



FINAL DECISION
Ergon Energy
determination
2015-16 to 2019-20

Attachment 4 – Value of
imputation credits

October 2015

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Note

This attachment forms part of the AER's final decision on Ergon Energy's 2015–20 distribution determination. It should be read with all other parts of the final decision.

The final decision includes the following documents:

Overview

Attachment 1 – Annual revenue requirement

Attachment 2 – Regulatory asset base

Attachment 3 – Rate of return

Attachment 4 – Value of imputation credits

Attachment 5 – Regulatory depreciation

Attachment 6 – Capital expenditure

Attachment 7 – Operating expenditure

Attachment 8 – Corporate income tax

Attachment 9 – Efficiency benefit sharing scheme

Attachment 10 – Capital expenditure sharing scheme

Attachment 11 – Service target performance incentive scheme

Attachment 12 – Demand management incentive scheme

Attachment 13 – Classification of services

Attachment 14 – Control mechanism

Attachment 15 – Pass through events

Attachment 16 – Alternative control services

Attachment 17 – Negotiated services framework and criteria

Attachment 18 – Connection policy

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Shortened forms

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
AGN	Australian Gas Networks
APTNT	APT Pipelines (NT) Pty Ltd
capex	capital expenditure
CAPM	capital asset pricing model
CCP	Consumer Challenge Panel
CGS	Commonwealth Government securities, also called Australian Government securities (AGS)
CPI	consumer price index
DGM	dividend growth model
DRP	debt risk premium
distributor	distribution network service provider
ERP	equity risk premium
FFM	Fama-French three-factor model
JEN	Jemena Electricity Networks
JGN	Jemena Gas Networks
MRP	market risk premium
NEL	national electricity law
NEO	national electricity objective
NER	national electricity rules
NGL	national gas law
NGO	national gas objective
NGR	national gas rules

4 Value of imputation credits

Under the Australian imputation tax system, investors can receive an imputation credit for income tax paid at the company level.¹ For eligible investors, this credit offsets their Australian income tax liabilities. If the amount of imputation credits received exceeds an investor's tax liability, that investor can receive a cash refund for the balance. Imputation credits are therefore valuable to investors and are a benefit to investors in addition to any cash dividend or capital gains they receive from owning shares.

The NER/NGR recognise that a service provider's allowed revenue does not need to include the value of imputation credits. Under the NER/NGR, service providers are to recover revenue that compensates them for their efficient costs in providing regulated services. This includes, among other things, a return to be provided to investors (return on equity) that is required to promote efficient levels of investment. The more that imputation credits are valuable, the less return that investors require from dividends and capital gains. However, the estimation of the return on equity does not take imputation credits into account.² Therefore, an adjustment for the value of imputation credits is required. This adjustment could take the form of a decrease in the estimated return on equity itself. An alternative but equivalent form of adjustment, which is employed by the NER/NGR, is via the revenue granted to a service provider to cover its expected tax liability. Specifically, the NER/NGR require that the estimated cost of corporate income tax be determined in accordance with a formula that reduces the estimated cost of corporate tax by the 'value of imputation credits' (represented by the Greek letter, γ , 'gamma').³ This form of adjustment recognises that it is the payment of corporate tax which is the source of the imputation credit return to investors.

In this attachment, we set out our final decision on the value of imputation credits and our key reasons for this decision. We also consider Ergon Energy's proposed value of imputation credits and the key reasons for its proposal. In appendix A, we include further supporting detail on our position on the value of imputation credits and also respond to Ergon Energy's proposal in more detail.

4.1 Final decision

We do not accept Ergon Energy's proposed value of imputation credits of 0.25. Instead, we adopt a value of imputation credits of 0.4.

Estimating the value of imputation credits is a complex and imprecise task. There is no consensus among experts on the appropriate value or estimation techniques to use.⁴ Further, with each estimation technique there are often a number of ways these may be

¹ *Income Tax Assessment Act 1997*, parts 3–6.

² While the return on equity is not reduced to take into account the value of imputation credits, we note our estimate of the MRP does consider the value we use for imputation credits to ensure it reflects the value to investors in the domestic Australian market inclusive of credits.

³ NER, cll. 6.4.3(a)(4), 6.4.3(b)(4), 6.5.3, 6A.5.4(a)(4), 6A.5.4(b)(4) and 6A.6.4; NGR, rr. 76(c) and 87A.

⁴ See section A.1 of appendix A.

applied resulting in different outcomes. Conceptually, the value of imputation credits must be between 0 and 1, and the range of expert views on the value of imputation credits is almost this wide.⁵

In coming to a value of imputation credits of 0.4, we have considered the full range of evidence before us with regard to its merits. Specifically, we use the widely accepted approach of estimating the value of imputation credits as the product of two sub-parameters: the 'distribution rate' and the 'utilisation rate'.⁶ Moreover, we have regard to:

- the widely accepted approach to estimating the distribution rate, and
- the range of approaches relevant to estimating the utilisation rate, with due regard to the merit of each approach.

Overall, this evidence suggests that a range of estimates for the value of imputation credits might be reasonable. With regard to the merits of the evidence before us, we choose a value of imputation credits of 0.4 from within a range of 0.3 to 0.5.

In considering the evidence on the distribution and utilisation rates, we have broadly maintained the approach set out in the rate of return guideline (the Guideline), but have re-examined the relevant evidence and estimates. This re-examination, and new evidence and advice considered since the Guideline, led us to depart from the 0.5 value of imputation credits we proposed in the Guideline.

4.2 Ergon Energy's revised proposal

In its revised proposal, Ergon Energy did not adopt our preliminary decision and maintained the position in its initial proposal.⁷ This was for a value of imputation credits of 0.25, calculated as the product of a distribution rate of 0.7 and a utilisation rate of 0.35.⁸ Its proposed distribution rate of 0.7 was consistent with the value in the Guideline and our value in the preliminary decision when estimated over all companies. However, in the preliminary decision we also relied in part on a distribution rate estimated over just public companies, of 0.8. Ergon Energy's proposed utilisation rate of 0.35 was lower than the value in the Guideline and a number of estimates on which we placed reliance in the preliminary decision. Ergon Energy's proposed utilisation rate was supported by Professor Stephen Gray's view that 'the best available estimate of theta is 0.35'.⁹ This estimate is from a 'dividend drop off' study by SFG Consulting and co-authored by Professor Gray.¹⁰

⁵ The value of imputation credits must be between 0 and 1 because receiving an imputation credit cannot make an investor worse off, nor would an investor value an imputation credit more than its face value.

⁶ These sub-parameters are discussed further in section 4.4.

⁷ Ergon Energy, *Revised regulatory proposal 2015-20*, July 2015.

⁸ Ergon Energy actually referred to the utilisation rate as the Greek letter 'theta'. The labelling and interpretations of the utilisation rate are discussed in sections A.6 and A.7 of appendix A.

⁹ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 6.

¹⁰ SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013. Dividend drop off studies are explained in section A.14.1.

Ergon Energy's proposed value of imputation credits of 0.25 and supporting reasons were broadly consistent with the proposals we received from a number of other service providers. Seventeen service providers over the past 18 Months have now made broadly consistent proposals on the value of imputation credits: ActewAGL, Ausgrid, Directlink, Endeavour Energy, Essential Energy, Jemena Gas Networks (JGN), TransGrid, SA Power Networks, Energex, Ergon, AusNet Services, Citipower, Powercor, Jemena Electricity Networks (Vic), ActewAGL Distribution, Australian Gas Networks, and APT Pipeline (NT) Pty Ltd. ActewAGL, Ausgrid, Directlink, Endeavour Energy, Essential Energy, JGN, TransGrid, SA Power Networks, Energex and Ergon, who lodged initial proposals in 2014, maintained in their revised proposals their position in their initial proposals.

The majority of the service providers listed above jointly commissioned two reports from SFG Consulting (SFG) and relied on these reports in their proposals. In addition, the majority of service providers have commissioned and relied on expert reports from NERA Economic Consulting (NERA) and Frontier Economics (Frontier).¹¹

Our analysis of JGN's revised proposal was broadly consistent with our analysis of the proposals from the service providers we released decisions for in April 2015.¹² The only material difference between the final decision for JGN and our earlier decisions for those service providers was that in the JGN final decision had regard to two new expert reports.¹³ The key difference between this final decision and the JGN final decision is we have had regard to several new expert reports from NERA and Frontier.¹⁴ We note that the new and revised proposals, which we have considered in detail, add little beyond what is contained in the new reports. We also note key areas of disagreement are largely unchanged from those we considered in making our final decisions released in April and June 2015 currently being considered by The Australian Competition Tribunal.¹⁵

Throughout this attachment we refer to AusNet Services, Citipower, Powercor, and Jemena Electricity Networks (Vic) as 'the Victorian service providers', and ActewAGL Distribution, Australian Gas Networks, and APT Pipeline (NT) Pty Ltd as 'the 2015 gas network service providers'.

¹¹ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015; NERA Economic Consulting, *Estimating Distribution and Redemption Rates: Response to the AER's Final Decisions for the NSW and ACT Electricity Distributors, and for Jemena Gas Networks*, June 2015.

¹² In April 2015 we released final decisions for Ausgrid, Essential Energy, Endeavour Energy and ActewAGL Distribution, and preliminary decisions for SA Power Networks, Ergon Energy and Energex.

¹³ See section 4.4 for more detail.

¹⁴ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015; NERA Economic Consulting, *Estimating Distribution and Redemption Rates: Response to the AER's Final Decisions for the NSW and ACT Electricity Distributors, and for Jemena Gas Networks*, June 2015.

¹⁵ We note that the Australian Competition Tribunal is currently considering gamma decisions of the AER released in April 2015 for Ausgrid, Endeavour Energy, Essential Energy and ActewAGL and released in June 2015 for Jemena Gas Networks. Key areas of disagreement between the AER and the service providers are being considered as part of this review process.

4.3 AER's assessment approach

In this section we set out the approach we have taken to assessing proposals on the value of imputation credits. This approach includes consideration of:

- the requirements of the NEL/NGL and NER/NGR
- the Guideline
- our definition of the benchmark efficient entity
- interrelationships with other aspects of the decision
- expert reports, and
- our approach to determining the value of imputation credits.

4.3.1 Requirements of the NEL/NGL and NER/NGR

The NER/NGR require that the estimated cost of corporate income tax of a service provider for each regulatory year (ETC_t) must be estimated in accordance with the following formula:¹⁶

$$ETC_t = (ETI_t \times r_t)(1 - \gamma)$$

where:

- ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of regulated services if such an entity, rather than the service provider, operated the business of the service provider, such estimate being determined in accordance with the post-tax revenue model.
- r_t is the expected statutory income tax rate for that regulatory year as determined by the AER.
- γ is the value of imputation credits.

Unlike many other aspects of the NER/NGR, there is no specific objective we must achieve for the value of imputation credits and no specific factors we must take into account in estimating it. The rate of return objective does not specifically apply to the value of imputation credits. However, the rate of return must be determined on a nominal vanilla basis consistent with our value of imputation credits.¹⁷

In this context, the conceptual rate of return framework developed by Officer in a 1994 paper informs our approach to interpreting and estimating the value of imputation credits.¹⁸ This is because:

¹⁶ NER, cl. 6.5.3 and 6A.6.4; NGR, r. 87A.

¹⁷ NER, cl. 6.5.2(d)(2) and 6A.6.2(d)(2); NGR, r. 87(4)(b).

¹⁸ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

- The NER/NGR's cost of corporate income tax formula (shown above) mirrors Officer's framework for the treatment of imputation credits, including through use of the parameter denoted by the Greek letter 'gamma'.¹⁹
- We have received expert advice that Officer's definition of the nominal vanilla rate of return provides the basis for the rate of return framework in the NER/NGR.²⁰ Previous statements by the consultant for the majority of the service providers', Gray, and their industry association appear to support this consideration:
 - During the AEMC's 2012 rule change process, Gray advised the AEMC that '...there are a number of different WACC formulas that can all be identified as post-tax nominal definitions of WACC. Officer (1994), in the paper that forms the basis for the regulatory rate of return framework, sets out four such definitions...'.²¹
 - During the development of the Guideline, the Energy Networks Association (ENA) submitted '[t]he fundamental economic framework in relation to dividend imputation was set out by Officer (1994)...'.²²

The NER/NGR require that we determine the rate of return on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.²³ The Officer framework provides a means for doing this. It provides a consistent framework for determining the rate of return for a business, which takes into account the value that investors receive from imputation credits.²⁴ An important implication of this is that gamma is not a standalone concept or parameter. It is part of a broader framework, and should be interpreted and estimated accordingly.

Consistent with the expert advice we have received, we consider that the Officer framework provides the basis for the rate of return framework in the NER/NGR. We therefore also consider that estimating the value of imputation credits consistently with the Officer framework will best promote the NEO/NGO and other requirements of the NER/NGR.

To this end, we have had regard to the differing expert opinions on the proper interpretation of the gamma parameter in the Officer framework. As discussed in section A.7.3 of appendix A, we accept Handley's expert advice on the Officer framework. An important aspect of this advice is that the framework is on a 'before-personal-tax and before-personal-costs' basis.²⁵

¹⁹ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, equation 2.

²⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–8.

²¹ SFG, *Response to submissions on rule change proposals, Report for the AEMC*, 5 November 2012, para. 2.

²² ENA, *Response to the Draft Rate of Return Guideline of the Australian Energy Regulator*, 11 October 2013, p. 49.

²³ NER, cll. 6.5.2 and 6A.6.2; NGR, r. 87.

²⁴ For a detailed discussion of the Officer framework, see: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–12.

²⁵ Although the term 'personal' is used, we note that classes of investors other than individual persons can value imputation credits (for example, superannuation funds and charities). Therefore, an alternative characterisation might be 'before-investor-tax' and 'before-investor-costs'.

That is, 'the per dollar value of an imputation credit γ gamma should be measured prior to any personal tax on the credit and prior to any personal costs associated with the receipt of the credit'.²⁶

By determining a value of imputation credits in a manner consistent with the Officer framework, we consider that we are making our decision in a manner that will or is likely to contribute to the achievement of the NEO/NGO.²⁷ Further, when exercising a discretion in making the relevant parts of a decision, we must take into account the RPP.²⁸ The RPP provide, amongst other things, that:²⁹

- a service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs providing regulated services and complying with regulatory obligations
- a service provider should be provided with effective incentives in order to promote economic efficiency with respect to the regulated services it provides, and
- a price, charge or tariff for the provision of a regulated service should allow for a return commensurate with the regulatory and commercial risks involved in providing the regulated service.

Therefore, the value of imputation credits we adopt must ultimately promote the achievement of the NEO/NGO (via its application in the estimated cost of corporate income tax building block) and must take into account the RPP.

With reference to the language of the RPP, this requires the exercise of our discretion in determining a tax building block (including the exercise of our discretion in determining the adjustment for the value of imputation credits) that is:

- not too low, in that it contributes to providing a reasonable opportunity to recover at least efficient corporate tax costs, and
- not too high, in that it contributes to a return that is not excessive and is commensurate with the relevant risks.

We consider that finding the right balance is best served by having regard to the merits of the full range of relevant evidence. We explain our consideration of, and reliance upon, the range of relevant evidence in this attachment. We have determined a value of imputation credits that we are satisfied achieves a balance between the opportunity for service providers to recover at least efficient costs but that is commensurate with relevant risks.

²⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 5.

²⁷ NEL, s. 16(1)(a); NGL, s. 28(1)(a).

²⁸ NEL, s. 16(2)(a)(i); NGL, s. 28(2)(a)(i).

²⁹ NEL, ss. 7A(2)–(7); NGL, ss. 24(2)–(7).

4.3.2 Rate of return Guideline

In December 2013, we published the Guideline which is available on our website.³⁰ Within it we specified:³¹

- The methodologies we propose to use to estimate the allowed rate of return (derived from the expected return on equity and the return on debt) for electricity and gas network service providers.
- The method we propose to use to estimate the value of imputation credits.
- How these methods will result in an allowed return on equity and return on debt which we are satisfied achieve the allowed rate of return objective.

In the Guideline we also set out the estimation methods, financial models, market data and other evidence that we propose to take into account in estimating the expected return on equity, return on debt and the value of imputation credits.³² We discuss in detail in attachment 3 on the rate of return our development of the Guideline.

The Guideline is not binding in determining the value of imputation credits. However, should we decide to depart from the Guideline we must provide reasons for doing so.³³ Equally, it is open to service providers to propose departures from the Guideline, so long as they provide reasons.³⁴ We have identified in section 4.2 where revised proposals have departed from the Guideline. We identify in section 4.4 the departures we have made from the Guideline position on the value of imputation credits.

4.3.3 Definition of benchmark efficient entity

As shown in section 4.3.1, the NER/NGR refer to a 'benchmark efficient entity'. For the benchmark efficient entity, we have adopted:

- a single benchmark across gas, electricity, transmission and distribution, and
- a conceptual definition of the benchmark efficient entity as 'a 'pure play', regulated energy network business operating within Australia'.³⁵

Our benchmark efficient entity includes the following sub-components as defined below.

³⁰ The requirements to make and publish the Guideline are set out in: NER, cls. 6.5.2(m) and 6A.6.2(m); NGR, r. 87(13). The Guideline is available at: <http://www.aer.gov.au/node/18859>.

³¹ NER, cl. 6.5.2(n) and 6A.6.2(n); NGR, r. 87(14).

³² NER, cl. 6.5.2(n)(2) and 6A.6.2(n)(2); NGR, r. 87(14)(b).

³³ NER, cl. 6.2.8(c) and 6A.2.3(c); NGR, r. 87(18).

³⁴ NER, ss. S6.1.3(9)–(9B) and S6A.1.3(4)(vi),(4A)–(4C); NGR, r. 72(1)(g).

³⁵ AER, *Better Regulation: Rate of Return Guideline*, December 2013, p. 8.

Pure play

A pure play business is one which offers services focused in one industry or product area. In this context, it means that the benchmark efficient entity provides only regulated energy network services.

Regulated

A regulated entity for the purposes of our benchmark is one which is subject to economic regulation (for example, its revenue is controlled by a revenue cap or price cap) under the NER and/or the NGR.

Energy network business

Energy network refers to a gas distribution, gas transmission, electricity distribution or electricity transmission business.

Operating within Australia

The benchmark efficient entity should be operating within Australia as the location of a business determines the conditions under which the business operates. This includes the regulatory regime, tax laws, industry structure and broader economic environment. An additional consideration that is particularly relevant to the value of imputation credits is that we recognise that both domestic and foreign investors participate in the Australian market. That is, we consider that the defined market is an Australian domestic market that recognises the presence of foreign investors to the extent that they invest in the Australian market. This is important for determining a value of imputation credits because typically domestic investors are eligible to utilise imputation credits while foreign investors are not.

4.3.4 Interrelationships

The NER/NGR recognise that a service provider's allowed revenue does not need to include the value of imputation credits. The NER/NGR adjust for the value of imputation credits via the revenue granted to a service provider to cover its expected tax liability. This form of adjustment recognises that it is the payment of corporate tax which is the source of the imputation credit return to investors.

The CCP's view suggests that we should take into account the interrelationship with the corporate tax allowance when determining the value of imputation credits. The CCP submitted evidence that our benchmark tax allowance was substantially higher than the corporate tax actually paid by service providers.³⁶ The CCP then concluded:³⁷

³⁶ CCP, *Responding to NSW draft determinations and revised proposals from electricity distribution networks*, February 2015, pp. 48–49.

³⁷ CCP, *Responding to NSW draft determinations and revised proposals from electricity distribution networks*, February 2015, p. 49.

Regarding gamma, it is difficult for the CCP to support a gamma of 0.5 as being better or worse than 1 or 0 or any number in between, we simply do not know enough about the vagaries of such calculations. Though the lack of tax paid would suggest a gamma nearer 1 than 0.

We agree with the CCP's suggestion that it would be reasonable to consider the tax building block as a whole when determining the value of imputation credits. Under this approach, a tendency toward a higher value of imputation credits (and therefore greater reduction in the tax building block) might be reasonable if the benchmark tax allowance is above the efficient cost of tax. However, in the Guideline and this final decision our determination of the value of imputation credits is guided by the relevant theoretical framework and associated evidence.

The value of imputation credits is also interrelated with the MRP. As discussed in attachment 3, the definition of the MRP in the SLCAPM should account for the capitalised value of imputation credits. Accordingly, in our determination of the return on equity in attachment 3 we adjust estimates of the MRP in a manner consistent with our determination of the value of imputation credits in this attachment. This is also required by the NER/NGR.³⁸

4.3.5 Expert reports

During the development of the Guideline, we commissioned expert advice on the value of imputation credits from Associate Professor Martin Lally of the Victoria University of Wellington.³⁹

Since the Guideline, we commissioned further expert advice from Associate Professor John Handley of the University of Melbourne.⁴⁰ We have also had regard to, among other things:

- the May 2014, February 2015 and June 2015 reports by Professor Stephen Gray that were commissioned by service providers.⁴¹
- the March 2015, April 2015 and June 2015 reports by NERA Economic Consulting (NERA) that were commissioned by service providers.⁴²
- the November 2013 and March 2014 reports by Associate Professor Lally that were commissioned by the Queensland Competition Authority.⁴³

³⁸ NER, cll. 6.5.2(d)(2) and 6A.6.2(d)(2); NGR, r. 87(4)(b).

³⁹ M. Lally, *The estimation of gamma*, 23 November 2013.

⁴⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015. J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015.

⁴¹ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014; SFG, *Estimating gamma for regulatory purposes*, 6 February 2015. Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015.

⁴² NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015. NERA, *Do imputation credits lower the cost of equity? Cross-sectional tests*, April 2015. NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015.

⁴³ M. Lally, *Estimating gamma*, 25 November 2013. M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014.

- an October 2013 review of a network rail access undertaking by Professor Michael McKenzie of the University of Liverpool and Associate Professor Graham Partington of the University of Sydney.⁴⁴ This review was commissioned by the Queensland Resources Council and submitted to the Queensland Competition Authority.
- a September 2013 report on tax statistics by Dr. Neville Hathaway that was commissioned by the Energy Networks Association.⁴⁵
- a June 2013 report on the distribution rate by NERA that was commissioned by the Energy Networks Association.⁴⁶

4.3.6 Approach to determining the value of imputation credits

There is no consensus among experts or regulators on the value of imputation credits or the techniques to use to estimate it.⁴⁷ Our approach to determining the value of imputation credits is guided by:

- the requirements of the NER/NGR—see section 4.3.1.
- the role of the value of the imputation credits in the revenue building block framework—this suggests that the value of imputation credits is intended to reflect the value of imputation credits to investors in the benchmark efficient entity.⁴⁸
- relevant academic literature—the framework developed in a 1994 paper by Officer is widely recognised as providing the basis for the value of imputation credits in the building block framework.⁴⁹ A key implication of Officer's framework is that the value of imputation credits should be estimated on a before-personal-tax and before-personal-costs basis. The work of Monkhouse (and others) extends the Officer framework, and shows that the value of imputation credits can be estimated as the product of two parameters:
 - the proportion of imputation credits generated that is distributed to investors (the distribution rate), and
 - the utilisation value to investors in the market per dollar of imputation credits distributed (the utilisation rate).⁵⁰

Consistent with this literature, we determine the value of imputation credits as the product of these two parameters.

- a wide range of relevant evidence—while there is a widely accepted approach to estimating the distribution rate, there is no single accepted approach to estimating the

⁴⁴ M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013.

⁴⁵ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

⁴⁶ NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013.

⁴⁷ See sections A.1 and A.2 of appendix A.

⁴⁸ See section A.5 of appendix A.

⁴⁹ See sections 4.3.1 and A.6 of appendix A.

⁵⁰ Assuming retained imputation credits have no value. See section A.6 of appendix A.

utilisation rate and there is a range of evidence relevant to the utilisation rate. This includes:

- the proportion of Australian equity held by domestic investors (the 'equity ownership approach').
- the reported value of credits utilised by investors in Australian Taxation Office (ATO) statistics ('tax statistics').
- studies that seek to infer from market prices the value to investors of distributed imputation credits ('implied market value studies').

Also, when estimating the distribution rate and the utilisation rate there is no consensus regarding whether evidence and data should be used on all companies and their investors (all equity) or just listed companies and their investors (only listed equity).⁵¹ In determining the value of imputation credits, we rely on the results from both approaches.

- the views of experts—experts differ in their interpretations of the:
 - role of the value of imputation credits in the regulatory framework
 - underlying theory and academic literature, and
 - relevance of different estimation techniques, particularly for the utilisation rate.

4.4 Reasons for final decision

In determining the value of imputation credits, we have considered the full range of evidence before us with regard to its merits. We consider that a value of imputation credits of 0.4, selected from within a range of 0.3 to 0.5, is reasonable because:

- it is within the range of values indicated by the evidence, and the relevance of the evidence is supported by the expert opinion of Handley, Lally, and McKenzie and Partington.
- it primarily reflects an estimate of the utilisation rate from the equity ownership approach. Handley considered this the most important approach to estimating the utilisation rate, relative to the alternatives of tax statistics and implied market value studies.⁵² The equity ownership approach was Lally's second preference after his recommendation for a utilisation rate of 1.⁵³

⁵¹ For instance, some experts advocate use of evidence on just listed companies and their investors because this is considered to be more reflective of the benchmark efficient entity and its investors, and/or this is consistent with the use of evidence from just listed companies when estimating the market risk premium. See section A.9.1 of appendix A for more discussion.

⁵² J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.

⁵³ M. Lally, *The estimation of gamma*, 23 November 2013, p. 4. Lally's recommendation of a utilisation rate of 1 is based on his consideration that, because we use a domestic rate of return framework, we should assume that all investors in the market are domestic (and therefore eligible to make full use of imputation credits).

- it is within the 'preferred' range for the value of imputation credits (0.4 to 0.5) in Handley's September 2014 advice.⁵⁴
- based on the evidence before us at this time, adopting a value of imputation credits that is rounded to one decimal place appropriately reflects the uncertainty and imprecision associated with this parameter. This uncertainty is evident in the range of views and values that have been espoused by experts, and was recognised by Handley and McKenzie and Partington.⁵⁵ The imprecision of determining the value of imputation credits was emphasised by Handley.⁵⁶

In considering the evidence on the distribution and utilisation rates, we have broadly maintained the approach set out in the Guideline, but have re-examined the relevant evidence and estimates. This re-examination, and new evidence and advice considered since the Guideline, led us to depart from the Guideline value of imputation credits of 0.5. Departures from specific aspects of the Guideline are noted in the discussion of the distribution rate and utilisation rate below.

Further to the Guideline approach, in this final decision we consider that:

- we may have regard to evidence from all equity and/or only listed equity. Some experts advocate use of evidence on only listed companies and their investors because they consider it to be more reflective of the benchmark efficient entity and its investors, or because they consider this is consistent with the use of evidence from only listed companies when estimating the market risk premium. However, there is no consensus on this point. We discuss the issue further in section A.9.1 of appendix A. We did not consider this issue in the Guideline.
- it would be inappropriate to pair an estimate of the utilisation rate from only listed equity with an estimate of the distribution rate from all equity (and vice versa). There is a relationship between definitions and estimates of the distribution rate and utilisation rate that should be recognised when estimating the value of imputation credits. In the Guideline, we estimated the distribution and utilisation rates independently, and did not recognise this relationship. We discuss this relationship further in section A.9.2 of appendix A.

Recognising these considerations, Table 4-1 and Table 4-2 show estimates of the value of imputation credits that arise from internally consistent evidence from all equity and only listed equity, respectively.⁵⁷ These individual sources of evidence allow us to present estimates to

⁵⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 3.

⁵⁵ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 32. M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, pp. 31–35. See also section A.1 of appendix A.

⁵⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 32.

⁵⁷ Note that our estimates of the distribution rate for listed equity come from ATO data on public companies. Handley advised that it is not strictly correct to refer to ATO data on public companies as data on listed companies. This is because the ATO

two decimal places. However, we consider it reasonable to determine a value of imputation credits to only one decimal place when determining a single value from across this evidence.

Table 4-1 Estimates of the value of imputation credits—evidence from all equity

Evidence on utilisation rate	Utilisation rate	Distribution rate	Value of Imputation Credits
Equity ownership approach	0.56 to 0.68	0.7	0.40 to 0.47
Tax statistics	0.45	0.7	0.31

Source: AER analysis.

Table 4-2 Estimates of the value of imputation credits—evidence from listed equity

Evidence on utilisation rate	Utilisation rate	Distribution rate	Value of Imputation Credits
Equity ownership approach	0.38 to 0.55	0.77	0.29 to 0.42
Implied market value studies	0 to 1	0.77	0 to 0.77
<i>SFG dividend drop off study</i>	0.35 (0.4) ^(a)		0.27 (0.31) ^(a)

Source: AER analysis.

(a): Following the adjustment proposed by Handley and Lally. This adjustment is discussed further in section 4.4.2.

