GOLDFIELDS GAS TRANSMISSION PTY LTD

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9 May 2022

Ms Jenness Gardner
Chief Executive Officer
Economic Regulation Authority

By e-mail: publicsubmissions@erawa.com.au

Dear Ms Gardner

GGT's response to ERA Discussion Paper - focused consultation for the 2022 gas rate of return instrument review

Goldfields Gas Transmission Pty Limited (**GGT**) operates the Goldfields Gas Pipeline for the participants in the Goldfields Gas Transmission Joint Venture. The Goldfields Gas Pipeline is a gas transmission pipeline which is fully regulated under the regime of the National Gas Law and the National Gas Rules.

On 22 April 2022, the Economic Regulation Authority (**ERA**) published a Discussion Paper entitled *focused consultation for the 2022 gas rate of return instrument review*.

GGT appreciates the opportunity to provide a submission on this Discussion Paper.

Please see the attached for the GGT's submission.

If you would like GGT to elaborate on any of the views in the submission, please feel free to reach out to our Regulatory Manager, Ignatius Chin. He can be contacted directly on ███████████ or at ████████████████████

Yours sincerely

Barrie Sturgeon
General Manager
Goldfields Gas Transmission

Submission responding to ERA focused consultation

9 May 2022

Executive Summary

In the focused consultation, which included an online meeting with stakeholders on 27 April 2022, the ERA examined:

- the use of international comparators in equity beta estimation; and

- the use of different methods for estimation of the market risk premium.

Use of international comparators in equity beta estimation

GGT's submission on the December 2021 Discussion Paper recognised the need to broaden the set of comparator firms which provide data for equity beta estimation.

GGT did not support the use of a broader set of Australian comparators, and we note that the ERA's own investigations, which were reported during the online meeting on 27 April, did not support broadening the set of Australian comparators with firms from the airports, ports, telecommunications and transport sectors.

GGT was of the view that carefully selected international comparators might be used to expand the dataset for beta estimation.

Despite this view, in February, GGT did not support the use of international comparators in beta estimation for the 2022 gas rate of return instrument. This was because too many issues still needed to be resolved, and we saw little scope for moving away from the sample of domestic comparators which was used for equity beta estimation in 2018.

This remains GGT's view.

We are, nevertheless, aware that there has been support from other stakeholders for the use of international comparators in beta estimation for the 2022 instrument, and the ERA has responded with its April 2022 Discussion Paper and the focused consultation.

In this submission, GGT further considers the use of international comparators for equity beta estimation, should the ERA decide to proceed with their use in beta estimation for the 2022 gas rate of return instrument.

GGT remains concerned that no consideration is being given to the question of whether any of the potential comparators - Australian or international - has a degree of risk similar to the degree of risk of the Goldfields Gas Pipeline in respect of the provision of pipeline services. The Goldfields Gas Pipeline has similar risk characteristics to other regulated assets which serve the mining sector in the Pilbara and, with a benchmark gearing of 55%, should have an equity beta of at least 0.8.

ERA Question 1: Are the firms selected by the ERA in the discussion paper (reproduced in Appendix 1 of this paper) appropriate? If there are firms which are inappropriate, what characteristics make them inappropriate?

More detailed assessments of the potential international comparators listed in Appendix 1 of the ERA's April 2022 Discussion Paper are required before those potential comparators can be considered as providing a sample for estimation of the beta of the benchmark efficient entity.

ERA Question 2: Are there any additional jurisdictions that should be considered by the ERA?

GGT does not think that there are additional jurisdictions which should be considered by the ERA when selecting international comparators.

ERA Question 3: Should the ERA consider reweighting foreign market indices to be reflective of the Australian Securities Exchange (ASX), or would this create distortions and interpretation issues as the market beta would no longer be one?

The data for beta estimation from an appropriately selected sample of international comparators are from businesses with shares traded in equity markets are, for practical purposes, comparable to the Australian equity market. In these circumstances, the ERA should not reweight foreign market indices. Any reweighting of those indices would be likely to distort the results of beta estimation.

ERA Question 4: What adjustments, if any, should be made to estimates of international equity betas?

Once betas have been estimated for the international comparators, no further adjustments should be made to those estimates.

ERA Question 5: Once the sample has been selected and individual betas have been estimated, how should the ERA best use this information to determine an equity beta point estimate? Should this be done in a mechanical way or should regulatory discretion be used?

A point estimate of beta for the rate of return instrument should be obtained as a simple equally weighted average of the beta estimates for the international and remaining Australian comparators.

Use of different methods for estimation of the MRP

GGT has previously supported continued and careful use of historical excess returns in estimation of the MRP. Careful use means, among other things, that the arithmetic mean of historical excess returns, and not the geometric mean, should be used in estimation.

Furthermore, GGT has been supportive of Energy Networks Australia's development of a method for applying the DGM which addresses concerns previously raised by the ERA, the Australian Energy Regulator and others.

ERA Question 6: What are stakeholder views on the calibrated DGM proposed by Energy Networks Australia? Does this amended model provide additional confidence in the DGM and how?

GGT is of the view that the growth rate calibration undertaken when applying the Energy Networks Australia model contributes to greater confidence in MRP estimates made using the DGM (compared to the uncalibrated DGM).

Use of the Energy Networks Australia DGM leads to estimates of the MRP higher than the estimates in the ERA's current gas rate of return instrument and in the Australian Energy Regulator's current rate of return instrument. This indicates to GGT that estimates of the MRP previously used in setting rates of return allowed for regulation have had a significant downward bias, biasing downward those rates of return.

ERA Question 7: Is it possible to combine inputs in a more formulaic manner when estimating a forward-looking market risk premium?

In GGT's view, a point estimate of the MRP can only, and should, be made in a mechanical or formulaic way.

ERA Question 8: What weight, if any, should be assigned to the historic market risk premium, DGM and conditioning variables in estimating the market risk premium?

GGT is strongly of the view that no weight should be given to conditioning variables when estimating the MRP.

The best that can be done is to equally weight an estimate of the market risk premium made using historical excess returns and an estimate made using the calibrated DGM. Any merits weighting would be no more than the result of subjective assessment.

ERA Question 9: Do you support a fixed or updating market risk premium being used over the four-year term of the gas instrument?

Updating of the MRP over the term of the gas rate of return instrument is, in principle, the correct way of proceeding.

