistent practice has also resulted in the practice of only adjusting rate of return by one half to two thirds of the change in the benchmark interest rate.

In addition, it noted:<sup>363</sup>

<sup>358</sup> Ofgem, *RIIO-GD1: Final Proposals - finance and uncertainty supporting document*, December 2012, p. 27.

<sup>359</sup> CEG, *Update to March 2012 Report*, November 2012, pp. 27-29.

<sup>360</sup> National Economic Research Associates, *Review of ESCOSA's decision on ETSA utilities equity beta*, April 2005, p. 23.

<sup>361</sup> NERA Economic Consulting, *Equity beta for gas distribution*, 29 October 2007, pp.9-12.

<sup>362</sup> Network Economics Consulting Group, *International comparison of WACC decisions*, September 2003, pp.30-31



[In the US] Pipeline operators are required to file a schedule of rates with the Federal Energy Regulatory Commission (ERC). Under section 717c of the Natural Gas Act the onus is placed on the companies to demonstrate that the rates are fair and reasonable, a process that does not necessitate use of the WACC model.

Accordingly, a key component of the approach by US regulators is the use of DGM estimates to calculate the overall cost of equity. The AER's analysis of the use of DGM estimates to calculate the overall cost of equity is set out in section B.6.2. This is in addition to the different in data quality between the US and Australia noted in this section.

A second key component of the approach of US regulators appears to be an explicit "goal" to set a stable regulatory cost of equity. The AER considers a stable regulatory cost of equity should be adopted if the weight of theoretical and empirical evidence supports the position that the cost of equity is stable. However, the weight of evidence does not support this position. The AER's analysis on the evidence on a stable cost of equity is set out in section B.3.2.

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<sup>363</sup> Network Economics Consulting Group, *International comparison of WACC decisions*, September 2003, pp.25-26

## C Adjustment for the return on difference associated with 2007 capex

Under the building block approach to determining revenue, the return on capital building block is often the largest component of all revenue drivers. It is calculated using the opening capital base for each year of the access arrangement period multiplied by the rate of return. This means that all things being equal, a higher capital base will result in a higher return on capital allowance, which in turn results in higher revenue requirements and therefore tariffs.

The AER has adjusted APA GasNet's revised proposal on the opening capital base as at 1 January 2013 to account for the accumulated return on capital arising from the difference between estimated and actual capex in 2007. The AER has set out in this appendix:

- a description of the adjustment
- the incentive effects of the adjustment, including analysis of APA GasNet's submissions in its revised proposal regarding:
  - the interaction between the adjustment and the ongoing capex incentive
  - the scope to overestimate
- the Australian Competition Tribunal's (Tribunal) decision on whether the adjustment is open to the AER under the NGR.

### C.1 The adjustment

When the ACCC made its final decision for the 2008–12 access arrangement period, it calculated a return on capital allowance for APA GasNet. This was based on the opening capital base at 1 January 2008 and forecast capex from 2008–12 being added to the capital base. At the time when the ACCC was finalising the access arrangement (March–April 2008), APA GasNet could not report actual capex for 2007 in time to be incorporated in the final decision.<sup>364</sup> The opening capital base at 1 January 2008 therefore includes an estimate of capex for 2007.

In the draft decision, both APA GasNet and the AER updated APA GasNet's capital base roll forward to:

- remove estimated capex for 2007
- include actual capex for 2007.

APA GasNet's actual capex for 2007 was approximately \$20.0 million (\$nominal) or 21 per cent less than the estimate included in the capital base roll forward for the 2008 access arrangement decision. Based on the difference between actual and the estimate for 2007 capex, APA GasNet recovered approximately \$13.2 million of additional revenue from return on capital over the 2008–12 access arrangement.

In its draft decision, the AER therefore:

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<sup>364</sup> Typically, a short lag is involved at the end of the reporting period to provide for relevant auditing arrangements.

1. Determined the opening capital base as at 1 January 2008 using actual 2007 capex (\$72.4 million) instead of estimated capex (\$93.8 million).
2. Removed from the opening capital base as at 1 January 2013 the accumulated return on capital arising from the difference between 2007 actual and estimated capex (approximately \$13.2 million).

In its revised proposal, APA GasNet adopted the first of these adjustments, but not the second.

## C.2 The incentive effects of the adjustment

The AER has adjusted the capital base roll forward to account for the difference between actual and estimated capex for the final year (2007) of the access arrangement period. It has also adjusted for the accumulated return on capital for that difference. As discussed below, this removes the financial incentive to over-estimate total final year capex in an access arrangement period. It also removes the incentive for APA GasNet to defer efficient expenditure. A weak strategic incentive remains if APA GasNet prefers to recover its revenue earlier (a cash flow timing matter) or to influence future capex forecasts, but APA GasNet's revenues remain equal in net present value terms over the life of the asset.

In its draft decision, the AER adjusted APA GasNet's capital base to remove the return on capital that APA GasNet recovered arising from its over-estimate of 2007 capex. This is return on capital for capex that APA GasNet estimated it would spend but did not spend. This overestimate arises as shown in figure C.1:

**Figure C.1 The process for including final year capex in the capital base**

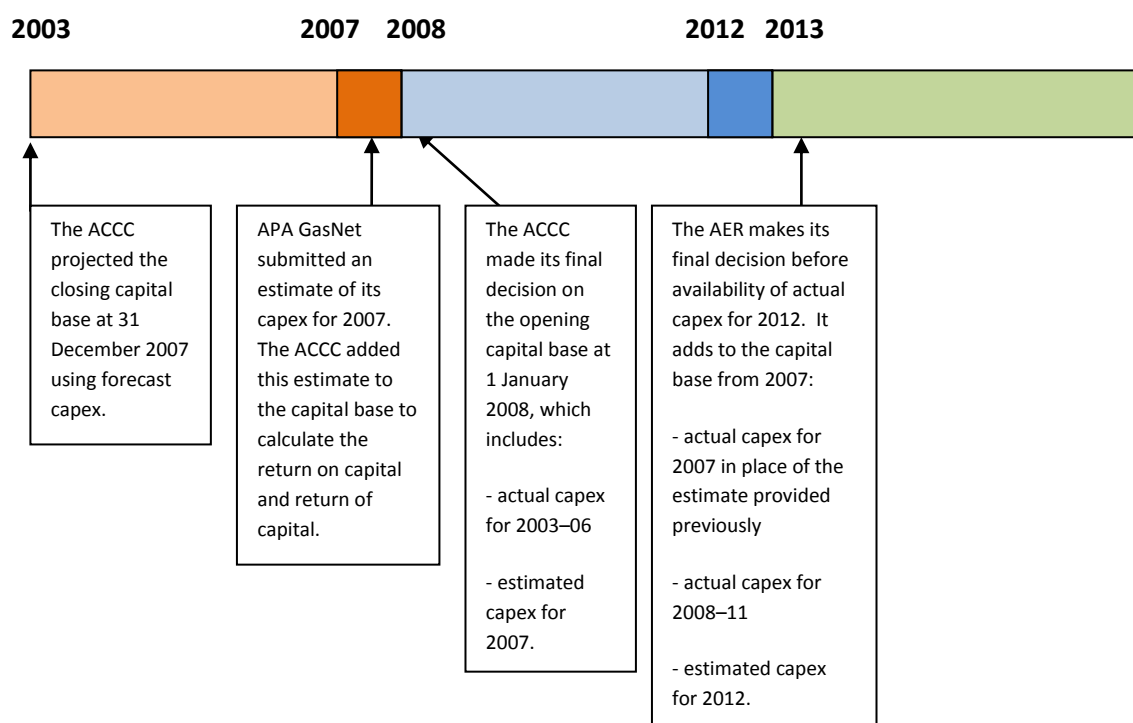


Figure C.1 The process for including final year capex in the capital baseFigure C.2 illustrates the amount by which estimated capex for 2007 exceeded actual expenditure. Both estimated and actual capex were also much higher than forecast expenditure.

**Figure C.2 APA GasNet capex from 2003–07**

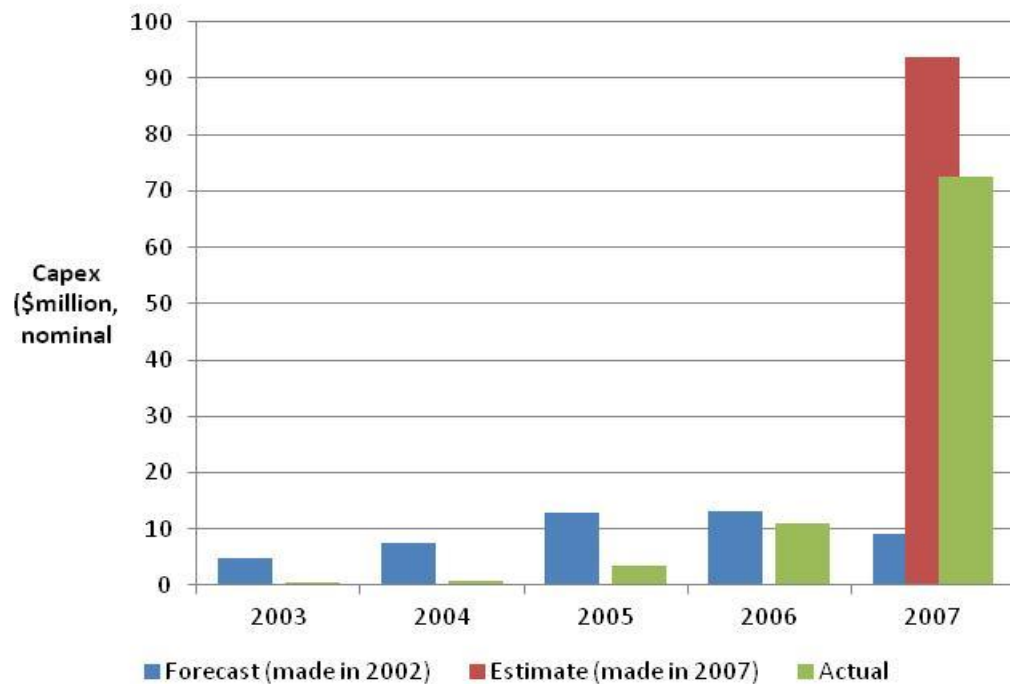
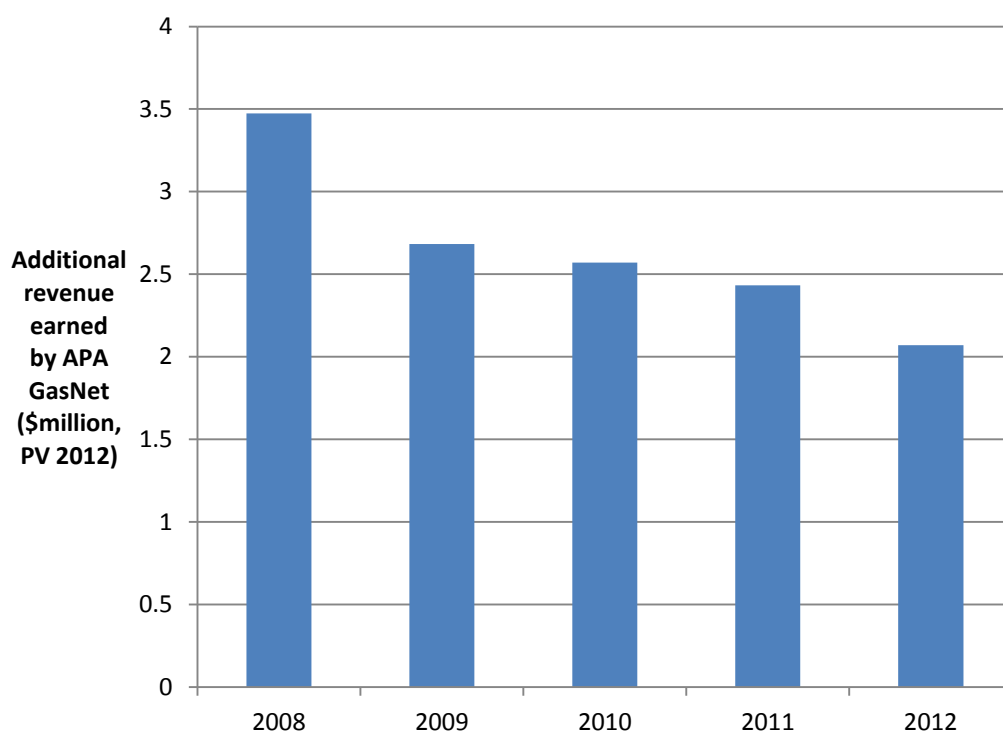