Overall, the evidence suggests that a reasonable estimate of the value of imputation credits is within the range 0.3 to 0.5.⁵⁸ From within this range, we choose a value of 0.4. This is because:

- the equity ownership approach, on which we have placed the most reliance, suggests a value between 0.40 and 0.47 when applied to all equity and between 0.29 and 0.42 when applied to only listed equity. Therefore, the overlap of the evidence from the equity ownership approach suggests a value between 0.40 and 0.42.
- the evidence from tax statistics suggests the value could be lower than 0.4. Therefore, with regard to this evidence and the less reliance we place on it, we choose a value at the lower end of the range suggested by the overlap of evidence from the equity ownership approach (that is, 0.4).

definition of a public company includes but is not limited to listed companies. However, Handley also advised that referring to the public company data as relating to listed companies is suitable for our purpose. J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, footnote 26.

⁵⁸ Although implied market value studies produce estimates below 0.3 and above 0.5, we place less reliance on these studies.

- the evidence from SFG's dividend drop off study also suggests that the value could be lower than 0.4. However, we place even less reliance on this evidence. We therefore consider that choosing a value at the lower end of the range suggested by the overlap of evidence from the equity ownership approach (that is, 0.4) has appropriate regard to the merits of SFG's evidence. Moreover, evidence from other implied market value studies suggests that the value could be both higher or lower than 0.4.

The reasons for the relative levels of reliance that we place on different types of evidence are set out in this attachment and appendix A.

We therefore do not accept the service providers' proposed value of imputation credits of 0.25, calculated as the product of a distribution rate of 0.7 and a utilisation rate of 0.35. Specifically, we do not accept the service providers' proposed estimate of the utilisation rate of 0.35. This is because we do not consider it appropriate to rely exclusively on implied market value studies (or SFG's single dividend drop off study). Handley and Lally advised that other classes of evidence are more valuable.⁵⁹ McKenzie and Partington's report for the Queensland Resources Council suggested that it is reasonable to have regard to other classes of evidence.⁶⁰ The South Australian Centre for Economic Studies report for the South Australian Council of Social Service suggested that dividend drop off studies be disregarded entirely.⁶¹

Even if we were to rely solely on the estimate of the utilisation rate of 0.35 from SFG's study, we consider that a value of imputation credits of 0.25 is unreasonable. This is because:

- Handley and Lally advised that the proper use of this estimate of the utilisation rate requires its adjustment to 0.4.⁶² We agree.
- This is an estimate of the utilisation rate of investors in only listed equity, and therefore it should be paired with an estimate of the distribution rate from only listed equity (that is, 0.77).

Therefore, even if the service providers' proposed utilisation rate is used, it yields a value of imputation credits of (0.4×0.77) 0.31 rather than 0.25. However, with regard to the discussion above, our estimated value of imputation credits is higher than 0.31.

⁵⁹ Handley considers that the equity ownership approach and tax statistics are more important to estimating the utilisation rate than implied market value studies: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31. Lally prefers an estimate of the utilisation rate from the equity ownership approach to one from implied market value studies: M. Lally, *The estimation of gamma*, 23 November 2013, p. 4. We discuss the different approaches to estimating the utilisation rate in more detail in section 4.4.2.

⁶⁰ McKenzie and Partington describe the approach to estimating the utilisation rate in our draft rate of return Guideline, which relied on evidence other than implied market value studies, as making a 'reasonable case' for the estimate adopted in that document; M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 32.

⁶¹ SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015, p. 17.

⁶² We discuss the adjustment advised by Handley and Lally in section 4.4.2.

In sections 4.4.1 and 4.4.2, we describe the sources of the estimates in Table 4-1 and Table 4-2, and we present our assessment of the underlying evidence.

Responses to key issues raised by stakeholders

The issues raised by the service providers are addressed in the relevant sections below and in various sections of appendix A. In section A.4 of appendix A, we identify where in this final decision we have responded to:

- the eight key concerns of the majority of service providers in relation to the AER draft regulatory decisions released in 2014; and
- Other key concerns raised by service providers in response to our draft regulatory decisions released in 2014 or regulatory decisions released in April and June 2015.

Submissions on the value of imputation credits from consumer representatives are summarised below:

- The CCP expressed a view that suggests we should take into account the interrelationship with the corporate tax allowance when determining the value of imputation credits.⁶³ We address this in section 4.3.4.
- The Public Interest Advocacy Centre (PIAC) submitted that the Australian Competition Tribunal's decision in 2011 to rely on an estimate of the utilisation rate from the 2011 version of SFG's dividend drop off study should not be viewed as permanently determinative.⁶⁴ We agree with these comments in light of the Tribunal's finding that:⁶⁵

Further, the Tribunal notes that estimation of a parameter such as gamma [the value of imputation credits] is necessarily, and desirably, an ongoing intellectual and empirical endeavour. Its decision in these proceedings is based on the material before it.

PIAC also submitted that our draft decisions adequately set out the reasons for departing from the value of imputation credits in the Guideline.⁶⁶

- The Energy Markets Reform Forum (EMRF) submitted that our estimates of the utilisation and distribution rates are lower (and, therefore more favourable to service providers) than those relevant to a pure play energy network (which is the benchmark efficient entity for setting the rate of return).⁶⁷ The EMRF also submitted that we should

⁶³ CCP, *Responding to NSW draft determinations and revised proposals from electricity distribution networks*, February 2015, p. 49.

⁶⁴ PIAC, *Moving to a new paradigm: submission to the Australian Energy Regulator's NSW electricity distribution network price determination*, 8 August 2014, pp. 90–92; PIAC, *A missed opportunity? Submission to the Australian Energy Regulator's draft determination for Ausgrid, Endeavour Energy and Essential Energy*, 13 February 2015, p. 46.

⁶⁵ Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, 12 May 2011, para. 45.

⁶⁶ PIAC, *A missed opportunity? Submission to the Australian Energy Regulator's draft determination for Ausgrid, Endeavour Energy and Essential Energy*, 13 February 2015, pp. 19–20.

⁶⁷ EMRF, *NSW Electricity Distribution Revenue Reset, AER Draft Decision and revised proposals from Ausgrid, Endeavour Energy and Essential Energy, A response*, February 2015, pp. 31–32.

consider actual industry practices when determining the value of imputation credits—for example, the EMRF submitted that none of APA Group, Envestra Limited (pre sale) or JGN's parent company had balances in their franking accounts.⁶⁸ To clarify, we have interpreted and estimated the value of imputation credits consistently with Officer's 1994 paper and related literature, such as Monkhouse. Under this literature, the utilisation rate is a market-wide parameter and the distribution rate is a firm specific parameter. We estimate the utilisation rate on a market-wide basis. Although the distribution rate is a firm specific parameter, we estimate it on a market-wide basis also and our reasons for doing so are set out in the Guideline.⁶⁹

- The South Australian Council of Social Service (SACOSS) submitted, based on advice received from the South Australian Centre for Economic Studies, that evidence was emerging for a value of imputation credits lower than the 0.5 in the Guideline.⁷⁰ SACOSS supported a value of imputation credits of at least 0.4. In a subsequent submission on the AER's preliminary decision for SA Power Networks SACOSS supported the AER's decision to use the lower estimate of gamma than in the rate of return guideline, although noting its preferred estimate was for a gamma of 0.36. However, given the AER is reporting gamma to one decimal place SACOSS acknowledged that its preferred estimate of 0.36 concurs with the AER's estimate of 0.4 to one decimal place.⁷¹
- The Energy Consumers Coalition of South Australia (ECCSA) considered that the service providers (who had submitted regulatory proposals to us in 2014) submitted no new evidence to change our conclusions in the Guideline regarding the value of imputation credits.⁷² We set out in this decision how and why we have departed from the Guideline. In a subsequent submission on the AER's preliminary decision the ECCSA submitted that 'the AER has moved to a conservative position on the issue of gamma to the detriment of consumers' and it appeared 'the AER has based its assessment on lower utilisation and distribution rates than would otherwise be the case for a pure play energy network which is the benchmark entity for setting the WACC.'⁷³
- The Queensland Council of Social Service (QCOS) submitted a 'more even-handed and consistent approach' would be a value of imputation credits of 0.5 as per the Guideline.⁷⁴ QCOS had regard to a recent decision by the Queensland Competition Authority for a value of 0.47. We set out in this decision why we consider 0.4 to be the best estimate from within the range 0.3 to 0.5.

⁶⁸ EMRF, *NSW gas distribution revenue reset, Draft decision by the Australian Energy Regulator on Jemena's Gas Networks Access Arrangement, A response*, March 2015, p. 71.

⁶⁹ AER, *Better regulation: Explanatory Statement Rate of Return Guideline*, December 2013, pp. 163–164.

⁷⁰ SACOSS, *Submission to Australian Energy Regulator on SA Power Networks' 2015 – 2020 Regulatory Proposal*, January 2015, p. 21.

⁷¹ SACOSS, *Submission to Australian Energy Regulator on SA Power Networks' 2015 – 2020 AER Preliminary Decision* June 2015, p. 5.

⁷² ECCSA, *SA Electricity Distribution Revenue Reset, SA PowerNetworks Application, A response*, December 2014, pp. 80–81.

⁷³ ECCSA, *SA Electricity Distribution Revenue Reset, The AER preliminary decision, A response*, June 2015, p. 42.

⁷⁴ QCOS, *Understanding the long term interests of electricity customers, Submission to the AER's Queensland electricity distribution determination 2015-2020*, 30 January 2015, p. 81.

- The Alliance of Electricity Consumers (the Alliance) employed a value of imputation credits of 0.25 in its estimation of an efficient rate of return.⁷⁵ However, the Alliance provided no discussion or justification for the use of this estimate. Regardless, the Alliance submitted that the appropriate rate of return was 3.76 per cent, which is less than half the rate of return typically proposed by the service providers.
- UnitingCare Australia supported our value for gamma, if a value for gamma is necessary.⁷⁶

4.4.1 The distribution rate

The distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors.⁷⁷ We use an estimate of 0.77 for the distribution rate when considering estimates of the utilisation rate that relate to only listed equity, and an estimate of 0.7 for the distribution rate when considering estimates of the utilisation rate that relate to all equity.

Consistent with the Guideline, we estimate the distribution rate using the 'cumulative payout ratio approach', which uses data from the ATO on the accounts used by companies to track their stocks of imputation credits ('franking account balances').⁷⁸ Using this approach, NERA estimated a distribution rate across all equity of 0.7 for the period 1987 to 2011.⁷⁹ Hathaway found a similar estimate for the period 2004 to 2011.⁸⁰ We relied on these estimates in the Guideline and the draft decisions released in 2014. We consider that updated analysis of the ATO data to the 2012 tax year by NERA and Handley indicates that 0.7 remains a reasonable estimate of the distribution rate over all equity.⁸¹

We use the cumulative payout ratio approach because it:

- uses long-term, published data

⁷⁵ Alliance of Electricity Consumers, *Submission on Ergon Energy's Regulatory Proposal 2015--2020*, 30 January 2015, p. 24.

⁷⁶ Uniting Care Australia, *Submission to the Australian Energy Regulator -Response to Electricity Distribution Business Revised Regulatory Proposal from 2015-20 from SA Power Networks, and AER Preliminary Determination*, July 2015, p. 29.

⁷⁷ In the Guideline we referred to the distribution rate as the 'payout ratio'. We have in this decision adopted 'distribution rate' as we consider this to be the more commonly used terminology. In the Guideline and this decision we attach the same meaning to these two different ways of describing the parameter. Note also that the distribution rate is referred to as the 'access fraction' in the Monkhouse framework.

⁷⁸ We discuss the cumulative payout approach and alternative approaches to estimating the distribution rate in section A.10 of appendix A.

⁷⁹ NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013.

⁸⁰ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

⁸¹ We discuss this updated analysis in section A.10 of appendix A. NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015. J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015.

- is supported by the service providers, Gray (for SFG), Handley, and McKenzie and Partington,⁸² and
- is simple and intuitive.

Also using this approach, Handley estimated a distribution rate across only listed equity of 0.8 for the period 1987 to 2011.⁸³ We found a similar estimate for the period 2004 to 2011.⁸⁴ We relied on these estimates in the preliminary decision. Updated analysis of the ATO data to the 2012 tax year by NERA and Handley indicates that the distribution rate over only listed equity has fallen slightly.⁸⁵ With regard to this updated analysis, in this final decision we use an estimate of the distribution rate over only listed equity of 0.77, consistent with the value used on our June 2015 decision for JGN.

A distribution rate across only listed equity was not presented in the Guideline. However, as set out above, we now consider that:

- It is open to us to have regard to evidence from all equity and/or only listed equity.
- It would be inconsistent to pair an estimate of the utilisation rate from only listed equity with an estimate of the distribution rate from all equity (and vice versa).

We discuss our approach to estimating the distribution rate further in section A.10 of appendix A.

Responses to key issues raised by stakeholders

The service providers submitted that we should not apply a distribution rate based on evidence from only listed equity.⁸⁶ We disagree and set out our reasons in section A.10.1 of appendix A.

⁸² SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 84–92; J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 25–30; M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 31.

⁸³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 28–29.

⁸⁴ See section A.10 for more detail.

⁸⁵ We discuss this updated analysis in section A.10 of appendix A.

⁸⁶ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 1; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 3; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 3; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 3; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 3; JGN, *Gamma - response to the draft decision*, February 2015, p. 4; AusNet Services, 2016-20 Regulatory Proposal, April 2015, p354; United Energy, *Assessment of the Value of Imputation Credits - Gamma*, Proposal for 2016 to 2020, April 2015, pp2, 6-8; CitiPower - Appendix J - Gamma, April 2015, pp6-7; Powercor, Appendix J - Gamma, April 2015, pp6-7; Jemena Electricity, Attachment 06-06 Gamma proposal, April 2015, p2; SA Power Networks, 2015-20 Revised Regulatory Proposal, pp376-379, July 2015; Energex, Revised Regulatory Proposal, pp124-125, July 2015; Ergon, Revised Regulatory Proposal, p153, July 2015; ActewAGL Distribution, Attachment 8 Detailed gamma proposal, pp 4-6, June 2015; Australian Gas Networks, Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network, pp 183-184, July 2015; Amadeus Gas Pipeline, Access Arrangement revision submission, August 2015, p. 153.

4.4.2 The utilisation rate

We understand the utilisation rate to be the utilisation value to investors in the market per dollar of imputation credits distributed. In the Monkhouse framework, the utilisation rate is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors. For an 'eligible' investor, each dollar of imputation credit received can be fully returned to the investor in the form of a reduction in tax payable or a refund.⁸⁷

Therefore, we consider that eligible investors have a utilisation rate of 1. Conversely, 'ineligible' investors cannot utilise imputation credits and have a utilisation rate of 0. It follows that the utilisation rate reflects the extent to which investors can utilise the imputation credits they receive to reduce their tax or obtain a refund. We discuss our interpretation and definition of the utilisation rate further in sections A.6 and A.8 of appendix A.

Consistent with the Guideline, when estimating the utilisation rate we place:

- significant reliance upon the equity ownership approach
- some reliance upon tax statistics, and
- less reliance upon implied market value studies.

The results from those classes of evidence on which we place reliance are summarised in Table 4-1 and Table 4-2.

The relative importance that we assign to each approach is supported by Handley and Lally, while McKenzie and Partington's report for the Queensland Resources Council suggested that having regard to all of these approaches is reasonable.⁸⁸ We discuss each approach in the sections below.⁸⁹ We depart from the Guideline by not relying upon the 'conceptual goalposts approach'. We discuss this approach and our revised consideration of it in section A.15 of appendix A.

The equity ownership approach

We consider that the value-weighted proportion of domestic investors in the Australian equity market is a reasonable estimate of the utilisation rate. This is because, in general, domestic investors are eligible to utilise imputation credits and foreign investors are not. Moreover, as discussed above, we consider that eligible investors have a utilisation rate of 1 because each dollar of imputation credit received by these investors can be fully returned to them in the form of a reduction in tax payable or a refund. We refer to this approach as the 'equity

⁸⁷ This is the return to eligible investors before administrative costs, personal taxes and diversification costs. Handley advises that this is the desired basis for the utilisation rate. We discuss this further in section A.8.1 of appendix A.

⁸⁸ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31; M. Lally, *The estimation of gamma*, 23 November 2013, p. 4; M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 32.

⁸⁹ We have also considered these approaches and the evidence they employ against the criteria used to assess evidence on the allowed rate of return. See section A.11 of appendix A.

ownership approach', and we use data from the National Accounts of the Australian Bureau of Statistics (ABS) to estimate the domestic ownership share.⁹⁰

We place significant reliance upon the equity ownership approach when considering estimates of the utilisation rate. This is because:

- it is well aligned with the definition of the utilisation rate in the Monkhouse framework
- it employs a relatively simple and intuitive methodology
- it uses a reliable and transparent source of data, and
- it provides estimates of the utilisation rate for investors in both all equity and only listed equity.

We are aware of the limitations with this approach. But, we do not consider them significant. We discuss these limitations in section A.12 of appendix A.

We consider that a reasonable estimate for the utilisation rate from the equity ownership approach is between:

- 0.56 and 0.68, if all equity is considered, and
- 0.38 and 0.55, if only listed equity is considered.

This differs from the Guideline. In the Guideline, we considered that the equity ownership approach supported a utilisation rate between 0.7 and 0.8. Since the Guideline's publication, we have examined more closely the relevant data from the National Accounts. This has allowed us to update and refine our estimates. We describe our application of the equity ownership approach and our re-examination of this source of evidence since the Guideline in detail in section A.12 of appendix A.

Responses to key issues raised by stakeholders

The majority of service providers have submitted that the equity ownership approach, and other measures of the utilisation or redemption of imputation credits, do not reflect a number of factors which affect investors' valuation of imputation credits.⁹¹ We have received advice from Handley on these factors, and our responses are set out in detail in section A.8.2 of

⁹⁰ Specifically, we use data from Australian National Accounts: Finance and Wealth (ABS cat. 5232.0).

⁹¹ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 5; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, pp. 6–7; Directlink, *Directlink submission on gamma (updated)*, January 2015, pp. 8–9; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, pp. 6–7; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, pp. 6–7; and JGN, *Gamma - response to the draft decision*, February 2015, pp. 8–9; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 364; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 10; CitiPower, *Appendix J - Gamma*, April 2015, p. 10; Powercor, *Appendix J - Gamma*, April 2015, p. 10; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 11; Energex, *Revised Regulatory Proposal*, July 2015, p. 118; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, p. 13; Australian Gas Networks, *Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network*, July 2015, p. 184.

appendix A. In summary, we consider that such factors are either immaterial or should not be accounted for when estimating the properly defined utilisation rate.

Tax statistics

The ATO publishes aggregate statistics on the tax returns submitted by individuals, superannuation funds and companies, as well as on the imputation credits refunded to certain income tax exempt entities (for example, charities).⁹² In theory, these statistics can be used to derive a measure of the total amount of imputation credits utilised by eligible investors to offset tax or to be refunded. As discussed in relation to the distribution rate, ATO statistics also provide estimates of the amount of imputation credits distributed. We consider that the reported value of credits utilised divided by the reported value of credits distributed is a reasonable estimate of the utilisation rate.

We have had regard to tax statistics when considering estimates of the utilisation rate. We place a degree of reliance upon tax statistics that is less than that placed upon the equity ownership approach, but which is more than that placed on implied market value studies. Our position on tax statistics is consistent with the advice from Handley and Lally. Handley considered tax statistics to be the second most important approach to estimating the utilisation rate after the equity ownership approach.⁹³ Lally considered that the tax statistics approach lacks precision, and he did not prefer it to the equity ownership approach.⁹⁴ However, Lally still preferred tax statistics to implied market value studies.⁹⁵

We have placed less reliance upon tax statistics compared with the equity ownership approach because we consider that tax statistics have a number of limitations:

- There are residual concerns regarding the data. While Hathaway considered that the amounts of tax paid and credits utilised can be concluded 'with some confidence' and that they are 'unlikely to be in major error', Hathaway also identified a significant discrepancy associated with the tracking of imputation credits in the data that led him to 'urge all caution in using ATO statistics for any estimates of parameters concerned with [imputation] credits'.⁹⁶
- They do not reflect the amount of credits refunded to individuals that do not have to fill out a tax return.
- They might not reflect the amount of credits refunded to certain types of entities.⁹⁷

⁹² These statistics are available at: <https://www.ato.gov.au/About-ATO/Research-and-statistics/Taxation-statistics/>. Accessed 9 April 2015.

⁹³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.

⁹⁴ M. Lally, *The estimation of gamma*, 23 November 2013, p. 4.

⁹⁵ M. Lally, *The estimation of gamma*, 25 November 2013, p. 4.

⁹⁶ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, paras. 9 and 99–100.

⁹⁷ That is, statistics are published on the refunds to 'endorsed income tax-exempt entities and deductible gift recipients', but it is not clear whether this covers refunds to other entities entitled to a refund of imputation credits. Such entities include public funds declared by the Treasurer to be a developing country relief fund and exempt institutions that are eligible for a

- They do not provide estimates of the utilisation rate for investors in only listed equity. Handley suggested that evidence from listed equity is more relevant to the benchmark efficient entity.⁹⁸

With regard to Hathaway's analysis, in the draft decision released in 2014 we considered that tax statistics supported an estimate of the utilisation rate between 0.4 and 0.6.⁹⁹ However, we also recognised in the draft decisions that our estimate of the distribution rate (0.7) implied that we should adopt a utilisation rate of around 0.43 from within this range for consistency. This differs from the Guideline, in which we considered that tax statistics supported an estimate of the utilisation rate between 0.4 and 0.8.

Since the Guideline, we have continued to examine this evidence. We now consider that greater reliance should be placed upon estimates that are:

- derived from post-2004 data, consistent with Hathaway's findings that the ATO statistics are subject to a number of issues prior to 2004,¹⁰⁰ and
- consistent with our estimates of the distribution rate.

In this final decision we have regard to NERA's updated analysis of the ATO data to the 2012 tax year.¹⁰¹ This analysis supports a distribution rate of 0.7 and a utilisation rate of 0.45.

We discuss our revised consideration of tax statistics in more detail in section A.13 of appendix A.

Responses to key issues raised by stakeholders

The majority of service providers submitted that tax statistics, and other measures of the utilisation or redemption of imputation credits, do not reflect a number of factors which affect investors' valuation of imputation credits.¹⁰² We have received advice from Handley on these factors, and our responses are set out in detail in section A.8.2 of appendix A. In summary,

refund under the regulations. See: <https://www.ato.gov.au/Non-profit/Frinking-credits/In-detail/FAQs/Refund-of-franking-credits--endorsed-entities---FAQs/?page=3>. Accessed 9 April 2015.

⁹⁸ We discuss this issue further in section A.9.1 of appendix A.

⁹⁹ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

¹⁰⁰ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 32.

¹⁰¹ NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015.

¹⁰² ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 5; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, pp. 6–7; Directlink, *Directlink submission on gamma (updated)*, January 2015, pp. 8–9; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, pp. 6–7; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, pp. 6–7; and JGN, *Gamma - response to the draft decision*, February 2015, pp. 8–9; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 364; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 10; CitiPower, *Appendix J - Gamma*, April 2015, p. 10; Powercor, *Appendix J - Gamma*, April 2015, p. 10; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 11; Energex, *Revised Regulatory Proposal*, July 2015, p. 118; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, p. 13; Australian Gas Networks, *Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network*, July 2015, p.184.

we consider that such factors are either immaterial or should not be accounted for when estimating the properly defined utilisation rate.

Implied market value studies

Implied market value studies seek to infer from market prices the value of distributed imputation credits. A wide range of such studies have been conducted over time, employing a variety of techniques. A common type of implied market value study are dividend drop off studies. These studies compare the price of a security with and without the entitlement to a dividend. Econometric techniques are then used to infer the value of the imputation credits attached to these dividends. We discuss the different types of implied market value study in section A.14.1 of appendix A.

We consider that the equity ownership approach and tax statistics provide more direct and simpler evidence on the utilisation rate than implied market value studies. Handley supported this view; he noted that dividend drop off studies are the most relevant class of implied market value study, but considered them less important to estimating the utilisation rate than the equity ownership approach and tax statistics.¹⁰³ Lally identified a number of issues with using market prices to estimate the utilisation rate and, therefore, preferred the equity ownership approach.¹⁰⁴

We also consider that these studies can be subject to a number of limitations. The limitations of implied market value studies can include:

- These studies can produce nonsensical estimates of the utilisation rate; that is, greater than one or less than zero.
- The results of these studies can reflect factors, such as differential personal taxes and risk, which are not relevant to the utilisation rate.
- The results of these studies might not be reflective of the value of imputation credits to investors in the market as a whole.
- These studies can be data intensive and employ complex and sometimes problematic estimation methodologies.
- Regarding dividend drop off studies, it is only the value of the combined package of dividends and imputation credits that can be observed in the market. However, there is no consensus among experts on how to separate the value to the market of dividends from the value to the market of imputation credits (this is referred to as the 'allocation problem').

The limitations of dividend drop off studies are discussed in more detail in section A.14.6 of appendix A.

¹⁰³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 31.

¹⁰⁴ M. Lally, *The estimation of gamma*, 23 November 2013, p. 4.

The available implied market value studies produce estimates for the utilisation rate between 0 and 1, with some studies even producing estimates outside this range. We summarise the available studies and their results in section A.14.2 of appendix A. Opinion on the merits of the various studies differs:

- Gray (for SFG) considered that implied market value studies should be relied upon exclusively when estimating the (after-personal-tax and after-personal-costs) utilisation rate. Moreover, he considered that dividend drop off studies should be preferred to alternative market studies. In Gray's view, there is no reasonable basis for adopting an estimate from dividend drop off analysis above the 0.35 estimate from SFG's study.¹⁰⁵
- The Economic Regulation Authority of Western Australia (ERA) conducted its own dividend drop off study and concluded that a reasonable estimate is between 0.35 and 0.55.¹⁰⁶
- Lally concurred with the view that implied market value studies 'warrant low weight', but suggested that some studies are more useful than others based on their characteristics.¹⁰⁷ Lally also raised a number of issues in relation to SFG's dividend drop off study.¹⁰⁸
- McKenzie and Partington considered that there is no obvious manner in which to weigh the results from various studies based on their characteristics. They observed that a simple average of the results from a reasonably comprehensive sample of studies suggests an estimate of the utilisation rate of 0.53. They also noted that their own studies suggest a significantly higher estimate of 0.83.¹⁰⁹
- Gray (for Frontier) expressed concerns that the reintroduction of pre-2000 and low quality studies is an error, and that it is also an error to assume all market value studies are of uniform relevance and quality.¹¹⁰

A further issue regarding implied market value studies is the appropriate interpretation of their results. Handley and Lally both advised that in the rate of return framework investors are assumed to value a dollar of dividends at one dollar (on a pre-personal-tax basis). However, the results of implied market value studies can reflect certain factors that suggest that investors value a dollar of dividends at less than one dollar (such as differential personal taxes on dividends and capital gains). Moreover, any such factors will affect these studies' results for investors' valuation of imputation credits. Handley and Lally advised that the

¹⁰⁵ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 17 and 20.

¹⁰⁶ Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, 13 December 2013, para. 921.

¹⁰⁷ M. Lally, *The estimation of gamma*, 23 November 2013, pp. 20–30.

¹⁰⁸ M. Lally, *The estimation of gamma*, 23 November 2013, pp. 24–26 and 28–29; M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, pp. 35–38.

¹⁰⁹ M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, p. 34.

¹¹⁰ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 35.

desired estimate of the utilisation rate should exclude the effect of these factors.¹¹¹ To remove the effect, they advised that the estimate of the utilisation rate from a given study can be divided by investors' estimated valuation of dividends from the same study.¹¹² Therefore, Handley and Lally advised that the 0.35 estimate from SFG's dividend drop off study should in fact be interpreted as an estimate of around 0.4.

In response to our decision to adjust the theta estimate from SFG' dividend drop off study to correct for the apparent incorrect valuation of cash dividends, Gray (for Frontier) indicated the appropriate response was not to adjust the theta estimate, rather it was to adjust the allowed return on equity. Gray put the position that the valuation from SFG's study for cash dividends of less than \$1 for each dollar of cash dividends paid indicates you need to increase the allowed return on equity stating:¹¹³

If further consideration of this issue is required, it can be best considered in the following way. Suppose the dividend drop-off regression produced a coefficient of 1 on cash dividends and a coefficient of 0.35 on imputation credits. This would suggest that 100% of the face amount of dividends and 35% of the face amount of imputation credits is capitalised into the stock price. In this case, the AER's proposed adjustment would be to divide the 0.35 estimate by 1, leaving it at 0.35.

Now consider a case that is identical, except that the coefficient on cash dividends is 0.9. This implies that dividends are worth only 90% of their face amount and imputation credits are still worth 35% of their face amount. In this case, the allowed return would need to be higher to leave investors equally well off. This would enable the firm to pay dividends with a higher face amount, which would be necessary if investors value dividends at less than their face amount. Regulators in some jurisdictions (e.g., New Zealand) allow higher returns in relation to dividends being valued at less than the face amount, but the AER does not.