Section 30E(2)(b) of the National Gas Law (NGL) requires that, if a rate of return instrument states the way to calculate the rate of return, the instrument must provide for the methodology to apply automatically without the exercise of any discretion by the regulator.

In order to comply with this section of the NGL, whether the MRP can be updated periodically over the term of the gas rate of return instrument depends on how feasible it is to specify the estimation process as a set of rules which can be applied in a mechanical way without the use of discretion.

If the estimation process can be specified as a set of rules, the MRP could be updated periodically over the term of the gas rate of return instrument.

ERA Question 10: Is it possible to estimate a forward looking market risk premium in a completely mechanical way with no use of regulatory discretion?

We think estimation of a forward looking MRP in a completely mechanical way is possible if:

- The estimate is made by combining the estimates from the historical excess returns and the calibrated DGM models on an equally weighted basis;
- Estimation of an MRP using historical excess returns could be undertaken in a completely mechanical way. We think this is possible although careful specification of the procedure in the gas rate of return instrument in a way sufficient to remove the need for discretion may be tedious; and
- Estimating of the MRP from the calibrated DGM can be made in a completely mechanical way. Professor Gray advised the 27 April online meeting that he thought this is it was possible. That is, it is possible to set out the steps for using the Energy Networks Australia calibrated DGM in the rate of return instrument.

This means, subject to confirmation of Professor Gray's advice, forward looking MRP can be estimated in a completely mechanical way.

1   This submission

Goldfields Gas Transmission Pty Limited (GGT) operates the Goldfields Gas Pipeline, a regulated pipeline under the regime of the National Gas Law and the National Gas Rules, for the participants in the Goldfields Gas Transmission Joint Venture. The current Joint Venture Participants are Alinta Energy GGT Pty Ltd, Southern Cross Pipelines Australia Pty Limited and Southern Cross Pipelines Australia (NPL) Pty Limited. Alinta Energy GGT is a company within the Alinta Energy Group. Southern Cross Pipelines Australia and Southern Cross Pipelines Australia (NPL) are APA Group companies.

GGT appreciates the opportunity to provide the Economic Regulation Authority (ERA) with the following responses to the questions raised in the discussion paper, *Focused consultation for the 2022 gas rate of return instrument review* (April 2022 Discussion Paper). Those responses address the two specific issues which the April 2022 Discussion Paper identified as requiring focused consultation. These two issues are:

- the use of international comparators in equity beta estimation; and
- the use of different methods for estimation of the market risk premium (MRP).

GGT attended the online meeting on 27 April 2022 where the above topics were discussed. GGT also appreciates the opportunity to participate in this discussion.

GGT remains concerned that no consideration is being given to the question of whether any of the potential comparators - Australian or international - has a degree of risk similar to the degree of risk of the Goldfields Gas Pipeline in respect of the provision of pipeline services.

The Goldfields Gas Pipeline has similar risk characteristics to other regulated assets which serve the mining sector in the Pilbara. The ERA has determined:

- a beta for the Pilbara railway assets of 1.30 (with gearing of 20%);
- a beta for the Horizon Power electricity network assets of 0.8 (with gearing of 45%); and
- a beta for the Alinta Energy electricity network assets of 0.9 (with gearing of 40%).

With a benchmark gearing of 55%, the equity beta for the Goldfields Gas Pipeline should be at least 0.8.

2 Equity beta estimation

GGT's submission on the December 2021 Discussion Paper recognised the need to broaden the set of comparator firms which provide data for equity beta estimation.

GGT did not support the use of a broader set of Australian comparators. There is no prior reason for expecting that other - "non-energy" - Australian infrastructure businesses using different technologies, with different operating environments and different markets, and subject to different schemes of regulation, would have risks similar to those of regulated gas pipeline service providers.

GGT noted that the ERA's own investigations, which were reported during the online meeting on 27 April, did not support broadening the set of Australian comparators with firms from the airports, ports, telecommunications and transport sectors.[1]

GGT was of the view that carefully selected international comparators might be used to expand the dataset for beta estimation.

Despite this view of GGT, in February, GGT did not support the use of international comparators in beta estimation for the 2022 gas rate of return instrument. This is because too many issues still needed to be resolved, and we saw little scope for moving away from the sample of domestic comparators which was used for equity beta estimation in 2018.

This remains GGT's view.

We are, nevertheless, aware that there has been support from other stakeholders for the use of international comparators in beta estimation for the 2022 instrument, and the ERA has responded with its April 2022 Discussion Paper and the focused consultation.

In this section 2 of this submission, GGT further considers the use of international comparators for equity beta estimation, should the ERA decide to proceed with their use in beta estimation for the 2022 gas rate of return instrument.

2.1 Use of international comparators

The December 2021 Discussion Paper had advised that, when applying the regulatory regime of the National Gas Law and the National Gas Rules, the ERA compensates the financing costs of an efficient regulated service provider, a benchmark efficient entity, rather than the actual financing costs of a specific service provider.[2]

In Dr Fallon's presentation to the ERA's 27 April online meeting, he set out a case for not using international comparators, arguing that they were not sufficiently similar to the benchmark efficient entity. Dr Fallon contended that the international comparators were, statistically, unlike the benchmark efficient entity and did not have the benchmark's characteristics. These comparators, he argued: (a) were not pure-play network service providers, (b) were not operating within Australia without parental ownership, and (c) were without degrees of risk similar to that which applies to an Australian gas pipeline service provider in respect of the provision of gas network services.

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[1] Economic Regulation Authority, *2022 Gas Instrument Review Focused Consultation*, 27 April 2022, slide 10.

[2] Economic Regulation Authority, *2022 gas rate of return instrument review*, December 2021, paragraph 47.

The issue of comparability of international firms with the benchmark is further examined in sections 2.1.3, 2.1.3.1 and 2.1.3.2 of this submission.

2.1.1   Regulatory need in current circumstances should be considered

Dr Fallon's arguments above relating to comparability with the benchmark may have some validity at a conceptual level. However, these arguments overlook the current need of regulatory practice as it is shaped by current circumstances.

Current circumstances include, in particular, merger and acquisition activity which can distort the share prices used in beta estimation. The online meeting was advised, by Mr Tran, that the ERA was of the view that firms which had recently been in merger or acquisition negotiations (or which were currently the subjects of merger or acquisition) were to be excluded from the set of potential comparators.[3]

In December 2018, four Australian comparators provided data for equity beta estimation. These were APA Group, DUET Group (although the group had been delisted in May 2017 following its acquisition by CK Infrastructure), Spark Infrastructure and AusNet Services. Shares in Spark Infrastructure ceased to be traded on the Australian Securities Exchange on 23 December 2021 following acquisition of the company by Pika Bidco Pty Ltd, and AusNet Services shares ceased trading on 4 February 2022 during acquisition of the business by Brookfield Asset Management.