Figure C.3 illustrates the additional return on capital (revenue) (in 2012 present value dollar terms) that APA GasNet received in each year of the 2008–12 access arrangement period.

**Figure C.3 Incremental return on difference associated with 2007 capex**



Source: AER analysis.

Note: This chart is presented in 2012 present value terms. This means that cash flows have been converted into consistent units reflecting the time value of money. For example, because APA GasNet can either spend \$1 million in 2008 or invest \$1 million in 2008 at the rate of return, \$1 million in 2008 is worth the same to APA GasNet as \$1.11million ( $\$1 \text{ million} + 10.55 \text{ per cent rate of return}$ ) in 2009.

If the AER does not remove this total incremental return from the capital base, APA GasNet will keep it. For future periods, this creates an incentive to:

- over-inflate its estimate of efficient expenditure for 2012 at the time of making its proposal for the 2013–17 access arrangement – which increases estimated capex relative to the likely actual expenditure
- defer efficient expenditure – which lowers actual capex relative to the estimate.

In some cases, service providers may spend less than their capex allowance due to incremental efficiency gains made during the access arrangement period. However, not all reductions in expenditure reflect efficiency gains. APA GasNet's proposed approach would create an incentive for a service provider to over-estimate capex and then defer efficient expenditure. In typical circumstances, final year capex is not known at the time of finalising the access arrangement decision. In these circumstances, there is an information asymmetry. A service provider has more available information to estimate its final year capex than the AER has to assess it. As such, there is scope and a financial incentive for a service provider to inflate its estimate of final year capex. The AER's approach eliminates this financial incentive. Further, as the AER's approach applies symmetrically, it also ensures that a service provider does not incur any penalty if it under-estimates the final year capex.

The remainder of this appendix addresses APA GasNet's submissions that:

- The AER's approach removes the ongoing capex efficiency incentive in the final year of an access arrangement—in section C.2.1

- The incentive for over-estimation of final year capex is not relevant since the AER can require a statutory declaration of its accuracy—in section C.2.2
- The NGR does not allow the AER to make this adjustment since in APA GasNet's view it is not set out in the provisions—in section C.3.

### **C.2.1 Interaction with the ongoing capex efficiency incentive**

The AER does not agree with APA GasNet that its approach removes the ongoing capex efficiency incentive in the final year of an access arrangement. APA GasNet's revenues for 2003–07 were based on, amongst other building blocks, the forecasts of capex for each year made in 2002. The AER does not make any adjustment for the difference between this forecast capex and estimated capex for 2007. As a result, this provides an ongoing incentive over the 2003–07 access arrangement period to outperform these forecasts.

In contrast, APA GasNet's proposed approach results in an incentive for APA GasNet to overstate its final year capex estimate, or to defer efficient expenditure. Given the lumpiness of capex projects, this may create large differences between estimated and actual capex for the final year. The AER considers that the likely consequences that would arise from APA GasNet's proposed approach are detriments that outweigh the potential losses to the capex efficiency incentive where a revised estimate is made some way through the year in question.

Nonetheless, the AER accepts that the strength of the final year capex efficiency incentive in isolation depends to some extent on the subsequent estimate. However, the estimate of final year capex is generally made midway through the year to which it applies. For example, the estimate of 2007 capex was made some way through 2007. The AER considers there is limited scope for APA GasNet to make significant efficiency gains in this limited amount of time.

The following example illustrates the interaction between the AER's adjustment and the ongoing capex efficiency incentive. To avoid confusion, it is a hypothetical example referring to a generic gas service provider where the AER follows the approach other gas service providers have applied

1. At the start of the 2003–07 access arrangement period, if the AER approved a final year capex value of \$100 million for 2007, the service provider's revenues for 2007 would include a return on capital allowance reflecting this forecast.
2. Then, towards the end of that access arrangement period, if the AER approved an updated estimate of \$80 million for 2007 the opening capital base for 1 January 2008 would include a return on capital allowance based on this lower capital base. This would result in lower revenues for the 2008–12 access arrangement period compared to a scenario where the service provider's estimate of 2007 capex was equal to its initial forecast.
3. However, if the actual capex for that year was \$60 million, the AER would adjust the opening capital base at 1 January 2013 to remove the \$20 million difference, as well as the return on capital associated with the difference that arose from this overestimate.

The AER does not adjust for the excess return on capital for the difference in time value of money between the \$100 million forecast and the \$80 million estimate (as opposed to the difference between the estimate of capex and actual capex). This is recovered during the 2003–07 access arrangement period. This time value of money on the difference arises because the service provider recovers revenues based on the forecast of capex in 2007. Then, the capital base is reduced by this difference in 2008. The service provider therefore keeps the incremental rate of return on this difference for one year. This creates its ongoing capex efficiency incentive. This incentive applies symmetrically.

## C.2.2 The scope to overestimate

APA GasNet submitted that no scope exists within the NGR for APA GasNet to overestimate its capex as regulatory proposals are signed by a company officer and covered by statutory declaration. The AER accepts that APA GasNet has signed a statutory declaration to verify that, to the best of its knowledge, the information in its revised proposal is true and accurate. Nonetheless, estimates and forecasts are uncertain by nature. Because of this uncertainty, APA GasNet's estimates are likely to be chosen from a range of possible values. It is not unreasonable to expect APA GasNet to be conservative in its estimation.

APA GasNet underspent its capex estimate for 2007 by approximately \$20 million (\$nominal) or 21 per cent. This suggests that even final estimates subject to statutory declarations have significant scope for error. The AER considers that APA GasNet's proposed approach will, other things being equal, increase the incentive for APA GasNet to be conservative in its estimation. Such behaviour is consistent with the legal requirements under the statutory declaration. However, APA GasNet's past performance suggests there is still significant scope to overestimate. In contrast, the AER's approach creates a neutral and symmetrical incentive for the estimation of final year capex. It is neutral because it removes the incentive to overestimate or underestimate the amount of capex for the final year of the access arrangement period.

## C.3 The Australian Competition Tribunal decision

The AER considers that r. 77(2)(a) of the NGR allows the AER to remove any benefits or penalties associated with the difference between estimated and actual capex. The Tribunal has previously upheld this approach. In contrast, APA GasNet proposed that despite being a full discretion rule, r. 77 of the NGR does not allow the AER to make this adjustment because it does not explicitly identify the removal of any benefits or penalties associated with the difference between estimated and actual capex.

Rule 77(2)(a) of the NGR is as follows:

- (2) If an access arrangement period follows immediately on the conclusion of a preceding access arrangement period, the opening capital base for the later access arrangement period is to be:
  - (a) the opening capital base as at the commencement of the earlier access arrangement period (adjusted for any difference between estimated and actual capital expenditure included in that opening capital base);

In contrast, this adjustment is explicitly required in the NER. Schedule 6.2.1(e)(3) to the NER is as follows:

- (3) The previous value of the regulatory asset base must be adjusted for the difference between:
  - (i) the estimated capital expenditure for any part of a previous regulatory control period where that estimated capital expenditure has been included in that value; and
  - (ii) the actual capital expenditure for that part of the previous regulatory control period.

**This adjustment must also remove any benefit or penalty associated with any difference between the estimated and actual capital expenditure.** (emphasis added)

While r. 77(2)(a) does not explicitly specify this adjustment in the same manner as the NER, the AER considers that:

- nothing in the rule limits the AER from making this adjustment



- there is no sound economic reason why different capital base approaches and incentives regarding final year capex estimates should be applied to gas and electricity service providers
- the less specific wording of the NGR does not limit the AER's discretion, and does not prevent the AER from applying consistent approaches
- the Tribunal supported the AER's interpretation.

The Tribunal considered this issue in Jemena Gas Networks' (JGN) appeal of the AER's approach. The Tribunal upheld the AER's ability to make the adjustment. In particular, the Tribunal determined that:<sup>365</sup>

...neither the South Australian Minister (who made the initial NGR and NER) nor the Australian Energy Market Commission (AEMC)(the body which now makes the NGR and NER) intended that gas networks would be allowed to keep the return on capital of an over-estimation while electricity networks would not.

While the NGR does not include the explicit requirement for this adjustment, the Tribunal determined it was appropriate for the AER to 'fill the gap' in the rules. Principally, this was because the Tribunal found no reason for the NER and NGR to require different incentives for estimating final year capex. The Tribunal stated that:<sup>366</sup>

Filling the gap in the NGR is also consistent with the national gas objective of providing efficient investment in natural gas services because it minimises the incentive to overestimate the amount of capital expenditure.

