

Energy Networks Association: Benchmark term of debt assumption

*Energy Networks
Association*

*Benchmark debt period
assumption*

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Executive summary

The Brief

The Energy Networks Association ('ENA') engaged PricewaterhouseCoopers ('PwC' or 'we') to advise whether the 10 year benchmark debt term assumption continues to be appropriate to apply in estimating the debt risk premium consistent with the observed borrowing practices of comparable entities.

The 10 year benchmark debt term assumption

First principles analysis

We define the benchmark regulated business as a privately owned business that, is regulated on a 5 year regulatory cycle and geared to 60 per cent of its regulated asset base (RAB).

A key issue to be considered is how the nature of the regulatory regime affects the debt financing practices of regulated entities and, in particular, whether firms that are subject to 5 yearly price reviews are able and also motivated to align their debt refinancing with their price resets.

We expect that the benchmark privately owned firm with a relatively high debt component in its capital structure will perceive refinancing risk as one of the key risks for the entity. As such, it would be expected to structure its debt financing and refinancing practices so that its annual debt refinancing task is limited to a prudent level and is also diversified across funding sources so that the firm is not unduly exposed to events that may reduce the supply of debt finance at any particular time or from any particular source. For example, Australian regulated businesses in the energy sector are observed to obtain debt funding from three major sources:

- Domestic bank debt;
- Domestic bonds; and
- International bonds.

During the Australian Energy Regulator's (AER) review of the term of debt issuance in 2009, several regulated energy businesses provided confidential information that showed an average term of 10.14 years.¹ The AER accepted that a 10 year term continued to be a reasonable assumption for estimation of the debt risk premium, but noted that the term of issuance would be reducing due to the closure of bond markets and the observation that many businesses were refinancing expiring debt with shorter term bank loans. This raises the empirical question of whether the process of bank loan substitution that was observed by the AER has continued, and whether the average term of debt at issuance has fallen or risen since the time of the AER's review of this matter.²

¹ Australian Energy Regulator (May, 2009), *Electricity transmission and distribution network service providers – Review of the weighted average cost of capital (WACC) parameters*.

² A separate matter that is not addressed in this report is whether the equity beta of a regulated business would remain constant if the term of debt fell and so the exposure to refinancing risk of the regulated business increased.

Methodology to estimate the weighted average of debt at issuance

Based on applying industry selection criteria in the Bloomberg Service, we selected three samples of regulated gas/electricity transmission/distribution businesses operating in Australia, the UK and US. The US and UK samples were used for illustration rather than as direct or equal comparators for the Australian data because of differences in their operating environments.

The Australian sample was comprised of 5 businesses engaged in energy transmission/distribution:

- APA Group
- DUET
- Envestra Limited
- Spark Infrastructure
- SP AusNet

Different data sources were applied depending upon the country of origin of the firms in the sample.

- For the 22 US firms in our sample we were able to obtain the required information directly from the SNL Financial database, which provided an accurate summary of the term of debt at issuance for all 22 firms.
- For the 5 Australian and 6 UK sample firms we estimated the term of debt at issuance from data contained in Bloomberg, Loan Connector, and the most recent published annual balance sheet.

The weighted average term at issuance was used to estimate the benchmark debt term assumption because it represents the average tenure of debt issued by benchmark firms, and therefore the relevant piece of information the AER should have regard to.

We note that for the Australian and UK firms, our approach was to build up a database of the debt on issue (and issuance terms) based on two sources – Bloomberg and Loan Connector – and then to reconcile this to the information contained in the latest published annual balance sheet.³ We note that this method required some estimation, however, we are confident that the estimation error is very low (an indication of the potential estimation error is provided in the text).

Empirical evidence

Our analysis of debt issuance terms in Australia, the UK and US revealed that the current debt of regulated infrastructure businesses was issued with a weighted average term in the range of 10 to 21 years.

- For the Australian sample we found that the average term of debt at issuance across the sample of firms at the time of the last balance sheet date for the

³ For Australian firms the latest balance sheet information ranged from September 2012 to December 2012, and for UK firms all information was as at 31 March, 2012.

relevant firm (September 2012 or December 2012) is 10.21 years,⁴ which is similar to the average issuance term of 10.14 years observed for a number of Australian energy network businesses prior to the global financial crisis (2007)

- For the sample of UK regulated energy and water transmission/distribution businesses we found that the current (31 March, 2012) weighted average term of debt at issuance is 21.3 years, and
- For the sample of US regulated energy transmission/distribution businesses we found that the current average term of debt at issuance across the sample is 18.9 years.

We expect that the longer debt terms achieved in the US and UK are due to access to deeper and more liquid long term debt markets in these locations.

Conclusion on 10 year benchmark debt term assumption

From the empirical evidence, we conclude that regulated infrastructure businesses in Australia, the UK and the US strive to reduce re-financing risk by increasing the term of debt at issuance. In the UK and US, the greater access to deep capital markets has resulted in average debt terms at issuance of close to 20 years, while in Australia a weighted average debt term at issuance of 10.21 years is observed. Based on this evidence, we consider that the 10 year benchmark debt term assumption continues to be appropriate to apply in estimating the debt risk premium consistent with the observed borrowing practices of comparable regulated network energy distribution entities.

⁴ The term of debt at issuance for each firm is taken as the weighted average for that firm, where the principal amounts are used as the weights. The figure for the sample from each country is the simple average of the figures for each firm.

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1 Background, scope and overview

1.1 Scope

The Energy Networks Association ('ENA') has engaged PricewaterhouseCoopers ('PwC' or 'we') to address the following matter:

- Advise whether the 10 year benchmark debt term assumption continues to be appropriate to apply in estimating the debt risk premium consistent with the observed borrowing practices of comparable regulated network energy distribution entities.

The precise terms of reference can be found in Appendix B.

1.2 Structure of the report

This report is structured as follows:

- In Chapter 2 we consider debt issuance from first principles and discuss the data sources and methodology that have been applied in the current study.
- Chapter 3 provides the empirical evidence on the term of debt at issuance for Australian, UK and US infrastructure firms engaged in the provision of energy and water utility services.

2 *The debt period benchmark assumption*

2.1 Introduction

In this chapter we consider from first principles the specific characteristics of regulated infrastructure businesses that influence the strategy that they apply to manage their indebtedness. In particular, we focus on the requirement to spread the maturity profile of debt in order to reduce re-financing risk. We then review the evidence on debt issuance that was presented in the course of the AER's 2009 WACC review.