We consider that such an adjustment to the allowed return on equity would not be appropriate. The post-tax required return on the equities market is reflective of the face value of dividends paid in the market, not a higher amount. We also note the equities market sets equilibrium prices based on the expected post tax returns to shareholders (post tax dividends, post-tax capital gains and post-tax imputation credits). Having considered Gray's latest report (for Frontier) we remain of the view that dividend drop off studies, including SFG's study, that estimate a value for cash dividends at a materially different amount to their face value, are not correctly estimating a post-tax value before personal taxes and personal transaction costs. We remain of the view the estimate of the value of theta from SFG's study (as a minimum) requires an adjustment for the apparent incorrect valuation of cash

¹¹¹ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 43–44; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p.16; M. Lally, *The estimation of gamma*, 23 November 2013, p. 21.

¹¹² In the appendix to the Guideline we noted that this adjustment was contentious and required further examination. In his recent advice, Handley also advised that this adjustment should be applied. Having given this issue further consideration, we agree with the advice from Lally and Handley that estimates from dividend drop off studies should be adjusted in this manner for the reasons that Lally and Handley explain.

¹¹³ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 37-38.

dividends that would also be expected to be reflected in the estimated value of distributed imputation credits.

In light of the differing views on these studies and the range of estimates they produce, we consider that implied market value studies provide limited guidance. In the Guideline, we considered that implied market value studies supported an estimate of the utilisation rate between 0 and 0.5. This range was determined with regard to a range of studies, with higher regard given to those studies that:

- used longer data periods
- used data since 2000, when the change in tax law entitled eligible investors to a refund of credits that exceeded their tax liability
- encompassed the breadth of the market instead of just selected firms, and
- appeared to use more reasonable and robust econometric treatments.

However, in this final decision we recognise that experts advocate both broader and narrower assessments of the evidence from implied market value studies. McKenzie and Partington considered it reasonable to have regard to a range of studies, including those that produced estimates above 0.5.¹¹⁴ In Gray's view (for SFG), there is no reasonable basis for adopting an estimate from dividend drop off analysis above the 0.35 estimate from SFG's study.¹¹⁵ It appears that Gray (for Frontier) continues to hold this view.¹¹⁶

Ultimately, as discussed in section 4.4, estimates from implied market value studies and the level of reliance we place on them (including SFG's dividend drop off study) do not give us cause to move from the estimate of the value of imputation credits that we determine with regard to evidence from the equity ownership approach and tax statistics. In response to Gray's comments (for Frontier) on our consideration of "pre-2000 and low-quality studies"¹¹⁷ we note that our having regard to more studies since the Guideline, including those that use pre 2000 data and those that estimate a value for theta between 0.5 and 1, was not material to our decision to set gamma at 0.4, and that we have had particular regard to SFG's dividend drop off study in making our decision.

Responses to key issues raised by stakeholders

The majority of service providers submitted that implied market value studies are direct evidence on the value of imputation credits to investors, and that this value will reflect the transactions costs or other personal costs incurred in redeeming credits.¹¹⁸ However, we

¹¹⁴ M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, pp. 33–35.

¹¹⁵ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 17 and 20.

¹¹⁶ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 33.

¹¹⁷ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 35.

¹¹⁸ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, pp. 5–6 and 9; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, pp. 6–7 and 11; Directlink, *Directlink submission on gamma (updated)*, January 2015, pp. 8–9 and 14; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re*

consider that the utilisation rate relates to the before-personal-tax and before-personal-costs utilisation value to investors in the market per dollar of imputation credits distributed. As discussed in sections A.5, A.6, A.7 and A.8.1, we estimate the utilisation rate in this way in order to be consistent with the Officer framework, which provides the basis for the rate of return framework in the NER/NGR, and we consider, and remain of the view having had regard to the new information considered since our JGN decision was released in June 2015, that our estimation of the utilisation rate is consistent with a valid interpretation of the "value of imputation credits" in clause 6.5.3 of the Rules. Therefore, we do not consider that implied market value studies provide direct evidence on the utilisation rate, and this is reflected in the lower level of reliance we place on these studies.

A number of service providers also submitted that:

- the use of implied market value studies to estimate the value of imputation credits is consistent with the approach to estimating other rate of return parameters¹¹⁹
- an adjustment can be made to the results of SFG's dividend drop off study to account for the differences between our and the service providers' interpretations of the utilisation rate,¹²⁰ and
- several of the limitations that we have identified as potentially applying to implied market value studies do not apply to SFG's dividend drop off study.¹²¹

gamma, January 2015, pp. 6–7 and 11; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, pp. 6–7 and 11; JGN, *Gamma - response to the draft decision*, February 2015, pp. 8–9 and 13; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, pp. 363-367; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 13; CitiPower, *Appendix J - Gamma*, April 2015, p. 16; Powercor, *Appendix J - Gamma*, April 2015, p. 16; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, pp. 12-16; Energex, *Revised Regulatory Proposal*, July 2015, pp. 118-119; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, pp. 12-15; Australian Gas Networks, *Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network*, July 2015, p.184.

¹¹⁹ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 7; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 8; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 10; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 8; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 8; and JGN, *Gamma - response to the draft decision*, February 2015, p. 10 ; AusNet Services, *2016-20 Regulatory Proposal, April 2015*, p. 364; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 14; CitiPower, *Appendix J - Gamma*, April 2015, p. 13; Powercor, *Appendix J - Gamma*, April 2015, p. 13; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 13; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, p. 13.

¹²⁰ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 7; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 8; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 11; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 8; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 8; and JGN, *Gamma - response to the draft decision*, February 2015, p. 10.

¹²¹ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 9; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 10; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 14; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 10; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 10; and JGN, *Gamma - response to the draft decision*, February 2015, p. 13.

We disagree with all of these points and our reasons are set out in section A.14 of appendix A.

A Value of imputation credits: Detailed analysis

In attachment 4, we set out our decision on the value of imputation credits—which is to adopt a value of 0.4—and our key reasons for that view. We also indicated the position submitted to us by the service providers and briefly set out our consideration of that position. In this appendix, we set out further supporting material for our decision on the value of imputation credits. We also respond in more detail to the position submitted to us by the service providers.

All of the service providers proposed a value of imputation credits of 0.25. The reasons submitted by the service providers in their initial and revised proposals were largely the same and the majority of the service providers jointly commissioned reports from SFG (by Gray) and relied on those reports in their proposals. In addition, while the majority of service providers with decisions to be released in October and November 2015 jointly commissioned new reports post the release of our JGN decision from NERA and Gray (for Frontier), the substance of these reports is largely unchanged from earlier expert material submitted by the service providers and considered in our JGN decision. Accordingly, our analysis in this appendix is broadly consistent with our analysis of the proposals from the service providers that we released decision for in April and June 2015. The only material difference between this appendix and the appendix for our June 2015 Jemena Gas Networks (JGN) determination is that we have in this appendix had regard to the new proposals (revised proposal of SA Power Networks, Energex and Ergon, and new proposals of the Victorian service providers and the 2015 gas network service providers) and submissions on these proposals and new expert reports from NERA and Gray (for Frontier).¹²² We also note that the JGN decision was an update from the AER decisions releases in April 2015, and the only material difference between the JGN decision and the April 2015 AER decisions was that we had regard to new expert reports from NERA and Handley.¹²³

A.1 Expert views on the value of imputation credits

We, other regulators, service providers and consumer representatives have commissioned expert advice on the value of imputation credits from a range of experts in the context of a number of regulatory processes. These expert reports demonstrate that there is no consensus among experts on either the value of imputation credits (particularly for the utilisation rate parameter), nor on the techniques to estimate it. Table 4-3 summarises recent expert advice of which we are aware. We have considered the advice from each of these experts in forming our position on the value of imputation credits. For this final decision the AER has considered the new expert reports from the NSPs internally and has not commissioned further expert advice. We consider the new expert reports from the service

¹²² Professor Gray previously provided expert reports through SFG consulting. He now provides expert reports through Frontier Economics. To avoid confusion, in section heading where we would have previously referred to the work of SFG, we refer to the work of Professor Gray. Where relevant, these sections cover expert opinion of Professor Gray through both SFG Consulting and Frontier Economics.

¹²³ See section A.10 for more detail.

providers do not provide new evidence to justify a departure from the position we adopted in the decisions we released in April and June 2015.

Table 4-3 Summary of expert views on the value of imputation credits

Expert	Distribution rate	Utilisation rate	Value of imputation credits
Lally (2013a, 2013b, 2014) ¹²⁴	0.84 using the financial statements of 20 largest ASX-listed companies	1.0 , based on assumption that all investors in the Officer CAPM are domestic investors 0.54 to 0.7, using equity ownership as second preference	0.84 0.45 to 0.59 using second preference utilisation rate
McKenzie and Partington (2013) ¹²⁵	0.7 , using cumulative payout ratio approach over all equity	None recommended , although estimates considered included 0.7 from AER draft rate of return Guideline approach, 0.53 from average of implied market value studies and 0.83 from average of McKenzie and Partington's implied market value studies	Evidence not compelling enough to depart from 0.5
Handley (2014) ¹²⁶	0.8 , using cumulative payout ratio approach over only listed equity	0.5 to 0.6 , with regard to (in order of importance) equity ownership approach, tax statistics and dividend drop off studies	0.4 to 0.5
SACES (2015) ¹²⁷	0.8 , using cumulative payout ratio approach over only listed equity	0.45 , using the average of the estimate from tax statistics (0.43) and the refined domestic ownership share of only listed equity (0.46)	0.36
CEG (2014) ¹²⁸	0.7 , using cumulative payout ratio approach over all equity	0.35 , based on SFG's dividend drop off study	0.25
Gray (for SFG) (2015) ¹²⁹	0.7 , using cumulative payout ratio approach over all equity	0.35 , based on SFG's dividend drop off study	0.25

¹²⁴ M. Lally, *The estimation of gamma*, 23 November 2013; M. Lally, *Estimating gamma*, 25 November 2013; M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014.

¹²⁵ M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013.

¹²⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014.

¹²⁷ SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015.

¹²⁸ CEG, *WACC estimates: A report for NSW DNSPs*, May 2014.

¹²⁹ SFG, *Estimating gamma for regulatory purposes*, February 2015.

Expert	Distribution rate	Utilisation rate	Value of imputation credits
Gray (for Frontier) (2015) ¹³⁰	0.7, using cumulative payout ratio approach over all equity, or alternatively using an estimate of the payout ratio for listed equity excluding the 20 largest firms.	0.35, based on SFG's dividend drop off study	0.25

Source: As specified in table.

In summary:

- A distribution rate of 0.7 estimated using the cumulative payout ratio approach is most commonly accepted. We describe this approach in section A.10.2. However, Handley considers that this approach should be applied to only listed equity, and this produces a higher estimate of the distribution rate. The South Australian Centre for Economic Studies (SACES) accepts Handley's approach. Lally considers that the best estimate of the distribution rate is 0.84, calculated using the financial statements of the 20 largest ASX-listed companies.
- There is no widely accepted utilisation rate or method for estimating it. The recommended values for the utilisation rate range from 0.35 to 1.
- Only CEG, SFG, and Gray (for SFG and Frontier), rely exclusively on the SFG dividend drop off study when estimating the utilisation rate. Handley and McKenzie and Partington rely on a range of evidence. SACES gives equal weight to the equity ownership approach and tax statistics. Lally prefers a conceptual approach, but his second preference is the equity ownership approach.
- As a result of the differing approaches, particularly to the utilisation rate, the range of estimates of the value of imputation credits is 0.25 to 0.84.

Conceptually, the value of imputation credits must be between 0 and 1. Accordingly the range of recommended estimates from 0.25 to 0.84, which spans most of the possible range for the value of imputation credits, highlights the lack of consensus among experts. Our final decision value of imputation credits of 0.4 sits in the lower half of the range recommended by experts, which is more favourable to service providers.

A.2 The value of imputation credits used by other regulators

Australian regulators have applied a wide range of approaches to estimate the value of imputation credits, resulting in varied outcomes. Table 4-4 summarises some recent regulatory decisions on the value of imputation credits. While these decisions have not directly informed our position on the value of imputation credits, they indicate that there is no conceptual or practical consensus amongst Australian regulators.

¹³⁰ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015.

Table 4-4 Australian regulators' approaches to the value of imputation credits

Regulator	Form of adoption	Year	Distribution rate	Utilisation rate	Value of imputation credits
IPART ¹³¹	Review of imputation credits, final decision	2012	0.7 , using cumulative payout ratio approach	0.35 , using 2011 version of SFG dividend drop off study	0.25
ESC ¹³²	Price review, greater metropolitan water businesses, final decision	2013	N/A	N/A	0.5 , based on 2011 guidance ¹³³
QCA ¹³⁴	Cost of capital market parameters, final decision	2014	0.84 , using the financial statements of 20 largest ASX-listed companies	0.56 , based primarily on the domestic ownership share of listed equity	0.47
ERA ¹³⁵	Review of rate of return estimation for rail networks, revised draft determination	2014	0.7 , using cumulative payout ratio approach	0.7 , most weight to simple domestic ownership share of all equity, some weight to conceptual goalposts approach, low weight to tax statistics and dividend drop off studies	0.5

¹³¹ Independent Pricing and Regulatory Tribunal, *Review of imputation credits (gamma), Research—Final decision*, March 2012.

¹³² Essential Services Commission, *Price Review 2013: Greater Metropolitan Water Businesses, Final decision*, June 2013.

¹³³ Essential Services Commission, *2013 Water Price Review, Guidance on Water Plans*, October 2011, p. 66. The Essential Services Commission also proposes to continue to apply a value of imputation credits of 0.5 to Melbourne Water's 2016 price review: Essential Services Commission, *Proposed approach to Melbourne Water's 2016 price review—Consultation paper*, February 2015, p. 40.

¹³⁴ Queensland Competition Authority, *Cost of capital: Market parameters*, August 2014.

¹³⁵ Economic Regulation Authority, *Review of the method for estimating the weighted average cost of capital for regulated railway networks, Revised draft decision*, 28 November 2014.

Regulator	Form of adoption	Year	Distribution rate	Utilisation rate	Value of imputation credits
ACCC ¹³⁶	Fixed line services (telecommunications), draft decision on access determination	2015	N/A	N/A	0.45, set for consistency with previous ACCC decisions, but with regard to a range of recent evidence, including firm specific factors

Source: As specified in table.

Conceptually, the value of imputation credits must be between 0 and 1. The range of values adopted by Australian regulators is from 0.25 to 0.5. This range is narrower than the range of estimates recommended by experts (from 0.25 to 0.84), but it is still quite wide. This highlights the lack of consensus among regulators on the value of imputation credits. Given the lack of consensus among experts, this is perhaps not surprising. Our final decision value of imputation credits of 0.4 sits within the range adopted by regulators.

A.3 Previous Australian Competition Tribunal considerations

The Australian Competition Tribunal has considered in detail the value of imputation credits (gamma) in three proceedings since 2010, relating to applications by:

- Energex Limited
- DBNGP (WA) Transmission Pty Ltd, and
- WA Gas Networks Pty Ltd.

The Tribunal's comments in each case referred to the lack of expert consensus regarding the value of imputation credits and the scope that existed for future assessments of the evidence. We discuss these comments further in the sections below.¹³⁷

¹³⁶ Australian Competition and Consumer Commission, *Public inquiry into final access determinations for fixed line services—primary price terms, Draft decision*, March 2015. We note that this estimate is based on the ACCC's draft decision on the fixed line services supplied by Telstra (ACCC, *Public inquiry into final service determinations for fixed line services—Primary price terms: Draft decision*, March 2015, p. 101). The ACCC released its final decision on 9 October 2015, which maintained its value for imputation credits estimate of 0.45 (ACCC, *Public inquiry into final service determinations for fixed line services: Final decision*, October 2015, p. 67). However, we consider information up to the end of July 2015 for the SA/Qld DNSPs and the end of August 2015 for the Victorian service providers and the 2015 gas network service providers in estimating the MRP. This is reasonably consistent with these NSPs' risk free rate averaging periods. Therefore, to be consistent with the estimation of the required return on equity, we do not include the ACCC's final decision in our analysis.

¹³⁷ We note that the Australian Competition Tribunal is currently considering gamma decisions of the AER released in April 2015 for Ausgrid, Endeavour Energy, Essential Energy and ActewAGL and released in June 2015 for Jemena Gas Networks. Key areas of disagreement between the AER and the service providers are being considered as part of this review process.

A.3.1 Energex

In our 2009 industry wide review of rate of return parameters (the 2009 WACC review), we adopted a gamma of 0.65.¹³⁸ In 2009, we applied this value in the Queensland and South Australian electricity distribution determinations. Energex and Ergon successfully sought review of this decision by the Australian Competition Tribunal. The Tribunal set the distribution rate to 0.7 and initiated a dividend drop off study from SFG to estimate the utilisation rate. The Tribunal adopted SFG's recommendation that the utilisation rate be set at 0.35. This resulted in a gamma of 0.25.

In reaching its position, the Tribunal expressed views on the important factors in its decisions. This included areas where the Tribunal felt its understanding was incomplete, as summarised in Table 4-5 below. We have carefully considered these views.

¹³⁸ AER, *Final decision: Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters*, 1 May 2009.

Table 4-5 Australian Competition Tribunal's observations on imputation credits in Energex matter

Issue	Tribunal comments	AER comments
The conceptual framework for gamma	<p>"The Tribunal has found some deficiencies in its understanding of the foundations of the task facing it, and the AER, in determining the appropriate value of gamma. These issues have not been explored so far because they have not arisen between the parties, who appear to be in agreement about how the Rules should be interpreted regarding the treatment of corporate income tax. They may be matters that the Tribunal will take up in its further decision in these matters; or they may best be left until the next WACC review. Indeed, they may go to the basis for the Rules themselves.</p> <p>The Tribunal would be assisted in its consideration of the issues before it if the AER were to provide relevant extrinsic material explaining:</p> <p>(a) the rationale for including the gamma component in the formula for calculating the estimated cost of corporate income tax; and</p> <p>(b) how it relates to the rest of the building blocks, especially the rate of return (cl 6.4.3(a) and cl 6.5.2(b) of the Rules)."¹³⁹</p>	<p>In developing the Guideline, we re-evaluated the conceptual framework for the value of imputation credits. In making this final decision, we have built on this re-evaluation and received further advice from Handley. We discuss the role of the value of imputation credits and the underlying conceptual framework in sections A.5 and A.6.</p>
The distribution rate (payout ratio)	<p>"...there is [was] no empirical evidence currently available supporting a distribution ratio higher than 0.70."¹⁴⁰</p>	<p>As discussed in section 4.4.1 of attachment 4 and section A.10 of this appendix, we consider that the approach used to estimate a distribution rate of 0.7 across all equity can be applied to only listed equity to produce a distribution rate of 0.77. Lally also finds a distribution rate of 0.84 over the largest 20 ASX-listed companies.</p>

¹³⁹ Australian Competition Tribunal, *Application by Energex Limited (No 2) [2010] ACompT 7*, October 2010, paras. 149–150.

¹⁴⁰ Australian Competition Tribunal, *Application by Energex Limited (Distribution Ratio (Gamma)) (No 3) [2010] ACompT 9*, December 2010, para. 2.

Issue	Tribunal comments	AER comments
Tax statistic estimates	<p>"The AER accepted that utilisation rates derived from tax statistics provide an upper bound on possible values of theta. Setting aside the manner in which the AER derived a value from the tax statistics study, it correctly considered that information from a tax statistics study was relevant. However, its relevance could only be related to the fact that it was an upper bound. No estimate that exceeded a genuine upper bound could be correct. Thus the appropriate way to use the tax statistics figure was as a check."¹⁴¹</p> <p>"SIRCA's March 2011 report provided responses to a number of specific questions asked by the AER. Some of these responses raise serious issues regarding the use of dividend drop-off studies and the Tribunal's earlier reasons. For example, SIRCA's March 2011 report suggests that:</p> <ul style="list-style-type: none"> - estimates from dividend drop-off studies are very imprecise and of questionable reliability; - such studies are likely to produce downwardly-biased estimates of theta; and - taxation studies do not give an upper bound to theta. <p>By way of background, the Tribunal in earlier reasons noted that the AER accepted that tax statistics studies provide an upper bound on possible values of theta. The AER in its report, while being less unequivocal than SIRCA, adopts SIRCA's suggestion that the results of tax statistics studies (now called the redemption rate) could be discounted for factors such as the time between the distribution and the redemption of imputation credits. These adjustments "would need to be made on an economically justifiable basis". The AER referred to a 2004 study by Hathaway and Officer as being an example of such a use of an estimate of the utilisation rate.</p> <p>Beyond these observations, the AER does not seek to adduce material from SIRCA's March 2011 report to advance its submissions. On the material before it, the Tribunal is unable to reach any conclusions about the further use of tax statistics studies in estimating the utilisation ratio, theta. No doubt the AER will in the future have opportunity, and perhaps cause, to investigate further. It has not sought to do so in these proceedings."¹⁴²</p>	<p>Handley advised that his previous comments regarding the use of tax statistics being an 'upper bound' were misinterpreted in these proceedings. Handley confirmed that tax statistics can be used to produce a point estimate of the utilisation rate. We discussed Handley's views in section A.6.1 of the draft decisions, and he has reiterated them in his latest report. We discuss the use of tax statistics more broadly in section 4.4.2 of attachment 4 and section A.13 of this appendix.</p>

¹⁴¹ Australian Competition Tribunal, *Application by Energex Limited (No 2) [2010] ACompT 7*, October 2010, para. 91.

¹⁴² Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, paras. 32–34.

Issue	Tribunal comments	AER comments
The conceptual basis for dividend drop off studies	<p>"The AER has tendered, largely without comment, material that casts some doubt on the use of dividend drop-off studies in estimating gamma for regulatory purposes. In responding to questions from the AER, SIRCA's March 2011 report raises questions about the theoretical basis for dividend drop-off studies. In doing so, it touches on issues raised in the Tribunal's earlier reasons regarding the arbitrage model underlying dividend drop-off studies.</p> <p>However, SIRCA's March 2011 report does not resolve these issues and the AER has provided no conclusions of its own."¹⁴³</p>	<p>The limitations of dividend drop off studies have been widely identified since these proceedings—we provide a selection of comments from academics and regulators in section A.14.6. Moreover, both Handley and Lally advised that other approaches to estimating the utilisation rate should be preferred (see section 4.4.2 of attachment 4). Handley and Lally also advised that, without adjustment, dividend drop off studies produce downwards-biased estimates of the utilisation rate.</p>
The need to re-evaluate gamma	<p>"Further, the Tribunal notes that estimation of a parameter such as gamma is necessarily, and desirably, an ongoing intellectual and empirical endeavour. Its decision in these proceedings is based on the material before it."¹⁴⁴</p>	<p>Consistent with this comment, we have not sought to apply the Tribunal's previous considerations in this final decision. Instead, we adopt a value of imputation credits that is based on our assessment of the merits of the evidence before us, which includes a large amount of material that was not before the Tribunal in these proceedings.</p>

Source: As specified in table.

¹⁴³ Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, paras. 40–41.

¹⁴⁴ Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, para. 45.

During the Guideline process, service providers frequently proposed a value of imputation credits of 0.25 and referenced the Tribunal decision in support of this.¹⁴⁵ However, the last quote from the Tribunal demonstrates that it did not intend for its decision to be determinative of the appropriate estimation technique for gamma, and certainly not on a permanent basis. In the Guideline, we also made this point. Service providers with current proposals no longer refer to the Tribunal's decision as if it were precedent. Rather, they propose a value of imputation credits, and reasons for that value, which are consistent with the Tribunal decision.

Both during the Guideline development process and this determination process, we have considered the previous Tribunal decision carefully in forming our view on the value of imputation credits. For the reasons expressed in this appendix and attachment 4 we have come to a different position. This is consistent with the Tribunal's expectation that the value of imputation credits is 'necessarily, and desirably, an ongoing intellectual and empirical endeavour'.

A.3.2 DBNGP and WA Gas Networks

In 2012, Dampier to Bunbury Natural Gas Pipeline (DBNGP) sought Tribunal review of the ERA's decision to adopt a value of imputation credits of 0.25. In upholding the ERA's value, the Tribunal again emphasised the lack of consensus on an appropriate value and the fact that determining a value for gamma is continually being refined:¹⁴⁶

171 Determining the appropriate values of F [the distribution rate] and theta has been a fiercely contested issue in Australia's regulatory history. There is no unique pair of values of F and theta that are regarded as universally correct. Therefore there is no value of gamma that is regarded as universally correct. The academic models, empirical research methods, data and relevant time periods all need to be carefully investigated. Debate is inevitable, and ultimately, which value is most relevant for the matter at hand must be decided on a case-by-case basis.

...

210 The material (and conclusions drawn from it) that were relied on by the ERA were objectively produced by respected academic researchers. Professor Gray advanced alternative interpretations. This whole area of discourse about inputs into the CAPM and the correct approach to estimating the relevant parameters of the CAPM, including gamma, is a continuing area of sophisticated debate involving competing opinions. An agreed position appears to be a distant outcome. In reaching its decision the ERA relied on expert opinions that were contrary to those of Professor Gray, who had been engaged by DBP. Such a difference of opinion is common amongst academics in this as in other similar areas. Thus, so long as the ERA acted reasonably in preferring one expert to another, it will not have committed error.

¹⁴⁵ For example, see: ENA, *Response to the Draft Rate of Return Guideline of the Australian Energy Regulator*, 11 October 2013.

¹⁴⁶ Australian Competition Tribunal, *Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14*, July 2012.

211 The Tribunal reiterates that there is no single agreed-upon correct value of gamma. While the value of F is relatively settled in Australia, great controversy has surrounded the relevant value of theta. Many papers on the measurement of theta, and thus gamma, were produced for the ERA's consideration, from its own and from DBP's experts. The gap between their estimating models, and their ensuing calculations, was wide.

...

214 The Tribunal observes that this is not to say, however, that a gamma value of 0.25 is the only possible value for this parameter. It is simply the best estimate currently available for use in this matter now before it. As with the estimation of many economic and financial parameters, finding the "right" value is a process of continual refinement as new models and paradigms emerge and as better data and estimating techniques become available.

The Tribunal made similar comments in the earlier WA Gas Networks matter.¹⁴⁷

A.4 Key concerns of the service providers

In their revised proposals, Ausgrid, Endeavour Energy, Essential Energy, ActewAGL, TransGrid, Directlink, and Jemena Gas Networks directly raised eight key concerns with our draft decisions released in 2014, which they characterised as errors.¹⁴⁸ A number of these concerns were also implicitly or explicitly raised in the revised or initial regulatory proposals and supporting expert's reports submitted by a number of other service providers. Below we set out each of these and identify where we have responded to each of these eight key concerns in this final decision.

- Our definition of the utilisation rate is conceptually incorrect and inconsistent with the requirements of the NER/NGR—our understanding of the utilisation rate (and the value of imputation credits more broadly) is discussed in sections 4.3.1, 4.3.6, 4.4.2, A.6, A.7 and A.8. As shown there, our understanding is consistent with the theoretical framework that underpins the NER/NGR and is supported by expert advice from Handley.
- We incorrectly use equity ownership rates as direct evidence of the value of distributed imputation credits—given our understanding of the utilisation rate, we set out in section 4.4.2 why the equity ownership approach provides a reasonable estimate.
- The ranges we used for the equity ownership rate were not supported by the evidence in the draft decisions—as discussed in section A.12, the service providers who raised this did not recognise that our ranges were based on the evidence from two alternative

¹⁴⁷ Australian Competition Tribunal, *Application by WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12*, June 2012, paras. 119 and 125.

¹⁴⁸ ActewAGL, *Revised Regulatory Proposal 2015-19*, January 2015, pp. 485–486; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 1; Directlink, *Directlink submission on gamma (updated)*, January 2015, pp. 1–2; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 1; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 1; and JGN, *Gamma - response to the draft decision*, February 2015, p. 1.

applications of the equity ownership approach. In this final decision, our ranges are based on the application that was deemed more relevant by Handley in his recent advice.

- We incorrectly use tax statistics as direct evidence of the value of distributed imputation credits—given our understanding of the utilisation rate, we set out in section 4.4.2 why tax statistics provide a reasonable estimate.
- We incorrectly conclude that implied market value studies reflect factors that are not relevant to estimating the utilisation rate—given our understanding of the utilisation rate, we set out in sections 4.4.2, A.14.4 and A.14.5 why the results of implied market value studies can reflect factors that are not relevant to the utilisation rate.
- We erred by considering implied market value studies in a general manner rather than considering the merits of SFG's dividend drop off study—in section 4.4.2 we set out a list of limitations that can apply to implied market value studies, and in section A.14.5 we conclude that there is reasonable evidence to suggest that several of these limitations apply to SFG's dividend drop off study. In section 4.4.2 we also refer to the issues raised by Lally in relation to SFG's dividend drop off study, and McKenzie and Partington's view that there is no obvious manner in which to weigh the results from various implied market value studies based on their characteristics. In section A.14.6 we set out statements from experts and other regulators on the limitations of dividend drop off studies. All but one of these statements occurred after the development of SFG's dividend drop off study.
- It was neither necessary nor appropriate for us to identify a distribution rate for only listed equity—in sections A.9 and A.10.1 we explain why we disagree.
- Our ultimate conclusion as to the value of imputation credits was inconsistent with the evidence presented in the draft decisions—the evidence presented in both the draft decisions and this final decision suggests that a reasonable estimate for the value of imputation credits is within the range 0.3 to 0.5. Our estimate of 0.4 is within this range.