Today (April 2022), APA Group remains the only Australian regulated gas pipeline business with share trading which might provide the share price data needed for beta estimation. However, as AGIG's Dr Wills-Johnson reminded the online meeting, APA had been the target of a takeover by CK Infrastructure during the second half of 2018.

We are currently at risk of being left without Australian comparators which might provide the data required for beta estimation for the benchmark Australian gas pipeline service provider.

We now have little choice but to examine the data for beta estimation which might be available from appropriate international comparators. The New Zealand Commerce Commission found itself in a similar position in 2010, and the Queensland Competition Authority has recently begun using international comparators for beta estimation because few Australian comparators are available.

2.1.2   Beta estimates are not stable over time

Dr Fallon's response to the problem of the small number of Australian comparators was reliance on the beta estimates made for the larger set of Australian comparators which had been available in 2018 and earlier. There was, he argued, sufficient stability in the estimates over time to allow their continued use in 2022.

A closer examination of the evidence indicates that, even if there had been stability in earlier periods, relevant betas have been rising since at least 2013.

We reproduce below, as Figure 1, a graph of the rolling beta estimates for APA Group, AusNet Services and Spark Infrastructure over a period commencing in December 2010 and ending after December 2020. APA Group, AusNet Services and Spark Infrastructure were, at the time the graph

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[3]   Noted in Economic Regulation Authority, *2022 Gas Instrument Review Focused Consultation*, 27 April 2022, slide 8, with elaboration by Mr Tran during his presentation.

was prepared, all the "live" (listed on the Australian Securities Exchange) Australian regulated electricity network and gas pipeline system service providers.

Figure 1: Rolling OLS beta estimates for the live Australian comparators
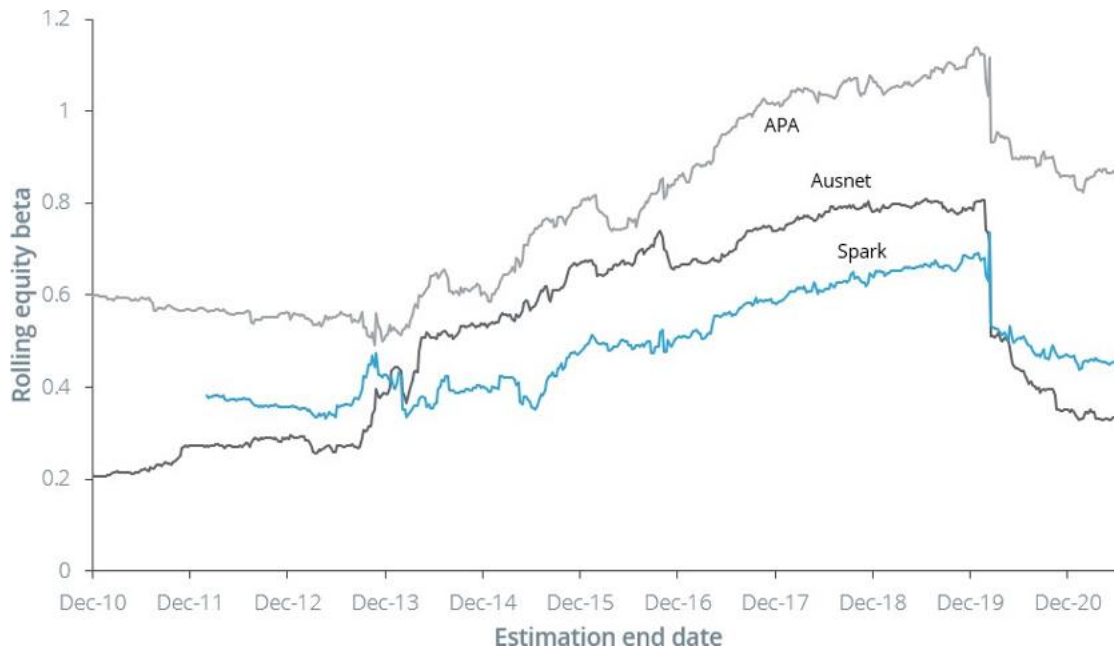
The graph was prepared by Frontier Economics for Energy Networks Australia's submission on the AER's draft equity omnibus working paper and is shown on page 80 of that submission.[4] The estimates of beta, ordinary least squares estimates, were made by Frontier Economics using Bloomberg data and were relevered to the Australian Energy Regulator's current benchmark gearing of 60%.

Figure 1 shows rising betas for all three comparators between December 2013 and December 2019. Then, after December, the betas drop sharply. Frontier Economics has attributed the drop to the onset of the Covid-19 pandemic. After the sharp drop, the betas continue to fall, but less dramatically. GGT's own calculations, using data to December 2021, suggest they may be levelling. The betas for APA, AusNet Services and Spark Infrastructure have not been stable since December 2013.

The trends in data after December 2013 do not support continued reliance on beta estimates made before 2018. The trends suggest that, when estimating beta for the 2022 gas rate of return instrument, most weight should be placed on estimates made using the most recent five years of data. However, we then face the problem of the data - and the estimates made from it - being distorted by merger and acquisition activity in relation to each of the three "live" Australian comparators.

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[4]   Energy Networks Australia, *Estimating the cost of equity: Response to AER's Pathway to 2022 Rate of Return Instrument: Draft Equity Omnibus Working Paper*, 3 September 2021.

2.1.3 Benchmark comparability

Dr Fallon alerted the online meeting to three specific issues which would arise if consideration were to be given to potential international comparators:

- betas determined for different markets would be different because the market portfolios were different;

- comparators could not have significant unregulated activity; the beta that was required for Australian regulatory practice was the beta of a regulated entity; and

- not only should the comparators be regulated; they must be regulated electricity or gas network businesses, and not regulated businesses in other sectors (for example, electricity generation or telecommunications services) where technology, markets and regulation may be different.

These three issues raised by Dr Fallon point to difficulties in comparing potential international firms with Australian gas pipeline businesses which are subject to full regulation.

Two of the three issues, that comparators should not have significant unregulated activity, and that they should be regulated electricity or gas network businesses, can be addressed by careful selection of a sample of international comparators.