2.2 First Principles Analysis

2.2.1 Characteristics of regulated infrastructure

The typical benchmark regulated business is assumed to have a substantial amount of debt, with this assumed to be maintained at 60 per cent of the value of the enterprise. From first principles we would expect a typical benchmark regulated business to issue debt for a period longer than 5 years. A prudent debt manager would seek to issue debt that leads to a relatively even and manageable debt refinancing task in each year. Limiting the annual refinancing obligation reduces the exposure of the firm to events in financial markets that may make refinancing difficult or excessively costly. The annual refinancing task is related to the term of debt at issuance – putting aside growth, if ten year debt is issued and structured so the refinancing task is constant, then 10 per cent of the portfolio would need to be refinanced each year, with this doubling to 20 per cent if 5 year debt is issued. Sources of debt funding

The major sources of debt funding that are, or have recently been, available to Australian regulated infrastructure firms are:

- Bank debt, which includes:
 - term debt – a set amount of money borrowed and repaid in periodic frequencies much like a home loan.
 - revolvers – a line of credit that a business can draw down and repay as it needs
 - facilities – a stand-by amount of debt that a bank has provided for a business to draw down as necessary.

Typically, the domestic bank debt market provides loans for terms of 3 to 5 years, with terms greater than 5 years generally being rare (but more common in the case of regulated utilities). Bank debt facilities are often used to provide 'head room' for contingencies, capital expenditure programs, liquidity, or initial funding for acquisitions. A large portion of these bank facilities may remain unused.

- Domestic bond market:

- Medium Term Note (MTN) market
- CPI indexed bond market

The CPI indexed bonds have been issued for long (10 years plus) terms in the past, but the market is currently inactive.⁵ The issuance term for domestic MTNs is typically in the range of 3 to 13 years.

- Offshore capital markets
 - USPP (Private Placement) market – this US-based market provides issuance terms between 5 and 30 years.
 - US144A public market - this US-based market provides issuance terms between 5 and 30 years.
 - European (Eurodollar) and Asian bond markets.
 - We note that significant volumes of long-term debt are being raised in international capital markets, which assists Australian regulated businesses to complete their large funding programs as well as helping to address refinancing risk. If access to international markets was not available, it is likely that shorter borrowing profiles would result, and the refinancing risk faced by Australian firms would be higher.
- Credit wrapped domestic bonds
 - Prior to the global financial crisis, a number of international ‘monoline insurers’ (e.g. MBIA and AMBAC) operated in the Australian bond market, providing insurance cover that enabled bonds that would otherwise be rated BBB+ to be re-rated AAA.
 - The AAA credit rating enabled issuing firms to achieve longer debt terms, and to thereby manage their re-financing risk without greater resort to international debt markets.
 - The monoline insurance industry no longer exists as it collapsed in the global financial crisis, and the long term bonds issued during that period are still part of the capital structures of Australian network infrastructure businesses (albeit, now generally re-rated to the BBB credit rating band).

2.2.2 Characteristics of the benchmark firm

We have assumed that the ‘benchmark’ is a business that is regulated on a 5 year regulatory cycle, and in keeping with the principle of competitive neutrality, is privately owned.

The key question that is being addressed empirically in this report is whether the form of regulation may affect the debt financing practices of a prudent and efficient benchmark firm, for example, by reducing the term and/or timing of borrowings to match the 5 yearly price review cycle. Flowing from the discussion above, a critical concern for such a firm is how shortening the term of debt may affect refinancing risk.

⁵ In general, debt is issued in nominal terms and therefore has inflation risk.

2.2.3 Distinguishing management of interest rate risk from management of re-financing risk

As discussed above, we would expect a benchmark efficient firm to manage refinancing risk by adopting a debt portfolio that limits its annual debt refinancing task to a prudent level, while also being diversified across funding sources. The conclusion that we reach from first principles (and confirm from empirical observation in the following chapter) is that it is not efficient for regulated firms to match the maturity of their debt borrowings with the term of the regulatory cycle in view of the re-financing risk this would create.⁶

We note, however, that it has been argued that regulated firms are able to reduce their interest rate risk by using swaps to match the term of the base interest cost that they pay to the term of the regulatory period. While we note that the question of the feasibility or appropriateness of such a strategy is beyond the scope of the current report, we observe that it is not possible to use derivative instruments to alter the debt risk premium that the firm bears. That is, interest rate swaps as discussed above can only alter the firm's exposure with respect to the base interest cost – the regulated firm will still have to pay a debt risk premium that reflects the original term at issuance. Hence, it remains necessary to estimate the debt risk premium for the period of actual benchmark debt issuance and hence necessary to establish just what term this implies.

2.3 The AER's position on the term of debt issuance

The issue of the average term of debt issuance for regulated electricity network businesses was raised in the 2009 review of the Weighted Average Cost of Capital (WACC) for electricity transmission and distribution businesses undertaken by the AER.⁷ Initial advice provided to the AER by Deloitte indicated that the remaining term to maturity of debt issued by regulated infrastructure businesses was significantly less than 10 years, and 'expected that average maturities will drop rapidly given the current state of markets.' On the basis of this evidence the AER's draft report foreshadowed a reduction of the benchmark debt term assumption to 5 years.

Subsequent to the AER's draft report, the Joint Industry Associations (JIA), which represented the businesses, demonstrated that the remaining term of debt on issue will be close to half of the term of debt at issuance. It submitted a table outlining the weighted average term of debt portfolios of four energy businesses, as reproduced in Table 2.1 below. On a confidential basis, the Treasurers of the businesses provided the AER with a breakdown of the debt portfolios, which were reconciled to the 2007 annual reports of these businesses.

As noted by the AER, the additional information provided by the businesses confirmed that during 2007 these energy transmission and distribution businesses were re-financing on average every 10 years. The AER conceded that re-financing risk is a major concern for capital intensive infrastructure businesses, and that as a result these businesses will seek to issue long term debt.

⁶ This would imply refinancing all of its debt at the beginning of each regulatory period.

⁷ Australian Energy Regulator (May, 2009), *Electricity transmission and distribution network service providers – Review of the weighted average cost of capital (WACC) parameters*.

Table 2.1 JIA submission – weighted average term of debt portfolios (2007)

Business	Ownership	Amount (\$m)	Average term (years)	
			To maturity	At issuance
Citipower & Powercor	Private	2,532.0	5.65	10.40
ETSA Utilities	Private	2,353.5	7.11	10.81
SP AusNet	Private	3,662.8	4.47	7.27
Envestra	Private	1,960.9	10.91	14.39
Total		10,509.1	6.55	10.14

Source: JIA

2.4 Conclusion

As the work undertaken by the JIA and AER in connection with the review of WACC parameters in 2009 (based on 2007 evidence) is becoming dated, there is a need to review and update the current evidence on the term of debt at issuance. This is particularly important given the dislocation to capital markets that occurred as a result of the global financial crisis. During the height of the global financial crisis (2008 and 2009) we observed that the Australian bond market was closed for a time, and there was a great emphasis placed on re-financing long term bonds with shorter term bank debt.

In its 2009 analysis, the AER observed that in the global financial crisis regulated businesses were re-financing expiring debt with shorter term bank loans, and that it was therefore likely that the average term at issuance was falling. Since 2010 there has been much greater activity in the Australian bond market, and casual observation suggests that Australian firms have been approaching international bond markets to obtain longer term debt. The net outcome of these processes is considered in the empirical analysis that follows.