The AER agrees with the Tribunal's reasoning. It has applied this approach consistently in all of its gas and electricity decisions to date, except where incentive mechanisms set by previous regulators have required a different transitional approach. As no such incentive mechanism exists for APA GasNet, the AER applied the Tribunal's approach. In contrast, APA GasNet proposed that the Tribunal was incorrect to uphold the AER's decision for JGN. APA GasNet referred to the Tribunal's statement that:<sup>367</sup>

...we would say that for the sake of clarity and in case we are wrong, it would be desirable for the rules to be amended to expressly provide for this adjustment.

The AER has not sought a rule change to make the adjustment explicit. The AER considers the current rules are sufficient and consistent with the national gas objective and the revenue and pricing principles. In particular, the AER considers its preferred approach will result in appropriate incentives to encourage efficient investment in its network by reducing the incentive to over-estimate and under-spend. The AER considers that this will promote the long term interests of consumers of natural gas with particular respect to price.

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<sup>365</sup> Australian Competition Tribunal, *Application by Jemena Gas Networks (NSW) Ltd (No 3) [2011] ACompT 6*, 25 February 2011, paragraph 55.

<sup>366</sup> Australian Competition Tribunal, *Application by Jemena Gas Networks (NSW) Ltd (No 3) [2011] ACompT 6*, 25 February 2011, paragraph 55.

<sup>367</sup> Australian Competition Tribunal, *Application by Jemena Gas Networks (NSW) Ltd (No 3) [2011] ACompT 6*, 25 February 2011, paragraph 56.

## D Depreciation

Attachment 6 summarised the reasons why the AER did not accept APA GasNet's proposed depreciation approach. This appendix details discussion on APA GasNet's proposed depreciation approach and why:

1. it would not lead to tariffs varying, over time, in a way that promotes efficient growth in the market for reference services
2. it is not needed to support APA GasNet's reasonable cash flow needs.
3. Each of these matters is discussed in turn below.

### D.1 Efficient growth in the market for reference services

This section discusses the framework the AER has applied in assessing whether the proposed change of approach would lead to tariffs varying, over time, in a way that promotes efficient growth in the market for reference services. It also assesses capacity constraints; the scenarios APA GasNet presented and others the AER considered; and other matters (for example, inflation protection, incentives to manage assets under the two approaches, and NERA's views on financing costs). This subsection begins, however, with a brief revisit of the issue of net present value (NPV) neutrality and why it is an insufficient standard to apply in these circumstances.

#### D.1.1 NPV neutrality

In the draft decision the AER agreed that the APA GasNet's proposed change of depreciation approach was largely NPV neutral.<sup>368</sup> However, there are two important points to observe regarding this standard:

1. NPV neutrality is not equivalent to efficiency. It is adopted as a standard to make sure a business is kept whole—that is, what is invested by the business is returned to it in NPV terms over the economic life of its assets. However, even if recovery of funds were, say, deferred by a hundred years in a NPV neutral way, this deferral would likely send the business bankrupt. Similarly, if customers were asked to pay for all investment immediately (again consistent with NPV neutrality) those customers could go bankrupt or simply stop consuming. Neither outcome would be efficient.
2. NPV neutrality from the business perspective is unlikely to be NPV neutral from a customer perspective. It is reasonable to assume that the current service provider will still be delivering the service into the future. Accordingly, there is scope to consider when it is optimal for the business to recover sunk costs. However, it is less certain that today's customers will also be future customers. It is even less likely customers will consume the same amount of services in each period, which would be necessary for NPV neutrality from a customer perspective.<sup>369</sup>

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<sup>368</sup> As noted by PwC, the proposed approach offers less inflation protection than the standard approach. This issue is discussed further below.

<sup>369</sup> For example, assume mortgage interest rates drop two per cent in the market. Your bank may come to you and say it is planning to keep interest rate at their previous (now higher) level on the basis that it will provide lower than market interest rates in ten years time. Such a pricing approach may be NPV neutral for the bank's perspective. However, it would not be for a customer with only 10 years left on their mortgage. That customer would pay only the higher than market interest rate and receive no benefit from the lower than market rate in the future.

These observations suggest that assessing efficiency is a broader assessment than merely considering NPV neutrality and that customers will not necessarily be indifferent to the timing of revenue recovery by a business.

## D.1.2 Framework for assessment

PwC and NERA stated the single asset example the AER used in its draft decision to highlight the recovery profile under the two approaches is too simplistic. They stated that there are many assets with overlapping asset ages that make up a service provider's capital base. The AER agrees with this observation but notes that the example in the draft decision was based on one that APA GasNet presented in its original proposal. The AER used it to highlight the underlying dynamics of the two approaches. Given that APA GasNet's proposed approach would apply to all new investments, the simplified example is relevant to show that a downward trend in cash flows was the likely outcome under APA GasNet's proposed change of approach. This has been borne out by the scenarios presented by APA GasNet and discussed below. In the draft decision, the AER also assessed the impact of the proposed change based on APA GasNet's circumstances for the 2013–17 access arrangement. It found the changed approach would increase revenues by about \$100 million in total. The scenarios below extend beyond this period. They reveal that APA GasNet would also earn additional revenues in the following two access arrangement periods.

What follows is a generalised position for determining the depreciation approach that will promote efficient development in the market for reference services, expanding on the simple example in the draft decision. Modelling scenarios based on APA GasNet's actual position are discussed later in this attachment.

### General position

The AER considers that the standard depreciation approach will generally lead to tariffs varying, over time, in a way that promotes efficient growth in the market for reference services. It is efficient that tariffs reflect costs and changes in costs over time. However, costs can be both variable and sunk. Sunk costs<sup>370</sup> do not vary with output. To recover those costs, an important economic consideration is that recovery of such costs does not unnecessarily distort customers' consumption patterns or lead to over/under utilisation of the asset over time.<sup>371</sup>

In most circumstances this would imply that sunk costs are recovered as evenly as possible over an asset's life and that revenues (and tariffs) be relatively flat.<sup>372</sup> As the scale of operations change, the revenue (and tariff) path should shift up/down to reflect the new scale of operations. The standard depreciation approach achieves such outcomes.<sup>373</sup>

Importantly, the standard approach achieves this outcome regardless of the mix of asset ages, because the profile of recovery of costs for each asset is relatively flat. This is shown in figure E.2, which takes the single asset example in the draft decision and assumes a second asset of similar size and economic life is acquired seven years (left graph) or seventeen years (right graph) after the first

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<sup>370</sup> That is, the costs cannot be readily recovered or assets deployed to other uses beyond delivery of gas.

<sup>371</sup> Not all costs the AER approves are sunk. Variable costs, such as opex, can be a significant component of overall costs. Other costs vary in relation to market conditions, such as the return on capital, which is intermittently reviewed.

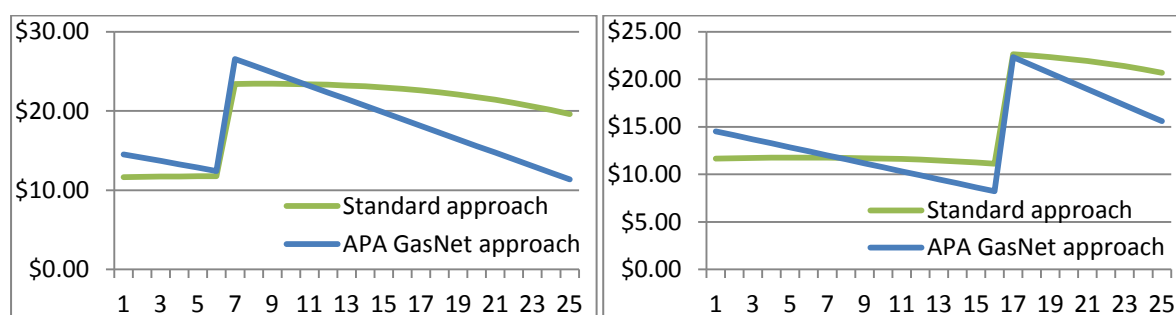
<sup>372</sup> This is consistent with PwC's generalisation of the Ramsey pricing approach.

<sup>373</sup> Tariffs need not step up the same amount, if the increased scale of operation is also reflected in increased demand. The impact of converting revenues to tariffs is the same under both approaches. Tariffs would decrease as economies of scale are realised.

asset. The revenues (and tariffs) are **flat** (around \$12) and then step up to the new scale of operation and are then **flat** again (around \$20 to 23). NERA presented a similar example in its report.<sup>374</sup>

In contrast, the revenue (and tariff) path under APA GasNet's approach depends on the mix of assets and their remaining economic lives. In the example, tariffs begin **falling** from \$15, then step up from \$13 to \$27 or from \$8 to \$23 depending on when the second asset is acquired. The tariffs then **fall** to \$12 or \$16 by year 25. APA GasNet's approach may achieve a relatively flat revenue (and tariff) path reflecting the scale of its operations. However, the mix of assets needs to be right to achieve this outcome. Therefore, the circumstances in which APA's approach will have this outcome are likely to be more limited and transient in nature than under the standard approach. This is further borne out by figure D.4 that shows the slope of the tariff path under the proposed approach is different depending on whether the draft decision or revised proposal numbers are used. In contrast the standard approach shifts up or down in a parallel fashion in figure D.4 as in the simple example presented in figure D.1.

**Figure D.1 Depreciation profile with two assets**



Source: AER analysis.

However, there are two situations where a flat tariff profile is unlikely to lead to efficient growth in the market. These are:

1. Where large lumpy investments occur with little initial demand. In this case the deferral of depreciation may be necessary to encourage asset use. Economies of scale and scope will be encouraged by having lower prices initially to encourage use of such an asset. The standard approach does not deal well with this scenario. However, neither does APA GasNet's proposed approach. The proposed approach would be even further removed from the efficient outcome. This is because it front loads depreciation and make revenues (and tariffs) even higher initially. Rule 89(2) of the NGR envisages the prospect of a significant amount of depreciation being deferred in such circumstances. NERA also commented on the need for deferral of depreciation in such circumstances and stated that both approaches have difficulty in these circumstances.<sup>375</sup>
2. Where capacity has been reached and no augmentation occurs. In these circumstances tariffs may have to rise, rather than remain flat. However, there are a variety of ways to achieve this. In the first instance, the efficient response would be to restructure tariffs to deal with any localised constraints. If the network is constrained overall, tariff structures are less relevant and the recovery of sunk costs more quickly could be an efficient way to ration supply of the fixed capacity. If augmentations occur, however, constraints can be relieved and the more general situation (described above) is most relevant.