The difficulty arising from differences in market portfolios across countries is not so easily addressed but, in GGT's view, it is not insurmountable. The key issue is finding comparators that can reasonably be expected to have an exposure to market risk similar to that of the benchmark Australian gas pipeline service provider.

2.1.3.1 International comparators can provide beta estimates for the Australian benchmark

At the online meeting on 27 April, Dr Wills-Johnson reported work which had been done by consultants CEG for the Australian Pipeline and Gas Association.[5] That work used an international sample of 24, mainly US, firms which had been carefully selected to ensure that they were regulated electricity and gas businesses. CEG estimated asset betas for the international comparators and for the three Australian comparators with shares which were still trading at 30 June 2021 (APA Group, AusNet Services and Spark infrastructure).

The 24 firms in CEG's sample are a subset of the firms listed in Appendix 1 of the ERA's April 2022 Discussion Paper.

Beta estimates for CEG's carefully selected international comparators and estimates of the betas for the three Australian comparators trading on 30 June 2021 are summarised in slide 4 of Dr Wills-Johnson's presentation. This slide shows, for each of three periods (longest, post-GFC and last five years) and two estimation methods (ordinary least squares and least absolute deviation):

- 95% confidence intervals for the beta estimates of the international comparators (international beta ranges); and

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[5] CEG's report, *Use of foreign asset beta comparators*, was an attachment to the Australian Pipeline and Gas Association submission to the Australian Energy Regulator, *Rate of return final omnibus paper and information paper*, 11 March 2022.

- 95% confidence intervals for the Australian comparators (Australian beta ranges).

The international beta ranges are far narrower than the Australian beta ranges, indicating that the selected international comparators are providing a more statistically precise estimate of beta (compared to the Australian comparators). Such precision is to be expected due to the larger sample of international comparators.

For five out of six cases (three periods x two estimation methods), the international beta range falls within the Australian beta range. In the sixth case (last five years, ordinary least squares estimation), the upper limit of the international beta range is above the upper limit of the Australian beta range, but the international beta range is largely within the Australian beta range.

The six cases shown in Dr Wills-Johnson's slide 4 indicate that CEG's selected international comparators appear to be a reasonable sample for estimating a beta for the benchmark Australian gas pipeline service provider.

Based on the overlap of confidence intervals in Dr Wills-Johnson's slide 4, and the above statistical analysis, the international comparators appear to be reasonable. However, comparability between the international beta estimates and the estimates from the Australian comparators cannot be established without understanding the underlying economic reasons for such comparability. This is discussed in the next section 2.1.3.2. In this next section, we also further set out evidence which demonstrates the comparability of the betas for the international comparators and the betas for the Australian comparators.

2.1.3.2 Understanding why the betas for the international comparators are similar to the betas for the Australian comparators: demonstrating comparability

Beta, CEG noted, was usually defined as the ratio of the covariance between comparator return ($R_{comparator}$) and the return on the market portfolio (R_M), and the variance of the return on the market portfolio:

$$\text{beta}_{comparator} = \frac{\text{cov}(R_{comparator}, R_M)}{\text{var}(R_M)}$$

Now, the correlation between two random variables X and Y is defined as

$$\rho(X, Y) = \frac{\text{cov}(X, Y)}{\sqrt{\text{var}(X)\text{var}(Y)}}$$

so that

$$\text{beta}_{comparator} = \frac{\rho(R_{comparator}, R_M)\sigma(R_{comparator})}{\sigma(R_M)}$$

where

- $\rho(R_{comparator}, R_M)$ is the correlation between return on the comparator and return on the market portfolio;

- $\sigma(R_{comparator})$ is the standard deviation of return on the comparator; and

- $\sigma(R_M)$ is the standard deviation of return on the market portfolio.

To understand why a beta for the international comparators might be different from a beta for the Australian comparators, CEG compared the three components of beta for the international comparators - correlation between return on the comparator and return on the market portfolio, standard deviation of the return on the comparator, and standard deviation of the return on the market portfolio - with the same components of beta for the Australian comparators.

For the beta equation in correlation form, CEG finds that each of the three components for the international comparators is similar to the corresponding component for the Australian comparators.

This indicates similarity between the economic determinants of the betas of the international comparators and the betas of the remaining Australian comparators. This should allow the data from appropriately selected international comparators to be used in estimating the beta for the benchmark Australian gas pipeline service provider.

2.1.4 Others have reached similar conclusions

Finding, in 2009, that there were no suitable domestic comparators in New Zealand, the regulator - the Commerce Commission - examined in detail some 74 potential international comparators which might be used for beta estimation. The Commission concluded that, although the comparators were generally not pure-play, they were likely to reflect a degree of risk similar to that which could be expected for New Zealand electricity distribution and gas pipeline service businesses.[6]

In the November 2021 final report from its rate of return review, the Queensland Competition Authority advised:

> *To determine beta for a regulated entity, it is common regulatory practice to consider the observed beta values of a benchmark set of firms on the basis that these betas reflect the systematic risk of the regulated entity. Ideally, in the Australian context, this set would comprise firms that are listed on the Australian Stock Exchange (ASX), with similar operational characteristics and facing similar risks as the regulated entity.*[7]

There were, the Authority noted, few Australian listed firms which were comparable to the entities subject to the Queensland regulatory regime, and:

> *In the absence of any ideal comparator firms, we need to generate a sample, or samples, of sufficiently comparable listed firms that will allow us to produce the best estimate of beta, such that it reasonably compensates the regulated entity for the systematic risk that it faces.*
>
> *Our view is that using samples of firms from domestic and international stock exchanges will allow us to compare the relative risk of the regulated entity in question with that of the firms that make up these samples.*[8]

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6   Commerce Commission, *Input Methodologies (Electricity and Gas Pipeline Services) Reasons Paper*, December 2010, in particular section 6.5 and Appendix H.

7   Queensland Competition Authority, *Final report: Rate of return review, November 2021*, page 66.

8   Queensland Competition Authority, *Final report: Rate of return review, November 2021*, page 66.

Facing circumstances similar to those which now arise in the context of beta estimation for the benchmark Australian gas pipeline service provider, the New Zealand Commerce Commission and the Queensland Competition Authority concluded that a sample of appropriately selected international comparators could provide an estimate of beta which measured the systematic risk of the businesses which they regulated.