In the revised regulatory proposals of SA Power Networks, Ergon, and Australian Gas Networks, two issues were raised as the key issues in dispute. These issues were also raised in Gray's June 2015 report (for Frontier) relied on by the majority of service providers with proposals currently before the AER:¹⁴⁹

- The first key point of difference between the position of the AER and the service providers is conceptually whether θ should be interpreted as the value of distributed credits, or the redemption proportion. The service providers consider that if their value interpretation is adopted then you must use estimates that measure the value of

¹⁴⁹ We note that these issues have been raised by other service providers, however SA Power Networks, Ergon Energy and Australian Gas Networks have now clarified that they consider these to be the key issues in dispute with the AER. We also note Gray did not explicitly identify these as the key issues in dispute, although they featured prominently in his report.

distributed credits (such as dividend drop-off studies).¹⁵⁰ In section A.8.1 we explain why we consider the proportion of imputation credits distributed to shareholders eligible to utilise them is an appropriate measure of the value of imputation credits before personal taxes and transaction costs.

- The second key point of difference concerns the set of comparator businesses that should be used when estimating a benchmark distribution rate.¹⁵¹ The service providers consider: firstly, that the AER is incorrect to consider that the same set of firms need to be used to estimate the distribution rate and to estimate the value of imputation credits and secondly, the AER is incorrect to use a distribution rate from all listed equity of around 0.8¹⁵² given our benchmark efficient network operator is a pure play wholly domestic business that is not necessarily stock market listed. In section A.9 and A.10.1 we explain why we consider our approach is appropriate. Our position on this was also considered in our JGN decision and we do not consider new evidence has been presented to warrant a change of approach. We consider our approach will lead to an overall post tax return on equity for the benchmark efficient entity (inclusive of dividends, capital gains and imputation credits) that is appropriate and meets the rate of return objective.

We note that both of these points of difference were considered in our decisions released in April and June 2015 and also considered by Handley who supported our approach.

In addition, a number of key 'second order' differences of view between the AER and the service providers have been identified in the revised or initial regulatory proposals of the service providers, or in the new expert's reports by NERA or Gray (for Frontier):

- A redemption rate study can only provide an upper bound for estimating theta.¹⁵³ In section A.8.2 we explain why we consider redemption rates can be used as point estimates of theta.
- The AER's implementation of the redemption rate is incorrect.¹⁵⁴ In section A.12 we explain why we consider our implantation is reasonable.

¹⁵⁰ SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, pp. 370-371; Ergon, *Submission on value of imputation credits (gamma)*, July 2015, p. 7; Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 8; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, p.3, July 2015; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, pp. 2-3.

¹⁵¹ SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, pp. 370-371; Ergon, *Submission on value of imputation credits (gamma)*, July 2015, p. 7; Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 26-30; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, July 2015, p. 3.

¹⁵² We note we have used an estimate of the distribution rate of 0.77 in this decision. This was updated to 0.77 in our JGN decision released in June 2015 from 0.8 used in our final decisions released in April 2015.

¹⁵³ AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 354; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 2; CitiPower, *Appendix J - Gamma*, April 2015, p. 4; Powercor, *Appendix J - Gamma*, April 2015, p. 4; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 5; SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, pp. 370-371; Ergon, *Submission on value of imputation credits (gamma)*, July 2015, p. 7; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, p. 2; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, pp. 9-10, July 2015; Amadeus Gas Pipeline, *Access Arrangement revision submission*, August 2015, p. 151.

- The criticisms of Gray and Hall's dividend drop-off work is not reasonable.¹⁵⁵ We discuss the limitations of dividend drop off studies and which of these apply to the SFG dividend drop off study in section A.14.5

We note that the primary and second order differences of view identified above do not appear to be new issues and largely overlap with the 8 key concerns of service providers raised previously. Having considered the new and revised regulatory proposals, and the new experts' reports not considered by us in making our JGN decision, we remain of the view that a gamma value of 0.4 is appropriate.

A.5 The role of the value of imputation credits in the regulatory framework

To explain the role of the value of imputation credits in the NER/NGR, we must consider:

- the 'building block' revenue framework in the NER/NGR, and
- the construction of the tax building block.

A.5.1 The building block framework

Under the NER/NGR, we employ a building block framework to estimate revenue for service providers. The building block framework sets out how to estimate the various components (that is, 'building blocks') that make up a total revenue allowance.¹⁵⁶ The function of this building block revenue estimate is to determine the revenue that a service provider requires to:

- fund its operating expenses.
- achieve adequate returns to raise debt and equity in order to finance its capital investments. This is made up of a rate of return on capital to compensate investors for the risks of investment. It also includes a return of capital (depreciation), which gradually returns the initial principal of the investment, and subsequent investments, back to investors.
- pay its tax liability.
- reflect any revenue increments or decrements from incentive mechanisms in the design of the regulatory regime.

¹⁵⁴ SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, pp. 370-371; Ergon, *Submission on value of imputation credits (gamma)*, July 2015, p. 7; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, July 2015, p. 3.

¹⁵⁵ AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 367; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 18; CitiPower, *Appendix J - Gamma*, April 2015, p. 16; Powercor, *Appendix J - Gamma*, April 2015, p. 16; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 7; SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, pp. 370-371; Ergon, *Submission on value of imputation credits (gamma)*, July 2015, p. 8; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, p. 15; Australian Gas Networks, *Attachment 11.2 Value of Imputation Credits*, p. 3, July 2015.

¹⁵⁶ NER, cll. 6.4.3 and 6A.5.4; NGR, r. 76.

Importantly, the building block framework is intended to compensate the service provider (and its investors) only for costs incurred by the service provider and not by its investors; that is, the framework is on a before-personal-tax and before-personal-costs basis. Handley described this consideration as follows:¹⁵⁷

The post-tax basis of the regulatory framework can be more fully described as an after-company-before-personal-tax framework. In other words, cash flows and returns are to be measured after company taxes but before personal taxes. By definition, this means that allowed revenues should include compensation for corporate taxes incurred by the regulated firm but not for personal taxes incurred by the firm's shareholders. Similarly, allowed revenues should include compensation for prudent, efficient costs incurred by the regulated firm but not for costs (including personal transactions costs) incurred at the shareholder level. Note, this does not mean that personal taxes and costs are being ignored or assumed not to exist – rather there is no need to explicitly include them in the modelling framework.

...

The regulatory WACC framework is an after-company-before-personal-tax framework which requires explicit modelling of cash flows and returns after allowing for company tax but avoids most of the complications associated with having to model personal taxes - one complication which remains of course, is gamma. If one wanted to explicitly model personal taxes then an after-company-after-personal-tax WACC framework could be used instead.

In particular, Handley advised that the Officer framework provides the basis for the building block framework in the NER/NGR, and that the before-personal-tax and before-personal-costs interpretation is consistent with Officer. Handley's advice on these matters is discussed in more detail in sections A.6, A.7.3 and A.8.1.

In response to the position put by a number of service providers that the AER prefers its conceptual valuation relative to a market mechanism derived value, and concerns around the AER's definition of gamma, we note:

- There is no market for imputation credits and therefore there is no directly observable market price. This is also discussed below in section A.14.3.
- The value of imputation credits as estimated through a dividend drop off study:
 - is not necessarily a correct post company tax value before personal taxes and personal transaction costs (particularly demonstrated where the study estimates a value for cash dividends materially below their face value as the SFG study does)
 - is not necessarily consistent with the estimate of the return on equity and return on debt which are estimated required returns before personal taxes and

¹⁵⁷ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5 and footnote 2.

personal transaction costs (particularly demonstrated where the study estimates a value for cash dividends materially below their face value as the SFG study does), and

- is subject to significant uncertainty.

A number of limitations of these studies are discussed further in sections A14.4 and A14.5.

- The AER's definition of the utilisation value is consistent with Officer Framework underpinning the rules that uses a post-tax Vanilla WACC, is consistent with the way the AER estimates the required return on equity, and is supported by Handley. The explicit recognition that this is a pre personal taxes and pre personal transaction costs value is simply explicit recognition of something implicit in the Officer Vanilla WACC framework. This framework determines the required return to the company (i.e. before personal taxes and personal transaction costs are incurred) consistent with the definition of the after-tax net cash flows set out in Officer.¹⁵⁸
- The AER's definition is consistent with the 'value' concept in the rules given the rules are requiring the AER to estimate a post-tax nominal Vanilla WACC consistent with Officer formula (12) in his 1994 paper, which as stated by Officer is one particular definition of "a company's after-tax cost of capital (WACC)" and "is determined by the definition used of after-tax operating income or really after-tax net cash flows".¹⁵⁹ As these after-tax net cash flows are at the company level they are before personal taxes and personal transaction costs. This is supported by the advice of Handley.¹⁶⁰

A.5.2 The tax building block

One expense that a service provider faces is taxation. An allowance for taxation can be estimated as a separate building block allowance, or through the rate of return. Either way, the service provider and its investors are compensated for its tax liability. The difference is only how this return is presented. The NER/NGR specify that we must estimate a nominal vanilla rate of return.¹⁶¹ A nominal vanilla rate of return combines a post-tax return on equity with a pre-tax return on debt. More specifically, as described by Handley above, the return on equity is a post-company-tax-pre-personal-tax return on equity.

Amongst other things, this means the return on capital does not include an allowance for the cost of taxation. As a result, the building block framework includes an estimate of the cost of corporate income tax as a separate revenue item.

The cost of corporate income tax building block takes the following form:

¹⁵⁸ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, p. 7.

¹⁵⁹ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, p. 6.

¹⁶⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5 and footnote 2.

¹⁶¹ NER, cll. 6.5.2 and 6A.6.2; NGR, r. 87.

$$ETC_t = (ETI_t \times r_t)(1 - \gamma)$$

where:

- $(ETI_t \times r_t)$ is an estimate of the benchmark efficient entity's tax liability.
- γ is the value of imputation credits.

Therefore, the effect of the value of imputation credits is to reduce a service provider's allowed revenue by γ (gamma) dollars for each dollar of expected company tax payable by the benchmark efficient entity. Given it is the tax paid by the benchmark efficient entity that gives rise to the imputation credits, we consider that it is the (pre-personal tax) value of imputation credits to investors in the benchmark efficient entity that is relevant.¹⁶²

A.6 The conceptual framework for the value of imputation credits

With regard to the discussion of the tax building block in section A.5.2, we consider the 'value of imputation credits' to be the value of imputation credits to investors in the benchmark efficient entity. Moreover, as noted above, it is the pre-personal tax value of imputation credits to those investors that we seek to estimate. The issue is then how to interpret and estimate the value of imputation credits. Our approach to interpreting and estimating the value of imputation credits is guided in the first instance by the conceptual framework developed by Officer.¹⁶³ This is because:

- The construction of the tax building block mirrors the treatment of imputation credits in the framework developed by Officer, including through use of the parameter denoted by the Greek letter 'gamma'.¹⁶⁴
- Handley advised that Officer's definition of the nominal vanilla rate of return provides the basis for the rate of return framework in the NER/NGR.¹⁶⁵
- The NER/NGR require that we determine the rate of return on a nominal vanilla basis that is consistent with our estimate of the value of imputation credits.¹⁶⁶

Officer describes gamma in different ways, and this is a potential source of ambiguity regarding what the parameter represents and therefore how one might estimate it in practice. Whilst Handley acknowledged that Officer describes gamma in seemingly different

¹⁶² Although we consider that it is implied that the 'value of imputation credits' refers to the value of imputation credits to investors in the benchmark efficient entity, we note that the NER/NGR are not explicit on this point.

¹⁶³ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

¹⁶⁴ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, equation 2.

¹⁶⁵ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 7–8.

¹⁶⁶ NER, cll. 6.5.2 and 6A.6.2; NGR, r. 87.

ways, he advised that, when examined closely, there is no ambiguity in the meaning of Officer. Handley advised:¹⁶⁷

Similarly, Officer has described gamma in seemingly different ways. For example he refers to:

“A proportion (γ) of the tax collected from the company will be rebated against personal tax.”

and shortly thereafter:

“γ can be interpreted as the value of a dollar of tax credit to the shareholder.”

But again, there is no ambiguity. These terms can and have been used interchangeably because the underlying source of value of an imputation credit to shareholders is the consequent reduction in personal taxes in recognition of taxes that were previously paid at the corporate level. In other words, within the Officer framework, it is clear that gamma represents the utilisation or redemption value of imputation credits and this value corresponds to the proportion of company tax which is in effect a prepayment of personal tax by the company on behalf of its shareholders. It is this identification of the personal tax component of the company tax paid which is the central idea of the paper.

In other words, gamma in the Officer framework represents the proportion of company tax that is returned to investors through the utilisation of imputation credits and this is the value of imputation credits to investors. This is the interpretation of the value of imputation credits we adopted in the Guideline and continue to adopt in this decision. This interpretation is consistent with the Officer framework and is supported by advice from Handley.

The Officer framework assumes that all free cash flows (including imputation credits) are fully paid out each period. That is, the Officer framework is a 'perpetuity' framework. However, in reality not all imputation credits are necessarily paid out each period, nor are all other free cash flows necessarily paid out.¹⁶⁸ For example, it is typical for a company to retain some earnings from a previous year to fund part of its future investment, rather than pay out all earnings as dividends and fully raise the funding of future investment from external sources. Work by Monkhouse (and others) extends the Officer framework by allowing for less than a full payout of cash flows and imputation credits each period. Handley advised that Monkhouse effectively shows that:¹⁶⁹

$$\gamma = F\theta + (1 - F)\psi$$

where:

¹⁶⁷ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 9.

¹⁶⁸ This is evident in companies having positive franking account balances in aggregate.

¹⁶⁹ Handley considered that, although Monkhouse does not use the term gamma, the interpretation is clear: J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 11 and footnote 12.

- F is the proportion of imputation credits generated that are distributed in a period (the 'distribution rate').
- θ (theta) is the utilisation value to investors in the market per dollar of imputation credits distributed (the 'utilisation rate').
- ψ (psi) is the utilisation value of a retained credit to investors in the market.

Handley also advised that in frameworks such as Monkhouse's the utilisation rate in equilibrium is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market:¹⁷⁰

This interpretation of theta as a complex weighted average of investor utilisation rates is consistent with that appearing in Monkhouse (1993) and Lally and van Zijl (2003)...

This is also supported by Lally's remarks on the work of Lally and van Zijl:¹⁷¹

Although Officer (1994) provides no clarification on this matter, because his derivation of the model is intuitive rather than formal, Lally and van Zijl (2003, section 3) provide a formal derivation of a generalisation of Officer's model (with the Officer model being a special case), in which variation of utilisation rates across investors is recognised. In this derivation, they show that [the utilisation rate] is a complex weighted average over all investors holding risky assets, where the weights involve each investor's investment in risky assets and their risk aversion.

Consistent with the advice we received from Lally, in the Guideline we recognised that the utilisation rate is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market. In the Guideline, we also defined the utilisation rate as the extent to which investors can use the imputation credits they receive to reduce their tax (or receive a refund). In this decision, consistent with Handley's advice, we consider the utilisation rate is the utilisation value to investors in the market per dollar of imputation credits distributed. However, we consider that our views in the Guideline and in this decision are broadly equivalent; that is, our definition of the utilisation rate in this final decision still reflects the extent to which investors in the market can use the imputation credits they receive. This is because, as discussed above and in sections A.5, A.7 and A.8.1, to be consistent with the Officer framework (and therefore the building block framework in the NER/NGR) the utilisation rate should reflect the before-personal-tax and before-personal-costs value of imputation credits to investors. On a before-personal-tax and before-personal-costs basis, an investor that is eligible to fully utilise imputation credits should value each dollar of imputation credits received at one dollar (that is, have a utilisation rate of 1). Therefore, the utilisation value to investors in the market will reflect the weighted average, by wealth and risk aversion, of the utilisation rates of investors—some of whom will have a

¹⁷⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 18–20.

¹⁷¹ M. Lally, *The estimation of gamma*, 23 November 2013, p. 11.

utilisation rate of 1 and others who will have a utilisation rate of 0.¹⁷² We discuss Handley's advice on this matter further in section A.8.1.

Returning to the expression for γ above, we have not explicitly included the value of retained credits, ψ , when determining the value of imputation credits. This is mainly because we recognise that investors can only use imputation credits to reduce tax or receive a refund once the credits have been distributed. There is also the practical problem of how to quantify the value of retained credits. Handley acknowledged the potential for retained credits to have value, but also the difficulty in quantifying it.¹⁷³

Retained imputation credits can be worth no less than zero but may be worth more than zero. Estimates of gamma using the traditional approach will therefore be downward biased to the extent that retained imputation credits have value. Although it is not possible to reasonably estimate the magnitude of the bias, its direction is clear.

A.7 Gray's comments on the conceptual framework¹⁷⁴

In the previous section, we set out our position on the appropriate conceptual framework for the estimation of the value of imputation credits. In this section, we respond to Gray's view. Gray's view on the conceptual framework was largely adopted by the service providers in their proposals.

Gray's May 2014 report (for SFG) for the service providers submitted that:

- The advice and evidence cited in the Guideline does not support the interpretation of the utilisation rate in the Guideline.
- Officer shows that the value of imputation credits (gamma) represents the extent to which imputation credits are capitalised into the stock price.
- The utilisation rate in the framework provided by Monkhouse (and Lally and van Zijl) should not be used to estimate the value of imputation credits.

The submissions from Gray, including comments in his February 2015 report (for SFG) and his June 2015 report (for Frontier), do not change our view on the conceptual framework for the estimation of the value of imputation credits. We do not consider his work supports the position that the AER's conceptual framework is not an appropriate basis on which to estimate the value of imputation credits.¹⁷⁵ We set out our reasoning below.

¹⁷² Recall from section 4.3.3 that we define the relevant market as an Australian domestic market that recognises the presence of foreign investors to the extent that they invest in the Australian market.

¹⁷³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 14.

¹⁷⁴ Professor Gray undertook reports for both SFG and Frontier economics. To avoid confusion, we have generally referred to Professor Gray by name with the consulting firm after his name.

¹⁷⁵ SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, p. 373;

A.7.1 Gray's comments on the AER's position

Gray (for SFG) submitted that '...the AER's position is that theta (and consequently gamma) no longer represents the value (as in "worth" or "market value to investors")...'.¹⁷⁶ This is incorrect. Our definition of the utilisation rate in this final decision and our prior decisions released in 2014 and 2015 (our prior decisions) is the utilisation value to investors in the market per dollar of imputation credits distributed. Thus, we do consider that the utilisation rate represents the value to investors in the market. However, the key difference between our position and Gray's is we consider that, to be consistent with the underlying conceptual framework provided by Officer, we need to estimate the before-personal-tax and before-personal-cost value. This is discussed further in section A.7.3.

Gray also submitted that '[t]he AER then estimates the redemption rate, which it interprets as being consistent with the specific reference to "value" in the Rules in that it is "the number that is adopted" for imputation credits'.¹⁷⁷ This is also incorrect. In this final decision and our prior decisions we estimate the utilisation rate. Further, nowhere in this final decision or in our prior decisions do we seek to support any aspect of our position with 'specific reference to "value" in the Rules in that it is "the number that is adopted" for imputation credits'.

We also disagree with Gray's view that:¹⁷⁸

The AER is not saying that it has identified a number of approaches for estimating the value (as in "worth to investors in the market") of imputation credits. Rather, the AER considers:

- a) Some approaches for estimating the value (as in "worth to investors in the market") of imputation credits – the market value studies; and
- b) Some approaches for estimating the redemption rate – the equity ownership and ATO tax statistic approaches.

By contrast, the approaches on which we rely in this decision to estimate the utilisation rate are all relevant for the reasons discussed in section 4.4.2 of attachment 4.

A.7.2 Gray's comments on certain evidence and advice cited in the Guideline

In his May 2014 report, Gray (for SFG) set out why it considered that certain evidence cited in the Guideline did not support the position in the Guideline.¹⁷⁹ This evidence included:

- The AEMC's 2012 rule change
- McKenzie and Partington (2013)

¹⁷⁶ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 42.

¹⁷⁷ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 42.

¹⁷⁸ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 53.

¹⁷⁹ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, paras. 294–313, 331–334 and 341(b).

- Handley (2008), and
- Hathaway and Officer (2004).

In our decisions released in 2014, we set out why we disagreed with Gray's view on each piece of evidence.¹⁸⁰ In his February 2015 report (for SFG), Gray set out why his view on this evidence has not changed.¹⁸¹ Gray's February 2015 report (for SFG) and June 2015 report (for Frontier) does not change our view as set out in our earlier decisions. It seems that the disagreement between us and Gray regarding this evidence is unlikely to be resolved.

A.7.3 Gray's comments on Officer (1994)

Gray set out his views on Officer's 1994 paper in his May 2014 and February 2015 reports for SFG, and in his June 2015 report for Frontier. These views do not change our own view, consistent with the advice of Handley, that the value of imputation credits should be estimated on a before-personal-tax and before-personal-costs basis. We respond to Gray's comments on Officer below.

The text in Officer (1994)

Gray (for SFG) submitted that Officer's paper suggests that there are two possible interpretations of gamma:¹⁸²

(a) Officer means gamma to have a *value* interpretation and that words suggesting a *utilisation* interpretation were poorly drafted (i.e., the reference to utilisation should be read as simply identifying the source of value); or

(b) Officer means gamma to have a *utilisation* interpretation and that words suggesting a *value* interpretation were poorly drafted (i.e., the reference to value should be read as "the number used for" rather than "worth).

I concluded that the value interpretation was plausible and the utilisation/redemption interpretation was not, and set out my reasons for doing so. Nothing in the AER's recent draft decisions lead me to change my conclusion on this point.

We do not agree with Gray's opinion. As explained by Handley in his September 2014 report, interpretation of gamma on a before-personal-tax and before-personal-costs basis reconciles this apparent inconsistency in Officer;¹⁸³ that is, on this basis the 'value' and 'utilisation' interpretations are consistent. Handley reiterates this in his April 2015 report.¹⁸⁴

¹⁸⁰ See section A.6.1 of the draft decisions.

¹⁸¹ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 111–121 and 136–137.

¹⁸² SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 122–123.

¹⁸³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 8–9.

¹⁸⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 5.

This is precisely the reason why Officer refers to gamma as the value of franking credits in some parts of the paper, and as the proportion of tax collected from the company which will be rebated against personal tax, in other parts of the paper. These two descriptions are equivalent when one interprets value to mean the value of imputation credits before personal tax and before personal costs.

There would appear to be further support for Handley's view in the first line of footnote 5 of Officer's paper, which seemingly equates the ideas of 'utilisation' and 'value'.¹⁸⁵

For example, if the shareholder can fully utilize the imputation tax credits then ("value") $\gamma = 1$, e.g. a superfund or an Australian resident taxpayer.

Handley also noted:¹⁸⁶

It is clear that the Officer WACC valuation framework is a before-personal-tax framework. It is also a before-personal-cost framework in the limited sense that, there is no explicit adjustment (deduction) made to the cash flows or the discount rate for either personal taxes or personal costs.

On the other hand, if gamma was intended to reflect investors' personal taxes and costs, then the proportion of company tax returned to investors would never be equivalent to the value to investors per dollar of imputation credits. This is because, on an after-personal-tax and after-personal-costs basis where such taxes and costs were non-negligible, investors would likely value credits at less than their face value. Therefore, there would be no justification for defining gamma, as Officer does, in terms of the proportion of company tax returned to investors. As shown in the earlier quote, Gray attributes such a definition to 'poor drafting'. However, this is unconvincing to us.

Further, if the intended interpretation of gamma is on an after-personal-tax and after-personal-costs basis, then it would seem to make little sense to contemplate, as Officer does in footnote 5 of his paper, an investor having an individual utilisation rate of 1.¹⁸⁷ Again, this is because, on an after-personal-tax and after-personal-costs basis where such taxes and costs were non-negligible, investors would likely value credits at less than their face value. Conversely, Gray has previously argued that it is difficult to understand why Officer would contemplate in the same footnote the estimation of gamma via dividend drop off studies if the correct interpretation of gamma was as the proportion of company tax returned to investors.¹⁸⁸ However, as we have maintained throughout the Guideline and current determination process, implied market value studies remain a relevant estimation method for gamma. This is because any value attributed to credits which can be inferred from market prices is ultimately derived from the utilisation of those credits.

¹⁸⁵ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 1–17.

¹⁸⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 4.

¹⁸⁷ Recall that the utilisation rate equals gamma under Officer's perpetuity framework.

¹⁸⁸ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 319.

Finally, our view is supported by Officer's treatment of gamma in the numerical example in the appendix to his paper. Officer describes this numerical example as '...designed to help the reader through some of the obstacles to going from theory to practice'.¹⁸⁹

Assume that 50 percent of the tax collected at the company level represents personal tax, i.e. 50 percent of tax credits can be utilized against personal tax liabilities so that $\gamma = 0.5$.

The formulas in Officer (1994)

Gray (for SFG) submitted that the formulas in Officer (1994) support his interpretation of the value of imputation credits:¹⁹⁰

...gamma represents the extent to which imputation credits are capitalised into the market value of equity. I note that this is precisely what is estimated by dividend drop-off analysis and other market value studies. The formula shows that one takes the present face value of imputation credits (IC/r_e) and then multiplies by gamma and the result makes up part of the market value of equity.

Another way to see this is to rearrange the formula to isolate gamma as follows:

$$E_{with-IC} = E_{ex-IC} + \gamma \frac{IC}{r_e}$$

where $E_{with-IC}$ represents the market value of equity including imputation credits, E_{ex-IC} represents the market value of equity excluding imputation credits and IC/r_e represents the present face value of imputation credits. It is clear in this formula that gamma does not represent the proportion of imputation credits that might be redeemed, but the extent to which imputation credits increase the market value of equity.

Handley reviewed Gray's submission and considered:¹⁹¹

SFG (2015 para. 124-135) also suggests that the mathematical formulae in Officer (1994) support a value interpretation of gamma but not a redemption value interpretation since: "*It is clear in this formula [para.127] that gamma represents ... the extent to which imputation credits increase the market value of equity*". There is no dispute that the (market) value of credits are capitalised into stock prices – this is clear from equation (2) [in Handley's report]. However, SFG fails to see that within Officer's framework it is the before personal tax and before personal costs value of a credit – the redemption value – which is the item being capitalised.

¹⁸⁹ R. Officer, 'The cost of capital of a company under an imputation system', *Accounting and finance*, vol. 34(1), May 1994, pp. 11–17.

¹⁹⁰ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 126–127.

¹⁹¹ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 7.

Thus, Handley appeared to agree with Gray that the formulas in Officer indicated that the value of imputation credits is capitalised into stock prices. However, Handley considers (for the reasons set out in the previous sub-section) that it is the before-personal-tax and before-personal-costs value which is capitalised into the stock price in Officer's framework. As also set out in the previous sub-section, we agree with Handley's interpretation of the Officer framework.

Interpretation of gamma in textbooks

In his June 2015 report (for Frontier), Gray stated:¹⁹²

I am unaware of any published work that interprets gamma in terms of the redemption rate.

However, there are several textbooks that describe gamma in a manner consistent with our understanding. For example, Peirson et al (2009):¹⁹³

Officer (1994) discussed several alternative ways of defining net cash flows and the cost of capital under imputation. One way to define the after-tax cash flows is that they are equal to the before-tax cash flows multiplied by $(1 - t_e)$, where t_e is the *effective* company income tax rate. The effective company tax rate is $t_e = t_c(1 - \gamma)$, where t_c is the statutory company tax rate and γ represents the proportion of the tax collected from a company that is paid out to shareholders and recovered through tax credits associated with franked dividends.

...

For example, if...the company income tax rate is 30 cents in the dollar, and 60 per cent of the tax collected from the company is claimed as a credit by shareholders, then the effective company tax rate is $0.30(1 - 0.6) = 0.12...$

Berk et al (2014):¹⁹⁴

In a 1994 study, Officer shows that for valuation purposes the cost of equity under an imputation system should be adjusted by a factor equal to:

$$\frac{1 - T}{1 - T(1 - \gamma)}$$

where T represents the effective corporate tax rate and (γ) represents the proportion of tax collected from the firm that will be rebated against personal tax in the hands of shareholders.

Gitman et al (2011):¹⁹⁵

¹⁹² Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 24.

¹⁹³ G. Peirson, R. Brown, S. Easton and P. Howard, *Business Finance*, 10th Edition, 2009, pp. 429 and 432.

¹⁹⁴ J. Berk, P. DeMarzo, J. Harford, G. Ford, V. Mollica and N. Finch, *Fundamentals of Corporate Finance*, 2nd Edition, 2014, p. 535.

If we let γ be the proportion of company income tax that can be used by shareholders to offset their personal income tax liabilities...

...

With dividend imputation, the calculation of the weighted average cost of capital depends heavily on the estimate of γ . For a good estimate of γ we would need to know the proportion of company income that has borne Australian income tax, and the proportion of the company's shareholders who were Australian residents who could benefit from dividend imputation.

Gray quoted approvingly from a textbook co-authored by Partington in 2000, but none of the statements quoted contradict our understanding of gamma. For instance, Gray quoted:¹⁹⁶

γ = the market value of franking credits as a percentage of face value.