<sup>374</sup> NERA, *Economic efficiency: Does inflation-adjusted v. Historical tariff making matter?*, p. 7.

<sup>375</sup> NERA, *Economic efficiency: Does inflation-adjusted v. Historical tariff making matter?*, pp. 7-8.

More generally, the AER considers that efficient growth in the market for reference services requires variations in tariffs to reflect variations in costs in the short to medium term.<sup>376</sup> It does not preclude tariffs being reduced through a significant adjustment between access arrangement periods if a thorough assessment of the efficient cost base has occurred.<sup>377</sup> The revenue reductions in the draft decision (and this final decision) flow from the assessment of the efficient level of costs for each of the building block components.<sup>378</sup> There were reductions in certain building blocks—for example, a lower rate of return, actual capex less than forecast for the 2008–12 access arrangement period resulting in lower opening capital base as at 1 January 2013. Some of these reductions reflect changes in market conditions. Contrary to the implication of PwC's advice, it is not efficient to use the depreciation approach to 'fill in' revenues.<sup>379</sup> The lower revenues are due to changes in efficient costs that the AER has determined. In those circumstances, it is inappropriate to maintain an existing tariff in the short to medium term. At a high level, it is also not unexpected that tariffs in 2012, based largely on forecasts made five years ago, should require an adjustment.

### Assessing the impact of constraints over time

In assessing whether tariffs should rise to reflect emerging capacity constraints, it is important to have an idea of the likely impact those constraints would have on costs. Long run marginal costs (LRMC) can provide an analytical framework for assessing the likely cost impact of emerging constraints. LRMC will be relatively high if augmentation is currently high relative to historical levels. It will increase when augmentation exceeds current levels in response to emerging constraints. This is the framework Frontier adopted in its report.<sup>380</sup> It is also consistent with the frameworks used by PwC and NERA who focused on marginal costs, although it is unclear as to whether they have a short or long run perspective on this matter.<sup>381</sup> APA GasNet and PwC presented no estimates of marginal costs, but submitted they are rising due to constraints on the network.

The AER approves prices based on average costs and the scenarios presented by APA GasNet are all in terms of average costs. Average costs are typically well in excess of marginal costs, because average costs include not just variable costs but sunk costs. The AER considers that LRMC would have to rise substantially relative to average costs before higher tariffs would be efficient, particularly if the adjustment is to occur across all tariffs. Based on the evidence submitted by both APA GasNet and Frontier, the AER is not satisfied that marginal costs will rise substantially over the short to medium term. It appears that any significant increase in LRMC is likely to occur well into the future.<sup>382</sup>

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<sup>376</sup> Costs become too speculative and lack regulatory scrutiny if a very long term view is taken on possible cost variations.

<sup>377</sup> There is likely to be an asymmetry in customers' reactions to tariff reductions and tariff increases. A tariff reduction does not represent a shock to customers because budget constraints are not an issue. They can consider their response to the lower tariff and whether they wish to expand consumption. However, customers can be shocked by tariff increases due to their budget constraint. They may find it difficult to modify their behaviour by reducing consumption in the short run. With a given budget, other services or goods would have to be foregone for them to remain with their budget constraints.

<sup>378</sup> The straight-line depreciation allowance in the draft decision is comparable with what was allowed for the 2008–12 access arrangement period. The differences are explained by APA GasNet underspending its capex allowance by about \$45 million and a reweighting of capex in the 2013–17 access arrangement period towards longer lived assets, such as buildings and pipelines.

<sup>379</sup> PwC characterised the change of depreciation approach as 'digging a hole' in the capital base to absorb future costs. PwC, *Depreciation of assets under the National Gas Rules*, November 2012, pp.13, 16.

<sup>380</sup> Frontier, *APA GasNet proposed depreciation approach*, January 2013, pp. 16–17.

<sup>381</sup> On occasion economists will make a distinction between the short run and long run. The distinction rests on what is considered in the assessments undertaken rather than the actual time period per se. For example, in the short run capacity may be fixed, but in the long run it would be variable. The AER has used here the additional concept of medium term to reflect that data limitations would hamper any assessment that attempts to forecast too far into the future.

<sup>382</sup> Frontier stated that LRMC will stay relatively low until the end of this decade and then begin to gradually rise from 2020s. Frontier, *APA GasNet proposed depreciation approach*, January 2013, p.29.

In its follow up letter, PwC submitted that Frontier's formulation of LRMC meant it 'became largely irrelevant to the choice of depreciation approach'.<sup>383</sup> The AER does not consider that LRMC is irrelevant. However, there would have to be evidence of a substantial rise in LRMC for a substantial increase in tariffs across the board (which would result from the proposed change of depreciation approach) to be efficient.

### D.1.3 Capacity constraints

The AER does not consider that capacity concerns are sufficient to justify the change of depreciation approach. The AER considers that APA GasNet may have some capacity constraints. However, these constraints are localised and could be managed in various ways.<sup>384</sup> A change of depreciation approach is an inefficient response to the emerging areas of constraint. It would impact all tariffs and all customers regardless of where the constraints are emerging. The AER disagrees with APA GasNet's submission that it cannot rebalance tariffs and the implication that the AER has unnecessarily 'unwound' adjustments to tariffs. These matters are discussed below.

The size of the impact is also substantial when compared against the potential constraints. The additional revenues APA GasNet would receive over the next five years alone are roughly as large as the entire cost of the WORM project, which is a major new project modelled in one of APA GasNet's scenarios. The costs of such large projects are usually recovered over the life of the asset which can be as much as 55 years. This further shows how significant the impact of the change of approach would be.

#### Determining the level of likely constraints

APA GasNet's proposal could have some merit if LRMCs were expected to rise significantly due to the increasing capacity constraints. PwC discussed the prospect of rising resource costs as constraints are reached and equates these costs to marginal costs. However, APA GasNet and PwC provided no estimates of marginal costs. PwC stated the AER has assumed that APA GasNet's network is not constrained and has capacity to meet demand at all times.<sup>385</sup> This is a mischaracterisation. The AER acknowledged in the draft decision the maturity of APA GasNet's existing network.<sup>386</sup> However, the AER recognised that the change of approach would also apply to new investments, which are unlikely to become immediately capacity constrained. The AER exercised its judgement that overall the standard approach would lead to flatter prices. This has now been confirmed by the scenario analysis below.

For the final decision the AER engaged Frontier to advise on the issues raised by APA GasNet and PwC. Frontier's analysis shows the extent of expected capacity constraint is not sufficient to increase LRMC significantly in the short to medium term.<sup>387</sup> The high levels of utilisation shown in the statutory declarations of APA GasNet's staff depend on two important factors. They reflect: 1) the focus on peak demand, and 2) the standard used to determine whether full utilisation has been reached. On the first matter, utilisation rates will naturally look high if the only focus is on when demand is at its greatest during a day. Increased demand at off peak times can be accommodated on APA GasNet's

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<sup>383</sup> PwC, Letter, *Re: Frontier report on APA depreciation method*, p. 2.

<sup>384</sup> By their very nature constraints are localised. The statutory declarations and Frontier's analysis discusses the current and future scope for constraints across the South West Pipeline, Northern zone and Longford-Melbourne.

<sup>385</sup> PwC, *Depreciation of assets under the National Gas Rules*, November 2012, pp. 9-10.

<sup>386</sup> AER, *Draft decision, Part 2 – Attachments*, p.116.

<sup>387</sup> Frontier, *APA GasNet proposed depreciation approach*, January 2013, p.29 & p.33.



network as utilisation rates overall are very low.<sup>388</sup> While peak demand is important, the AER considers it should not be the sole focus in determining the efficient operation of a network. It understates the scope for APA GasNet to manage constraints over the short to medium term, including through tariff restructuring.<sup>389</sup>

On the second matter, a relatively high planning standard (1-in-20 year peak demand) was used by APA GasNet for determining whether constraints exist or are likely to emerge.<sup>390</sup>

In its report, Frontier noted the difference in the utilisation percentages contained in Mr Fothergill's statutory declaration and those in the original proposal, which showed significantly lower levels of utilisation. For example, Frontier noted that the Longford-Melbourne pipelines was said to have between 82-83 per cent utilisation in APA GasNet's original proposal, but 95-98 percent utilisation in Mr Fothergill's declaration.<sup>391</sup> APA GasNet in response submitted that the utilisation figures in the original proposal were based on a 1-in-2 year peak demand (the standard for tariff setting), whereas Mr Fothergill's assessment was based on a 1-in-20 year peak demand (the standard used for planning purposes).<sup>392,393</sup>

The AER considers the planning standard APA GasNet used to determine capacity constraints is important for considering probable augmentation needs in the long run and therefore relevant to the determination of LRMC. However, it is a relatively high standard. Frontier noted that such a standard represents a probability of exceedance of 5 per cent.<sup>394</sup> Frontier also noted the only 1-in-20 peak day recorded to date was on 17 July 2007. For the five years 2008-2012 (inclusive), actual peak day system demand did not reach even the 1-in-2 year forecast.<sup>395</sup> The fact there are different standards for tariff setting shows the imprecise nature of determining utilisation over time.

Augmentation alleviates capacity constraints. APA GasNet underspent its capex allowance for the 2008–12 access arrangement period by about \$45 million or 22 per cent. This suggests it could still defer investment over this period, despite any emerging constraints. For the 2013–17 access arrangement period, the AER has approved augmentation capex that it considers sufficient to prevent any inefficient constraints developing on the network out to 2017.<sup>396</sup> Accordingly, there should be no immediate need for additional revenues (beyond the capex allowances in this final decision) to alleviate constraints.

Concerns that constraints may emerge in future access arrangement periods cannot be effectively dealt with by raising tariffs today. Allowing additional cash flows through a change of depreciation approach today will not provide APA GasNet with incentives to alleviate future constraints. Alleviating future constraints in the upcoming period may result in APA GasNet exceeding the capex allowance for the 2013–17 access arrangement period.<sup>397</sup> It would not receive revenue for that additional expenditure unless and until it gets included in the capital base. At the earliest, that would occur at the beginning of the 2018–22 access arrangement period.