2.1.5 What are the options?

GGT understands Dr Fallon's concerns about the difficulties in comparing potential international firms with Australian regulated gas pipeline businesses which are subject to full regulation. However, with betas for relevant Australian businesses not being stable over time, and with the number of Australian comparators now reduced to, at most, one, a pragmatic approach needs to be taken.

The possible responses to the regulatory need for beta estimation in current circumstances can, GGT thinks, be summarised in four scenario categories.[9] These Scenario Categories are listed in *Table 1*.

Table 1: Rate of return Scenario Categories

Scenario Category	Benefits	Costs
Scenario Category 1: Continue using the Australian comparators for beta estimation	Avoids issue of comparability of international firms with the Australian benchmark.	Infeasible: • number of Australian comparators now reduced to, at most, one; • historical beta estimates have not been stable over time.
Scenario Category 2: Use international comparators that closely match the Australian benchmark gas pipeline service provider (fully addressing the issues identified by Dr Fallon as noted in section 2.1.3 above).	Ensures comparability of international firms with Australian benchmark.	Infeasible: • not possible to identify closely matching firms; • they either do not exist, or there are a very small number of such comparators; • GGT's review of Appendix 1 of the ERA's April 2022 discussion paper found two international comparators similar to Australian gas pipeline businesses; confidence in the estimated beta will not be enhanced with estimation from a sample of size 2 (or possibly 3).

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[9]   They are scenario categories because it is possible to have variation of scenarios within a Scenario Category

Scenario Category	Benefits	Costs
Scenario Category 3: Abandon the Sharpe-Lintner CAPM with its requirement for an estimate of beta because there are no comparators against which systematic risk can be measured.	Specifically addresses the issue of the lack of international and Australian comparators for the benchmark efficient gas pipeline service provider.	• Currently there is no accepted alternative to the Sharpe-Lintner CAPM for rate of return on equity estimation (and even models with limited acceptance, such as the Fama-French, model still require forms of beta estimates). • A major change which is not feasible within the review timeframe.
Scenario Category 4: A pragmatic approach: beta estimation from carefully selected international comparators which may not exactly match the Australian benchmark gas pipeline service provider.	• Capable of providing beta estimates which are likely to measure the degree of systematic risk of the Australian benchmark gas pipeline service provider (section 2.1.3.2 above). • Approach taken by regulators in other jurisdictions (New Zealand, Queensland) facing similar problems with beta estimation (section 2.1.4 above). • Approach proposed to AER by Australian Pipeline and Gas Association, based on supporting evidence from consultants CEG, and referred to by Dr Wills-Johnson in online meeting (sections 2.1.3.1 and 2.1.3.2 above).	Have to live with imperfections in the sample data, but such imperfections do not need to affect the reliability of the approach.

The analysis presented in *Table 1* indicates to GGT that, on the balance, Scenario Category 4 - a pragmatic approach to beta estimation using data from a carefully selected international comparators - can provide a beta likely to measure the degree of systematic risk of the benchmark Australian gas pipeline service provider.

2.1.6 GGT's conclusions

GGT concludes, with Dr Wills-Johnson and CEG, that with, careful choice of countries and comparators firms, the data from international comparators can be used in the estimation of a beta

for the benchmark efficient entity for which the allowed rate of return is set in the 2022 gas rate of return instrument.

Not only can the data from international comparators be used. They must be used as Australian market conditions are changing and as the number of Australian comparators falls to zero.

We comment further on the careful choice of comparators in the following response to the ERA's Question 1.

We note that from its work for the Australian Pipeline and Gas Association, CEG's estimated an asset beta of at least 0.3 (shown in slide 4 of Dr Wills-Johnson's presentation). With a benchmark gearing of 0.55, an asset beta of at least 0.3 for the benchmark efficient entity represents an equity beta of at least 0.7.

2.2   ERA Question 1

Are the firms selected by the ERA in the discussion paper (reproduced in Appendix 1 of this paper) appropriate? If there are firms which are inappropriate, what characteristics make them inappropriate?

To be appropriate for beta estimation, the international comparators should be firms with the characteristics of the benchmark efficient entity.

Paragraph 51 of the December 2021 Discussion Paper tells us that the benchmark has the following characteristics:

- it is a pure-play network service provider;
- it operates within Australia;
- it has no parental ownership; and
- it has a similar degree of risk to that which applies to a (Western Australian) gas pipeline service provider in respect of the provision of gas network services.

When considering appropriate international comparators, we must drop the requirement for operation in Australia.

Appendix 1 lists 66 firms as potential international comparators. Among these 66 firms:

- seven are not pure play network service providers because they have significant other business activities (Vector Ltd - fibre optic communications; Enbridge Inc. - liquids pipelines; Eversource Energy - water services; Hawaiian Electric Industries - banking; Nextera Energy Inc. - gas exploration and production; Oneok Inc. - petroleum liquids processing and liquids pipelines; Otter Tail Corporation - manufacturing and plastics);
- two, Canadian Utilities Ltd and Avangrid Inc., have significant parental ownership (ATCO Ltd in the case of Canadian Utilities, Iberdrola SA in the case of Avangrid), and do not meet the requirement of no parental ownership; and
- two, Superior Plus Corporation and Suburban Propane Partners, are distributors of propane and liquid fuels, and do not meet the requirement of being a network service provider.

We note that the work which CEG has undertaken for the Australian Pipeline and Gas Association, which was reported in the presentation by Dr Wills-Johnson, used a sample of only 24 firms.

GGT is of the view that more detailed assessments of the potential international comparators listed in Appendix 1 are required before those potential comparators can be considered as providing a sample for estimation of the beta of the benchmark efficient entity.

2.3   ERA Question 2

Are there any additional jurisdictions that should be considered by the ERA?

GGT does not think that there are additional jurisdictions which should be considered by the ERA.

2.4   ERA Question 3

Should the ERA consider reweighting foreign market indices to be reflective of the Australian Securities Exchange (ASX), or would this create distortions and interpretation issues as the market beta would no longer be one?

If the ERA uses the data from an appropriately selected sample of international comparators in beta estimation, that will be because, among other things, the international comparators have shares which are traded in equity markets which are, for practical purposes, comparable to the Australian equity market.

GGT is of the view that, in these circumstances, the ERA should not reweight foreign market indices. Any reweighting of those indices would be likely to distort the results of beta estimation.

2.5   ERA Question 4

What adjustments, if any, should be made to estimates of international equity betas?

GGT is of the view that no adjustments should be made to the estimates of the international equity betas.