However, there is no dispute here. As Handley explained:¹⁹⁷

Implicit in Officer's WACC framework (and the standard classical tax WACC framework) is the notion of market value and so the relevant measure of utilisation value is that value as determined by the market – in other words it is not the utilisation value of a credit to any single investor or the utilisation value to any single class of investors that we want but rather the utilisation value to the market as a whole. In contrast, much of the current debate appears to incorrectly suggest that market value and utilisation value are alternative concepts for this purpose.

Moreover, there are other references to gamma in Partington's textbook that accord more closely with the characterisation in Officer's paper:

γ = the proportion of corporate tax recovered by investors through imputation tax credits.¹⁹⁸

...

We assume a 100 per cent dividend payout and full use of imputation credits ($\gamma = 1$)...However, 100 per cent payout and full use of imputation credits are unrealistic assumptions. It is more realistic to assume that about 50 to 60 per cent of profits are paid out as dividends. Of the imputation credits attached to those dividends only about 50 to 60 per cent will be claimed by investors to offset their tax liabilities.¹⁹⁹

Gray also quoted:²⁰⁰

¹⁹⁵ L. Gitman, R. Juchau and J. Flanagan, *Principles of Managerial Finance*, 6th Edition, 2011, pp. 543 and 546.

¹⁹⁶ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 24.

¹⁹⁷ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 9.

¹⁹⁸ R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, 1st Edition, 2000, p. 523, footnote 8.

¹⁹⁹ R. Brealey, S. Myers, G. Partington and D. Robinson, *Principles of corporate finance*, 1st Edition, 2000, p. 526.

²⁰⁰ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 25.

The results have been mixed, but they suggest that the market value of franking credits is positive, but significantly less than the credit's face value.

...

...the market value of the franking credit is likely to differ from its face value. We do not know exactly what the market value is, but the evidence suggests that franking credits are valued at a significant discount to their face value.

Again, there is no dispute. The estimates of the utilisation rate on which we rely are all significantly less than one, and our estimate of gamma is significantly less than one.

Finally, Gray quoted an explanation, with which he agreed, as to why imputation may have had an immaterial effect on the corporate cost of equity capital.²⁰¹

The impact of imputation may not have been that big. There are several reasons for this. As suggested by Bob Officer, in a small open economy like Australia, equilibrium rates of return are likely to be determined by capital flows from international investors. If so, domestic tax changes are likely to have a reduced effect, or no effect at all, on equilibrium rates of return.

The implications of this quote for understanding or determining gamma are unclear to us. For instance:

- Gray appeared elsewhere to be of the view that imputation *is* having a material effect on the cost of capital. This is because he submitted that, in his view, the best estimate of the extent to which imputation credits are capitalised into stock prices per dollar of credit distributed is 0.35, and this is not immaterial.²⁰²
- The view in a recent paper co-authored by Partington did not appear to align with that in the quote.²⁰³

Indeed, whether prices are set by a marginal investor, or by aggregation across investors, is an open question... It is our contention, therefore, that a policy decision should not be based on the assertion that the marginal investor setting prices in the Australian market is an overseas investor. To do so would base policy on an insecure foundation, and risks serious error.

Recent academic work

The recent paper co-authored by Partington has been raised in direct support of the position that the equity ownership approach is not an appropriate way to estimate the value of distributed imputation credits.²⁰⁴ This paper largely draws on the existing literature and

²⁰¹ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 25.

²⁰² Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 6.

²⁰³ A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015.

²⁰⁴ Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network, p11, July 2015; Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp 45-48.

available evidence with the intention of contributing to the policy debate around the efficacy of dividend imputation.²⁰⁵ While the paper does consider relevant matters, we consider that the paper raises a number of issues without making strong recommendations. Consistent with the above quote it notes:²⁰⁶

Whether the marginal investor or aggregation approach better describes how imputation credits become priced in equilibrium is a point of debate. The marginal investor approach might be seen as more in keeping with the 'Economics 101' notions of price determination, and more consistent with general equilibrium analysis under which investor demand for (and supply of) imputation credits is jointly determined with the market clearing price. As a consequence, the marginal investor approach may assist in analysing the potential effect of changes in the demand curve. By contrast, aggregating observed demands assumes that investors have found their equilibrium position given market prices [footnote 6: Monkhouse (1993) explicitly states this assumption]. It thus does not directly address how the market equilibrium emerges in the first place. Nevertheless, the aggregation approach may still provide a useful description of an existing equilibrium. In any event, the key point is that there is no clear consensus on the appropriate approach, adding another layer of uncertainty to the issue of whether imputation credits are priced.

As such, while the paper raises a number of points highlighted by Gray (for Frontier), we do not consider the paper provides evidence that our equity ownership approach that uses the aggregation approach to estimate the value of theta is not reasonable. Frontier has taken a number of statements from the paper that should not be read in isolation of the remainder of the paper. For example, in response to Gray's point at paragraph 189 where he states "Ainsworth, Partington and Warren (2015) note that the evidence generally suggests that the two companies do sell for the same price",²⁰⁷ the paper makes clear this evidence needs to be treated with caution stating:²⁰⁸

In contrast, examination of returns and price levels reveals little evidence that imputation credits are priced. Lajbcygier and Wheatley (2012) find that the presence of imputation credits is not associated with lower realised returns. Further, they find a positive relation between realised returns and imputation credits, which is significant under some specifications. This implies an (implausible) negative value on imputation credits. While the sign on the coefficient probably flags issues with the empirical method (see Section 4.2), it is nevertheless the case that no hint emerges that imputation credits have lowered the distribution of realised returns. Saiu, Sault and Warren (2015) find that imputation might be reflected in share prices under discounted cash flow models, at perhaps about \$0.30 in the dollar. However, the imputation variable adds little explanatory power. Meanwhile, the results under the

²⁰⁵ A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p3.

²⁰⁶ A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p14.

²⁰⁷ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 46.

²⁰⁸ A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p17.

earnings yield model and portfolio sorts suggest that imputation credits are not priced, and in fact may be associated with higher earnings yields as well as lower prices relative to other valuation measures.¹⁰ The fact that the earnings yield results have the wrong sign suggests that caution needs to be applied in interpreting these findings (similar to Lajbcygier and Wheatley, 2012).

On the same page the paper also states in relation to some empirical evidence more generally:²⁰⁹

A very mixed set of results emerges from this body of research. Figure 4 (over) summarises the findings from the majority of dividend drop-off and comparative pricing studies. While a wide range of estimates emerges, these studies on balance indicate that imputation credits are partially priced. The data points in Figure 4 average 0.38, which would suggest that imputation credits are priced at about \$0.38 in the dollar.

A.7.4 Gray's comments on the Monkhouse framework

As discussed in section A.6, we consider that:

- The Officer framework provides the basis for the value of imputation credits adjustment in the NER/NGR.
- Monkhouse extends the Officer framework to a non-perpetuity setting, and shows that—assuming retained credits have no value—gamma from the Officer framework effectively equals the product of:
 - the distribution rate, and
 - θ (theta), which is the utilisation value to investors in the market per dollar of imputation credits distributed (the 'utilisation rate'), which in equilibrium is equal to the weighted average, by wealth and risk aversion, of the individual utilisation rates of investors in the market.

In his May 2014 and February 2015 reports, Gray (for SFG) provided a discussion of the class of CAPM employed by Monkhouse (and related literature).²¹⁰ Gray concluded that our recognition of foreign investors breaches the assumptions of this class of CAPM, and therefore we cannot estimate the value of imputation credits using the definition of theta in equilibrium from the Monkhouse framework. Gray's June 2015 report (for Frontier), upon which a number of service providers rely, holds the same view and notes the inconsistency between Lally and Handley's advice on this point²¹¹

²⁰⁹ A. Ainsworth, G. Partington and G. Warren, *Do franking credits matter? Exploring the financial implications of dividend imputation*, May 2015, p17.

²¹⁰ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, appendix 6; SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, section 4.

²¹¹ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp17-18.

Handley responded to Gray's view in his September 2014 and April 2015 reports and his response is equally applicable to the June 2015 report by Gray (for Frontier). He disagrees with Gray's view, and considers reasonable our use of:²¹²

- the definition of theta from the Monkhouse framework, and
- the equity ownership approach to estimate theta.

In the remainder of this section we identify what we consider to be the key points of this debate, and their implications for our estimation of the value of imputation credits.

Gray's key point appears to be that:²¹³

[The relevant class of CAPM models] derive an equilibrium by solving a market clearing condition. This involves noting that:

- (a) All of the m investors must invest all of their wealth across the n assets and nothing else; and
- (b) All of the n assets must be owned entirely by the m investors and no one else.

This suggests that the only legitimate application of the CAPM is one which recognises all investors and assets in the world (that is, an international CAPM). However, CAPMs have been employed in contexts other than the international one. Handley suggested that the key consideration is whether assets and investors that are outside the model are relevant to the determination of the prices of assets inside the model:²¹⁴

[SFG's claim that a representative investor equilibrium does not apply in the AER's framework] – which appears to be SFG's major criticism of this approach – is not correct since it is based on SFG's incorrect assertion that the market clearing condition invoked in the CAPM class of equilibrium asset pricing models is based on an assumption that the m investors in the model invest all their wealth across the n assets in the model and nothing else.

But the CAPM makes no such assumption – it is SFG who does.

An implication of SFG's assertion is that one could validly use a “domestic” version of the CAPM say to price U.S. stocks only if you assume that investors in the U.S. stock market hold no other assets except U.S. stocks. Such an assumption would be clearly implausible.

An alternative and less extreme assumption which is implicit in the use of a “domestic” version of the CAPM is that any assets outside the model and any investors outside the model are not relevant for determining the prices of the assets

²¹² J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 22–23, 30–31 and 35; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 3–11.

²¹³ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 89.

²¹⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 10–11.

inside the model. This is equivalent to saying that the system is “closed” by definition – everything that matters is inside the model and anything outside the model does not matter – which means a standard market clearing condition can indeed be invoked and a valid equilibrium can be found. There is nothing in the Copeland and Rosenberg statements quoted in SFG (2015) which is inconsistent with this approach.

Therefore, it would seem that the criticisms of our use of the definition of theta from the Monkhouse framework, and our responses to those criticisms, might be summarised as follows:

- By not using all assets and investors in the world, we are breaching a fundamental condition required by CAPMs to derive an equilibrium value. However, CAPMs have been used in contexts other than the international one, and therefore we are not convinced that this criticism presents grounds to disregard these models.
- The following implicit assumption in our approach is unreasonable: that the foreign asset holdings of (both Australian and foreign) investors in Australian assets are not relevant to those investors' valuation of Australian assets. Gray's view is that the assumption is unreasonable.²¹⁵ Handley's view is, if the assumption is considered unreasonable, 'then one should bring the outside assets and outside investors into the model, for example, by using an international CAPM'.²¹⁶ However, neither Gray nor Handley suggested that we employ an international CAPM. Moreover, Handley clearly set out his view that our use of the definition of theta from the Monkhouse framework is reasonable.²¹⁷

In conclusion, we are not convinced that we should disregard the definition of theta from the Monkhouse framework when estimating the value of imputation credits.

A.8 Further issues relating to the utilisation rate

As discussed in section A.6, and in section 4.4.2 of attachment 4, we define the utilisation rate as the utilisation value to investors in the market per dollar of imputation credits distributed. As also discussed in section A.6, the utilisation rate is equal to the weighted average, by wealth and risk aversion, of the utilisation rates of individual investors. For an 'eligible' investor, each dollar of imputation credit received can be fully returned to the investor in the form of a reduction in tax payable or a refund. Therefore, we consider that eligible investors have a utilisation rate of 1 (on a before-personal-tax and before-personal-costs basis). Conversely, 'ineligible' investors cannot utilise imputation credits and have a utilisation rate of 0. It follows that the utilisation rate reflects the extent to which investors can utilise the imputation credits they receive to reduce their tax or get a refund.

²¹⁵ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, appendix 6; SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 103–105.

²¹⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, footnote 14.

²¹⁷ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 22–23, 30–31 and 35; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 3–11.

In this section we provide further support for our position on the utilisation rate. In particular, we:

- explain how our position is consistent with the basis of the building block framework
- contrast our position with that of the service providers, including with reference to factors they considered should be reflected in the utilisation rate, and
- respond to NERA's view.

A.8.1 Consistency with the building block framework

To be consistent with the building block framework, the utilisation rate should reflect the before-personal-tax and before-personal-costs value of imputation credits to investors. In a before-personal-tax and before-personal-costs framework, an investor that is eligible to fully utilise imputation credits should value each dollar of imputation credits received at one dollar (that is, have a utilisation rate of 1).

This consideration is supported by Handley's advice on the basis of the regulatory (building block) framework:²¹⁸

The post-tax basis of the regulatory framework can be more fully described as an after-company-before-personal-tax framework. In other words, cash flows and returns are to be measured after company taxes but before personal taxes. By definition, this means that allowed revenues should include compensation for corporate taxes incurred by the regulated firm but not for personal taxes incurred by the firm's shareholders. Similarly, allowed revenues should include compensation for prudent, efficient costs incurred by the regulated firm but not for costs (including personal transactions costs) incurred at the shareholder level. Note, this does not mean that personal taxes and costs are being ignored or assumed not to exist – rather there is no need to explicitly include them in the modelling framework.

Handley also referred specifically to the basis on which the utilisation rate should be estimated.²¹⁹

Since the objective is to estimate the after-company-before-personal-tax value of a distributed imputation credit and also to avoid compensating the regulated firm for transactions costs incurred at the shareholder level then the particular estimation methodology should allow for these factors – in other words, ideally we want the value of credits before administrative costs, personal taxes and diversification costs.

The service providers consider our interpretation of the utilisation rate conceptually incorrect and inconsistent with the requirements of the NER/NGR.²²⁰ Specifically, a number of service providers submitted:²²¹

²¹⁸ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 4–5.

²¹⁹ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

It is certainly true that theta must reflect the value of imputation credits to investors. However it is unusual for theta to be defined in a way that excludes the effect of certain factors that may impact on value (and which will be reflected in market value measures), such as personal costs.

We disagree. We consider that our approach is consistent with the NER/NGR. We have previously noted in the Guideline and in our prior decisions, and maintain in this final decision, that the Officer framework provides the basis for the rate of return framework in the NER/NGR.²²² This point has not been contested by the service providers or their consultants. If the Officer framework provides the basis for the rate of return framework in the NER/NGR, then it is reasonable—if not necessary—to estimate gamma in a manner consistent with Officer. Therefore, we have considered whether Officer's framework is intended to reflect factors such as personal taxes and personal costs when determining the rate of return. Handley's advice is that it is not. Gray (for both SFG and Frontier) disagrees, but as discussed in section A.7.3, Gray's interpretation is unconvincing to us.

Put another way, our approach to estimating the value of imputation credits recognises that this parameter does not exist in isolation. That is, the NER/NGR employ the building block framework to determine a revenue allowance that contributes to the achievement of the NEO/NGO. The building block framework employs the Officer framework to determine a rate of return that contributes to meeting the NEO/NGO, and gamma forms part of the Officer framework. We consider that proper regard to the NER/NGR's use of the Officer framework best promotes the objectives and requirements of the NER/NGR.

²²⁰ ActewAGL, *Revised Regulatory Proposal 2015-19*, January 2015, p. 485; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 1; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 1; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 1; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 1; JGN, *Gamma - response to the draft decision*, February 2015, p. 1; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 354; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 9; CitiPower, *Appendix J - Gamma*, April 2015, p. 241; Powercor, *Regulatory Proposal 2016-20*, April 2015, . p249; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 2; Energex, *Revised Regulatory Proposal*, July 2015, p. 13; Ergon Energy, *Submission on draft decision NSW & ACT DNSPs & Ors*, February 2015, p. 8. ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, p. 7.

²²¹ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 2; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 4; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 5; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 4; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 4; JGN, *Gamma - response to the draft decision*, February 2015, p. 6; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 360; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 9; CitiPower, *Appendix J - Gamma*, April 2015, p. 9; Powercor, *Appendix J - Gamma*, April 2015, . p9; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 9; Energex, *Submission on Energex's regulatory proposal 2015-20 and AER issues paper - attachment 2*, January 2015, p. 6. ; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, p. 7.

²²² See section A.5 of the draft decisions and: AER, *Better regulation: Explanatory Statement Rate of Return Guideline, Appendices*, December 2013, p.138.

Handley supports our approach and has explicitly stated that the AER's definition of theta does correspond to a "market value" on a before personal taxes and before personal costs basis:²²³

When used in everyday language, the meaning of the term "value" is generally well understood. However, in a cost of capital context, the term value is potentially ambiguous. Value can be used to refer to a value before taxes or a value after taxes. It can refer to a value before costs or a value after costs. The term "rate of return" (or discount rate) is similarly potentially ambiguous. A return can be measured or defined before taxes or after taxes. A return can also be measured or defined before costs or after costs.

This is why it is very important to be absolutely precise about how the key inputs of a WACC analysis – cash flow and discount rate – are defined and to ensure that they are defined on the same basis.

The AER definition of theta does indeed correspond to a market value (as in "worth to investors") interpretation of theta if value is taken here to mean the value of imputation credits before personal taxes and before personal costs. This interpretation is neither novel nor new. It comes directly from the seminal 1994 paper by Officer.

Finally, given the discussion above that indicates why we consider our definition of theta is an estimate of the value of imputation credits to investors in the market before personal taxes and personal transactions costs, we consider there is little in the service providers position that imputation credits should either be interpreted as the value of distributed credits, or the proportion of distributed credits likely to be redeemed by investors. Handley also states with respect to the alleged difference between the value of imputation credits and the redemption value:²²⁴

There is no either-or decision to be made here. The value of distributed credits and the proportion of credits redeemed are the same thing when one uses the proper definition of "value" in relation to theta (and gamma). Specifically, theta is the value of a dollar of distributed credits before personal taxes and before personal costs. In this case, the value of the credits and the proportion of the credits redeemed are one and the same thing. This is why Officer (1994) uses both descriptions interchangeably when referring to gamma in his seminal paper.

Handley also states:²²⁵

SFG (2015 para. 124-135) also suggests that the mathematical formulae in Officer (1994) support a value interpretation of gamma but not a redemption value

²²³ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, pp. 3-4.

²²⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 23.

²²⁵ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 7.

interpretation since: “It is clear in this formula [para.127] that gamma represents ... the extent to which imputation credits increase the market value of equity”. There is no dispute that the (market) value of credits are capitalised into stock prices – this is clear from equation (2) above. However, SFG fails to see that within Officer’s framework it is the before personal tax and before personal costs value of a credit – the redemption value – which is the item being capitalised.

A.8.2 Factors affecting investors' valuation of imputation credits

A number of service providers submitted that estimates of the utilisation rate from the equity ownership approach and tax statistics do not reflect a number of factors which affect investors' valuation of imputation credits.²²⁶ We addressed each of these factors in our prior decisions, and concluded that they are either immaterial or should not be accounted for when estimating the properly defined utilisation rate. Nothing in the service providers' revised or new proposals give us cause to change this conclusion.

The 45-day holding rule

To be eligible to utilise imputation credits, an otherwise-eligible investor must have held the shares that distributed the credits ‘at risk’ for at least 45 days (90 days for certain preference shares).²²⁷ However, this rule does not apply if the investor's total credit entitlement is below \$5,000.

A number of service providers stated:²²⁸

It has been estimated that the 45-day rule has about a 5-10% impact on the redemption rate.

The source of this estimate is a 2010 paper by Handley. The relevant passage from this paper is:²²⁹

Post 1 July 2000, [Handley and Maheswaran in their 2008 paper] assume full utilization of credits by resident individuals since excess credits were refundable from that time. It is of course likely that the actual utilization rate would be somewhat lower due to for example, “investor irrationality” and the impact of the 45 day rule but any difference is likely to be small. (The effect of the 45 day rule is that the franking credit

²²⁶ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 5; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, pp. 6–7; Directlink, *Directlink submission on gamma (updated)*, January 2015, pp. 8–9; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, pp. 6–7; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, pp. 6–7; and JGN, *Gamma - response to the draft decision*, February 2015, pp. 8–9.

²²⁷ See: <https://www.ato.gov.au/Individuals/Investing/In-detail/Investing-in-shares/You-and-your-shares-2013-14/?page=11>. Accessed 9 April 2015.

²²⁸ ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 14; Directlink, *Directlink submission on gamma*, May 2014, p. 15; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 14. Essential Energy, *Essential Energy's gamma proposal*, May 2014, p. 14; JGN, *Gamma proposal*, June 2014, p. 17; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 19.

²²⁹ J. Handley, *Further issues relating to the estimation of gamma*, October 2010, footnote 59.

is denied i.e. the credit is worthless unless certain conditions are satisfied. I am not aware of any data on the extent to which credits have been denied pursuant to this rule, but one would expect that it continues to have some operation each year. As a guide, in their table 4, [Handley and Maheswaran] report that the estimated credit utilization rate for resident individuals was 94% in 1998, 89% in 1999 and 90% in 2000. Since the rule was operating at this time and assuming the less than 100% utilization is fully attributable to the impact of the 45 day rule (which would not be the case since credits were not refundable at that time), then the rule would have had about a 5-10% impact on the utilisation rate.)

Thus, it seems the service providers' submission as to the impact of the 45-day holding rule misinterprets the source data upon which it relies, being Handley and Maheswaran's 2008 paper. It does not appear that Handley ever intended the 5 to 10 per cent figure to be considered a point estimate of the effect of the 45-day holding rule. Rather, we consider that it was presented as a 'guide' to the maximum theoretical effect of the rule's operation as indicated by the analysis conducted in Handley and Maheswaran. Our interpretation of Handley's intention is supported by the fact that in their paper Handley and Maheswaran consider the post-2000 utilisation rate to be 1. That is, we consider that if Handley and Maheswaran had available to them a reliable estimate of the effect of the 45-day holding rule, then they would have used it. As Handley stated in his 2010 paper, he 'is not aware of any data on the extent to which credits have been denied pursuant to this rule'.²³⁰ Handley maintained this view in his April 2015 report.²³¹

It also appears from the above quote that Handley and Maheswaran considered that, if anything, the 5 to 10 per cent estimate would be an overestimate of the impact of the 45 day rule. This is because they attribute the full underutilisation of credits in 1998, 1999 and 2000 to the 45 day rule. However, they also note that, in reality, part of this underutilisation would reflect that credits for eligible investors that did not have a tax liability were not refundable in those years (whereas they are now refundable for cash).

One source of evidence on the effect of the rule is Hathaway's analysis of ATO data. This analysis indicates the reported amounts of fully franked dividends received and imputation credits utilised by taxpayers. Taxpayers are required to report in their tax returns all franked dividends received, but only those imputation credits that they are eligible to utilise (bearing in mind the 45-day holding rule and other criteria).²³² We know that the amount of imputation credits attached to a dollar of fully franked dividends is \$0.43 ($\$1 \times 0.3 / (1 - 0.3)$).²³³ Accordingly, we can compare the amount of imputation credits utilised by taxpayers with the amount of imputation credits received by those taxpayers as implied by the amount of fully

²³⁰ J. Handley, *Further issues relating to the estimation of gamma*, October 2010, footnote 59.

²³¹ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 29.

²³² See: <https://www.ato.gov.au/Individuals/Tax-return/2014/Tax-return/Income-questions-1-12/11---Dividends/>. Accessed 9 April 2015.

²³³ Franked dividends must be paid out of after-tax profits. Accordingly, if the corporate tax rate is 30 per cent, then the pre-tax profit (X) that gives rise to \$1 dollar of fully franked dividends is given by the expression $X - 0.3X = \$1$ where $X = \$1.43$. Therefore, \$0.43 of tax is paid on (and \$0.43 of imputation credits can be attached to) each \$1 of fully franked dividends.

franked dividends received. If the 45-day holding rule is having a material effect, then we would expect to see that the amount of credits utilised is materially lower than the amount of credits implied to have been received. Table 4-6 shows the relevant data for the two major classes of investor eligible to utilise imputation credits: individuals and superannuation funds. It shows that the amount of credits utilised is effectively the same as the amount of credits that are implied to have been received.²³⁴ This suggests that the 45-day holding rule is not having a material effect.

Table 4-6 Imputation credits received and utilised, 2004–2011 – \$ billions

	Individuals	Superannuation funds
Fully franked dividends received	188.1	84.8
<i>Implied imputation credits received</i>	80.6	36.3
Imputation credits utilised	81.2	36.2

Source: N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013; AER analysis.

Based on these considerations, it seems that the 45-day holding rule does not appear to have a material effect on the utilisation rate. The analysis above was presented in our draft decisions released in 2014, but the service providers the subject of those proposals did not comment on it in their revised proposals. Instead, they submitted.²³⁵

The AER seeks to dismiss the impact of tax rules affecting eligibility of domestic investors to redeem imputation credits by saying that:

“...we do not consider that there is clear evidence as to effect that these rules have or should be expected to have.”

...[we do] not consider that there must be "clear evidence" as to the effect of particular tax rules in order for these to be taken into account. The fact is that these rules exist and that they will affect the eligibility of certain domestic investors to redeem imputation credits.

In any event, the fact that the redemption rate indicated by tax statistics is significantly below the domestic equity ownership rate does indicate that these tax rules (and possibly other factors as discussed below) are affecting domestic investors' ability to redeem imputation credits. As the AER observes, the redemption rate indicated by

²³⁴ The fact that credits implied to have been received by individuals is higher than credits utilised could reflect rounding or issues with the dividend data in the ATO statistics. Our residual concerns with the ATO statistics are discussed in section 4.4.2 of attachment 4.

²³⁵ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 4; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, pp. 5–6; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 7; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, pp. 5–6; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, pp. 5–6; and JGN, *Gamma - response to the draft decision*, February 2015, p. 7.

tax statistics is approximately 0.43, which is well below the domestic equity ownership rate for all equity.

We do not consider that this represents clear evidence as to the effect of the 45-day rule and other tax rules. Firstly, the service providers' approach does not contemplate error or inaccuracy in the tax statistics. In section 4.4.2, we set out data concerns that exist regarding the tax statistics. Further, the service providers in their initial proposals submitted that no weight be placed on estimates of the utilisation rate from tax statistics because of significant unresolved problems with the data.²³⁶ While it does now appear some service providers may consider tax statistics can be used to estimate an upper bound for theta,²³⁷ we do not consider the above analysis provides compelling evidence that the 45 day rule is having a material impact given residual concerns with the data.

Secondly, the service providers' conclusion is contradicted by the analysis of tax statistics we presented in our prior decisions and which we repeat above. While we acknowledge the limitations of the tax data used for this analysis, the service providers themselves have not demonstrated the rule is having a material impact, and we do not consider the rule would be expected to have a material impact.

In his June 2015 report for a number of service providers Gray assert that "[o]ne cannot assume that the effect of the 45-day rule is negligible in the absence of any data about it."²³⁸ The new report by Gray (for Frontier) does not change our view that the 45 day rule is unlikely to be having a material impact on the utilisation rate.

Transactions costs

Service providers submitted that the redemption of imputation credits may involve transactions costs, such as requirements to keep records and follow administrative processes.²³⁹ Service providers also submitted that these transactions costs may dissuade some investors from redeeming (utilising) imputation credits.

²³⁶ ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 15; Directlink, *Directlink submission on gamma*, May 2014, p. 16; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 15. Essential Energy, *Essential Energy's gamma proposal*, May 2014, pp. 15–16; JGN, *Gamma proposal*, June 2014, p. 19; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 21.

²³⁷ AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 374; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 24; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 4; CitiPower, *Appendix J - Gamma*, April 2015, p. 20; Powercor, *Appendix J - Gamma*, April 2015, p. 20; Energex, *Submission on Energex's regulatory proposal 2015-20 and AER issues paper - attachment 2*, January 2015, p. 18.

²³⁸ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 41.

²³⁹ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 5; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 6; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 8; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 6; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 6; and JGN, *Gamma - response to the draft decision*, February 2015, p. 8.

Firstly, we note that Handley advised that we specifically not take account of these costs:²⁴⁰

Since the objective is to estimate the after-company-before-personal-tax value of a distributed imputation credit and also to avoid compensating the regulated firm for transactions costs incurred at the shareholder level then the particular estimation methodology should allow for these factors – in other words, ideally we want the value of credits before administrative costs, personal taxes and diversification costs.

Secondly, we are not convinced that transactions costs are likely to dissuade a material number of investors from redeeming imputation credits. Our considerations on this are as follows:

- When filling out a tax return, one is *required* to report the franked dividends received and the imputation credits that are eligible to be utilised.²⁴¹
- Investors are already incurring the transactions costs associated with shareholding, and most would also be already incurring the transactions costs associated with completing a tax return. This applies particularly to professional organisations, such as charities and superannuation funds, which we expect would utilise all imputation credits as a matter of proper accounting. But we consider it true also of individual investors, particularly when innovations such as 'e-tax' and automatic pre-filing of tax returns would reduce any incremental costs if they exist.²⁴²

Thirdly, we consider that we are estimating the value of imputation credits consistently with the other WACC parameters on a post company tax basis before personal taxes and personal costs.

Based on these considerations, we consider that in estimating the utilisation rate adjustments should not be made for transactions costs. And even if an adjustment were to be made, it would likely have an immaterial effect on the utilisation rate.