3 Empirical Evidence on the term of debt at issuance

3.1 Introduction

In this chapter we examine the current empirical evidence on the benchmark term of debt at issuance for regulated infrastructure businesses. The chapter commences with a description of the approach that we used to select the sample of infrastructure businesses in Australia, the United Kingdom and the United States. Next, we describe the methodology that we applied to estimate the term of debt at issuance for the sample group of businesses. Finally, we present the results of our analysis in tabular form.

3.2 Sample selection for the current study

Our Scope of Work required us to examine the term of debt at issuance by regulated infrastructure businesses in Australia, the United Kingdom and the United States. The US and UK samples were used for illustration rather than as direct or equal comparators for the Australian data, because of differences in their operating environment.

We applied the following procedure to derive our representative samples of infrastructure companies for these countries:

- The first step was to create an initial expanded sample of infrastructure companies from the UK, USA and Australia. Bloomberg has a large repository of privately and publicly owned companies around the world. Using the Bloomberg data terminal, we requested a list of stock market listed businesses that fall within Bloomberg's industry classification framework of energy and water in the UK, USA and Australia.
- The second step was to filter the initial expanded sample by removing non-infrastructure businesses. The initial sample was based on broad industry classifications and was likely to include non-infrastructure businesses. For example, gas exploration companies may be included in the initial expanded sample because they are an energy business. Using Bloomberg's descriptions of a firm's operations and purpose, we filtered the initial expanded sample by removing businesses that do not derive the majority of their revenue from an infrastructure arm.
- For the US sample we took the additional step of excluding businesses that are not primarily involved in the transmission and/or distribution of electricity and/or gas. Since the US energy transmission and distribution industry is large, we were able to obtain a highly relevant sample of comparable businesses while maintaining a reasonable sample size. On the other hand, comparable UK industries have fewer firms, so we retained regulated water network infrastructure businesses as appropriate comparators for regulated gas network infrastructure businesses. We would have done the same in Australia if there were listed regulated water businesses.

- Finally, we considered that businesses that have achieved a reasonable scale are more representative of the benchmark firm, and have therefore included firms with outstanding debt in excess of \$AU 500 million.⁸

3.3 Methodology applied to estimate term of debt at issuance

This section describes the process we applied to estimate the weighted average term of debt at issuance for the sample firms. We first discuss how we established a robust data set, and then describe how we estimated the weighted average term of debt.

3.3.1 The data and debt term estimation methodology

The purpose of this report is to estimate the weighted average term of debt at issuance for the current debt portfolio held by our sample of US, Australian and UK businesses. To construct the weighted average term, for each debt item we obtained values on the type of debt, the issue date, the maturity date, the amount issued, the amount outstanding, and the currency it is denominated in.

The way in which we constructed our corporate bond and bank debt data (debt data) depended on whether the company was from the US or from Australia/UK. We have explained the approach taken for US and Australia/UK separately below.

US companies

We constructed our US debt data using information from SNL Financial (SNL). SNL is a comprehensive source, which allows a precise calculation of the term of debt at issuance for all forms of debt obtained by firms in its database. The database includes debt issued historically and have matured as well as debt currently held by companies. Since our focus is on the term at issuance of the current debt portfolio, we have used the debt data for debt currently held by a company.

The SNL database could not be used for Australian/UK companies as it only covers North American companies.

Australian/UK companies

Our Australian/UK debt data was created using a combination of information from the following sources:

- Bloomberg Financial Services
- Loan Connector,⁹ and
- Annual reports.

We first downloaded Bloomberg's list of current and expired debt securities, including those that have pre-maturely expired, for our sample of Australian/UK companies.¹⁰ The Bloomberg data comprises a list of corporate bond and bank debt securities, including security information such as the date of issuance, date to maturity, whether it is current or has expired, and the principal at issuance. This

⁸ Debt was converted to \$AU using the exchange rate on the date of issuance.

⁹ Loan Connector is a debt information service provided by Thomson Reuters. It consolidates publicly available debt information for a range of companies, including Australian and UK companies. Importantly, it consolidates corporate bond issuances, and publicly available bank debt information.

¹⁰ Debt could have pre-maturely expired because they were redeemed early or have had their call option exercised

means that we were able to calculate precisely the term at issuance for each security reported by Bloomberg or Loan Connector.

Turning to the coverage of Bloomberg, we are reasonably confident that Bloomberg's corporate bond database is comprehensive and is likely to encompass the complete record of corporate bond issues by the UK and Australian companies. However, we were concerned that Bloomberg only identified and reported a portion of the complete set of bank debt data. That is, the downloaded Bloomberg data sometimes contained only a portion of the bank debt securities issued by the company. In view of this informational constraint, we augmented our Bloomberg data with Loan Connector data. Finally, we cross-checked and verified our debt data with information from annual reports.

We augmented and cross-checked the Bloomberg data by undertaking the following steps:

- First, we downloaded all bank debt securities provided by Loan Connector and added securities that were not identified by Bloomberg to our database. The information we gathered from Loan Connector, as in the Bloomberg service, includes information such as issue date, date to maturity and amount on issue.
- Next we cross-checked our Bloomberg and Loan Connector debt data with the latest published annual report and interim reports, cross-referenced with data obtained directly from the businesses. Annual and interim reports separate the outstanding debt at balance date into corporate bond and bank debt categories, allowing us to verify our Bloomberg and Loan Connector debt data by comparing the total value of each type of debt outstanding. We separately reconciled the values shown for bank debt and for corporate bonds, comparing the value of:
 - corporate bonds on issue in the annual report with the sum of the corporate bonds that were outstanding at the annual report date in the Bloomberg and Loan Connector database; and
 - bank debt outstanding in the annual report with the sum of the value of bank debt principal outstanding as at the annual report date, as reported by Bloomberg and Loan Connector.¹¹

If the balance sheet values for outstanding debt (either bank debt or bonds) were either higher or lower than the Bloomberg/Loan connector values:

- and the balance sheet value was higher, which only occurred for bank debt, the difference was added to the known bank debt value as a sensitivity, using issuance term assumptions of 1, 3 and 5 years;¹² and
- and the balance sheet value was lower, we prorated each debt item so that the sum equalled the balance sheet values for bank debt and for bonds.

Summary statistics for the Bloomberg/Loan Connector and balance sheet data for each of the Australian/UK companies as at the last balance sheet date are provided in the Appendix.

¹¹ One reason why the bank debt outstanding reported by Bloomberg and Loan Connector may not reconcile with the values shown in the latest accounts is that the former are current values, whereas the amounts shown in the annual report are as at the date of the annual report. For example, as some of the annual reports are at least 6 months old, the difference between the amount of debt outstanding reported by the annual reports compared with the current Bloomberg and Loan Connector data may be due to the pay-down of bank debt in the intervening period.

¹² Bank debt is usually for terms between 1 and 5 years.

3.4 Empirical findings

In this section we summarise the empirical findings for debt term at issuance for energy and water network infrastructure businesses in Australia, the UK and US respectively.