2.6   ERA Question 5

Once the sample has been selected and individual betas have been estimated, how should the ERA best use this information to determine an equity beta point estimate? Should this be done in a mechanical way or should regulatory discretion be used?

If an appropriate sample of international comparators is used in beta estimation, each of the comparators will be sufficiently similar to the benchmark Australian gas pipeline service provider to be regarded as having being drawn from the same statistical population as the benchmark.

Once comparability is ensured through the sample selection process, the use of international comparators provides a larger sample and more precise estimation of the beta for the benchmark efficient entity.

A point estimate of beta for the rate of return instrument should then be obtained as a simple equally weighted average of the beta estimates for the international and remaining Australian comparators.

We see, at present, no reasons for:

- country pooling - equally weighting country means in the point estimate; and
- domestic anchoring - using the estimates from the Australian comparators (now just one!) as an anchor, which is then modified by lower weightings on the estimates for the international comparators.

3   Market risk premium

Estimation of the MRP remains contentious. Furthermore, a new issue has arisen during consultation on the 2022 gas rate of return instrument: should the MRP be fixed for the term of the instrument, or should it be updated each time a final decision is made on an access arrangement revision proposal?

MRP estimation for the gas rate of return instrument currently uses, and has previously used, historical excess returns with some adjustment made by reference to the results obtained from dividend growth models (DGM), and by reference to certain conditioning variables. The adjustments made by reference to DGM results and conditioning variables have not followed specific rules.

In its response to the December 2021 Discussion Paper, GGT supported continued and careful use of historical excess returns in estimation of the MRP.

Careful use meant, among other things, that the arithmetic mean of historical excess returns, and not the geometric mean, should be used in estimation.

GGT recognised, in its response, that recent financial economics research was indicating that the MRP was time varying, and this was inconsistent with the assumption of a constant expected excess return on the market which underpinned the use of historical excess returns. Although there was broad acceptance of time variation in the MRP, the relevant research did not offer models and methods of estimation of a time varying premium which could be applied in the context of setting rates of return allowed for regulation.

GGT's response to the December 2021 Discussion Paper did not consider the DGM. The DGM was not a focus of the questions which the ERA had raised in the Discussion Paper.

However, GGT has been supportive of Energy Networks Australia's development of a method for applying the DGM which addresses concerns previously raised by the ERA, the Australian Energy Regulator and others.

The possibility of making more direct use of DGM estimates is raised in the April 2022 Discussion Paper, with the ERA now seeking stakeholder views on the Energy Networks Australia calibrated DGM, and on approaches to combining estimates from the DGM and other methods into a single point estimate of the MRP.

3.1 ERA Question 6

What are stakeholder views on the calibrated DGM proposed by Energy Networks Australia? Does this amended model provide additional confidence in the DGM and how?

GGT is of the view that the growth rate calibration undertaken when applying the Energy Networks Australia model contributes to greater confidence in MRP estimates made using the DGM, compared to the uncalibrated DGM.

However, use of the Energy Networks Australia DGM seems to lead to estimates of the MRP higher than the estimates in either the ERA's current gas rate of return instrument (6.0%) or the Australian Energy Regulator's current rate of return instrument (6.1%). This indicates to us that estimates of the MRP previously used in setting rates of return allowed for regulation have had a significant downward bias.

Our reasons for why the Energy Networks Australia DGM contributes to greater confidence in MRP estimates are set out in section 3.1.1 below. In the following section (3.1.2), we explain why we think the Energy Networks Australia model provides higher estimates of the MRP, indicating earlier downward bias.

3.1.1 Energy Networks Australia model contributes to greater confidence in MRP estimates

The Energy Networks Australia model is, we understand, a three-stage version of the DGM similar to the three-stage model used in rate of return determination by the Australian Energy Regulator.[10] That model requires, for its application, a forecast of the expected long term growth rate in nominal dividends per share. Model results, including the estimated MRP, are sensitive to the value assumed for this long-term growth rate in dividends.

When applying the Energy Networks Australia model, the consensus dividend forecasts used by the Australian Energy Regulator and the Australian Energy Regulator's estimate of the rate of utilisation of franking credits (theta) are used. The Australian Energy Regulator's adjustments for imputation credits are made.

The Energy Networks Australia DGM is then solved monthly over the period commencing in 1988, to determine a series of monthly returns on the market. This series of returns on the market is used, with a series of monthly estimates of the risk-free rate, to estimate a series of excess returns on the market. If the average of this series of excess returns is less that the average of historical excess returns for the same period since 1988, the growth rate in the DGM is increased and the calculation repeated. If the average of the series of excess returns is greater than the average of historical excess returns for the same period, the growth rate in the DGM is reduced and the calculation repeated. The process proceeds iteratively to obtain the growth rate for dividends, g*, at which the average of excess returns from the DGM is equal to the average of historical excess returns.

Once g* has been determined, it can be used in the Energy Networks Australia DGM to estimate a forward looking MRP.

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[10]   Australian Energy Regulator, *Rate of Return Instrument Explanatory Statement*, December 2018, section 9.4.

The forward-looking MRP obtained in this way is calculated from:

- a single, objective estimate of the dividend growth rate (g*) consistent with historical excess returns; and

- estimates of other parameters made using the methods and values used by the Australian Energy Regulator when applying its own DGM.

The scope for subjectively influencing the choice of model parameters is reduced, significantly in the case of the dividend growth rate, contributing to greater confidence in MRP estimates made using the DGM, compared to the uncalibrated DGM.

3.1.2   Higher MRP estimates from the Energy Networks Australia calibrated DGM

In *Figure 2* below we reproduce the graph from slide 7 of the presentation by Frontier Economics Director, Professor Stephen Gray, to the ERA's online meeting on 27 April. The graph shows results obtained using the Energy Networks Australia calibrated DGM.

Figure 2: Results from the Energy Networks Australia calibrated DGM

The teal line (k line) in Figure 2 shows a slightly declining expected return on the market over the period 1988 to the beginning of 2022. Over the same period, the estimate of the risk-free rate of return used in the modelling has fallen. In consequence, the difference between the expected return on the market and the risk-free rate, the estimate of the MRP, has increased. Since the Global Financial Crisis (after 2009), the estimated MRP seems to have had an average value of around 9%. The estimate of the MRP from the calibrated dividend growth model has, for over a decade, exceeded the MRP which is currently assumed for regulatory rate of return determination.