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<sup>388</sup> APA GasNet, *Access arrangement information*, 31 March 2012, p. 15. APA GasNet's original proposal also shows that since 2008 annual withdrawal volumes have generally been falling. APA GasNet, *Access arrangement revision proposal submission*, March 2012, p. 54.

<sup>389</sup> Shippers can also manage constraints by a number of means including injecting LNG or injecting gas from underground storage or curtailing their loads voluntarily at certain times.

<sup>390</sup> The standard used for tariff setting is a 1-in-2 year peak demand.

<sup>391</sup> Frontier, *APA GasNet proposed depreciation approach*, January 2013, p. 18.

<sup>392</sup> APA GasNet, Letter, *Frontier Economics report on APA GasNet's proposed depreciation approach*, 5 February 2013, p.2.

<sup>393</sup> Frontier subsequently confirmed with AEMO that a 1-in-20 year planning standard is not a regulatory obligation from AEMO. Frontier, *Rejoinder to APA GasNet response*, February 2013, pp. 5-6.

<sup>394</sup> Frontier, *Rejoinder to APA GasNet response*, February 2013, p. 4.

<sup>395</sup> Frontier, *Rejoinder to APA GasNet response*, February 2013, p. 4.

<sup>396</sup> Refer to capex attachment 4.

<sup>397</sup> This assumes the capex allowance was not sufficient to alleviate the constraint in the first instance.



There is, however, scope for APA GasNet to prioritise work within the capex allowance approved by the AER. In this regard, APA GasNet noted it typically prioritises expansion of the network to accommodate changes in demand over asset replacement.<sup>398</sup> This suggests the forecast capex allowance provides APA GasNet flexibility in dealing with capacity issues. In the scenario analysis, the capex allowance assumed for future access arrangement periods are equivalent or greater than those in the draft decision. In these periods, these allowances should be sufficient to alleviate constraints. APA GasNet would also have flexibility to prioritise how these allowances are spent.

The appropriate response to any capacity constraints that emerge beyond 2017 can be best addressed through subsequent access arrangement reviews in 2017, 2022, 2027 and 2032. These reviews all fall within the period of analysis APA GasNet has used in its scenario analysis below.

Based on the data presented by APA GasNet, the Northern zone seems the most constrained at peak times.<sup>399</sup> However, the SWP will have lower utilisation on peak days during the later part of the 2013–17 access arrangement period.<sup>400</sup> This would create scope for expanding demand at peak times in this zone. In addition, Mr Mark Fothergill of APA GasNet stated that the Longford zone has sufficient capacity to provide additional service on days when either the Northern zone and/or the South West Pipeline is being fully utilised.<sup>401</sup> This is borne out by the forecast for utilisation in the Longford zone being less than 100 per cent at peak times for the entirety of the 2013–17 access arrangement period.<sup>402</sup> This suggests that the larger Longford zone can accommodate constraints in other zones even at peak times, even based on the 1-in-20 year planning standard. It also suggests that there is some scope to trade-off capacity on different parts of the network to help manage constraints that may emerge from time to time.

Over the medium term there is little prospect for a substantial increase in demand. As noted in the Frontier report, latest forecasts of demand continue a trend of downgrading of expected peak demand growth.<sup>403</sup> APA GasNet submitted that certain sources of demand had been omitted from the AEMO data that was assessed by Frontier, namely demand from gas powered generation (GPG) and gas exports and withdrawal through Iona.<sup>404</sup> These limitations in the data were further analysed by Frontier in a second (rejoinder) report. Frontier noted that APA GasNet's suggestion that GPG may be sufficient to cause a 1-in-20 year constraint relies on simultaneously high electricity demand (which creates a derived demand for GPG) and gas demand. Given that electricity demand peaks in *summer* and gas demand (that is, demand other than for GPG) peaks in *winter*, such an outcome is not credible.<sup>405</sup> Frontier concluded that demand for GPG is unlikely to trigger any significant need for augmentation until 2024–25 at the very earliest.<sup>406</sup> In terms of gas export, Frontier considered there may be a need for augmentation of the relevant assets. However, it considered that (at most) only 14 per cent of demand should face a higher price due to this potential need for augmentation. It considered that tariff rebalancing would be the efficient response to this issue.<sup>407</sup> Overall, the AER agrees with Frontier's conclusions. The AER's view is that constraints are currently relatively

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<sup>398</sup> APA GasNet, *Revised proposal submission*, November 2012, p. 83.

<sup>399</sup> Mr Robert Wheals' statutory declaration (attachment 6.2 of APA GasNet's revised proposal) stated that customers in the Northern zone of the APA GasNet's network are more price sensitive and is regularly operating at full capacity. Mr Wheals noted that from where and when gas is consumed and stored will be affected by changes in price.

<sup>400</sup> APA GasNet, Attachment 6.3, p. 3.

<sup>401</sup> APA GasNet, Attachment 6.3, p. 2.

<sup>402</sup> APA GasNet, Attachment 6.3, p.3.

<sup>403</sup> Frontier, *APA GasNet proposed depreciation approach*, January 2013, p. 19.

<sup>404</sup> APA GasNet, Letter, *Frontier Economics report on APA GasNet's proposed depreciation approach*, 5 February 2013, p. 2.

<sup>405</sup> Frontier, *Rejoinder to APA GasNet response*, February 2013, p. 5.

<sup>406</sup> Frontier, *Rejoinder to APA GasNet response*, February 2013, pp. 8-10.

<sup>407</sup> Frontier, *Rejoinder to APA GasNet response*, February 2013, pp. 11-12

infrequent and localised. The prospect for any significant augmentation due to constraints is likely to be some time in the future.

Demand for gas transportation is largely a derived demand and is unlikely to significantly increase due to lower prices, caused by the reduction in other building block costs.<sup>408</sup> The AER agrees with the EUCV's view that lower prices are likely to be needed at this time to maintain demand, that is, prevent demand falling further.<sup>409</sup> In other words, maintaining tariffs at the previous higher levels would create allocative inefficiency.

A change of depreciation approach is a very blunt instrument to deal with localised constraints and will be an inefficient (and potentially ineffective) response to such concerns.<sup>410</sup> Managing peak demand can be done through pricing structures and is already achieved to some degree by APA GasNet.<sup>411</sup> There are various tariffs that apply, not a single average tariff as presented in APA GasNet's scenarios. There are, for example, over 20 withdrawal tariff zones. Some tariffs are already significantly higher than others to reflect the higher costs of providing service to those customers. APA GasNet's tariff structure is largely unchanged from its previous approach. Injection tariffs (that account for about 20 per cent of revenues) are levied on actual flows over 10 peak injection days. This provides a peak pricing signal to some degree. However, withdrawals tariffs (that account for 80 per cent of revenues) are charged on the basis of volume with no peak charging.<sup>412</sup> Further refinements to the tariffs could have been proposed if capacity constraints were becoming a significant issue in particular locations. These increases in costs could have been reflected in the relevant customer tariffs, rather than raising overall revenues (and therefore all tariffs) through the change of depreciation approach.

APA GasNet also has the ability to rebalance tariffs within period. An individual tariff can be increased by 8.2 per cent more than the average change within period, although other tariffs would need to be reduced for APA GasNet to remain within the overall cap. APA GasNet stated the AER has 'unwound' tariff adjustments.<sup>413</sup> To the extent that costs for individual customers have risen (for example, costs were incurred to relieve a constraint in a particular locality) these costs should be reflected in the

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<sup>408</sup> A derived demand means the demand stems from a purpose other than simple consumption. For example, gas is used to fire gas powered generators. If the demand for electricity increases, then the derived demand for gas from gas powered generation would increase. In the wider economy demand for electricity and other goods that may require gas as an input is falling or slowing significantly. Accordingly the derived demand for gas could also be expected to slow and demand is unlikely to pick up until conditions in those markets improves.

<sup>409</sup> EUCV, *Victorian gas transmission revenue reset draft decision by AER: a response*, January 2013, pp. 33-35.

<sup>410</sup> When working for Allen Consulting, Jeff Balchin the author of the PwC report stated:

"[E]fficient pricing – implies that average prices should limit the scope for the regulated entity to make unnecessarily high returns (as higher prices inevitably depress upstream and downstream activity). It also implies that costs caused by customers' decisions are reflected in the prices that they face. Signalling the costs caused by decisions in prices will encourage users of the system to change their usage patterns (where such a change would be efficient) and, in turn, reduce the overall cost of providing the regulated services. ....For electricity distribution, however, it needs to be borne in mind that congestion on the network is often localised. Efficient pricing implies signalling the relative availability of capacity in different locations, so that customers take account of the relative costs caused by society by locating in different areas." Allen Consulting Group, *Principles for determining regulatory depreciation allowances*, Sept 2003, p.3.

<sup>411</sup> NERA noted the efficiency of using tariff structures in its report. NERA stated 'the way tariff practitioners improve economic efficiency is not by changing how the revenue profile is defined for individual assets but by adjusting the price signals, service terms, and ancillary charges (like line extension charges) that end-users see through tariffs'. NERA, *Economic efficiency: Does inflation-adjusted v. Historical tariff making matter?*, pp. 3-5.

<sup>412</sup> The AER understands that prior to the 2008–12 access arrangement period, there was some peak charging for withdrawals. However, APA GasNet proposed removing these at the last access arrangement review, which the ACCC accepted.

<sup>413</sup> APA GasNet, Letter, *Frontier Economics report on APA GasNet's proposed depreciation approach*, 5 February 2013, p.3.

individual tariffs. The AER should not have to 'unwind' such rebalancing if the rebalancing reflects the changes in cost reflectivity over the period.<sup>414</sup>

#### D.1.4 Scenario modelling

The scenarios presented assume real increases in future costs. These costs could reflect capex to alleviate any emerging capacity constraint or other costs that may increase in the future. The analysis is by its nature speculative. The AER has significant concerns with such speculations. However, it has also engaged with APA GasNet's submissions by carefully considering the scenarios that have been presented.

The AER agrees with PwC and Frontier that the analysis of the tariff path should be in real dollar terms. This is different to the nominal tariff paths APA GasNet presented in its revised proposal and upon which it based its conclusions.<sup>415</sup> The AER considers that the scenarios presented by APA GasNet do not show its proposed depreciation approach will lead to reference tariffs varying, over time, in a way that promotes efficient growth in the market for reference services. It shows the opposite. The scenarios show real tariff decreases under APA GasNet's approach over 20 years whereas real costs are either flat or increasing in those scenarios. In contrast, the standard approach (after an initial reduction between access arrangement periods due to other cost reductions) leads to flat or increasing real tariffs consistent with the scenarios presented.<sup>416</sup> Tariffs that track costs over the short to medium term encourage efficient utilisation of assets and provide customers with an efficient signal as to the cost of service. The proposed approach does not do this.