3.4.1 Australia

Findings

Following the methodology outlined above, as displayed in Table 2 below, we found that for the 5 listed Australian businesses involved in gas and electricity transmission/distribution, the average term of debt at issuance is currently 10 years. By excluding APA Group (APA) from the sample, the average rises marginally to 10.32 years. We have provided this sensitivity since APA is a relatively acquisitive company, and has a relatively high level of shorter term bank debt facilities, which could result in a lower average term at issuance than if it were simply operating existing networks (which is a reasonable assumption for the benchmark business).

Table 3.1 also compares the current debt terms at issuance for Envestra, Spark Infrastructure and SP AusNet with the terms provided to the AER by several of these businesses in 2008-9. This comparison shows that Envestra's weighted average debt term at issuance has risen from 14.4 years as at 2007, to 16.3 years currently. We also find that SP AusNet's debt term at issuance has risen from 7.3 to 8.3 years, and Spark Infrastructure's (ETSA/Citipower/Powercor) debt term at issuance reduced to 9.3 years.

Table 3.1 Australia - term of debt at issuance (current)

Company	Industry	Total debt issued (AUD millions)	Date	Weighted average term at issuance	
				2007 ^b	2012
Residual debt term					
APA Group	Gas	4,192	31 Dec 12		9.8
DUET	Elect./Gas	5,200	31 Dec 12		7.4
Envestra Limited	Elect./Gas	1,248	31 Dec 12	14.4	16.3
Spark Infrastructure	Elect.	4,700	31 Dec 12	10.4-10.8	9.3
SP AusNet	Elect./Gas	4,716	30 Sep 12	7.3	8.3
Average					10.2

Source: Bloomberg, Loan Connector, annual reports. Notes: a) Assumes unaccounted for bank debt issued at 3 year term. b) AER (2009)

We expected that as a result of the global financial crisis, the source and term of debt issuance would have changed from what was observed in the period prior to this event. During the three year period from 2008 to 2010 liquidity fell significantly in the Australian bond market, and similar conditions existed in international bond markets. During this period it was observed that a number of businesses found difficulty in accessing bond markets due to low liquidity, and re-financed bond issues with shorter term bank debt (often in the range of 3 to 5 years).

Another issue that impacts on the results reported in Table 3.1 is credit wrapped bonds, a number of which are embedded in the current capital structures of the network businesses. Since the monoline insurers collapsed during the global financial crisis, and credit wrapping of bonds has ceased, it might be suggested that the current term at issuance is not reflective of the longer term trend. We undertook a sensitivity to test the impact on the average term at issuance if credit

wrapped bonds were not currently part of the comparator firms' capital structures. The average (median) term of debt at issuance reduced to 7.9 years (7.7 years). However, we consider that if credit wrapped bonds had not existed during the period prior to the global financial crisis, firms seeking longer terms in order to reduce re-financing risk would have placed greater reliance on international bond markets. In other words, the current capital structure would have had approximately the same average term at issuance of 10 years, but the foreign debt proportion would have been larger.

However, in the last two years liquidity in bond markets has returned, with businesses finding it advantageous to substitute shorter term bank debt with longer term capital market bond issues. As a result, we observe that businesses have been issuing large volumes of relatively longer term corporate bonds in recent months. Some of these may not have been captured by the data we have used in this report because they have occurred since the publication of the most recent annual/interim reports. For example, SP AusNet issued a 15 year bond in the Asian debt markets in early 2013.

3.4.2 United Kingdom

The United Kingdom results are shown in Table 3.2 below. For our sample of 6 listed electricity, gas and water businesses with transmission/distribution activities we found a current weighted average term of debt at issuance of 21.3 years. The UK's average debt term is somewhat longer than in Australia, presumably owing to the greater access that infrastructure firms have to deeper and more liquid bond markets in Europe and the US.

Table 3.2 United Kingdom - term of debt at issuance (at 31 March, 2012)

Company	Industry	Total debt issued (GBP millions)	Weighted average term at issuance (years)
National Grid	Electricity/Gas	22,589	19.9
Pennon Group PLC	Water	730	27.3
Scottish & Southern Energy	Electricity	5,141	15.2
Severn Trent	Water	4,179	21.1
United Utilities PLC	Energy/Water	5,656	21.9
Western Power Distribution	Electricity	4,782	22.1
Average			21.3

Source: Bloomberg, Loan Connector, annual reports

3.4.3 United States

The results for our sample of 22 listed US firms with electricity and/or gas transmission/distribution activities are shown in Table 3.3 below. These results show an average term of debt issuance of 18.9 years, which lies between the 10 year debt term observed in Australia, and the 21 year average debt term observed for similar regulated infrastructure businesses in the United Kingdom. Again, we expect that the achievement of longer terms by US businesses is due to greater access to deeper and more liquid capital markets.

Table 3.3 United States - current term of debt at issuance (2013)

Company	Industry	Total debt issued (\$,000)	Weighted average term at issuance (years)
Atmos Energy Corp	Gas	2,918	19.9
Boardwalk Pipeline Partners	Gas	1,600	11.2

Company	Industry	Total debt issued (\$,000)	Weighted average term at issuance (years)
CH Energy Group Inc	Electricity and Gas	655	22.6
Centerpoint Energy Inc	Electricity and Gas	4,866	24.8
Consolidated Edison Inc	Electricity and Gas	13,583	24.3
El Paso Pipeline Partners LP	Gas	2,393	11.1
AGL Resources Inc	Gas	3,523	21.1
Kinder Morgan Inc	Gas	9,727	18.5
Kinder Morgan Energy Partners	Gas	16,062	18.8
Laclede Group Inc	Gas	435	26.6
Nisource Inc	Electricity and Gas	7,554	17.0
New Jersey Resources Corp	Gas	580	17.7
Northeast Utilities	Electricity and Gas	6,288	15.7
NV Energy Inc	Electricity and Gas	6,739	18.2
Northwest Natural Gas Co	Gas	677	19.0
Piedmont Natural Gas Co	Gas	1,255	16.7
PEPCO Holdings Inc	Electricity	4,047	20.5
South Jersey Industries	Gas	937	13.9
Southwest Gas Corp	Gas	1,614	27.7
TC Pipelines LP	Gas	1,176	11.7
UIL Holdings Corp	Electricity	1,619	17.1
WGL Holdings Inc	Gas	780	21.1
Average		4,047	18.9

Source: SNL

3.4.4 Sensitivities for Australia and the UK

Lastly, tables 6 and 7 show the sensitivity of our estimates of the average terms at issuance for the Australian and UK firms to our assumption that the unknown portion of the bank debt has a remaining term of 3 years (this is not required for the US firms as full information on the term at issuance of current debt was obtained). The specific sensitivities that have been tested are that the term at issuance of the unknown debt was 1 (low case) and 5 (high case). The results in this table show that varying our assumption on this matter does not alter the results materially from those reported above.