Does this indicate a flaw in the Energy Networks Australia calibrated DGM? GGT does not think that it does. The problem, GGT thinks, lies in estimates of the MRP made from historical excess returns.

As we pointed out in our February submission to the ERA, the original Brailsford, Handley and Maheswaran (BHM) dataset from which estimates of the excess returns have been made included among its 128 observations 35 which were negative. When the BHM dataset is extended to 2021, 37 of the 139 observations are negative. Each of these observations is the *excess equity return* for a year in the dataset. A negative *excess equity return* for a year means, for that year, the market equity return is less than the risk free rate. Positive *excess equity return* means the reverse.

These observations of *excess equity returns* represent the ex-post *realised excess equity return* rather than the ex-ante *expected excess equity returns*.

Under the historical excess return model, the MRP is the mean[11] of the *excess equity return* observations across the sample years. As the MRP is an ex-ante expectation of return on investment by rational investors, this MRP should be calculated using the ex-ante *expected excess equity returns* rather than the *realised excess equity return*.

Care should be exercised when adopting the observed ex-post *realised excess equity returns* as a proxy for the ex-ante *expected excess equity return*. Specifically, the years with a negative *realised excess equity return* should be excluded from the ex-ante *expected excess equity returns* sample. This means the negative *excess equity return* should not be used in the historical excess return model calculation.

The negative *excess equity returns* should be excluded from the sample because:

- **Negative *realised excess returns* on the market portfolio do not reflect the ex-ante expectation of rational investors**: if returns from equity investment were expected to be below the risk-free rate of return, investors would invest in the risk-free asset and not in equities. In other words, rational investors expect the excess return to be positive. We note that, in times of significant economic change[12], such expectations may not be realised and the *realised equity returns* may fall below the risk-free rate of return. Notwithstanding this, such observations do not reflect a rational investor's expectation hence should not be used in estimating the MRP.
- **Negative excess equity returns are inconsistent with the equilibrium conditions of the Sharpe-Lintner Capital Asset Pricing Model (CAPM)**: a necessary condition for CAPM equilibrium is that the expected return on the market portfolio be greater than the risk free rate.[13] If the return on the market portfolio is negative, the equity market will not be in equilibrium, and a process of equilibration (increase in demand for the risk free asset, an increase in its price, and a fall in the risk free rate of return, together with a fall in the demand for equities, a fall in their prices, and rising equity returns) will be initiated. This process will bring the return on the market portfolio back to above the risk-free rate.

We think these negative *realised excess equity returns* bias downward the estimate of the MRP made using historical excess returns, and this biases downward the allowed rate of return on equity.

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[11]   Whether this should be arithmetic mean or geometric mean was discussed in GGT's February submission.

[12]   For example 1915 (the Great War); 1929 (the stock market crash and onset of the Great Depression); 1942 (World War 2); 1951 (the Korean War); 1973 (the international oil crisis); and 2008 (the Global Financial Crisis).

[13]   See, for example, Robert C Merton (1982), "On the Microeconomic Theory of Investment Under Uncertainty", in K J Arrow and M Intriligator (eds.), *Handbook of Mathematical Economics*, vol. II, Amsterdam: North-Holland, Proposition 4.6, page 628.

Our current estimate of the MRP made using all the BHM data, our own calculations of excess returns for the period 2011 to 2021, and the arithmetic (not geometric) mean as estimator is 6.4%. If we set the negative realised excess returns (26.6% of the observations) to zero, the arithmetic mean - the estimate of the MRP - rises to **9.9%**. This is similar to the MRP indicated by the Energy Networks Australia calibrated DGM. An MRP of around 6.0%, estimated using historical excess returns, seems too low.

3.2   ERA Question 7

Is it possible to combine inputs in a more formulaic manner when estimating a forward-looking market risk premium?

In its presentation to the online meeting on 27 April, the ERA indicated that, in asking Questions 7 and 8, it was concerned with whether a point estimate of the MRP should be made:

- in a mechanical or formulaic way; or
- through assessment of the available information and the use of regulatory discretion to develop the best point estimate.

In GGT's view, the use of historical excess returns and the DGM are formulaic and essentially mechanical ways of estimating the MRP.

Use of the DGM is, we think, less mechanical than the use of historical excess returns. However, the method of DGM calibration proposed by Energy Networks Australia reduces the scope for subjectively when it comes to influencing the choice of model parameters. This makes estimation of the MRP using the calibrated DGM more mechanical, compared to the DGM model without calibration. In our response to Question 10, we note Professor Gray's advice that estimating the MRP using a mechanical (or formulaic) way is possible.

In our response to Question 8, we find that the best that can be done is to equally weight an estimate of the MRP made using historical excess returns and an estimate made using the calibrated DGM. Given this, estimates made using historical excess returns and the calibrated DGM can be combined in a simple and formulaic way to provide a point estimate of the MRP for the gas rate of return instrument – on the condition that MRP can be estimated by both of these models in a mechanical (or formulaic) way.

We are quite uncertain about how the MRP could be assessed from the available information, and how regulatory discretion could be used to develop the best point estimate. This gives rise to questions, for examples:

- What is the "available information"?
- What would be the economic logic supporting its assessment?

Assessment of the MRP from the "available information" approach appears to be inherently arbitrary. Furthermore, GGT does not see how, under this approach, it might be possible to develop the best point estimate. In developing the methodology for the point estimate, an example of issue that may be difficult to resolve is: what criterion is to be used in choosing the "best" estimating method from among the alternatives assessed based on the available information?

There are, as we indicated in our February submission, new models and methods of estimation for a time varying MRP but none of these models and methods is well enough accepted for use in the setting of rates of return allowed for economic regulation.

Thus, in GGT's view, a point estimate of the MRP can only, and should, be made in a mechanical or formulaic way.

To make the point estimate through assessment of the available information and the use of regulatory discretion gives rise to the risk of arbitrariness in estimating a parameter which is critical to the setting of the allowed rate of return on equity and to service provider viability. An exercise of regulatory discretion, leading to an arbitrary estimate the MRP, and to an arbitrary return on equity, would (contrary to the requirement of section 30D(5)) not have regard to the revenue and pricing principles of section 24 of the National Gas Law. The revenue and pricing principles require, among other things, that the service provider be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in providing reference services. An arbitrary return on equity would not provide the service provider with a reasonable opportunity to recover financing costs which are usually a major component of the costs of providing reference services.