For example, scenario 1 as presented in figure D.2 is based on an expectation that the capex, opex and rate of return from 2018–32 will be the same as those allowed in the draft decision for 2013–17. That is, it assumes relatively constant costs into the future. However, in that scenario APA GasNet's approach leads to falling real tariffs over the entire period. The standard approach produces flat tariffs, after the initial adjustment between access arrangement periods due to reductions in other building block costs.

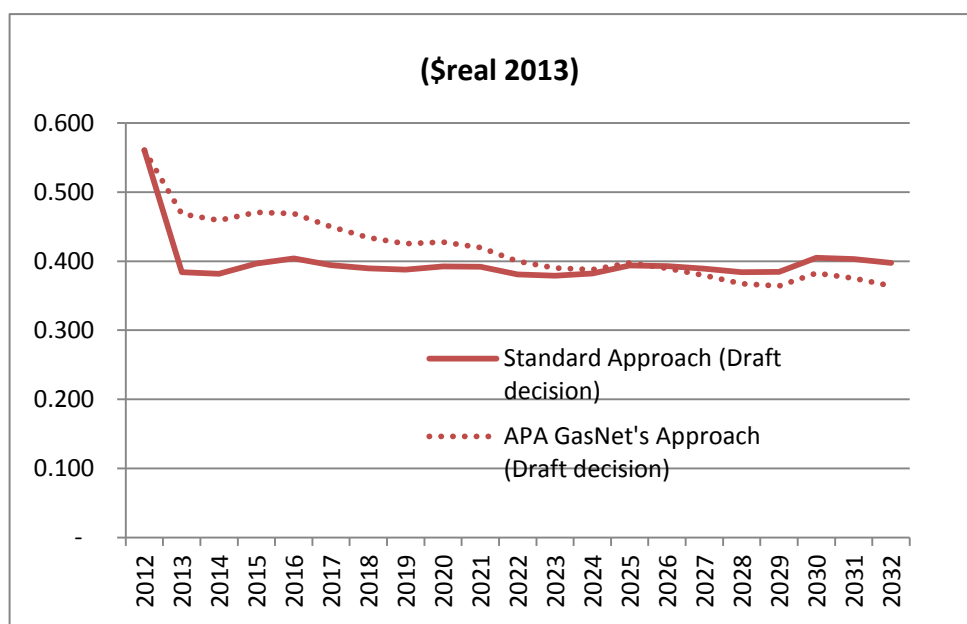
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<sup>414</sup> Forecast augmentations will also be reflected in the relevant tariffs. Therefore, no adjustment for cost reflectivity should be necessary if the tariffs appropriately reflect the efficient current and future costs (for the next five years) of providing the service.

<sup>415</sup> For example, figure 6.1 in APA GasNet's revised proposal is in nominal dollar terms. However, on page 18 of the PwC report the tariff paths for this scenario are presented in real dollar terms.

<sup>416</sup> APA GasNet made a couple of errors in its modelling of the scenarios in relation to nominal depreciation and tax depreciation. However, these errors do not noticeably affect the overall tariff pattern in the scenarios presented by APA GasNet.

**Figure D.2 Tariff paths under the two approaches – scenario 1**



PwC supported APA GasNet's approach stating that the forecast leads to 'reasonably stable' tariffs in real terms, 'albeit with a slight downward drift'. PwC also stated that 'the projected slight downward drift in reference tariffs is desirable as it would leave a capacity to absorb [a range of possible cost increases in the future] and thereby ameliorate the effect on reference tariffs.' PwC noted increases in material prices and urban encroachment on easements reducing cheap augmentation options as future cost drivers.<sup>417</sup>

For two reasons, the AER does not agree with PwC's interpretation of the efficiency of the tariff path projection under APA GasNet's approach. First, the assessment ignores the wider market conditions facing APA GasNet and the reasons for the adjustment between access arrangement periods. It is not efficient to maintain higher prices when other building blocks suggest a tariff reduction is efficient. The EUCV highlighted that under APA GasNet's original proposal, the change of depreciation approach would have lead to a significant tariff increase between access arrangement periods, rather than the decrease that emerges after the AER's adjustments to the other building blocks.<sup>418</sup> The increase in tariffs would have been 8.8 per cent from 2012 to 2013. The EUCV also highlighted the expected lower demand. The EUCV stated that lower tariffs are desirable in the face of falling utilisation and will lead to better utilisation.<sup>419</sup>

Second, if costs are assumed to be unchanged going forward as they are in scenario 1, it is unclear why a downward drift in tariffs is efficient. A flat tariff path would be efficient. Subject to the caveat of whether capacity constraints exist, PwC's own principle suggests an equal recovery of sunk costs over an asset's life. It would be logical inconsistency to then assume additional costs that have not been modelled in the scenario to support one's conclusion.

The pattern of falling real tariffs persists under scenarios 2-4 under APA GasNet's approach. In those scenarios, APA GasNet assumed real costs would increase. This does not send an efficient signal to users regarding the costs they are creating. In contrast, the standard approach tracks these cost

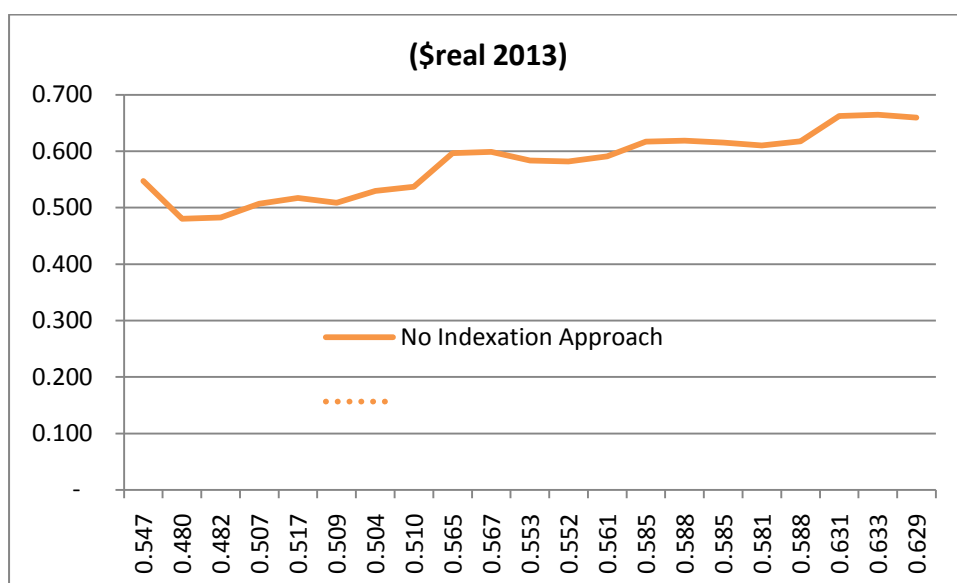
<sup>417</sup> PwC, *Depreciation of assets under the National Gas Rules*, November 2012, pp. 18-21.

<sup>418</sup> EUCV, *Victorian gas transmission revenue reset draft decision by AER: a response*, January 2013, p. 35.

<sup>419</sup> EUCV, *Victorian gas transmission revenue reset draft decision by AER: a response*, January 2013, pp. 33-35.

increases. Scenario 4, which assumes the largest cost increases (with the Western Outer Ring Main (WORM) project impacting in 2020), is shown in figure D.3.

**Figure D.3 Tariff paths under the two approaches – scenario 4**



PwC considered that scenario 4 is the most likely scenario to eventuate in the future.<sup>420</sup> However, the AER is unconvinced. For example, whether the WORM project proceeds after 2017 is not certain. Even if it does, it is unclear what the scope of the project will be.<sup>421</sup> The AER would need to assess what is the most efficient option at that time. In any event, the declining pattern of tariffs under APA GasNet's approach has not been arrested by the more generous assumption in scenario 4. The AER agrees with Frontier that it is unlikely that the WORM project will be completely additional to the capex allowances approved for 2013–17. If capex does increase (although not even this is certain) it is likely to be to a lesser extent than APA GasNet assumed. PwC in its follow up letter noted that 'merely allowing for a 1 per cent real growth in input costs would account for more than half [the increases modelled]'.<sup>422</sup> The AER considers that assuming increases in costs that are one percent greater than inflation over a number of years is not a modest assumption. No productivity improvements are assumed in these scenarios. Even if scenario 4 were to eventuate, the AER agrees with Frontier's observation that if LRMC does start rising in the future, the standard approach appropriately tracks this increase. The proposed approach does not.<sup>423,424</sup>

The declining tariff path under APA GasNet's approach becomes steeper if the scenarios are remodelled based on APA GasNet's revised proposal allowances, rather than the draft decision allowances. This shows the sensitivity of the APA GasNet approach to the assumptions on the size and timing of future costs.<sup>425</sup> In contrast, the standard approach shifts up parallel and remains relatively flat if the AER accepted the revised proposal costs in full. This is shown in figure D.4. Based on these numbers, by 2032 tariffs under the standard approach would be about 20 per cent lower than in 2012. Under the proposed approach, the tariffs would be about 50 per cent lower in real terms. Costs would have to increase dramatically to keep tariffs at previous levels under the proposed

<sup>420</sup> PwC, *Depreciation of assets under the National Gas Rules*, November 2012, p.18.

<sup>421</sup> Frontier's rejoinder report highlighted the need for regulatory scrutiny of this future project. Frontier, *Rejoinder to APA GasNet response*, February 2013, pp. 14-15.

<sup>422</sup> PwC, Letter, *Re: Frontier report on APA depreciation method*, February 2013, p. 4.