Table 3.4 below shows that for the two Australian businesses where the bank debt shown by Bloomberg/Loan Connector was less than the amount shown in the latest annual report, the impact of the assumption made about the issuance term of the 'unknown bank debt' is relatively small. Overall, the debt term at issuance ranges from 10.21 years (assuming 'unknown' bank debt was issued for a 1 year term) to 10.22 years (assuming 'unknown' bank debt was issued for a 5 year term). The main reason for the marginal variance is because the only organisation where the balance sheet bank debt was greater (\$378m) compared with Bloomberg and Loan Connector data (\$324m) was Spark Infrastructure. The resulting weighted average term of debt at issuance ranged from 9.26 years (assuming 'unknown' bank debt was issued for a 1 year term) to 9.31 years (assuming 'unknown' bank debt was issued for a 5 year term).

Table 3.4 Sensitivity analysis: Australia - term of debt at issuance (current)

Assumed issuance term for 'Unknown' bank debt	1 year	3 years	5 years
APA Group	9.77	9.77	9.77
DUET	7.40	7.40	7.40
Envestra Limited	16.30	16.30	16.30
Spark Infrastructure	9.26	9.29	9.31
SP AusNet	8.30	8.30	8.30
Average term (years)	10.21	10.21	10.22

Source: Bloomberg, Loan Connector, annual reports.

As shown in Table 3.5, the picture in the UK is similar to Australia, with the assumption about the term of issuance of bank debt having a relatively minor effect on the overall issuance term of debt for National Grid and United Utilities. As shown in the Appendix, even though the difference between the bank debt values shown in Bloomberg/Loan Connector and the balance sheet is large (respectively GBP1.2 billion and GBP3.2 billion) the amount of bank debt is small compared with the balance of bonds on issue (GBP19.3 billion). Hence, the assumption that is made about issuance term of the bank debt has only a small impact on the overall estimate of the term of debt at issuance.

Table 3.5 Sensitivity analysis: UK - term of debt at issuance (31 March, 2012)

Assumed issuance term for 'Unknown' bank debt	1 year	3 years	5 years
National Grid	19.77	19.91	20.05
Pennon Group PLC	27.35	27.35	27.35
Scottish and Southern Energy	15.2	15.2	15.2
Severn Trent	21.12	21.12	12.12
United Utilities	21.9	21.93	21.97
Western Power Distribution	22.06	22.06	22.06
Average term (years)	21.23	21.26	21.29

Source: Bloomberg, Loan Connector, annual reports.

3.5 Conclusion

Our survey of debt issuance terms in Australia, the UK and US has revealed that share-market listed regulated infrastructure businesses, on average, tend to issue debt with a term of materially longer than 5 years - in the samples we considered the average term at issuance ranged from approximately 10 years in Australia to approximately 21 years in the UK. Currently, the 10 year term of debt issuance by Australian businesses is similar to the average issuance term of 10.14 years that was observed prior to the global financial crisis and was accepted by the AER.

In Australia the proportion of shorter term bank debt rose as the global financial crisis unfolded between 2008 and 2010, and this would have reduced the overall term of debt at issuance. More recently, as bond market liquidity has improved, we are observing a trend for short term bank debt to be refinanced with longer term bond issues. This suggests that the average debt issuance term is now rising in Australia and may in future exceed 10 years. At the present time, however, we consider that a 10 year debt issuance term remains an appropriate benchmark assumption for estimating the debt risk premium for regulatory purposes.

Appendix A Annual report cross-check

This Appendix displays the differentials we observed when cross-checking Bloomberg and Loan Connector data against the balance sheet values for bond and bank debt issues by Australian and UK businesses.

Table A1 – Australia: Total debt, by debt type, reported by Bloomberg and Loan Connector, and in annual reports (AUD million)

Company	Corporate bonds				Bank debt			
	Bloomberg and Loan Connector data	Annual report	Diff-erence	%	Bloomberg and Loan Connector data	Annual report	Diff-erence	%
APA Group	2,616	3,068	-452	-17%	2,375	1,124	1,252	53%
DUET	3,419	3,224	195	6%	3,848	1,976	1,872	49%
Envestra ¹³	865	951	-86	-10%	325	297	28	9%
Spark Infrastructure	3,705	3,905	-200	-5%	710	795	-85	-12%
SP AusNet	3,529	3,401	128	4%	1,750	1,315	435	25%

Source: Bloomberg, Loan Connector, Annual reports and PwC's analysis

Table A2– UK: Total debt, by debt type, reported by Bloomberg and Loan Connector, and annual reports (GBP million)

Company	Corporate bonds				Bank debt			
	Bloomberg and Loan Connector data	Annual report	Diff-erence	%	Bloomberg and Loan Connector data	Annual report	Diff-erence	%
National Grid	23,869	19,368	4,501	19%	1,246	3,221	-1,975	-61%
Pennon Group PLC	575.00	590.20	-15.20	-3%	642.60	139.30	503.30	361%
Scottish and Southern Energy	4,254	4,054	200	5%	1,969	1,087	883	81%
Severn Trent	3,449	3,327	122	4%	1,951	853	1,099	129%
United Utilities PLC	4,432	4,419	12	<1%	1,137	1,236	-99	-8%
Western Power Distribution	4,650	4,758	- 108	-2%	695	24	671	2769%

Source: Bloomberg, Loan Connector, Annual reports and PwC's analysis

¹³ Note that this does not include Envestra's US private placement bonds because they are not publically traded and their details to a large extent is not publically available.

Appendix B Terms of reference

Background

The Australian Energy Regulator (AER) is developing Rate of Return Guidelines that will form the basis of the regulated rate of return applied in energy network decisions. The AER published an issues paper in late December 2012 and a formal consultation paper in early May 2013 under the recently revised National Electricity Rules (NER) and National Gas Rules (NGR).

The AER undertook its last review of the weighted average cost of capital (WACC) in 2009 under a previous version of the NER.

As further detailed below, the Energy Network Association (ENA) would like to engage you to advise whether the 10 year benchmark debt term assumption continues to be appropriate in estimating the debt risk premium consistent with the allowed rate of return objective :

“[t]he rate of return for a [Service Provider] is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applied to the [Service Provider] in respect of the provision of [services]”

Scope of work

The ENA requests you to advise whether the 10 year benchmark debt term assumption continues to be appropriate to apply in estimating the debt risk premium consistent with the observed borrowing practices of comparable entities.

The ENA requests the consultant to provide a report which must:

- Attach these terms of reference;
- Attach the qualifications (in the form of a curriculum vitae) of the person(s) preparing the report;
- Identify any current or future potential conflicts;
- Comprehensively set out the bases for any conclusions made; and
- Only rely on information or data that is fully referenced and could be made reasonably available to the AER or others.

The ENA intends to submit the consultant report to the AER in response to the consultation paper. Accordingly the report will become a public report.