Time value of money

Service providers submitted that the delay between the distribution of an imputation credit and the time at which it is redeemed may be expected to reduce an investor's valuation of the credit.²⁴³ In response, we note that:

²⁴⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

²⁴¹ See: <https://www.ato.gov.au/Individuals/Tax-return/2014/Tax-return/Income-questions-1-12/11---Dividends/>. Accessed 9 April 2015.

²⁴² Eligible investors that do not need to submit a tax return can have imputation credits refunded by submitting this form to the ATO: <https://www.ato.gov.au/uploadedFiles/Content/MEI/downloads/ind39831n40980614.pdf>. Accessed 9 April 2015. We consider that the form is quite straightforward, and therefore the cost of filling it out and submitting it is unlikely to outweigh the benefit of any material amount of imputation credits.

²⁴³ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 5; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 6; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 9; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 6; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 6; and JGN, *Gamma - response to the*

- We are unaware of any evidence that indicates the average size of this time delay across all investors.
- Even if there were a material time delay that should be accounted for when estimating the utilisation rate, we consider that the appropriate discount rate to apply to such delay would be a short-term risk free rate. This is because an imputation credit represents a promise from the Australian Government to reduce an investor's tax liability by the size of the credit or to refund the credit. Current interest rates on two year Commonwealth Government bonds suggest that the appropriate discount rate would be likely less than 2 per cent. Therefore, the magnitude of the adjustment would be quite small. Handley agreed with the immateriality of any required adjustment for time delay.²⁴⁴

Based on these considerations, we conclude that it is reasonable to not adjust any of our estimates of the utilisation rate for the time value of money where this effect is not already accounted for.

Portfolio effects

The service providers for which we released final decision in April and June 2015 submitted that, to the extent that an investor reduces the value of their overall portfolio simply to increase the extent to which they can redeem imputation credits, this lost value will be reflected in a lower valuation of the credits.²⁴⁵ Gray's report (for SFG) to the service providers on this topic referred to the 'cost of losing diversification'.²⁴⁶ However, as discussed in section A.8.1, Handley advised that our estimate of the utilisation rate should exclude 'diversification costs'. More specifically, we do not agree that portfolio effects would mean that a dollar of imputation credits in the hands of an eligible investor would be worth less than one dollar to that investor on a pre-personal-tax and pre-personal-costs basis. We made this point in our prior decisions and the service providers and their consultants have not commented on it. We consider that it is reasonable to not adjust any of our estimates of the utilisation rate for portfolio effects.

The 'illustrative impact' of these factors

Service providers submitted that, because of the factors set out above, our implied point estimates of the utilisation rate are 'well above any possible measure of the value of

draft decision, February 2015, p. 9; Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network, p. 9, July 2015;

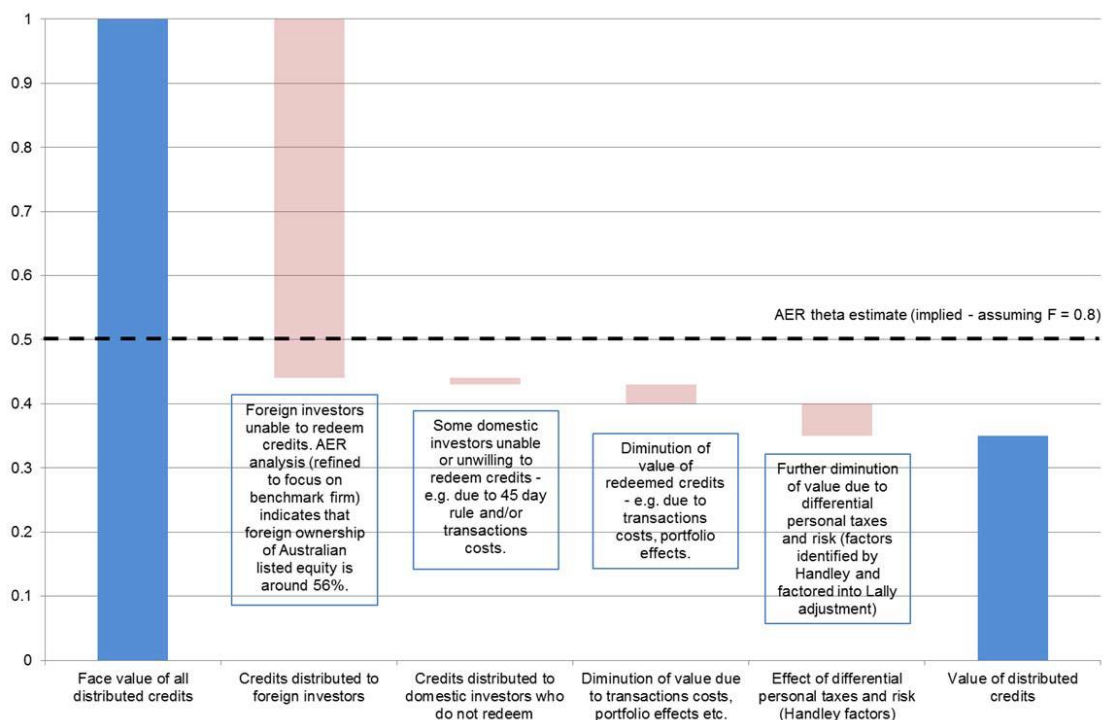
²⁴⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 46.

²⁴⁵ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 5; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 7; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 9; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 7; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 7; and JGN, *Gamma - response to the draft decision*, February 2015, p. 9.;

²⁴⁶ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 65(e).

distributed imputation credits'.²⁴⁷ In support of this, a number of service providers presented Figure 4-1 and Figure 4-2.

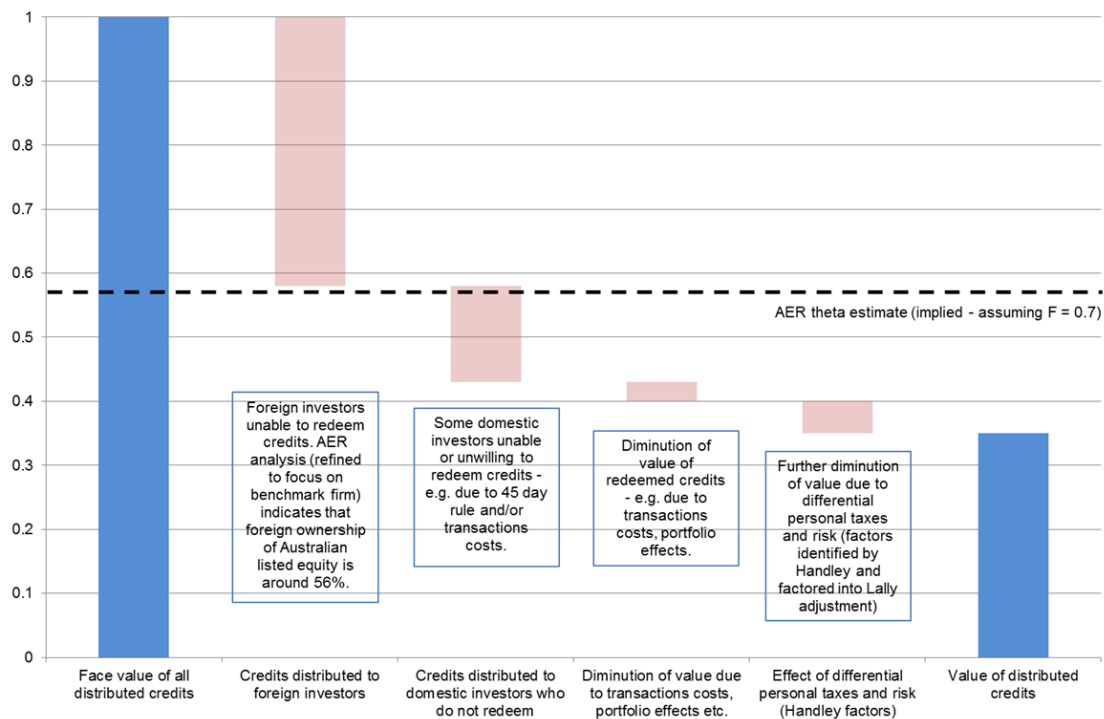
Figure 4-1 Illustrative impact on value of imputation credits – listed equity



Source: Service providers' revised proposals.

²⁴⁷ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 14; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 15; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 20; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 15; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 15; and JGN, *Gamma - response to the draft decision*, February 2015, p. 18.

Figure 4-2 Illustrative impact on value of imputation credits – all equity



Source: Service providers' revised proposals.

As already discussed, there is disagreement between the service providers and us on whether the utilisation rate (and therefore the value of imputation credits) should be estimated on a basis that is 'before' or 'after' the taxes and costs incurred by investors. The service providers consider that the value of imputation credits should be estimated 'after' these factors. Given that these factors can only result in the diminution of the value of credits, it follows that the service providers' preferred estimate of the value of imputation credits will be no higher than that estimated on a before-personal-tax and before-personal-costs basis.

This notwithstanding, we consider that there are a number of problems with Figure 4-1 and Figure 4-2. Moreover, the figures suggest that the value of distributed credits on which the service providers rely is likely understated relative to the (after-personal-tax and after-personal-costs) value to investors in all equity.

The relevant equity ownership share

The key difference between the figures is that in Figure 4-1 the SFG estimate of the value of distributed credits is ultimately compared to the refined share of foreign ownership of listed equity, and in Figure 4-2 the comparison is made with the refined share of foreign ownership in all equity. However, Gray (for SFG) indicated that if the value of distributed credits is estimated via a 'market value approach' (such as SFG's dividend drop off study), then the

estimate will represent 'an average across all listed firms'.²⁴⁸ Accordingly, the relevant foreign ownership share is that of listed equity, and it would be internally inconsistent to compare the SFG estimate of the value of distributed credits with the foreign ownership share of all equity (as the service providers have done in Figure 4-2).

It also seems that the SFG estimate of the value of distributed credits reflects the average value over the sample period of the data used by SFG: July 2001 to October 2012. If so, this estimate should be compared with the average, refined foreign ownership share of listed equity over a similar period (June 2001 to December 2012). This is equal to 0.51.

Implications for the value of distributed credits across investors in all equity

Although we have above identified the inconsistency in comparing SFG's dividend drop off estimate of the value of distributed credits to the foreign ownership share of all equity, Figure 4-1 and Figure 4-2 appear to be intended to indicate that the presence of foreign investors is a relevant source of the diminution of the market-wide value of distributed credits. This suggests that, all else held equal, an implied market value study conducted over all equity might produce a higher estimate of the value of distributed credits. This would be because the foreign ownership share of all equity is lower.

Using the relevant estimate of the foreign equity ownership share discussed above, the logic of Figure 4-1 and Figure 4-2 indicates that SFG's estimate of the value of distributed credits (0.35) represents the diminution of the face value of distributed credits by 51 per cent due to the presence of foreign investors and by $(1 - 0.35 - 0.51 =)$ 14 per cent due to other factors (including differential personal taxes and risk). If the combined diminution due to these other factors is the same for investors in all equity, then the logic of the figures indicates that the value of distributed credits across investors in all equity might be $(1 - 0.14 - 0.39 =)$ 0.47.²⁴⁹

Comparison to the redemption rate from tax statistics

The figures suggest that the difference between the foreign ownership share and the redemption rate from tax statistics is an estimate of the credits distributed to domestic investors who do not redeem them. The figures suggest that this might be because of the 45-day holding rule and/or transactions costs. We consider that there are a number of problems with this estimate.

Firstly, the redemption rate from tax statistics reflects all equity, and therefore it is inconsistent to compare it to the foreign ownership share of listed equity.

Secondly, this estimate does not contemplate error or inaccuracy in the tax statistics. In section 4.4.2, we set out the data concerns that exist regarding the tax statistics. The service providers that we released draft decisions for in 2014 submitted in their initial proposals that no weight be placed on estimates of the utilisation rate from tax statistics because of

²⁴⁸ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 216.

²⁴⁹ The refined foreign ownership share of all equity between June 2001 and December 2012 was 0.39 on average.

significant unresolved problems with the data.²⁵⁰ NERA has subsequently submitted that tax statistics can be used to estimate a value for theta consistent with a 70% distribution rate, and can also be used to estimate an upper bound value for gamma.²⁵¹ Gray (for Frontier) appears to support this.²⁵² However, given the issues with the tax data and Hathaway's caveated comments regarding the data where he says "[t]he conclusion is that I accept the tax payments and FAB data as given post-2003, and assume that the problem is more likely to have arisen within the franked dividend payments data"²⁵³, we remain of the view we should treat estimates of theta based on tax data with caution. Hathaway's draft 2014 report gives us no cause to change our view.²⁵⁴

Thirdly, we are not convinced that the 45-day holding rule and transaction costs are contributing to a material amount of credits not being redeemed. As discussed above, this is because:

- Our analysis of the 45-day rule suggests that it is not having a material effect. Although we acknowledge this analysis is subject to any data quality issues with the tax statistics.
- We do not consider that transactions costs are likely to dissuade a material number of investors from redeeming imputation credits.

In response to the service providers,²⁵⁵ we do not consider there is any inconsistency between Handley's earlier work and subsequent work indicating taxation statistics can be used as a point estimate of theta. Handley has clearly explained why tax statistics can be used as a point estimate for theta, a position we agree with.²⁵⁶ While we acknowledge that the ultimate source of the value for imputation credits is from redemption, this does not prevent an estimate of the redemption value from taxation statistics being a point estimate - we note, given the uncertainty with estimates based on the tax data, the true (unobservable) redemption value could be above or below the estimate.

A.8.3 NERA's comments on the utilisation rate

NERA submitted that theta is the value that a representative investor places on a dollar of distributed imputation credits.²⁵⁷ NERA also presented a simple derivation of theta. The

²⁵⁰ ActewAGL, *Gamma, detailed proposal*, May 2014, s. 1.4.3; Ausgrid, *Ausgrid's gamma proposal*, May 2014, p. 15; Directlink, *Directlink submission on gamma*, May 2014, p. 16; Endeavour Energy, *Endeavour Energy's gamma proposal*, May 2014, p. 15. Essential Energy, *Essential Energy's gamma proposal*, May 2014, pp. 15–16; JGN, *Gamma proposal*, June 2014, p. 19; and TransGrid, *TransGrid's approach to gamma*, May 2014, p. 21.

²⁵¹ NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, pp. 25-28.

²⁵² Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 6-7.

²⁵³ Neville Hathaway, *Imputation Credit Redemption ATO data 1988-2011 Where have all the credits gone?*, September 2013, p. 25.

²⁵⁴ Neville Hathaway, *Franking Credit Redemption ATO data 1988-2012 Where have all the credits gone? Draft only comments welcome*, October 2014.

²⁵⁵ SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, p. 373; Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network, p. 10, July 2015;

²⁵⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 39.; J. Handley, *Further Advice on the value of imputation credits*, 16 April 2015, p. 28.

²⁵⁷ NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, p. ii.

simple model employed by NERA consisted of, among other things: a set of domestic and foreign investors; a domestic asset that distributes imputation credits; and a foreign asset that does not distribute imputation credits. NERA showed that in this model:

$$\theta = \frac{D}{D + F}$$

where D is the wealth of domestic investors and F is the wealth of foreign investors.²⁵⁸ NERA also showed that the redemption rate of imputation credits does not equal theta in this model, and is instead given by the ratio of domestic holdings of the domestic asset to the sum of domestic and foreign holdings of the asset. NERA concluded:²⁵⁹

In a small open economy – like Australia – the proportion of credits created that are redeemed is likely to exceed by a substantial margin the value of a dollar of tax credits created to a representative shareholder.

That is, if domestic investors make up only a small proportion of all investors, then theta will be small. However, this conclusion appears to rely on determining theta in an international CAPM context—domestic and foreign investors can invest in both domestic and foreign assets. By contrast, we determine the value of imputation credits (and other rate of return parameters) using a domestic CAPM. In the domestic CAPM context, domestic investors that are eligible to redeem credits make up a significant proportion of all investors that invest in domestic assets. Further, the scope for a material 'wedge' to arise between the redemption rate and theta in the domestic CAPM context is not clear from NERA's analysis because it only considers the international CAPM context.

Our view is supported by Handley's review of NERA's submission. Handley concluded:²⁶⁰

The problem with the NERA model is that it is an international asset pricing model – along the lines of the Black (1974) International CAPM – whereas the current framework is based within a domestic market setting. This means that domestic investors have only a small market weighting by definition. Clearly, the value of imputation credits in an international asset pricing model will be substantially different from the value of imputation credits in a domestic asset pricing model.

...

In my opinion, NERA's analysis does not establish the presence of a wedge between theta and the redemption rate and so does not invalidate the use of tax statistics to estimate theta.

NERA responded to the AER position in the JGN decision in its June 2015 report.²⁶¹ In this report NERA put forward several propositions:

²⁵⁸ Strictly, D is the number of domestic investors and F is the number of foreign investors. However, NERA's model assumes that each investor has starting period wealth of \$1.

²⁵⁹ NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, p. ii.

²⁶⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, pp. 6 and 7.

- It would be expected that the proportions of credits that are redeemed would significantly exceed the value of a dollar of credits to a representative shareholder in a small open economy like Australia.
- The AER's use of a domestic Australian CAPM does not justify any presumption that theta take a non-negligible value
- The estimated cost of capital from a domestic CAPM will equal the cost of capital from an international CAPM under certain assumptions.

In response, we note that we consider our approach is consistent with our definition of the Australian domestic market in the presence of foreign investors.

While NERA does show a model consistent with the redemption of credits exceeding the value for theta, you may only get theta falling significantly below the redemption rate under specific assumptions.²⁶² We also note that NERA's model is an international asset pricing model.²⁶³ This model is inconsistent with our definition of the domestic market. We also consider the use of the international CAPM, with a high proportion of wealth held by foreign investors (NERA using 98% in its primary example) is prima facie inconsistent with the way in which the service providers estimate the return on equity using an Australian Domestic CAPM. Handley shows that NERA's claimed "wedge" between the redemption rate and theta can be either small, if input assumptions are made consistent with our definition of the market (domestic in the presence of foreign investors), or zero or even negative depending on your assumption about a number of largely unobservable factors.²⁶⁴ NERA response to one of Handley's examples that shows the wedge may be small makes clear they are using an International CAPM to argue Handley's response is invalid stating:²⁶⁵

"The assumption that Australian aggregated wealth makes up 60 percent of the world wealth is also very clearly at odds with the evidence and so we conclude that Handley's second example is similarly of no practical relevance."

We consider this response by NERA of limited relevance given our definition of the relevant market is a domestic market in the presence of foreign investors, a market which we have used to estimate both the return on equity and the value for imputation credits. Handley's example is appropriate given this definition.

While NERA responded to the position that theta could exceed the redemption rate arguing the market will not clear, irrespective of this we consider the wedge is not clearly material

²⁶¹ NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015.

²⁶² NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp. 6-7.

²⁶³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, p. 6.

²⁶⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, pp. 6-7.

²⁶⁵ NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p. 7.

under our definition of the market and as Handley notes, the current framework is based within a domestic market setting.²⁶⁶ NERA's comment in a separate report that it does not recommend the use of an International CAPM does not resolve this inconsistency issue.²⁶⁷

In addition, while NERA has effectively put forward the position that the use of a domestic CAPM to set the return on equity and the use of an international CAPM to determine theta are not inconsistent because both models may generate the same return on equity estimate under certain assumptions, we consider NERA's position is not adequately supported. An International CAPM may give a materially different required return on equity estimate. This may be lower or higher depending on whether local (domestic) systematic risk can be diversified away in the global market, or if specific risk in the domestic market contains global systematic risk.²⁶⁸ While NERA appear to have made a number of assumptions to show both a domestic version of the SLCAPM and international version of the SLCAPM can hold simultaneously²⁶⁹, these are assumptions that can only be tested empirically. An academic article by Koedijk, Mathijis and van Dijk explains the underlying premise of such a test stating.²⁷⁰

The testing methodology boils down to assessing whether the exposure of an individual company to the global risk factors is effectively captured in the international pricing of the domestic market index. If not, a significant pricing error will exist, which implies that global factors do have a substantial impact on the cost of capital. In effect, the domestic CAPM will underestimate the cost of equity capital of a company if the specific risk according to the domestic CAPM contains additional systematic risk related to the priced global factors. The domestic CAPM will lead to an overestimation of the cost of capital if part of the systematic risk indicated by the CAPM can be diversified away in the global market.

NERA appear to agree this is an empirical question as it states earlier in its report "[w]hether equity markets are integrated or segmented is an empirical issue."²⁷¹

We also note that some work by Associate Professor Lally at the time of the development of the Rate of return guideline indicated that the required return on equity for Australian firms could be materially lower under full integration.²⁷²

²⁶⁶ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, p. 6.

²⁶⁷ NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, p. 79.

²⁶⁸ Koedijk, K.G., and van Dijk, M, A., 2004, Global risk factors and the cost of capital, *Financial analysts journal*, March/April 2004, p. 33.

²⁶⁹ NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp. 8-10.

²⁷⁰ Koedijk, K.G., and van Dijk, M, A., 2004, Global risk factors and the cost of capital, *Financial analysts journal*, March/April 2004, p. 33.

²⁷¹ NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p. 3.

²⁷² Lally, *The estimation of gamma*, November 2013, pp. 39-43.

A.9 Estimation approach considerations

Our approach to determining the value of imputation credits involves two considerations that were not proposed in the Guideline. We discuss each below.

A.9.1 Evidence from all equity or only listed equity

When determining the value of imputation credits, we have regard to evidence from all companies and their investors (all equity) and just listed companies and their investors (only listed equity). There is no consensus on which should be the preferred approach.

We have had regard to experts' comments on the issue. Lally made some comments in support of considering all equity.²⁷³

The more important point here is whether unlisted equity should be included, in principle. Arguably, the fact that only listed equity is used to estimate the MRP and beta suggests that the same limitation be applied to the present issue. However, the limitation is only imposed for the MRP and beta because data from unlisted firms is entirely inadequate for estimating returns. Furthermore, MRP estimates are generally based on a subset of listed equity (such as the ASX200), the subsets used may vary and are sometimes never specified (in surveys), and betas are typically estimated from foreign returns data. All of these results could reasonably be viewed as proxies for the results that would arise from using Australian data on all equities. In addition, treating the CAPM as a model that applies to only listed equities would rule out using it to estimate the cost of equity for an unlisted company (and some regulated businesses are unlisted). Thus, in principle, I favour inclusion of unlisted equity for estimating the proportion of Australian equities held locally.

However, Handley suggested that evidence from listed equity is more relevant.²⁷⁴

Specifically, the NERA estimate [of the distribution rate] is based on aggregate [franking account balance] data for all companies – including public companies and private companies. In contrast, one can reasonably argue that the estimate should be based on public companies only since this is more likely to reflect the composition of the Australian domestic market for equity funds – private companies by definition are financed in entirely different ways – and so be a more relevant proxy for a benchmark efficient entity.

Gray's view (for SFG) is not clear to us. In his May 2014 report, Gray stated:²⁷⁵

The 45% foreign ownership figure in Figure 9 above is based on listed equity. In our view, this is the appropriate calculation given that all other WACC parameters are

²⁷³ M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 34.

²⁷⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 28.

²⁷⁵ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 412.

estimated with reference to exchange-listed businesses because they are more reflective of the efficient benchmark entity.

And in his February 2015 report (for SFG) Gray stated:²⁷⁶

There is also a question about whether data should be restricted to listed firms or whether it should be expanded to include private firms as well. Since the benchmark efficient entity is not necessarily listed, this would imply that private firms are also relevant.

A number of the service providers indicated clearly in their initial or revised proposals, or in a submission on their proposal, their view that the value of imputation credits should be estimated with regard to evidence from all equity.²⁷⁷

Gamma is conventionally estimated as a market-wide parameter and therefore there is no reason to measure the distribution rate based on data for listed equity only, in circumstances where data is available for both listed and unlisted firms.

Despite this view, the service providers propose to rely on the 'best estimate' of the utilisation rate from implied market value studies, which by definition relate to only listed equity.²⁷⁸ The service providers do not acknowledge the inconsistency (outlined in our prior decisions and repeated below) that arises from combining an estimate of the utilisation rate from only listed equity with an estimate of the distribution rate from all equity. The service providers also do not recognise that the evidence they have presented on their preferred estimate of the utilisation rate implies that it likely understates the value of distributed credits to investors across all equity (see our discussion in section A.8.2).

A.9.2 Relationship between the distribution rate and the utilisation rate

In developing the Guideline, we did not recognise the relationship between definitions and estimates of the distribution rate and the utilisation rate. This relationship is that a given estimate of the distribution rate represents the proportion of credits distributed by a given set of companies to the set of investors in those companies. For consistency in estimating the

²⁷⁶ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 222.

²⁷⁷ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 1; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 3; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 3; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 3; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 3; and JGN, *Gamma - response to the draft decision*, February 2015, p. 4; CitiPower, *Appendix J - Gamma*, April 2015, p. 6; Powercor, *Regulatory Proposal 2016-20*, April 2015, p. 6; Energex, *Submission on Energex's regulatory proposal 2015-20 and the AER issues paper*, January 2015, p. 4.

²⁷⁸ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 13; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 14; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 19; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 14; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 14; and JGN, *Gamma - response to the draft decision*, February 2015, p. 17; CitiPower, *Appendix J - Gamma*, April 2015, pp. 4-5; Powercor, *Regulatory Proposal 2016-20*, April 2015, pp. 4-5; Energex, *Revised regulatory proposal 2015-20*, July 2015, p. 13.

value of imputation credits, it follows that a corresponding estimate of the utilisation rate should reflect the utilisation of that same set of investors.

We consider that this relationship should be recognised when determining estimates of the value of imputation credits. We therefore consider that estimates of the utilisation rate determined with regard to investors in only listed equity should be paired with estimates of the distribution rate that are also determined with regard to only listed equity. Similarly, estimates of the utilisation rate determined with regard to all equity should be paired with estimates of the distribution rate that are also determined with regard to all equity.

Both Stephen Gray (for Frontier) and NERA submitted that there is no inconsistency with pairing the distribution rate for all equity with a theta value for listed equity as the distribution rate is firm specific within the Officer model.²⁷⁹ As a result they appear to consider we should use either the distribution rate from the broadest market (all equity) in combination with a theta estimate from listed equity,²⁸⁰ or alternatively we should use of a distribution rate estimated from listed equity excluding the 20 largest firms in the market, both of which yield an estimated distribution rate of around 70%. They effectively consider the use of the 20 largest listed firms to estimate the distribution rate from listed equity data alone will overestimate the distribution rate for the benchmark efficient entity as we assume this entity is not a large listed entity.²⁸¹

Handley considered this issues and supported our decision in JGN to not remove the largest listed equity firms from the estimation of the distribution rate on the basis foreign sourced income allows them to distribute a higher proportion of imputation credits.²⁸²

Having considered the new experts reports submitted since we released our JGN decision we remain of the view that the use of an estimated distribution rate from all listed equity (without excluding any firms) is appropriately paired with a theta value from all listed equity. This is discussed further below at A.10.1.

A.10 Estimating the distribution rate

We consider that the distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors. We set out our position on the distribution rate in section 4.4.1 of attachment 4. Consistent with the Guideline, we estimate it using the 'cumulative payout ratio approach', which uses data from the ATO on the

²⁷⁹ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 26-27; NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p. iii.

²⁸⁰ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 28-30; NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp.17-18.

²⁸¹ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp 28-30; NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, pp. 17-19.

²⁸² J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 21.

accounts used by companies to track their stocks of imputation credits ('franking account balances'). Using this approach, NERA estimated a distribution rate across all equity of 0.7 for the period 1987 to 2011.²⁸³ Hathaway found a similar estimate for the period 2004 to 2011.²⁸⁴ Also using this approach, Handley estimated a distribution rate across only listed equity of 0.8 for the period 1987 to 2011.²⁸⁵ Our own analysis indicated that the distribution rate over only listed equity is 0.8 for the period 2004 to 2011—we calculated the aggregate net tax paid by public companies over this period to be \$255.6 billion and the change in aggregate franking account balances of those companies over the same period to be \$50.2 billion (suggesting that \$205.4 billion, or 80 per cent, of imputation credits generated were distributed).

We relied on an estimate of the distribution rate over all equity of 0.7 in the Guideline and decisions released in 2014 and April 2015 and June 2015. We also relied on an estimate of the distribution rate over only listed equity of 0.8 in the decision released in 2014 and April 2015. We reviewed these estimates in light of an updated analysis of the ATO data to the 2012 tax year by NERA, which was submitted to us as part of JGN's decision process.²⁸⁶ Handley also reviewed NERA's analysis, and provided his own report.²⁸⁷ We consider that these reports indicate that 0.7 remains a reasonable estimate of the distribution rate over all equity. For instance, both NERA and Handley found an estimate of 0.7 for the period 2004 to 2012.²⁸⁸ However, both NERA and Handley found that the distribution rate over only listed equity has fallen slightly from 0.8. Specifically, Handley found an estimate of 0.77 over the period 2004 to 2012. We used this updated estimate for the JGN final decision released in June 2015 and continue to use this estimate in this final decision.