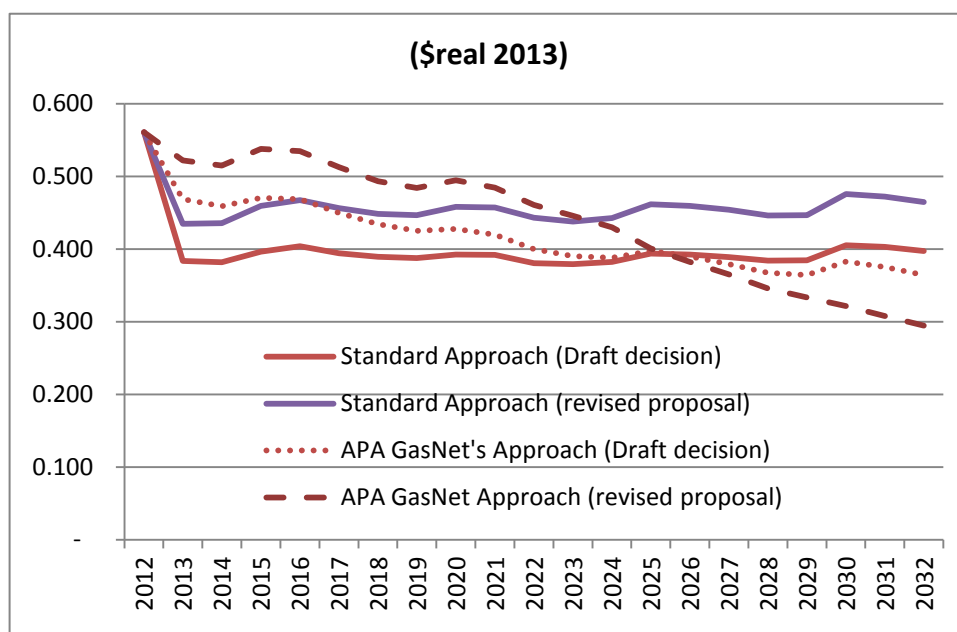
<sup>423</sup> Frontier, *APA GasNet proposed depreciation approach*, January 2013, p. 29.

<sup>424</sup> Frontier, *Rejoinder to APA GasNet response*, February 2013, p.14.

<sup>425</sup> This was also shown for a simplified example in figure 6.1.

approach. The AER considers incentives to increase future costs that are unrelated to efficiency should be avoided. It could also put APA GasNet in a far worse cash flow situation than currently.

**Figure D.4 Tariff paths under the two approaches – scenario 1**



Under APA GasNet's approach (and based on its revised proposal) it would receive additional cash flows in nominal dollar terms of about \$90 million (or 16 per cent higher revenues), \$50 million and \$5 million over the next three access arrangement periods (2013–17, 2018–22 and 2019–27) respectively.<sup>426</sup>

APA GasNet and PwC speculated on future costs beyond the scenarios they modelled. The AER considers these speculations are unhelpful. As the Frontier report indicated, additional costs would not affect the relativities of the two approaches. Both would be impacted similarly and LRMC would not be affected by the types of examples noted by PwC.<sup>427</sup> In addition, APA GasNet and PwC noted only potential sources for real cost increases in the future. But, neither mentions any areas for potential real cost decreases or productivity improvement. The AER considers that regulatory scrutiny of future costs is important for efficient growth of the market for reference services and these costs cannot be further assessed at this time.

The 'smoothing' scenarios<sup>428</sup> presented by APA GasNet are inaccurate and potentially misleading as they do not apply the AER's smoothing approach correctly. The AER aims to have the smoothed revenues in the final year of an access arrangement period as close as possible to the forecast unsmoothed revenues for that year. This prevents the step changes shown in APA GasNet's 'smoothing' scenarios. The fact that the unsmoothed scenarios lead to smoother tariffs than APA GasNet's 'smoothed' scenarios illustrates the error. PwC and Frontier did not comment on these 'smoothing' scenarios in their reports.

<sup>426</sup> This scenario was run based on the assumption that the AER accepted all of APA GasNet's figures in its revised proposal, such as the opening capital base, rate of return, opex and capex forecasts.

<sup>427</sup> Frontier, *APA GasNet proposed depreciation approach*, January 2013, p. 30. This tariff path was further discussed in Frontier's rejoinder report. Frontier, *Rejoinder to APA GasNet response*, February 2013, p.14.

<sup>428</sup> For example, see figure 6.2 in APA GasNet's revised proposal submission.



### D.1.5 Other matters

The PwC report stated there are two differences between the standard approach and APA GasNet's approach, namely the time path of revenues/tariffs and inflation protection. The first matter was discussed above. On the second matter, PwC noted the standard approach provides a degree of insulation to investors for differences between forecast and actual inflation. PwC noted that a similar outcome could be achieved under APA GasNet's approach if the assets were indexed for the difference between actual and forecast inflation. However, APA GasNet did not propose this. Under APA GasNet's approach, it will bear the gain/loss due to any difference in inflation outcomes. The AER agrees with PwC that the standard approach is better in dealing with inflation protection. A 'CPI – X' regime is based on inflation protection, which explains why CPI is part of the description of the regime. The AER considers this an important matter, although the impact is likely to be significantly less than the cash flow impact of the proposed change of approach. A one per cent error, for example, in the inflationary forecast is not insignificant. However, inflation can fluctuate year on year. Therefore, differences from one year to the next could offset each other. Expected inflation will also be forecast again in five years time at the next reset. Therefore, sustained periods of under or over estimation can be corrected intermittently. In contrast, the change of depreciation approach will have a lasting impact.

In its draft decision the AER noted the potential for inefficient asset management. For example, given the asset value is not indexed for inflation over time, this could provide APA GasNet an incentive to realise a revaluation gain on the historical cost value by selling the assets or replacing them before their useful life has ended. In its revised proposal APA GasNet submitted that there are no negative incentives with asset management under its approach.<sup>429</sup> In its report, Frontier acknowledged the AER's concerns in the draft decision. It agreed with these concerns but suggested that instances may be rare.<sup>430</sup> The AER considers that the concerns in its draft decision regarding inefficient management of assets are unlikely to propose a significant issue in the short run. However, these concerns may have relevance in the long run, as the replacement cost and historical cost of the assets diverge further each year under APA GasNet's proposed approach.<sup>431</sup> The scenario analysis indicates the significant tariff declines that can emerge from not indexing the capital base.

NERA stated that APA GasNet's approach will have lower financing costs than an indexed approach for the capital base.<sup>432</sup> It presented no evidence to support this position, but stated that such an approach is likely to be simpler and clearer. The AER considers it unlikely that there would be any inherent difference in financing costs between the two approaches. The AER releases its modelling of revenues publicly; therefore, there is no confusion as to the data used. To the extent that APA GasNet's change of approach has implications for its reasonable cash flow needs, these matters are discussed below. Also, if financing costs were inherently higher under the standard approach, a switch to APA GasNet's approach would require a corresponding reduction in the rate of return. Otherwise, the allowed revenues would be above an efficient level. Customers would not receive any benefit but the business could earn an additional return equal to the saving in financing costs. APA GasNet has not proposed such a reduction in the rate of return.

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<sup>429</sup> APA GasNet, *Revised proposal submission*, p. 83.

<sup>430</sup> Frontier, *APA GasNet proposed depreciation approach*, January 2013, pp. 31-32.

<sup>431</sup> The indexed historical cost of assets may also diverge from replacement costs. However, it should do so to a lesser degree than under the proposed approach because the assets are indexed each year for inflation under the standard approach.

<sup>432</sup> NERA, *Economic efficiency: Does inflation-adjusted v. Historical tariff making matter?*, pp. 2, 9.



NERA considered there are benefits in terms of certainty for investors in 'long standing regulatory accounting institutions'.<sup>433</sup> To the extent this is correct, the standard approach would be the correct approach. It is the standard approach in Australia, United Kingdom and New Zealand, as PwC noted.<sup>434</sup> APA GasNet's proposed approach is dominant in the United States of America, where much of NERA's experience on this matter appears to lie.<sup>435</sup>

## D.2 Reasonable cash flow needs

This section details the AER's conclusions in the attachment on the Australia Ratings' report.

### D.2.1 Australia Ratings' report

The AER considers that its final decision on depreciation will allow APA GasNet to recover its reasonable cash flow needs. Further, the AER considers this provision does not imply a specific credit rating, as discussed in the attachment. Notwithstanding this, the AER has reviewed Australia Ratings' report in detail. The AER has concerns with the use of 'shadow credit ratings' analysis to justify major changes to revenue profiles. Specifically, this analysis is subjective. Further, the conclusions in the Australia Ratings report are sensitive to several assumptions which would materially change the conclusions.

This section discusses:

- how Australia Ratings performs a shadow credit rating analysis
- the AER's concerns with Australia Ratings' assumptions and conclusions.

#### Shadow credit rating analysis

In its report, Australia Ratings performed a shadow credit rating analysis of APA GasNet. Australia Ratings identified that this is distinct from a rating of the APA Group, who owns APA GasNet, because the APA Group also has 'significant other assets, liabilities, and cash flows'.<sup>436</sup> Australia Ratings replicated the process Standard and Poor's (S&P) would go through in determining a credit rating for a firm. Figure D.5 includes the measures used by Australia Ratings and S&P to arrive at an overall credit rating. This final rating is a function of a 'business risk' profile and a 'financial risk' profile.

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<sup>433</sup> NERA, *Economic efficiency: Does inflation-adjusted v. Historical tariff making matter?*, p. 9.

<sup>434</sup> PwC, *Depreciation of assets under the National Gas Rules*, November 2012, p. 6.

<sup>435</sup> The ATCO submission included the resume of Dr Makholm, author of the NERA report.

<sup>436</sup> Australia Ratings, *Assessment of implied credit ratings arising from the Australian Energy Regulator's draft decision on access arrangements for APA GasNet Australia (Operations) Pty Ltd for 2013–17*, November 2012, p. 11.

**Figure D.5 Business and financial risks profile matrix**

Business Risk Profile	--Financial Risk Profile--					
	Minimal	Modest	Intermediate	Significant	Aggressive	Highly Leveraged
Excellent	AAA/AA+	AA	A	A-	BBB	--
Strong	AA	A	A-	BBB	BB	BB-
Satisfactory	A-	BBB+	BBB	BB+	BB-	B+
Fair	--	BBB-	BB+	BB	BB-	B
Weak	--	--	BB	BB-	B+	B-
Vulnerable	--	--	--	B+	B	B- or below

Source: Australia Ratings, *Assessment of implied credit ratings arising from the Australian Energy Regulator's draft decision on access arrangements for APA GasNet Australia (Operations) Pty Ltd for 2013–17*, November 2012, p. 24

The business risk profile and financial risk profile are made up of the factors shown in table D.1. They are consistent with those S&P uses in its analysis of businesses subject to regulation.