Contact

Any questions regarding this terms of reference should be directed to:

Nick Taylor (Jones Day)

Email: njtaylor@jonesday.com

Phone: 02 8272 0500

Appendix C CVs

Jeff Balchin **(Incenta Economic Consulting)**

Managing Director

Mob: 0412 388 372

jeff.balchin@incenta.com.au

Jeff is an economist at Incenta Economic Consulting. Jeff has almost 20 years of experience in relation to economic regulation issues across the electricity, gas and airports sectors in Australia and New Zealand and experience in relation to water, post and telecommunications. He has advised governments, regulators and major corporations on issues including the development of regulatory frameworks, regulatory price reviews, licensing and franchise bidding and market design. Jeff has also undertaken a number of expert witness assignments. His particular specialities have been on the application of finance principles to economic regulation, the design of tariff structures, the design of incentive compatible regulation and the drafting and economic interpretation of regulatory instruments.

In addition, Jeff has led a number of analytical assignments for firms to understand the responsiveness of consumers to changes to prices or other factors (like promotional activities) and to use this information to inform pricing strategy.

Relevant experience – Energy and Resources

- Strategic regulatory advisor – he has been a strategic adviser to regulators during a number of major price reviews, including the precedent setting early Victorian gas and electricity distribution price reviews (1998, 2001, 2003 and 2006). He has also been retained by regulated businesses to provide strategic advice during major regulatory reviews, including Australian electricity transmission businesses during several major reviews of their regulatory regime, for gas and electricity businesses during price reviews and for two major New Zealand firms (Powerco and Christchurch International Airports) during New Zealand regulatory reviews. Has also assisted a number of firms in relation to unregulated infrastructure, to justify their prices (providers) or to respond pricing proposals (customers) for infrastructure assets, including Dunedin Airport, Virgin Australia and SunWater.
- Review of regulatory regimes – has assisted major utilities during the review of regulatory regimes, including major assignments for the Australian electricity network businesses during the drafting and subsequent review of the regulatory regime for electricity networks.
- Regulatory finance issues – he has provided advice on a range of finance issues to regulators and regulate businesses, including major reviews of equity betas and deriving a benchmark cost of debt and complex valuation issues (including the proper specification of target revenue formulae). He has also provided extensive advice in relation to regulatory accounting issues, including the treatment of related party arrangements, provisions and revaluation gains, and on methodologies for allocating costs between activities.

Similarly, he has provided extensive advice in relation to deriving an allowance for taxation for regulatory purposes. He has also provided substantial advice in relation to regulatory asset valuation and depreciation issues.

- Cost benefit studies – he has advised in relation to methodological issues in quantifying the economic costs and benefits of electricity distribution and transmission investment, including specific advices on the treatment of green obligations and on the economic benefits of IT projects to make expanded use of advanced metering infrastructure.
- Incentive regimes – he has advised on the design of incentives for regulated businesses to minimise cost, undertake efficient service improvement and on the design of price controls (an objective of which is to create an incentive for firms to structure prices efficiently).
- Market structure – he was involved in the early debate around market structure in the Australian energy sector and assisted in the design of the ring fencing arrangements in place for the gas sector. More recently, he undertook a major review for the Victorian government on the need for continuing with special cross ownership rules for the energy sector.
- Analytical pricing activities – has undertaken assignments for a major Australian supermarket and department store to use analytical techniques to estimate the sensitivity of sales to prices and other factors (including promotional activities) from transactions data bases to assist in pricing strategy and to review the effect of pricing activities.

Qualifications and memberships

- Bachelor Economics (First Class Honours) University of Adelaide
- CEDA National Prize for Economic Development]

Michael Lawriwsky **(Incenta Economic Consulting)**

Executive Director

Mob: 0400 002 355

michael.lawriwsky@incenta.com.au

Michael is an Executive Director at Incenta. Previously he was a director at PricewaterhouseCoopers (Australia), a director and partner in the Allen Consulting Group, and a director – corporate finance in ANZ Investment Bank. He has had a career spanning academia, investment banking and economic policy advice. He has had involvement in regulation and market reform in wide a range of businesses spanning energy, transport, water, gaming and wagering. He has advised on over \$15 billion of bids in the Australian energy and transport sectors.

Regulatory and Policy roles:

- International Air Services Commission - Between 1997 and 2007 Michael was a part-time Commissioner of the International Air Services Commission. The IASC was established in 1992 as an independent body regulating new entrant airlines and allocating capacity to Australian international airlines with an objective of strengthening competition.
- Review of Business Programs (Mortimer Report) - In November 1996 Dr. Lawriwsky was appointed to the Review of Business Programs under the leadership of Mr. David Mortimer (Mortimer Report). This was a major review of Government support programs for business with a 15 person secretarial staff. The process included public forums, stakeholder interviews with key government and business groups and analysis of numerous submissions. The report led to the formation of Invest Australia.

Relevant experience by sector

Regulated gas networks:

- Jemena Gas Networks – advice on the appropriate methodology to estimate the cost of debt in relation for gas transmission assets. This is part of the WACC proposal for a gas network revenue determination.
- Essential Services Commission (Victoria) – adviser to the ESC on cost of capital issues associated with the 2007-2008 Gas Price Review.
- QCA – adviser on cost of capital issues (including beta) in relation to Queensland gas distribution assets.
- QCA – adviser on the prepayment of network charges by Envestra.
- Allgas – Adviser on regulatory modelling and regulatory

outlook for ANZ Infrastructure Services in its bid for Allgas.

- Envestra – adviser to ESCOSA and Queensland Competition Authority on cost of capital and working capital (prepayment) issues relating to Envestra’s 2006 access arrangements in South Australia and Queensland respectively.
- ACCC – advised the ACCC on differentials between BBB and BBB+ for a gas utility in connection with an appeal lodged by the East Australia Pipeline Limited. ACCC – prepared a report on review of studies comparing international regulatory determinations, which was included as Appendix G of ACCC’s submission to Productivity Commission Review of the National Gas Code.
- BHP Billiton – advised BHP Billiton on its submission in response to the Draft Report of the Productivity Commission Review of the National Gas Code.
- Gas and Fuel (Gascor) – adviser to the company in relation to the potential purchase of the Wagga Wagga Gas Company from the City of Wagga Wagga.
- Gas and Fuel (Gascor) – mandated to critique Gascor’s weighted average cost of capital calculation used in regulatory tariff setting.
- The USA Gas Utility market – authored this ANZ Securities monograph examining the regulatory structure and market reforms introduced into the US gas industry and implications for Australia. ☐ Gas and Fuel Corporation – co-authored this ANZ Securities monograph

Regulated electricity networks:

- Powerlink – adviser to Powerlink on regulatory cost of capital including beta, debt risk premium and on equity and debt raising transaction costs.
- Aurora Energy – advice to Aurora Energy by writing their debt risk premium submission to the Australian Energy Regulator
- CitiPower and Powercor - advice on the appropriate methodology to estimate the cost of debt in relation for electricity distribution assets, as part of the WACC proposal for an electricity network revenue determination.
- Independent Market Operator WA – advised the Western Australia’s wholesale electricity market operator, the Independent Market operator, by advising on the methodology to be used to calculate to estimate Allowance For Funds Used During Construction, and the WACC to be applied in the determination of the maximum reserve price for generation capacity.
- Energy Networks Association, APIA and Grid Australia – adviser on the AER review of WACC parameters for electricity transmission and distribution network service providers.
- Retail credit support arrangements – advised the Essential

Services Commission of Victoria on new arrangements for credit support by electricity retailers.