In the remainder of this section we respond to the service providers' and Gray's comments on the distribution rate; describe the cumulative payout ratio approach and alternative approaches to estimating the distribution rate; and discuss an updated report on tax statistics from Hathaway.

A.10.1 Service providers', Gray's and NERA's comments on the distribution rate

The service providers and Gray (for SFG) submitted that it would be inappropriate to apply a distribution rate based on evidence from only listed equity. We disagree and set out our reasons below.

²⁸³ NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013.

²⁸⁴ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013.

²⁸⁵ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 28–29.

²⁸⁶ NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015.

²⁸⁷ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015.

²⁸⁸ As discussed in section A.13, we have regard to Hathaway's finding that the ATO statistics are subject to a number of issues prior to 2004.

There appears to be agreement between the service providers, Gray and us that the distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors. There also appears to be agreement between the service providers and us that the distribution rate should be estimated on a market-wide basis; for instance, a number of service providers submitted.²⁸⁹

Gamma is conventionally estimated as a market-wide parameter and therefore there is no reason to measure the distribution rate based on data for listed equity only, in circumstances where data is available for both listed and unlisted firms.

As set out in the decisions previously released in 2014 and 2015, and in section A.9.2 of this final decision, we consider that there are good reasons—on internal consistency grounds—for using in certain circumstances an estimate of the distribution rate based on only listed equity.

Gray's report (for SFG) appears to support an estimate of the distribution rate that is not affected by the distribution behaviour of very large public firms or very small private firms. That is, Gray (for SFG) stated:

Conceptually, the task is...to estimate the distribution rate for the benchmark efficient firm.²⁹⁰

...

For the same reason that very large multinational firms are not comparable to the benchmark efficient entity, very small private firms would also not be close comparators.²⁹¹

In particular, Gray submitted that the distribution behaviour of large multinational firms seemed unrepresentative of the benchmark efficient entity on account of their foreign-sourced income.²⁹² Gray concluded that the 'best estimate' of the distribution rate from analysis which considered only listed equity was not materially different from 0.7.²⁹³ Handley considered Gray's analysis to be 'incomplete and oversimplified to support such a strong conclusion'.²⁹⁴ We consider Handley's analysis remains applicable to Gray's new work (for Frontier) (as discussed above in section A 9.2 and also further below).

²⁸⁹ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 1; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 3; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 3; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 3; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 3; and JGN, *Gamma - response to the draft decision*, February 2015, p. 4; CitiPower, *Appendix J - Gamma*, April 2015, p. 6; Powercor, *Regulatory Proposal 2016-20*, April 2015, p. 6; Energex, *Submission on Energex's regulatory proposal 2015-20 and the AER issues paper*, January 2015, p. 4.

²⁹⁰ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 211.

²⁹¹ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 222.

²⁹² SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, paras. 215 and 217–218.

²⁹³ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 223.

²⁹⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 21.

Regarding internal consistency when combining estimates of the distribution and utilisation rates, Gray (for SFG) submitted:²⁹⁵

Since all credits from all companies are identical, it must be the case that, in equilibrium, the credits have the same value throughout the economy. Consequently, it is generally accepted that theta is a market-wide parameter – with a single value that would apply to all firms.

That is, if the only value of theta is the market-wide value, then it is internally consistent to combine it with any estimate of the distribution rate. NERA agreed.²⁹⁶

As theta should not vary from firm to firm, however, there should be no link between how one estimates theta and how one estimates the distribution rate.

Gray (for Frontier) considered this matter again in his June 2015 report (for Frontier) and stated.²⁹⁷

In my view, when estimating the distribution rate there are two reasons to be concerned about the weight that is afforded to the top 20 listed firms:

- a. The AER has specifically stated that the benchmark efficient entity should not be assumed to be a large listed company, as set out above; and
- b. The top 20 listed firms differ from the benchmark entity in that their foreign sourced profits enable a higher distribution rate.

NERA appears to agree with SFG that you should not consider the largest listed companies and it considers "it is difficult to see there is a case for setting the distribution rate to be any different to the value ... of 0.7".²⁹⁸

In the proposals lodged in 2015 the service providers have submitted that the appropriate distribution rate for both listed and all equity is 70% consistent with the advice from Gray and NERA.²⁹⁹ :

However, NERA's views and Gray's views (for SFG and Frontier) must be reconciled with the fact that different investors can value imputation credits differently. For instance, foreign

²⁹⁵ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 209.

²⁹⁶ NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015, p. ii.

²⁹⁷ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 28.

²⁹⁸ NERA, *Estimating distribution and redemption rates: Response to the AER's final decisions for the NSW and ACT electricity distributors, and for Jemena Gas Networks*, June 2015, p.18.

²⁹⁹ AusNet Services, *2016-20 Regulatory Proposal*, April 2015, pp. 353-354; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, pp. 1-4.; CitiPower, *Appendix J - Gamma*, April 2015, pp. 4-7.; Powercor, *Appendix J - Gamma*, April 2015, pp. 4-7; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, pp. 6-8; SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, p. 378; Energex, *Revised Regulatory Proposal*, July 2015, pp. 124-125; Ergon, *Revised Regulatory Proposal*, July 2015, p. 153; ActewAGL *Distribution, Attachment 8 Detailed gamma proposal*, June 2015, pp. 4-6; Australian Gas Networks, *Access Arrangement Information - Attachment 11.2 Value of Imputation Credits*, July 2015; pp. 3-6; Amadeus Gas Pipeline, *Access Arrangement Revision Proposal Submission*, August 2015, p. 153.

investors do not value credits and eligible domestic investors do. Therefore, a given estimate of theta will reflect the set of investors over which it is calculated. Gray (for SFG) appears to recognise this elsewhere in his report:³⁰⁰

If theta is estimated using a market value approach, the estimate will represent an average across all listed firms.

This is further illustrated in Figure 4-1 and Figure 4-2 submitted by a number of service providers, which indicate that SFG's dividend drop off estimate of theta reflects the proportion of foreign investors in listed equity.

To clarify, in theory there may be a single economy-wide theta. However, the practical reality is that a given estimate of theta will reflect the set of investors in the evidence used. Accordingly, for internal consistency and from a practical perspective, we consider that the distribution rate we use in combination with that estimate of theta represent the distribution of credits to that same set of investors (or at least a similarly reflective set). The service providers, NERA and Gray (for SFG and Frontier) give us no cause to change this view. Handley also supported our view.³⁰¹

It is correct to say that theta is not firm-specific and the distribution rate is firm-specific. But I do not agree with the suggestion that there need be no link between how one estimates theta and how one estimates the distribution rate.

We are interested in estimating the value of imputation credits to the market as a whole. In setting prices, investors in the market will take into account the quantity of credits expected to be distributed by all firms in the market. Since gamma is effectively defined as a price (theta) times a quantity (distribution rate) then in my opinion, it is obvious that both components should be based on consistent data sets which relate to the same market.

We also note that even if we were minded to do so, there is not necessarily a correct way to filter listed equity data to make it more reflective of the benchmark efficient entity (as the benchmark entity has a number of characteristics). While Gray (for SFG and Frontier) and NERA have proposed filtering based on a single characteristic (excluding the 20 largest listed firms) in a way that leads to a lower estimated distribution rate (and therefore a lower estimated value of imputation credits), they have not demonstrated their filtering method will lead to a better estimate of the distribution rate for the benchmark efficient entity.

Handley indicated that Gray's analysis was 'incomplete and oversimplified' to support the restriction proposed, and we consider that Gray's June 2015 report (for Frontier) and NERA's June 2015 report add nothing material to the discussion.

We also note that if we estimated a distribution rate strictly in accordance with our benchmark definition we would end up with only the firms that we regulate, or an observable

³⁰⁰ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 216.

³⁰¹ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the NERA report 'Estimating distribution and redemption rates from taxation statistics'*, 20 May 2015, pp. 7–8.

set of similar firms, yet the service providers have not suggested an industry benchmark distribution rate. We also do not propose an industry benchmark for the reasons set out in the Guideline.³⁰² However, we note the EMRF submitted that our assumed distribution rates are lower (and, therefore more favourable to service providers) than those relevant to a pure play energy network.³⁰³

Further, we are not convinced that we should use only a subset of public companies when we seek to apply a distribution rate that is internally consistent with a value for theta estimated over investors in only listed equity.

A.10.2 The cumulative payout ratio approach

The cumulative payout ratio approach is applied as follows. It starts with the change in the total value of imputation credits in firms' franking account balances over a particular period of time. This reflects the cumulative additions and subtractions of imputation credits over that particular period of time. Then, subtracting this from total company tax paid over the same period of time produces an estimate of the imputation credits that have been distributed in total. This relies on the idea that every dollar of company tax paid generates an imputation credit, which can either be distributed or retained in franking account balances. Then, dividing this estimate by the value of company tax paid over the same time period produces an estimate of the distribution rate over this time.

A limitation of this approach is that factors other than the distribution of imputation credits can lead to a decrease in aggregate franking account balances.³⁰⁴ However, we are unaware of the materiality of these factors. Moreover, as discussed in the next section:

- Hathaway and NERA each preferred this approach to an approach involving data on franked dividends, and
- an estimate of the distribution rate across only listed equity using this approach is broadly reinforced by evidence from the financial statements of the largest listed companies.

A.10.3 Alternative approaches

There are at least two alternative approaches to estimating the distribution rate:

- Hathaway and NERA each estimated a distribution rate of around 0.5 using ATO statistics on the franked dividends distributed by companies as reported in their tax returns.³⁰⁵ However, neither advocated the use of this estimate. NERA considered.³⁰⁶

³⁰² AER, *Better regulation: Explanatory Statement Rate of Return Guideline*, December 2013, pp. 163–164.

³⁰³ EMRF, *NSW Electricity Distribution Revenue Reset, AER Draft Decision and revised proposals from Ausgrid, Endeavour Energy and Essential Energy, A response*, February 2015, pp. 31–32.

³⁰⁴ The ATO website contains a list of events that cause a debit to a company's franking account balance: https://www.ato.gov.au/Business/Imputation/In-detail/Simplified-imputation---the-franking-account/?page=5#When_does_a_frinking_debit_arise_. Accessed 9 April 2015. NERA identified that the bankruptcy of a company and the failure of a company to report its franking account balance can also cause the aggregate franking account balance to decrease: NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013, p. 5.

In our opinion, the cumulative payout ratio is the most reliable estimate that is least likely to be affected by potential distortions in the underlying data set.

And Hathaway considered:³⁰⁷

As was explained in section 3, I have more faith in the [franking account balance] data than in the dividend data. The dividend data appears to be missing about \$87.5 billion and the ATO has had substantial problems with the dividend data in the past.

Lally examined the financial statements of the 20 largest ASX-listed firms by market capitalisation, and found an aggregate distribution rate across these firms of 0.84.³⁰⁸ We consider that this broadly reinforces the higher cumulative payout ratio estimate across only listed equity.

A.10.4 Hathaway (2014)

After the publication of the draft decisions in 2014, and deep into the process of preparing the final decision for JGN, we became aware of an updated analysis of the tax statistics by Hathaway dated October 2014.³⁰⁹ This report updates the analysis to include tax data for the 2011-12 financial year, which were published by the ATO during 2014. Hathaway (2014) remains in draft form. Importantly, Hathaway (2014) appears to come to the opposite conclusion of his 2013 analysis regarding the FAB data:³¹⁰

...the FAB data indicate a *net* \$337.4 billion of credits have been distributed and a *gross* \$428 billion was distributed.

This gross distribution seems highly improbable and is quite inconsistent with the recorded franking credit income. It represents a gross payout ratio of 88% of all company tax as franking credits for the period 2004-12. This is in stark contrast to the gross 66% distribution recorded by the payment of franked dividends. We conclude that the FAB data are a concern.

To the extent that the new conclusions in Hathaway (2014) are well founded, the potential implication is that an estimate of the distribution rate using franked dividend data might be more appropriate (that is, around 0.5, or at least between 0.5 and 0.7). However, on first assessment, we are not convinced by Hathaway's main reason for concluding that the FAB data are a concern—the idea that they imply a gross distribution rate of 0.88 which is 'improbable' and much higher than the gross distribution rate implied by franked dividend data (0.66, which appears to be considered by Hathaway to be probable). This is because

³⁰⁵ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 97; NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013, p. 11.

³⁰⁶ NERA, *The payout ratio: A report for the Energy Networks Association*, June 2013, p. 11.

³⁰⁷ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 99.

³⁰⁸ M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, p. 30.

³⁰⁹ N. Hathaway, *Imputation credit redemption ATO data 1988–2012: Where have all the credits gone? (draft)*, October 2014.

³¹⁰ N. Hathaway, *Imputation credit redemption ATO data 1988–2012: Where have all the credits gone? (draft)*, October 2014.

Lally's estimate of the gross distribution rate across the largest listed companies is 0.84, and therefore we do not consider that an estimate of 0.88 is necessarily improbable.

While we are aware of it, we do not place reliance on the conclusion in Hathaway (2014) regarding the FAB data in this final decision. This is because:

- We do not find convincing Hathaway's reasoning for his conclusion.
- This conclusion does not appear contingent on any new information provided by the release of the 2011-12 statistics. Therefore, this conclusion would appear to have been open to Hathaway, NERA and Handley previously, yet none of them came to it.

We also note the report is still marked draft nearly one year after initially being completed.

A.11 Application of rate of return criteria to evidence on the utilisation rate

Our main assessment of the various approaches to estimating the utilisation rate is set out in section 4.4.2 of attachment 4, with supporting evidence provided in this appendix. However, we have also considered these approaches and the evidence they employ against the criteria used to assess evidence on the allowed rate of return (Table 4-7). Assessment against these criteria broadly supports our main assessment of the approaches.

Table 4-7 Application of rate of return criteria to evidence on the utilisation rate

Criteria ^(a)	Equity ownership approach	Tax statistics	Implied market value studies
<p>Where applicable, reflective of economic and finance principles and market information.</p> <ul style="list-style-type: none"> - Estimation methods and financial models are consistent with well accepted economic and finance principles and informed by sound empirical analysis and robust data. 	<p>Accords with Monkhouse framework and principle of investor rationality (e.g. eligible investors expected to utilise credits to which they are entitled).</p> <p>Analysis is straightforward and sound. Data is from credible source (ABS).</p>	<p>Market information on the amount of imputation credits utilised.</p> <p>Analysis is straightforward and sound. Data is from credible source (ATO), but some data concerns have been identified.</p>	<p>Mainly based on the principle that share prices reflect the present value of future dividends (and imputation credits) and 'no arbitrage'.</p> <p>Varying opinions on the soundness of analysis across studies. Underlying data is typically from credible sources (e.g. Bloomberg, ASX).</p>
<p>Fit for purpose.</p> <ul style="list-style-type: none"> - The use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose. - Promote simple over complex approaches where appropriate. 	<p>ABS data used to estimate the domestic ownership share of Australian equity, which is consistent with its purpose. Approach is simple.</p>	<p>ATO statistics used to observe the reported amount of imputation credits utilised by investors, which is consistent with their purpose. Approach is simple.</p>	<p>Some studies undertaken for the specific purpose of estimating the utilisation rate for regulatory purposes. Results of some studies need to be interpreted carefully to be consistent with the regulatory framework. Studies can employ complex and sometimes problematic estimation methodologies.</p>
<p>Implemented in accordance with good practice.</p> <ul style="list-style-type: none"> - Supported by robust, transparent and replicable analysis that is derived from available credible datasets. 	<p>Transparent and replicable using published data. Some knowledge of ABS classifications required.</p>	<p>Transparent and replicable using published data, although detailed knowledge of tax return labels required. Some data concerns have been identified.</p>	<p>Less transparent and replicable, as econometrics knowledge required and data not always publicly or freely available.</p>
<p>Where market data and other information is used, this information is: credible and verifiable; comparable and timely; and clearly sourced.</p>	<p>ABS is a credible source. Relevant statistics are published online on a quarterly basis.</p>	<p>ATO is a credible source. Relevant statistics are published online on an annual basis, with a two-year lag (e.g. 2011-12 statistics published in 2014). Some data concerns have been identified.</p>	<p>Underlying data typically from credible sources (e.g. Bloomberg, ASX) and is produced on a timely basis. Data not always publicly or freely available.</p> <p>Use of econometrics makes the results difficult and complex to verify.</p>
<p>Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.</p>	<p>Reflects current ownership of Australian equities. However, might not reflect any tax law changes that reduce eligible investors' utilisation rates below 1.</p>	<p>Reflects conditions up to two years ago.</p>	<p>Reflects current conditions to the extent that recent data is used. Different studies span various time periods.</p>

Source: AER analysis.

(a): The criteria relating specifically to return on equity and return on debt quantitative models are excluded because they are not applicable.

A.12 The equity ownership approach

Recalling that eligible investors have a utilisation rate of 1 and ineligible investors have a utilisation rate of 0, we consider that the value-weighted proportion of domestic investors in the Australian equity market is a reasonable estimate of the utilisation rate. This is because, in general, domestic investors are eligible to utilise imputation credits and foreign investors are not. We refer to this approach as the 'equity ownership approach', and we use data from the National Accounts to estimate the domestic ownership share.³¹¹

Our views on the equity ownership approach to estimating the utilisation rate are set out in section 4.4.2 of attachment 4. In this section, we provide further detail on our application of the approach. We also compare our assessment of the approach in this final decision with our assessment in the Guideline.

We place significant reliance on the equity ownership approach for the reasons set out in section 4.4.2 of attachment 4. We have regard also to the limitations of this approach, but we do not consider them significant:

- The approach does not take into account the effect of the 45-day holding rule (or any other rules that can affect the eligibility of domestic investors to claim imputation credits). However, as discussed in section A.8.2, we do not consider that there is clear evidence as to effect that these rules have or should be expected to have. Moreover, we consider that the most relevant evidence on the effect of these rules suggest that they have a negligible effect.
- The approach allows investors' utilisation rates to be weighted by wealth, but not by risk aversion, as required by the definition of the utilisation rate in the Monkhouse framework. However, we do not consider that we can feasibly weight our estimates in this regard, as this would require specific calculations or assumptions regarding the portfolios and risk preferences of individuals or classes of investors. Moreover, neither Handley nor Lally identified the inability to weight by risk aversion as an unacceptable limitation of the approach.³¹²

We consider that a reasonable estimate for the utilisation rate from the equity ownership approach is between:

- 0.56 and 0.68, if all equity is considered, and
- 0.38 and 0.55, if only listed equity is considered.

In the Guideline, we considered that the equity ownership approach supported a utilisation rate between 0.7 and 0.8. This range was based on:

³¹¹ Specifically, we use data from Australian National Accounts: Finance and Wealth (ABS cat. 5232.0).

³¹² J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 24–25; M. Lally, *The estimation of gamma*, 23 November 2013, pp. 11–12.

- A 2007 feature article by the ABS, in which it was estimated using data from the National Accounts that domestic investors held 71 per cent of Australian equity.³¹³
- A graph in a September 2013 report by Hathaway, which suggested that the domestic ownership share of Australian equity had fluctuated between 75 and 81 per cent over the period 1988 to 2012.³¹⁴ The data underlying this graph also came from the National Accounts.

Since the Guideline's publication, we have examined more closely the relevant data from the National Accounts. This has allowed us to update and refine our estimates. Moreover, we now express estimates for both all equity and only listed equity, consistent with the approach set out in section A.9.1.

We consider that the equity ownership approach can be refined by filtering the National Accounts data to focus on the types of equity that we consider most relevant to the benchmark entity, and the specific classes of investor that are expected to either utilise or waste the imputation credits they receive. That is, we can:

- Exclude from the calculation equity in entities that are wholly owned by the public sector. In the National Accounts, this is equity issued by the 'central bank', 'central borrowing authorities' and 'public non-financial corporations'.
- Calculate the equity held by those classes of investor that are eligible to utilise imputation credits as a share of the equity held by all classes of investor that either utilise or waste credits. In the National Accounts, this is calculated as the equity held by 'households', 'pension funds' and 'life insurance corporations' as a share of the equity held by these classes plus 'rest of world'. In the draft decisions released in 2014, our calculation of the refined domestic ownership share effectively assumed that governments 'wasted' the imputation credits they received. We noted in the draft decisions that there was no clear case for making this assumption. In this final decision, consistent with the approach we took for the decisions we released in April and June 2015, we exclude government-held equity from the calculation of the refined domestic ownership share. This is because the value of imputation credits forms part of our determination of the rate of return required by private investors in the benchmark efficient entity.³¹⁵ In doing this we are estimating market-wide utilisation rates (for both listed and all equity) reflective of the capital invested by private investors. We do not consider this is inconsistent with other parameter estimates used for estimating the WACC and consider this will lead to an overall return that should lead to efficient investment in regulated assets.

³¹³ Australian Bureau of Statistics, *Feature article: Foreign ownership of equity*, September 2007. Available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5302.0Feature%20Article10Sep%202007?opendocument&tabname=Summary&prodno=5302.0&issue=Sep%202007&num=&view>. Accessed 9 April 2015.

³¹⁴ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, figure 5.

³¹⁵ If governments are assumed to waste the credits they receive, the equity ownership approach supports an estimate of the utilisation rate of between 0.54 and 0.65 if all equity is considered, and between 0.38 and 0.54 if only listed equity is considered.

Our estimate ranges in this final decision differ from the corresponding ranges in the draft decisions. These changes in part reflect the views of service providers, Gray (for SFG) and Handley. We discuss our consideration of these views below.

A number of service providers have submitted that we erred in our earlier decisions because:³¹⁶

...the ranges used by the AER for the equity ownership rate are inconsistent with the evidence in the Draft Decision.

The service providers then referred to the data presented in the draft decisions released in 2014 on the refined domestic ownership share (figures 4-4 and 4-5 of the draft decisions). However, as indicated in the draft decisions, our estimates were based on evidence across both the refined domestic ownership share (figures 4-4 and 4-5 of the draft decisions) and simple domestic ownership share (figures 4-2 and 4-3 of the draft decisions).

In his recent advice, Handley advised that, although it is reasonable to rely on both the simple and refined domestic ownership share, 'the refined share should (subject to the limitations in the data) be more relevant by construction'.³¹⁷ Accordingly, as we did in the decisions released in April and June 2015, in this final decision we rely only on the refined domestic ownership share.

Service providers have also submitted that only the most recent point estimates of the equity ownership share are relevant.³¹⁸ We disagree. Given that the series exhibits considerable volatility, we think it is reasonable to not rely solely on the most recent point estimate. Handley supported this view:³¹⁹

³¹⁶ ActewAGL, *Revised Regulatory Proposal 2015-19*, January 2015, pp. 485–486; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 1; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 1; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 1; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 1; and JGN, *Gamma - response to the draft decision*, February 2015, p. 1; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 1; Energex, *Revised Regulatory Proposal*, July 2015, p. 13; Powercor, *Regulatory Proposal 2016-20*, April 2015, p. 249; CitiPower, *Regulatory Proposal*, April 2015, p. 241; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, pp. 367-368; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, pp. 19-20.

³¹⁷ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p.12.

³¹⁸ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 11; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 12; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 16; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 12; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 12; JGN, *Gamma - response to the draft decision*, February 2015, p. 14; Access Arrangement Information for Australian Gas Networks' South Australian Natural Gas Distribution Network, July 2015, p.14; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p.17 ; Powercor, *Regulatory Proposal 2016-20*, April 2015, p. 17 ; CitiPower, *Regulatory Proposal*, April 2015, p. 17; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 368; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 20; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal, June 2015*, p. 16.

³¹⁹ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 13.

Referring to the refined data, it is apparent that there is substantial volatility in the reported ABS estimates over time. There are also residual issues with the ABS data. This suggests that more than just the most recent estimates should be taken into consideration, although the length of period to be considered is open to judgment.

On Handley's point regarding the length of period to be considered, we agree with Gray's view (for SFG) that:³²⁰

It is not clear why estimates of what the domestic equity ownership proportion was in the 1980s are relevant to the current determination for the forthcoming regulatory period.

We consider that the most relevant period to consider is that since July 2000, when eligible investors became entitled for a refund of excess credits. This accords with one of the periods Handley considered relevant.³²¹ It is also consistent with the service providers' proposed estimation of the value of distributed credits via SFG's dividend drop off study. This study employs data from July 2001 to October 2012.

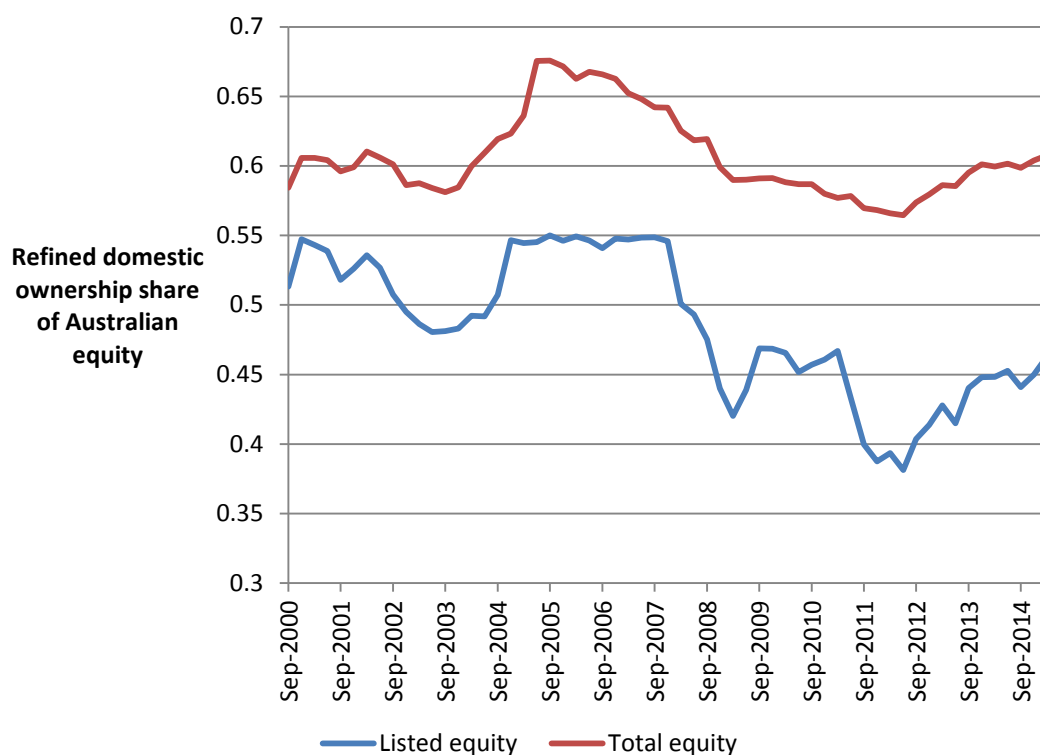
Gray (for Frontier) submitted that we are incorrect to exclude from the equity ownership calculation entities that are wholly owned by the public sector.³²² We disagree for the reasons stated above as set out in our April and June 2015 decisions. We consider that the Vanilla WACC framework as embedded in the rules is aimed at ensuring private investors are fairly compensated. This should ensure efficient investment and use of regulated network infrastructure. We consider an estimate of gamma reduced due to government entities being assumed to not redeem credits is not appropriate. With regard to these considerations, the relevant data is shown in Figure 4-3.

³²⁰ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 147(a).

³²¹ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, footnote 16.

³²² Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 31-32.

Figure 4-3 Refined domestic ownership share of Australian equity



Source: Australian National Accounts: Finance and Wealth (ABS cat. 5232.0), tables 47 and 48.

Figure 4-3 indicates that the refined domestic ownership share of total equity has ranged from 0.56 to 0.68 over the relevant period, while the refined domestic ownership share of only listed equity has ranged from 0.38 to 0.55.

A.13 Tax statistics

The ATO publishes aggregate statistics on the tax returns submitted by individuals, superannuation funds and companies, as well as on the imputation credits refunded to certain income tax exempt entities (for example, charities).³²³ These statistics can be used to derive a measure of the total amount of imputation credits utilised by eligible investors to offset tax or to be refunded. As discussed in relation to the distribution rate, ATO statistics also provide estimates of the amount of imputation credits distributed. We consider that the reported value of credits utilised divided by the reported value of credits distributed is a reasonable estimate of the utilisation rate.

³²³ These statistics are available at: <https://www.ato.gov.au/About-ATO/Research-and-statistics/Taxation-statistics/>. Accessed 9 April 2015.

Our position on the use of tax statistics to estimate the utilisation rate is set out in section 4.4.2 of attachment 4. In this section, we explain how our position has changed compared to that in the Guideline.

In the Guideline, we considered that tax statistics supported a utilisation rate between 0.4 and 0.8. This was based on:

- A 2013 report by Hathaway, which sought to estimate the proportion of distributed credits that have been utilised. This report produced two estimates for the period 2004 to 2011: 0.43 and 0.61. The two estimates reflect two alternative measures of the value of credits distributed, which in turn imply two alternative estimates of the distribution rate (as discussed in section A.10). The 0.43 and 0.61 estimates of the utilisation rate correspond to estimates of the distribution rate of around 0.7 and 0.5 respectively.³²⁴
- A 2004 paper by Handley and Maheswaran, which sought to estimate the proportion of distributed credits that were used to reduce investors' tax liabilities. This paper produced an estimate for the period 2001 to 2004 of 0.81.