**Table D.1 Factors in the business and financial risk profile assessment**

Business risk profile	Financial risk profile
Regulation	Liquidity
Markets	Cash flow adequacy
Diversification	Capital structure and liability management
Operations	Financial flexibility
Competitiveness	–

Source: Australia Ratings, *Assessment of implied credit ratings arising from the Australian Energy Regulator's draft decision on access arrangements for APA GasNet Australia (Operations) Pty Ltd for 2013–17*, November 2012, p. 24

Australia Ratings made assessments for each of these factors to arrive at an overall score for the business risk profile and an overall score for the financial risk profile. Except for the cash flow adequacy component, these factors are qualitative judgements. They rely on comparisons against APA GasNet's electricity and gas network peers. Australia Ratings then combined these scores to form an estimate of the credit rating using the matrix in figure D.5. For example, an excellent business profile combined with a 'significant' financial risk profile would result in an A– rating.

### Australia Ratings' assumptions and conclusions

The AER considers that there is insufficient evidence to demonstrate that APA GasNet will not receive a BBB+ credit rating. Rather, the AER considers that the analysis is sensitive to contentious assumptions which in several cases it disagrees with. Australia Ratings has not tested the sensitivity of the conclusions to these assumptions in its report. Due to the untested sensitivity of these assumptions, the AER considers little or no weight should be placed on this sort of analysis in assessing revenue decisions.

Australia Ratings concluded that APA GasNet would likely receive an 'excellent' (highest possible) business risk profile. This business risk profile is made up of a series of sub-categories. One of these categories is for 'regulation', where Australia Ratings rated APA GasNet as 'on par' with its network peers. As identified by S&P, 'regulation is the most critical aspect that underlies regulated utilities'

creditworthiness'.<sup>437</sup> In contrast, Australia Ratings concluded that APA GasNet would be scored as having an 'aggressive' financial risk profile.

The AER does not agree with Australia Ratings' assessment of APA GasNet's financial risk profile. The AER's concerns are set out below in line with the four factors underlying the financial risk profile. These are summarised in Australia Ratings' conclusion table, which is repeated in figure D.6.

**Figure D.6 Australia Ratings' assessment of APA GasNet financial risk profile**

	Comparison With Australian Network Peers
<b>Liquidity</b>	Adequate
<b>Cashflow Adequacy</b>	Comparable with that of 'BBB-' and 'BBB' peers
<b>Capital Structure and Liability Management</b>	Above average
<b>Financial Flexibility</b>	Weaker than average
<b>Overall Financial Profile Score</b>	<b>Aggressive</b>

Source: Australia Ratings, *Assessment of implied credit ratings arising from the Australian Energy Regulator's draft decision on access arrangements for APA GasNet Australia (Operations) Pty Ltd for 2013–17*, November 2012, p. 24

**Liquidity**—The AER does not accept Australia Ratings' analysis of APA GasNet's liquidity. Specifically, Australia Ratings' liquidity analysis includes the observation that the AER has not made any allowance for working capital. This ignores the AER's conservative cash flow timing assumptions, which the AER maintains to ensure adequate liquidity.<sup>438</sup> In 2002, Allen Consulting Group (ACG) provided the ACCC with a report on working capital and the post tax revenue model (PTRM) for gas service providers. In this report, ACG concluded that the ACCC's timing assumptions were likely to exceed the working capital service providers require to maintain adequate liquidity.<sup>439</sup> Specifically, using 2001 as the test year, ACG found that the cash flow timing assumptions in the gas PTRM provided an example service provider with revenue of 1.8 per cent greater than the target revenue. The AER's PTRM is derived from the ACCC's PTRM. However, in 2007 the AER updated the PTRM to assume capex was incurred in the middle of each year, while still assuming that revenues were recovered at the end of the year. Because of this, the AER compensates the service provider for an additional half a year of return of on capital. This increases the benefit to the service provider beyond that considered in the ACG report.

**Cashflow adequacy**—The AER does not agree with Australia Ratings assessment of cashflow adequacy. Specifically, the cashflow adequacy assessment depends primarily on a series of credit rating metrics. Based on the draft decision allowances, Australia Ratings has compared its estimated credit ratings metrics for APA GasNet against average credit ratings metrics for a set of comparison firms. The AER considers that the credit ratings metrics analysis in the Australia Ratings report is not robust for the following reasons:

<sup>437</sup> Standard and Poor's, *Key credit factors: Business and financial risks in the investor-owned utilities industry*, November 2008, p. 8.

<sup>438</sup> The AER has recently addressed this issue in its draft decision for Envestra. Envestra's proposal contained an amount for liquidity costs. The AER's draft decision did not accept this and removed the proposed amount. The AER referred to analysis of the PTRM timing cash flow assumptions, which shows that the allowed buffer more than offsets these costs. Envestra's revised proposal adopted the AER's draft decision. See, AER, *Envestra draft decision*, September 2012, pp. 198–201.

<sup>439</sup> ACG, *Working capital—Relevance for the Assessment of Reference Tariffs*, March 2002, p. 2.

- The use of average metrics is misleading, because it only shows the average point of a range of values. Australia Ratings confidentially provided these values to the AER. The AER confirms that there are such ranges amongst the underlying data. To illustrate the problem with averaging ranges, suppose two hypothetical firms with A– credit ratings have funds from operations (FFO) interest cover ratios of 2.7 and 3.3 respectively. The average point estimate of this range is 3.0. Now, a third comparator firm with an FFO ratio of 2.8 would fall below the average despite fitting within the range. This would suggest a rating below A– for this comparator firm using Australia Ratings' approach. However, the comparator firm's ratio is higher than the 2.7 ratio of a firm with the A– rating. Therefore, in this case, Australia Ratings' approach of using average metrics cannot be relied upon to conclude that the comparator firm would (would not) achieve an A– rating.
- These average credit ratings are based on a small set of comparator firms, which limits the strength of the conclusions. Specifically, the Australia Ratings report indicated that the credit ratings metrics are based on five years of data. However, the AER confirmed with Australia Ratings that it is actually based on one year of data and that the five year label was an error.<sup>440</sup> The underlying data includes single observations for 13 comparator firms, of which some ratings are estimated using only one firm. The AER considers that such small samples of data do not result in robust conclusions, and are highly sensitive to peculiarities of individual data points.
- S&P and Australia Ratings both identify that credit rating metrics are less important than other factors in determining credit ratings for regulated utilities.<sup>441</sup> However, Australia Ratings concludes that a change to APA GasNet's depreciation allowance would increase the likely credit rating from BBB to BBB+. This change in depreciation allowance only affects the credit rating metrics in Australia Ratings's analysis. If a change in the credit rating metrics is enough to change the conclusion to this extent, this suggests that either:
  - Australia Ratings has placed incorrect weight on credit rating metrics in forming its conclusion
  - The overall conclusion is even more sensitive to other factors discussed in this section. This supports the AER's conclusion that the report is too sensitive to questionable analysis.

**Financial flexibility**—The AER does not agree with Australia Ratings' analysis of financial flexibility. Australia Ratings identified that the 'capital structure and liability management' and 'financial flexibility' categories are more important than the cashflow adequacy scores. This suggests that the financial risk profile is particularly sensitive to Australia Ratings' conclusions on financial flexibility. The AER considers the following:

- Capital expenditure flexibility—APA GasNet has demonstrated strong capex flexibility. For example, APA GasNet deferred \$45 million or 22 per cent of its forecast capital expenditure during 2008–12. In comparison, the Victorian electricity distribution network service providers underspent their capex allowances by 2 per cent on average from 2006–10. These service providers make up several of the comparator firms in Australia Ratings' sample. There are many different reasons a service provider might defer its capex. However, the magnitude of APA GasNet's underspend suggests APA GasNet has relatively great flexibility to defer capex compared to its peers.
- Scope for asset sales—Australia Ratings has not compared APA GasNet's scope for asset sales on a like-for-like basis with its peers. Specifically, Australia Ratings stated that APA GasNet is

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<sup>440</sup> Australia Ratings, *Response to AER information request 4a*, 4 December 2012.

<sup>441</sup> Australia Ratings, *Assessment of implied credit ratings arising from the Australian Energy Regulator's draft decision on access arrangements for APA GasNet Australia (Operations) Pty Ltd for 2013–17*, November 2012, p.14.

indivisible and has no incremental financial flexibility from potential asset sales.<sup>442</sup> However, Australia Ratings has not provided any direct evidence suggesting that APA GasNet has less scope to sell its assets than other networks. Further, Australia Ratings has compared APA GasNet as a stand-alone entity against other service providers without adjusting for their ownership structures. In all cases, these other service providers are owned by parent firms with multiple network assets. The AER considers this is not a like-for-like comparison and introduces bias into the conclusion. This is because a stand-alone network will generally appear riskier than a diversified network with parental support. So, by hypothetically assuming APA GasNet does not have ownership support, it will always appear riskier than real world peers in the sample who do. In reality, APA GasNet does have ownership support from the APA Group. This suggests that the APA Group has at least as much flexibility for asset sales as its peers because it owns 'a substantial and high quality portfolio of pipeline assets'.<sup>443</sup> To this end, the AER notes APA Group recently undertook to divest some of its network assets as part of its undertaking to acquire Hastings Diversified Utilities Fund.<sup>444</sup>

- Ownership support—As with the scope for asset sales, Australia Ratings' conclusion is biased because it artificially compares APA GasNet as a stand-alone network against real-world peers that are unadjusted for ownership support. In reality, APA GasNet does have ownership support comparable to that of its peers.

The AER considers that adjusting for the matters above could improve APA GasNet's score on its financial risk profile. If APA GasNet moved up only one score on the financial risk profile to 'significant', it would receive an A– credit rating using the matrix in figure D.5. An A– rating is two levels higher than the BBB credit rating determined by Australia Ratings for APA GasNet, and one level higher than the benchmark BBB+ credit rating used to determine the allowed cost of debt. Using APA GasNet's logic, an A– rating would suggest APA GasNet was receiving more than reasonable cash flow needs. This demonstrates the sensitivity of the approach to contentious qualitative judgements. The AER considers the Australia Ratings report is too imprecise to draw robust conclusions about the likely credit rating to be attributed to APA GasNet as a stand-alone network.

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<sup>442</sup> Australia Ratings, *Assessment of implied credit ratings arising from the Australian Energy Regulator's draft decision on access arrangements for APA GasNet Australia (Operations) Pty Ltd for 2013–17*, November 2012, p. 22.

<sup>443</sup> JP Morgan, *Utilities 2013 outlook—Regulatory risks recede; ORG and SKI preferred*, January 2013, p. 1.

<sup>444</sup> APA Group, *Undertaking to the Australian Competition and Consumer Commission*, July 2012.