- ETSA Utilities – adviser to the Essential services Commission of South Australia on cost of capital issues.
- Energex and Energon – advised the Queensland Competition Authority on cost of capital issues relating to the 2005 access arrangements of these companies.
- Electricity Commission of Papua New Guinea (PNG Power) – lead financial/strategic adviser to the PNG Government on the corporatisation/privatisation of PNG Power, managing a team of investment bankers, lawyers, accountants and regulatory consultants.
- Electricity Trust of South Australia (ETSA) – lead financial adviser to Edison Mission Energy in their bid for this \$3.5 billion electricity distribution and retailing company, particularly in relation to regulation, valuation, financial modelling and capital structure.
- Pacific Gas and Electric Company – lead financial adviser in bids for four electricity distribution/retailing companies totalling \$5.5 billion (United Energy, Powercor, Citipower, Eastern Energy).
Electro Power Limited (NZ) – adviser to the company’s board in its merger negotiations with the contiguous Central Power Limited, including valuation and capital structure issues.

Energy:

- Snowy Hydro – Michael led a team undertaking a comprehensive valuation analysis of Snowy Hydro, including a cost of capital update.
- Snowy Hydro – Adviser to the Snowy Hydro on cost of capital (on-going annual review). ☐ Southern Electric International (US) – advised on cost of capital with respect to Australian electricity generation assets.
- Energy Developments Limited – float valuation and pricing for this independent power project underwritten by ANZ Securities.
- Loy Yang A – coordinated a sell-down of \$30 million of equity in Horizon Energy Investments to institutional investors.
- Southern Hydro Limited – established a consortium of bidders for this privatisation (Pacific Hydro, Hyder Investments and Hastings Funds Management) and directed financial due diligence/valuation. Including capital structure determination.
- Electro Power Limited (NZ) – analysis of the rate of return on investment which would be required by investors in the Gateway Electronic Monitoring System (“GEMS”) – a “smart meter” technology.

Road and Rail:

- Federal Government Department – Strategic and governance review
- QCA – Adviser on the cost of capital issues relating to the Northern Missing Link railway. ☒ QCA – Adviser on cost of capital issues in relation to the Queensland Rail below rail network – coal price review. ☒ Victorian Department of Transport – adviser on new techniques for attracting private sector capital to the roads sector
- Victorian Auditor General’s Office – Adviser analysing the terms of the cost of capital for the financing of the Tulla-Calder freeway extension.
- Stagecoach plc – adviser to Stagecoach on cost of capital issues relating to bidding for rail infrastructure assets in Victoria.
- Adelaide-Darwin railway – adviser on regulatory issues to the ANZ Investment Bank project finance team in relation to this financing.

Ports:

- Abbot Point Coal Terminal – regulatory adviser to the consortium comprising CKI and Deutsche Bank (RREEF), which bid for this asset (lead adviser, Macquarie Bank).
- Port of Brisbane – regulatory adviser to the Q Ports Holdings consortium partners, Industry Funds Management, Global Infrastructure Partners, QIC Global Infrastructure and Tawreed Investments, which won this bid and was awarded ‘Best Privatisation Deal’ and ‘Asian Infrastructure of the Year’ awards (lead advisor, Macquarie Bank). PwC received an award from Infrastructure Partnerships Australia for the role it played in this transaction.
- BHP Billiton – advise on Pilbara ports from a real options perspective
Port of Melbourne Corporation – review of regulatory cost of capital for price monitoring by the Essential Services Commission.
- Wiggins Island Coal Terminal - adviser to the ANZ Bank and the User Group proposing a selffunded expansion of coal loading capacity at the Port of Gladstone.
- Port of Waratah – adviser to Newcastle Coal Infrastructure Group (NCIG) in relation to the Prime Minister’s Taskforce on Infrastructure.
- Dalrymple Bay Coal Terminal – Adviser to the Queensland Competition Authority on the WACC parameters (including beta) for DBCT.
- Port of Brisbane Corporation – strategic adviser to the port, including a review of strategic options and a valuation of the port’s operations.
- Ports of Portland and Geelong – advice on cost of capital to the ANZ Investment Bank team bidding for the assets on

behalf of the Strang/Hastings consortium.

- Port of Napier (NZ) – reviewer of the valuation of the port by the ANZ Investment Bank Auckland office.

Airports:

- New Zealand Airports Association – analysis of airport betas for negotiations with airlines and the Commerce Commission.
- Virgin airlines – advice on cost of capital issues for negotiations with airports on landing charges.
- Federal Airports Corporation – directed a seven-month regulatory modelling, valuation and capital structure analysis of all 22 airports as part of the Capital Structure Review commissioned by the Department of Transport/Department of Treasury.
- Brisbane International Airport – lead financial adviser to the Port of Brisbane Corporation in the course of the successful Schiphol/CBA/POBC bid in 1997.
- Christchurch International Airport – adviser to the airport with respect to its negotiations with the NZ Commerce Commission on the cost of capital and implications for landing charges.

Water:

- Gladstone Area Water Board – adviser to the Queensland Competition Authority on the assessment of costs of capital parameters for the 2005 GAWB price review.
- Melbourne Water – adviser to Melbourne Water on its financial strategy, including capital structure, dividend policy and financial benchmarks.
- SA Water – adviser on its capital structure review and review of dividend policy.
- SA Water – adviser on commercialisation, and dividend policy in negotiations with the SA Treasury.
- Auckland City Council (NZ) – advice on the corporatisation of water and waste water assets.
- Gippsland Water – adviser on pricing policy with respect to future capital funding requirements. ☐ South Gippsland Water – prepared a benchmarking analysis of corporate performance relative to peers.
- United Water – advised the company on the potential for listing on the stock exchange pursuant to requirements under the United Water Management Contract.

General regulatory assignments:

- QCA – adviser on the level of regulated WACCs.
- Debt and equity transaction costs – Advised the ACCC on

debt and equity transaction costs that could be applied in regulatory determinations.

- International evidence on regulatory rates of return – Adviser to the ACCC on rates of return provided internationally by regulators.
- Exceptional circumstances – advised the Queensland Competition Authority on appropriate regulatory responses to exceptional circumstances.
- Monte Carlo analysis – adviser to a regulatory agency assessing the efficacy of Monte Carlo analysis as a methodology to be employed in cost of capital studies for regulatory purposes.