Thus, in making a point estimate of the MRP, there is no role for assessment of the available (but otherwise unspecified) information or for the use of regulatory discretion.

3.3   ERA Question 8

What weight, if any, should be assigned to the historic market risk premium, DGM and conditioning variables in estimating the market risk premium?

GGT is of the view that:

- no weight should be given to conditioning variables because there is no evidence of relationship between the conditioning variables and the MRP; and

- an MRP estimate made using historical excess returns should be equally weighted with an estimate made using the DGM.

3.3.1 Conditioning variables

Conditioning variables, the April 2022 Discussion Paper advises, are readily available market data which allow the ERA to take into account current market conditions when making an estimate of the MRP. The ERA may give consideration to the following conditioning variables:

- the spread between the Bloomberg fair value curve for AA Australian corporate bonds and the yield on a Commonwealth Government bond;

- the spread between the five-year interest rate swap rate and the yield on a Commonwealth Government bond;

- the dividend yield for the portfolio of the All Ordinaries index; and

- implied market volatility measured using the ASX 200 volatility index.

The use of conditioning variables in estimating the MRP amounts to assuming a relationship between the MRP and current values of the conditioning variables. For conditioning variable CONDVARi, the relationship might be linearized and estimated as the regression:

$$MRP_{t+1} = a_i + b_i \times CONDVAR_{i,\,t} + \varepsilon_t$$

Establishing such a relationship takes us back to the issue of returns predictability, which GGT briefly discussed in its February response to Question 12 of the December 2021 Discussion Paper. We noted the large number of studies which had explored relationships between expected returns and a range of predictors. Many of these studies found statistically significant in-sample return predictability but showed poor out-of-sample performance for relationships between returns and predictors which lacked clear economic rationales. An examination of these studies led Welch and Goyal to conclude that use of these purported relationships, out-of-sample, was not superior to reliance on an MRP estimate made from the mean of historical excess returns.[14]

Before any conditioning variable might be used in estimation, a relationship between that variable and the MRP must be established. The returns predictability literature points to the difficulty of establishing the necessary relationship. Financial economists have responded to the Welch and Goyal conclusion with more complex models that include combinations of forecasts, diffusion indexes, and controlled time variation of the parameters (regime switching). However, as we noted in February, Principal Economist, Peter Gibbard, had reported to the ACCC (and to the Australian Energy Regulator) that recent models were diverse and complex, making them difficult to implement, and posing a challenge for evidence-based selection of a particular model for regulatory purposes.[15]

We are not aware of any work to establish relationships between the MRP and any of the proposed conditioning variables.

Without these relationships having been established, any use of conditioning variables amounts to the making of arbitrary adjustments in the process of estimating the MRP.

GGT is therefore strongly of the view that, in these circumstances, no weight should be given to conditioning variables when estimating the MRP.

3.3.2   Equal weighting of estimates from historical excess returns and DGM

We are left with only the use of historical excess returns and the DGM to estimate the MRP.

The Energy Networks Australia calibrated DGM enhances our confidence in MRP estimates made using the DGM. However, its results further reduce our confidence in the use of historical excess returns as being able to provide a reasonable estimate of a forward-looking MRP (see section 3.1.2 above).

In these circumstances, we think the best that can be done is to equally weight an estimate of the market risk premium made using historical excess returns and an estimate made using the calibrated DGM.

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[14] Ivo Welch, Amit Goyal (2008), "A Comprehensive Look at The Empirical Performance of Equity Premium Prediction", Review of Financial Studies, 21(4), pages 1455-1508.

[15] Peter Gibbard, *Estimating the Market Risk Premium in Regulatory decisions: Conditional versus Unconditional Estimates*, ACCC/AER Working Paper Series, Working Paper No. 9, September 2013.

Equal weighting is a weak response to uncertainty of outcome, but we see no basis for merits weighting of the two models as suggested in slide 26 of the ERA's presentation to the 27 April online meeting. Any merits weighting would be no more than the result of subjective assessment by the party assigning weights.

3.4   ERA Question 9

Do you support a fixed or updating market risk premium being used over the four-year term of the gas instrument?

Recent financial economics research supports the view that the MRP is time-varying.[16]

GGT is of the view that, in these circumstances, updating of the premium over the term of the gas rate of return instrument is, in principle, the correct way of proceeding.

Updating the MRP within the four-year term of the gas instrument, however, require compliance with section 30E(2)(b) of the National Gas Law (NGL). This section of the NGL requires that, if a rate of return instrument states the way to calculate the rate of return, the instrument must provide for the methodology to apply automatically without the exercise of any discretion by the regulator.

In order to comply with this section of the NGL, whether the MRP can be updated periodically over the term of the gas rate of return instrument depends on how feasible it is to specify the estimation process as a set of rules which can be applied in a mechanical way without the use of discretion.

If estimates can be made in ways which are completely mechanical and which do not require the use of regulatory discretion, the MRP could be updated periodically over the term of the gas rate of return instrument.

3.5   ERA Question 10

Is it possible to estimate a forward looking market risk premium in a completely mechanical way with no use of regulatory discretion?

In GGT's view, a forward-looking MRP should be estimated from historical excess returns and the calibrated DGM. The Energy Networks Australia calibrated DGM would seem to be a reasonable choice of DGM for this purpose.

Even if they were relevant (GGT does not think that they are), conditioning variables could not be used in a mechanical way. Their use would be precluded by the need for regulatory discretion.

We think estimation of a forward looking MRP in a completely mechanical way is possible if:

- The estimate is made by combining the estimates from the historical excess returns and the calibrated DGM models on an equally weighted basis;
- Estimation of an MRP using historical excess returns could be undertaken in a completely mechanical way. We think this is possible although careful specification of the procedure

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[16]   Again, see the response to Question 12 of the ERA's December 2021 Discussion Paper in GGT's February 2022 submission.

in the gas rate of return instrument in a way sufficient to remove the need for discretion may be tedious; and

- Estimating of the MRP from the calibrated DGM can be made in a completely mechanical way. We have not seen the full details of the calibrated DGM, and are unsure whether it can be applied in a completely mechanical way. However, in the 27 April online meeting, Professor Gray, when responding to a question from ERA convenor Jason Dignard, advised that he thought it was possible to set out the steps for using the calibrated DGM in the rate of return instrument.

This means, subject to confirmation of Professor Gray's advice, forward looking MRP can be estimated in a completely mechanical way with no use of regulatory discretion.