Expert Opinions:

- Ferrier Hodgson – Expert opinion on the conduct of an investment bank advising on a multi-billion dollar merger transaction, which destroyed substantial shareholder value and resulted in a default of banking covenants.
- Essential Services Commission of Victoria – Relative bias in the yields of indexed Commonwealth Government Securities when used as a proxy for the CAPM risk free rate.
- Australian Taxation Office, Commerciality of AAPT's financial arrangements

Australian Taxation Office, Statement on the financial arrangements of Futuris Corporation Limited

Qualifications and memberships

- Ph.D. B.Ec. (Hons) (University of Adelaide)
- Trustee and Chair of the Finance Committee, Shrine of Remembrance



Matthew Santoro **(PwC)**

Managing Director, Joint National Head - Debt & Capital Advisory

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Professional qualifications and memberships

- Bachelor of Economics (Honours), University of Adelaide
- Affiliate, Institute of Chartered Accountants

Career summary

Matthew has over 28 years of debt and capital markets experience, comprising over 20 years of corporate and institutional banking experience with Deutsche Bank and Citibank and the last eight years in an advisory capacity. Matthew is experienced in a wide range of financing and fundraising transactions, in particular in the area of project financing, acquisition financing, leverage financing, re-financings, property financing and procurement of debt capital markets instruments across the Australian, European and USA markets. His experience includes dealings with credit rating agencies such as Standard and Poor's and Moody's. Prior to joining PwC, Matthew established and was Joint National Head of KPMG's debt advisory practice for a period of five years.

Matthew has extensive experience in the utilities and energy sector, having been responsible for structuring, underwriting and syndicating multi-billion dollar financings for successful bidders during the privatisations of the Victorian and South Australian electricity industries. Debt transactions successfully completed during these privatisations cover the full spectrum of the industry; electricity generation, gas and electric distribution and gas and electric transmission and.

Relevant experience

- Debt structuring, arranging and procurement, onshore and offshore
- US Private Placement, Australian and European Bond markets
- Capital management
- Credit rating agencies



Steven Hong (PwC)

Manager

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Steven is a Manager in PricewaterhouseCoopers' Australian Economics practice with specific experience in regulatory economics and the application of economic and financial principles in regulation.

Prior to joining PricewaterhouseCoopers, Steven was a Senior Analyst at the Australian Competition Consumer Commission, where he was mainly responsible for providing financial and economic advice in regulatory projects.

Relevant experience

- **Regional development authority** – Steven is currently helping a development authority build an investment case for a piece of energy network infrastructure. Part of the project involves identifying the major drivers of investment and the exploring whether future developments in the drivers will support a case for a regulatory investment.
- **Energy Networks Association** – Steven is currently helping the Energy Networks Association (ENA) with a strategy for the future cost of equity. Recent changes to regulatory cost of capital determination procedures allowed the Australian Energy Regulator more freedom to determine the cost of equity. As a result, the ENA want to develop a strategy for future cost of equity proposals.
- **Queensland Competition Authority** – Steven is currently developing a first principles study into the cost of debt. The major issues behind this study is what yield should long-term debt be paying that is supported by financial and economic theory and empirical evidence.
- **Indonesian gas pipeline operator** – Steven helped prepare a submission on the likely return on equity expected by investors on an Indonesian gas pipeline in the past, considering issues such as how the capital asset pricing model would have been applied and whether international cost of equity values can be used as comparators.
- **Goulburn-Murray Water** – Steven helped Goulburn-Murray water develop its operating and capital expenditure forecasts for its third water plan. It involved collaborating with the operating, finance and capital expenditure teams within Goulburn-Murray water so that information can be collated and structured to explain to a regulator the cost forecasts for operating and capital expenditure.
- **Electricity and gas utilities** – Development of a methodology to estimate a regulatory debt margin in light of the current uncertainty of a fair value of long term bonds.

- **Energy Networks Association** – Assisted in producing a report that advised on the risks and implications of two possible incentive mechanisms for capex during the AEMC’s review of transmission frameworks. The two incentive frameworks are ex-post capex reviews and an efficiency carryover mechanism.
- **Investment consortium** – Steven helped advise an investment consortium on a bid for a regulated asset. Steven’s major roles were to: review and identify risks in the asset’s the pricing structure, and review the regulatory model that were used to project the asset’s revenue in the future
- **Airline** – Steven assisted an airline in providing financial modelling and regulatory advice to help them negotiate aeronautical charges. The issues covered range from depreciation, allowance for funds used during construction and analysis of pricing models
- **Resources Company** – Steven assisted a resources company in negotiating gas tariffs for a pipeline that is about to be constructed.
- **Resources Company** – Steven helped a resources company re-negotiate gas capacity tariffs by modelling the impact on gas tariffs if they were to be regulated.
- **Resources Company** – Steven assisted a resources company in a gas tariff appeal whereby he modelled the impact of varying degrees of cost allocation. The outcome of this work secured a significant cost decrease by way of lower gas tariffs.
- **Powerco New Zealand** – Steven has assisted Powerco in New Zealand in a number of regulatory engagements in relation to the New Zealand Commerce Commission’s review of input methodologies
- **Dunedin International Airport Limited** - Steven has helped Dunedin airport in preparing their pricing proposal to key stakeholders. In this, Steven played a key role in creating a regulatory modelling as well as drafting of the pricing proposal, covering topics such as cost allocation, cost of capital and financial modelling.
- **Kimberly Clark Australia** – Steven was involved in assisting in providing advice as to how an initial regulatory asset base would be set for a gas pipeline if it is to be declared.
- **Powerlink Queensland** – Steven helped Powerlink estimate how much it would cost to raise debt and equity. Steven is also helping to propose a methodology to estimate a debt risk premium in a situation where there is a lack of reliable information.
- **Aurora Energy** – Steven assisted Aurora Energy by writing their debt risk premium submission to the Australian Energy Regulator
- **Independent Market Operator WA** – Steven assisted Western Australia’s wholesale electricity market operator, the Independent Market operator, by advising on the methodology to be used to calculate to estimate Allowance

For Funds Used During Construction, and the WACC to be applied in the determination of the maximum reserve price for generation capacity.

- **Jemena Gas Networks** - Steven assessed the appropriate methodology to estimate the cost of debt in relation for gas transmission assets. This is part of the WACC proposal for a gas network revenue determination.
- **Assorted energy companies and regulators** – Steven has prepared advice on the appropriate method to estimate a benchmark cost of debt.
- **Christchurch International Airport Limited** - Steven is regularly engaged to provide advice to Christchurch International Airport Limited in relation to input methodologies as part of a regulatory review undertaken by the New Zealand Commerce Commission.
- **Air Services Australia** - Steven assisted the review of WACC parameters applicable for Air Services Australia
- **Snowy Hydro Limited** - Steven reviewed and updated the regulatory WACC parameters for Snowy Hydro Limited.
- **Queensland Competition Authority** – Steven was involved in assessing the financial model used to support a proposed infrastructure charges schedule
- **Queensland Competition Authority** – Steven has prepared advice on the appropriate method to estimate a benchmark cost of debt.
- **Airline** - Steven was involved in a high level review of the WACC assumptions and methodologies applied by three airports with respect to aeronautical pricing.
- **Essential Services Commission of South Australia** - Steven was involved in a review on the advantages and disadvantages of two methodologies to set an initial regulatory asset base.

Qualifications and memberships

- Bachelor of Commerce (Economics) with Honours, University of Melbourne
- Chartered Financial Analyst
- Institute of Public Administration, corporate member