Since the Guideline we have continued to examine this evidence. We now consider that we should rely on estimates that are:

- derived from post-2004 data, consistent with Hathaway's findings that the ATO statistics are subject to a number of issues prior to 2004,³²⁵ and
- consistent with our preferred estimates of the distribution rate.

Applying these considerations, in our prior decisions we did not rely on:

- Handley and Maheswaran's estimate of 0.81, because this is (predominantly) derived from pre-2004 data.
- Hathaway's estimate of 0.61, because this corresponds to an estimate of the distribution rate of around 0.5 whereas we adopt an estimate of the distribution rate over all equity of 0.7.

In this final decision we have regard to NERA's updated analysis of the ATO data to the 2012 tax year.³²⁶ This analysis supports a distribution rate of 0.7 and a utilisation rate of 0.45.

As discussed in section A.10, for this decision we place no reliance on Hathaway's new report and therefore it does not change our conclusions regarding the utilisation rate indicated by tax statistics.

³²⁴ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013. Hathaway's calculations actually suggest estimates of the utilisation rate of 0.44 and 0.62 and corresponding estimates of the distribution rate of 0.69 and 0.49, respectively. However, we round these distribution rate estimates up to 0.7 and 0.5, which implies slightly higher amounts of credits distributed and therefore slightly lower utilisation rates of 0.43 and 0.61.

³²⁵ N. Hathaway, *Imputation credit redemption ATO data 1988–2011: Where have all the credits gone?*, September 2013, para. 32.

³²⁶ NERA, *Estimating distribution and redemption rates from taxation statistics*, March 2015.

A.14 Implied market value studies

Implied market value studies seek to infer from market prices the value of distributed imputation credits. Our position on the use of implied market value studies to estimate the utilisation rate is set out in section 4.4.2 of attachment 4.

This section sets out further evidence which supports our position on the use of implied market value studies to estimate the utilisation rate. It describes the types of study available, and estimates from these studies. As we discuss in section 4.4.2 of attachment 4, the level of reliance we place on implied market value studies reflects the limitations of these studies. We discuss the limitations of the most common type of implied market value study, dividend drop off studies, in sections A.14.5 and A.14.6.

A.14.1 Types of implied market value studies

In this section, we describe the key characteristics of dividend drop off studies and other implied market value studies.

Dividend drop off studies

Dividend drop off studies are the most common type of implied market value study. These studies involve comparing share prices between:

- the cum-dividend date—the last day on which investors owning shares will be eligible to receive dividends and the attached imputation credits, and
- the ex-dividend date—the first day on which investors owning shares will not be eligible to receive dividends and attached imputation credits.

That is, an investor that buys a share on the cum-dividend date will be eligible to receive a dividend from that company. An investor who buys a share on the ex-dividend date will not. The difference in these prices should therefore reflect investors' valuation of the combined package of dividends and imputation credits, all other things being equal. Dividend drop off studies often will report this as a dividend drop off ratio. This is the reduction in the share price as a proportion of the face value of dividends paid out.

Table 4-8 identifies the dividend drop off studies that we are aware of, and describes the methodology of each study. The results from these studies are presented in Table 4-10.

Table 4-8 Summary of available dividend drop off studies

Authors	Data range	Assessment relative to other studies in that class
Dividend drop off study – Compare share prices before and after dividend events (with and without imputation credits).		
Vo et al (2013) ³²⁷	2001-2012	Builds on SFG (2011), includes additional econometric permutations and sensitivity analysis.
SFG (2013a) ³²⁸	2001-2012	Updates SFG (2011) – same author, longer data series.
SFG (2011) ³²⁹	2001-2010	Study commissioned by the Australian Competition Tribunal.
Minney (2010) ³³⁰	2001–2009	Partitions by firm size; sub-periods 2001–2005 and 2006–2009.
Beggs and Skeels (2006) ³³¹	1986-2004	Key study in the AER's 2009 review of rate of return parameters. Data calculated yearly.
Hathaway and Officer (2004) ³³²	1986-2004	Study partitions by firm size, dividend yield level.
Bellamy and Gray (2004) ³³³	1995-2002	Several regression forms and sample selections. Partitions by size and time period (pre and post 45-day holding rule). Use of simulation to inform regression equation.
Bruckner et al (1994) ³³⁴	1987-1993	Early study with limited data; sub-periods 1987–1990 and 1991–1993.

³²⁷ D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', *ERA working paper*, April 2013.

³²⁸ SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

³²⁹ SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011.

³³⁰ A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, pp. 29–34.

³³¹ D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, pp. 239–252.

³³² N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004.

³³³ D. Bellamy and S. Gray, 'Using stock price changes to estimate the value of dividend franking credits', *working paper, University of Queensland Business School*, March 2004.

³³⁴ P. Bruckner, N. Dews and D. White, 'Capturing value from dividend imputation: How Australian companies should recognize and capitalise on a major opportunity to increase shareholder value', *McKinsey and Company report*, 1994.

Authors	Data range	Assessment relative to other studies in that class
Brown and Clarke (1993) ³³⁵	1973–1991	Compares dividend drop off before and after imputation; presents yearly figures and sub-periods.

Source: As specified in table.

Alternative implied market value studies

Besides dividend drop off studies, there are alternative market-based implied valuation approaches to estimating the utilisation rate. Generally, these studies are based on similar arbitrage principles to dividend drop off studies. This means they compare two security prices where one security includes the entitlement and one security excludes the entitlement. They then assume the difference reflects the market valuation of the entitlement. However, they are designed to avoid the other influences in the data that affect traditional dividend drop off analysis. In particular, these studies typically use simultaneous price differentials that make them less affected by general market movements. That is, the differentials should more accurately reflect the implied market value of the specific dividend event. Some examples of alternative market-based valuation approaches involve:

- Simultaneous trading of shares with and without entitlements.
- Simultaneous trading of derivatives and futures and of their underlying shares.
- Hybrid securities which trade with imputation credits.
- Comparison of the capital gains and (cash) dividend returns across time.

Table 4-9 identifies the alternative implied market value studies that we are aware of, and describes the methodology of each study. The results from these studies are presented in Table 4-11.

Table 4-9 Summary of alternative implied market value studies

Authors	Data range	Assessment relative to other studies in that class
Dividend drop off using hybrids – Similar to standard DDO but using debt/equity hybrid securities.		
Feuerherdt et al (2010) ³³⁶	1995–2002	Uses hybrid securities (such as convertible preference shares), 165 ex-dividend events for 46 securities which are primarily fully franked.
Futures study (using individual firms or index) – Compare simultaneous prices for securities and futures contracts.		

³³⁵ P. Brown and A. Clarke, 'The ex-dividend day behaviour of Australian share prices before and after dividend imputation', *Australian journal of management*, vol. 18, June 1993, pp. 1–40.

³³⁶ C. Feuerherdt, S. Gray and J. Hall, 'The value of imputation tax credits on Australian hybrid securities', *International review of finance*, vol. 10(3), 2010, pp. 365–401.

Authors	Data range	Assessment relative to other studies in that class
SFG (2013b) ³³⁷	2000–2013	Updates Cannavan et al (2004). Compares matched trades in individual shares to futures contracts and low exercise price options for 98 firms (over 52,000 trades).
Cannavan et al (2004) ³³⁸	1994–1999	Uses matched trades (four minute window) in individual shares and futures contracts for 19 firms (over 14,000 trades). Sub-periods 1994–1997 and 1997–1999.
Cummings and Frino (2008) ³³⁹	2002–2005	Uses entire ASX200 index (rather than specific firms) and futures over the index, distinct from other studies in this class (which use individual shares).
Rate of return study – Compare past returns (capital gains and cash dividends) or future returns (dividend forecasts).		
NERA (2013b) ³⁴⁰	1987–2012	Updates the Lajbcygier and Wheatley paper; same author and more relevant data set. Sub-period splits 1987–2000 and 2000–2012.
Lajbcygier and Wheatley (2012) ³⁴¹	1987–2009	Compares current prices to past returns from capital gains and dividends. Includes sub-periods from 1987–2000 and 2000–2009.
Siau et al (2013) ³⁴²	1996–2011	Compares current prices to expected future returns. Uses ASX300 index firms and consensus analyst dividend forecasts.
Siau et al (2015) ³⁴³	1996–2011	Journal published version of the 2013 paper by Siau et al with relatively minor editorial changes
NERA (2015) ³⁴⁴	1987–2013	Updates the results of the Lajbcygier and Wheatley and NERA (2013) studies.
Simultaneous share trades – Compare simultaneous prices for shares that are/are not entitled to imputation credits.		
Chu and Partington (2008) ³⁴⁵	1996	Uses shares trading in two forms (one with dividend, one without) as a result of the CRA bonus issue. 154 matched trades (one minute window) across 3 months.
Chu and Partington (2001) ³⁴⁶	1991–1999	Uses shares trading simultaneously with and without dividend after certain rights issues - 3,356 trades (matched within a minute) from 26 rights issues for 23 firms.

³³⁷ SFG, *Using market data to estimate the equilibrium value of distributed imputation tax credits*, Report for the Energy Networks Association, 3 October 2013.

³³⁸ D. Cannavan, F. Finn, S. Gray, 'The value of dividend imputation tax credits in Australia', *Journal of financial economics*, vol. 73, 2004, pp. 167–197.

³³⁹ J. Cummings and A. Frino, 'Tax effects on the pricing of Australian stock index futures', *Australian journal of management*, vol. 33(2), December 2008, pp. 391–406.

³⁴⁰ NERA, *Imputation credits and equity prices and returns*, A report for the Energy Networks Association, October 2013.

³⁴¹ P. Lajbcygier and S. Wheatley, 'Imputation credits and equity returns', *The economic record*, vol. 88 (283), December 2012, pp. 476–494.

³⁴² K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *ANU working paper*, 18 June 2013.

³⁴³ K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *Accounting and Finance*, Vol. 55, 2015, pp. 241–277.

³⁴⁴ NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015.

³⁴⁵ H. Chu and G. Partington, 'The market valuation of cash dividends: The case of the CRA bonus issue', *International review of finance*, Vol. 8(2), June 2008, pp. 1–20.

³⁴⁶ H. Chu and G. Partington, 'The market value of dividends: evidence from a new method', *Paper presented at the Accounting Association of Australia and New Zealand Annual Conference, Wellington*, 2001.

Authors	Data range	Assessment relative to other studies in that class
Walker and Partington (1999) ³⁴⁷	1995–1997	Looks at shares trading cum-dividend in the ex-dividend period. 1,015 data points (trades matched within a minute) for 93 ex-dividend events from 50 securities.

Source: As specified in table.

A.14.2 Estimates from implied market value studies

This section presents the results from the available implied market value studies.

Table 4-10 reports estimates of the utilisation rate from the set of available dividend drop off studies. As a high level summary table, it attempts to report the single utilisation rate preferred by the authors for the scenario most relevant to our rate of return framework. The table separately reports results based on whether the underlying data is (primarily) from before or after 2000, when the change in tax law entitled eligible investors to a full refund of excess imputation credits.

Table 4-11 is the equivalent table for alternative implied market value studies. In this table, several results are recorded as 'N/A', even though there is a specific date range provided. In such cases, that particular technique (or data limitations) did not permit the disaggregation of the value of the dividend component and the imputation credit. In this situation, the study typically reports the combined value of the cash dividend and imputation credit together. The minimum value for the imputation credit component of this package will arise if the cash dividend is fully valued, and these estimates are presented in the 'notes' column.

³⁴⁷ S. Walker and G. Partington, 'The value of dividends: Evidence from cum-dividend trading in the ex-dividend period', *Accounting and Finance*, vol. 39(3), November 1999, pp. 275–296.

Table 4-10 Estimates of the utilisation rate from dividend drop off studies

Authors	Pre-2000 results	Post-2000 results	Notes
Dividend drop off study			
Vo et al (2013) ³⁴⁸		0.35–0.55 (2001–2012)	Range derived from large number of permutations and sensitivity tests.
SFG (2013a) ³⁴⁹		0.35 (2001–2012)	Author's point estimate across a number of different regression forms.
SFG (2011) ³⁵⁰		0.35 (2001–2010)	
Minney (2010) ³⁵¹		0.39 (2001–2009)	Average of results from 2001–2005 and 2006–2009 sub-periods. For the most recent sub-period (2006–2009), utilisation rate is 0.53.
Beggs and Skeels (2006) ³⁵²	0.20 (1992–1997)	0.57 (2001–2004)	Several other pre-2000 periods are presented.
Hathaway and Officer (2004) ³⁵³	0.49 (1986–2004)		Authors suggest that estimate has increased post-2000.
Bellamy and Gray (2004) ³⁵⁴	0.36 (1995–2002)		Range of 0.0–0.60 is also presented.
Bruckner et al (1994) ³⁵⁵	0.69 (1991–1993)		Also present an earlier period (1987–1990).
Brown and Clarke (1993) ³⁵⁶	0.80 (1988–1991)		

Source: As specified in table.

³⁴⁸ D. Vo, B. Gellard and S. Mero, 'Estimating the market value of franking credits: Empirical evidence from Australia', *ERA working paper*, April 2013.

³⁴⁹ SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013, p. 1.

³⁵⁰ SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011, p. 3.

³⁵¹ A. Minney, 'The valuation of franking credits to investors', *JASSA: The FINSIA journal of applied finance*, no. 2, 2010, p. 32.

³⁵² D. Beggs and C. Skeels, 'Market arbitrage of cash dividends and franking credits', *The economic record*, vol. 82, 2006, p. 247.

³⁵³ N. Hathaway and B. Officer, *The value of imputation tax credits, Update 2004*, November 2004, p. 21.

³⁵⁴ D. Bellamy and S. Gray, 'Using stock price changes to estimate the value of dividend franking credits', *working paper, University of Queensland Business School*, March 2004, pp. 5 and 21.

³⁵⁵ P. Bruckner, N. Dews and D. White, 'Capturing value from dividend imputation: How Australian companies should recognize and capitalise on a major opportunity to increase shareholder value', *McKinsey and Company report*, 1994, p. 27.

³⁵⁶ P. Brown and A. Clarke, 'The ex-dividend day behaviour of Australian share prices before and after dividend imputation', *Australian journal of management*, vol. 18, June 1993, p. 1.

Table 4-11 Estimates of the utilisation rate from alternative market value studies

Authors	Pre-2000 results	Post-2000 results	Notes
Dividend drop off study using hybrids			
Feuerherdt, Gray and Hall (2010) ³⁵⁷	N/A (1995–2002)		Combined drop off of 1.0. With dividends at full value, this is a utilisation rate of 0.
Futures study (individual or index)			
SFG (2013b) ³⁵⁸		0.12 (2000–2013)	Uses individual firms.
Cannavan et al (2004) ³⁵⁹	0–0.15 (1994–1999)		Uses individual firms.
Cummings and Frino (2008) ³⁶⁰		0.52 (2002–2005)	Uses index.
Rate of return study			
NERA (2013b) ³⁶¹	-1.57 (1987–2000)	-1.90 (2000–2012)	Uses past returns. For the entire period, estimate is -1.50.
Lajbcygier and Wheatley (2012) ³⁶²	-1.57 (1987–2000)	-1.68 (2000–2009)	Uses past returns. For the entire period, estimate is -1.88
Siau et al (2013) ³⁶³		-0.29–0.30 (1996–2011)	Uses forecast returns. Note range is from negative 0.29 to positive 0.30.
Siau et al (2015) ³⁶⁴		-0.29–0.30 (1996–2011)	Uses forecast returns. Note range is from negative 0.29 to positive 0.30.
NERA (2015) ³⁶⁵	-0.90 (1987–2000)	-3.18 (2000–2013)	Uses past returns. For the entire period, estimate is -1.76

³⁵⁷ C. Feuerherdt, S. Gray and J. Hall, 'The value of imputation tax credits on Australian hybrid securities', *International review of finance*, vol. 10(3), 2010, pp. 365–401.

³⁵⁸ SFG, *Using market data to estimate the equilibrium value of distributed imputation tax credits*, Report for the Energy Networks Association, 3 October 2013, p. 3.

³⁵⁹ D. Cannavan, F. Finn, S. Gray, 'The value of dividend imputation tax credits in Australia', *Journal of financial economics*, vol. 73, 2004, pp. 167–197.

³⁶⁰ J. Cummings and A. Frino, 'Tax effects on the pricing of Australian stock index futures', *Australian journal of management*, vol. 33(2), December 2008, pp. 391–406.

³⁶¹ NERA, *Imputation credits and equity prices and returns*, A report for the Energy Networks Association, October 2013, p. 22.

³⁶² P. Lajbcygier and S. Wheatley, 'Imputation credits and equity returns', *The economic record*, vol. 88 (283), December 2012, p. 490.

³⁶³ K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *ANU working paper*, 18 June 2013, pp. 24 and 27.

³⁶⁴ K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *Accounting and Finance*, Vol. 55, 2015, pp. 241–277.

³⁶⁵ NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, pp 21,23.

Authors	Pre-2000 results	Post-2000 results	Notes
Simultaneous share trades			
Chu and Partington (2008) ³⁶⁶	N/A (1996)		Combined drop off of 1.29. With dividends at full value, this is a utilisation rate of 0.68.
Walker and Partington (1999) ³⁶⁷	0.88–0.96 (1995–1997)		
Chu and Partington (2001) ³⁶⁸	N/A (1991–1999)		Combined drop off of 1.5. With dividends at full value, this is a utilisation rate above 1.

Source: As specified in table.

In relation to the 2015 study by Siau et al, this is an academic journal published version of the early study by Siau et al already considered by us. The 2015 paper has relatively minor editorial changes and gives us no cause to change our views.³⁶⁹

In relation to the 2015 study by NERA, this is an update of the 2013 study by NERA using one extra year's data. The results are somewhat similar to the 2013 study and we consider the results do not provide compelling evidence on the value of imputation credits, particularly given the large negative estimate for the value of imputation credits.³⁷⁰ While NERA has responded to the criticism effectively stating the results may indicate there is something wrong with the SLCAPM³⁷¹, this does not resolve the issue of the reliability of the theta estimate for use in the SLCAPM.³⁷²

A.14.3 Comparison with other market-based estimation approaches

The majority of service providers have submitted that the use of implied market value studies to estimate the value of imputation credits is consistent with the approach to estimating other

³⁶⁶ H. Chu and G. Partington, 'The market valuation of cash dividends: The case of the CRA bonus issue, *International review of finance*, Vol. 8(2), June 2008, pp. 1–20.

³⁶⁷ S. Walker and G. Partington, 'The value of dividends: Evidence from cum-dividend trading in the ex-dividend period', *Accounting and Finance*, vol. 39(3), November 1999, p. 293.

³⁶⁸ H. Chu and G. Partington, 'The value of dividends: evidence from a new method', *Paper presented at the Accounting Association of Australia and New Zealand Annual Conference, Wellington*, 2001, p. 2.

³⁶⁹ The earlier working paper, although substantively the same as the 2015 paper, remains referenced in this decision because this was the paper considered by us in making our decisions released in April and June 2015.

³⁷⁰ NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, p. vii; M. Lally, *The estimation of gamma*, 23 November 2013, p. 25.

³⁷¹ NERA, *Do Imputation Credits Lower the Cost of Equity? Cross-Sectional Tests A report for United Energy*, April 2015, p. vii.

³⁷² Concerns around the reliability of the estimates of the return on equity from the Black CAPM are discussed in the rate of return attachment to this final decision.

rate of return parameters.³⁷³ We disagree. As we set our prior decisions, we consider that the use of market prices to estimate the value of imputation credits is fundamentally different to using market prices to estimate other rate of return parameters. For example, bonds are separately and (generally) regularly traded, and we can observe the market price that arises from this trading. As correctly noted by Gray (for SFG), '...when estimating the cost of debt the AER uses traded bond prices which reflect the value of those bonds to investors...'.³⁷⁴ By contrast, imputation credits are not separately traded. Therefore, no market price exists for imputation credits in the same manner as that for separately traded assets.

We also noted in the decisions released in 2014 and April and June 2015 that, because no market price exists for imputation credits in the same manner as that for separately traded assets, dividend drop off studies must infer using ex-dividend price changes and econometric techniques the value attributed to imputation credits by investors. This is in contrast to simply observing or measuring the value attributed to imputation credits by investors via prices resulting from market transactions in imputation credits. Gray (for both SFG and Frontier) noted that we apply econometric techniques (that is, regression analysis) to observed market prices when estimating beta.³⁷⁵ This is correct, but beta is not a measure of the value attributed to an asset by investors; for example, Gray's definition of beta (for SFG) is 'the risk of the asset or firm in question relative to the average firm or asset'.³⁷⁶

A number of service providers also submitted, consistent with advice from Gray (for SFG), that we do not seek to adjust other rate of return parameters for personal costs.³⁷⁷ However, this consideration did not change Handley's view—which we accept—that the value of imputation credits should be estimated on a before-personal-tax and before-personal-costs basis.³⁷⁸

In other words, the per dollar value of an imputation credit γ gamma should be measured prior to any personal tax on the credit and prior to any personal costs associated with the receipt of the credit. This approach is also consistent with the standard approach to calculating a return in a classical tax system – you take the observed capital gain and the observed dividend without making any adjustment for

³⁷³ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 7; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 8; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 10; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 8; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 8; JGN, *Gamma - response to the draft decision*, February 2015, p. 10; AusNet Services, *2016-20 Regulatory Proposal*, April 2015, p. 364; United Energy, *Assessment of the Value of Imputation Credits - Gamma, Proposal for 2016 to 2020*, April 2015, p. 14; CitiPower, *Appendix J - Gamma*, April 2015, p. 13; Powercor, *Appendix J - Gamma*, April 2015, p. 13; Jemena Electricity, *Attachment 06-06 Gamma proposal*, April 2015, p. 13; ActewAGL Distribution, *Attachment 8 Detailed gamma proposal*, June 2015, p. 13.

³⁷⁴ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 79.

³⁷⁵ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 78; Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, p. 36.

³⁷⁶ SFG, *Equity beta*, 12 May 2014, para. 15.

³⁷⁷ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 52.

³⁷⁸ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 5.

personal taxes or personal costs associated with trading the share or receiving the dividend.

That is, we take the observed distribution of \$1 of dividends to yield \$1 of value to investors. We do not take it to yield \$1 of value minus personal taxes and personal costs associated with that dividend. Similarly, we take a \$1 change in stock prices (capital gain) to yield \$1 of value to investors. We do not take it to yield \$1 of value minus personal taxes and personal costs associated with that capital gain.

A.14.4 Adjustment of estimates from implied market value studies

A number of service providers submitted that estimates of the utilisation rate from implied market value studies can be adjusted to make them consistent with the before-personal-tax and before-personal-costs value of imputation credits.³⁷⁹ However, we do not consider that the relevant adjustment—proposed by Handley and Lally and discussed in section 4.4.2—will fully account for the potential effect of personal taxes and costs. This is because the proposed adjustment seeks to remove from the estimates of investors' valuation of dividends and imputation credits the effect of factors that suggest that investors' valuation of \$1 of dividends is less than \$1. However, according to Gray (for SFG), there are:³⁸⁰

...costs that reasonable, efficient investors would incur in relation to imputation credits, which do not apply to dividends or capital gains.

Thus, Gray's view (for SFG) appears to be that there are factors which affect investors' valuation of imputation credits (as reflected in share prices) which do not affect investors' valuation of dividends.³⁸¹ Therefore, it does not appear that the proposed adjustment—which only addresses factors which affect both dividends and imputation credits—would exclude the effect of the factors identified by SFG as affecting just imputation credits.

A.14.5 Limitations of SFG's dividend drop off study

A number of service providers submitted that 'several of the general limitations [of implied market value studies identified in the draft decisions released in 2014] do not apply to the SFG study'.³⁸² Below we set out the limitations that we consider apply generally to implied market value studies and consider whether these apply to SFG's dividend drop off study. We

³⁷⁹ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 7; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 8; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 11; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 8; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 8; and JGN, *Gamma - response to the draft decision*, February 2015, p. 10.

³⁸⁰ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 50.

³⁸¹ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, para. 65.

³⁸² ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 9; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 10; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 14; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 10; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 10; JGN, *Gamma - response to the draft decision*, February 2015, p. 13.

conclude that there is reasonable evidence to suggest that several of the limitations do apply to SFG's dividend drop off study. There appears to be no information in the proposals lodged in 2015 or in Gray's June 2015 report (for Frontier),³⁸³ to warrant us changing our view on any of the material below set out in our decisions released in April and June 2015.

These studies can produce nonsensical estimates of the utilisation rate; that is, greater than one or less than zero.

We accept that this limitation does not apply to SFG's study. Its estimate of the utilisation rate is 0.35.

The results of these studies can reflect factors, such as differential personal taxes and risk, which are not relevant to the utilisation rate.

Both Handley and Lally advised that the results from SFG's dividend drop off study reflect these factors.³⁸⁴ A number of service providers themselves also acknowledged this elsewhere in their revised proposals:³⁸⁵

...even if the AER's definition of theta were to be adopted, there is a relatively simple adjustment that can be made to estimates from market value studies to address this concern. As explained by Associate Professor Handley, this involves 'grossing up' the theta estimate from a market value study to reflect the effect of personal taxes and personal costs.

Therefore, we conclude that this limitation does apply to SFG's study.

The results of these studies might not be reflective of the value of imputation credits to investors in the market as a whole.

Gray's response to this point (for SFG) was:³⁸⁶

The AER has previously argued that the increased trading volume that occurs around ex-dividend dates could potentially affect the estimates. I have previously responded to this point in great detail, explaining why, if anything, this additional trading would have the effect of increasing the estimate of theta.

³⁸³ Frontier Economics, *An appropriate regulatory estimate of gamma*, June 2015, pp. 35-38.

³⁸⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 43-44; J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p.16; M. Lally, *The estimation of gamma*, 23 November 2013, p. 21.

³⁸⁵ ActewAGL, *Detailed response to the AER's draft decision in relation to gamma*, January 2015, p. 7; Ausgrid, *Ausgrid's revised proposal on gamma*, January 2015, p. 8; Directlink, *Directlink submission on gamma (updated)*, January 2015, p. 11; Endeavour Energy, *Endeavour Energy's response to the AER draft decision re gamma*, January 2015, p. 8; Essential Energy, *Essential's response to AER draft decision re gamma*, January 2015, p. 8; and JGN, *Gamma - response to the draft decision*, February 2015, p. 10.

³⁸⁶ SFG, *Estimating gamma for regulatory purposes*, 6 February 2015, para. 185(c).

I have previously addressed this issue at pp. 31-32 of SFG (2014 Gamma) and at ENA (2013), Section 7.9, pp.119-123.

The ENA (2013) report referred to by Gray (for SFG) was a response to our draft rate of return Guideline. Lally reviewed our draft Guideline and the ENA response. His conclusion was:³⁸⁷

The AER's third approach to estimating [the utilisation rate] involves estimates derived from market prices (AER, 2013, pp. 133-134, 239-247). The AER does not consider that these estimates are useful for a number of reasons.

...

I concur with all of these concerns, and I have additional concerns about these studies or their interpretation.

Regarding the particular limitation at hand, Lally noted:³⁸⁸

Tenthly, although the utilisation rate is a value-weighted average over all investors in the market, the use of market prices will produce an estimate that reflects the tax position, transactions costs and motives of those investors who transact at the relevant times (such as tax arbitrageurs) and these investors may be quite unrepresentative of the entire market.

And on the effect of trading around the ex-dividend date, Lally noted:³⁸⁹

In respect of tax arbitrage around dividend ex-days, the ENA (2013, section 7.9) argues that this would lead to [the utilisation rate] being overestimated by such studies (because these arbitrageurs would tend to drive up the prices of shares with large imputation credits prior to ex-day in the course of buying them, and then depress them shortly afterwards in the course of selling them). This point would be plausible if tax considerations fully explained ex-dividend day results. However, as described above, this is not the case.

Thus, Lally appeared unconvinced by the ENA's views and provided no indication that SFG's study (or any implied market value study) should necessarily be deemed free of this limitation.

Handley also appeared unconvinced by the views of Gray (for SFG) in his 2014 report on this limitation, noting in his September 2014 report:³⁹⁰

...there remains a residual concern as to whether the composition of investors around the ex-dividend date is reflective of the composition of (long term) investors in the benchmark market who supply capital to firms (including to the benchmark efficient

³⁸⁷ M. Lally, *The estimation of gamma*, 23 November 2013, p. 20.

³⁸⁸ M. Lally, *The estimation of gamma*, 23 November 2013, p. 26.

³⁸⁹ M. Lally, *The estimation of gamma*, 23 November 2013, p. 29.

³⁹⁰ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 44.

entity) and therefore whether the implied value of imputation credits around ex-dividend dates is representative of the value of imputation credits to the market as a whole.

Handley reiterated this view in his April 2015 report.³⁹¹

Finally, we note the South Australian Centre for Economic Studies recommended disregarding evidence from all dividend drop off studies due to this limitation entirely:³⁹²

The studies included by SFG consulting in their review of estimates for theta all appear to be of good quality and are undertaken in a manner which reflects the current best practice in the literature.

However, purchase of stocks in any given period is dominated by a relatively small share of equity holders who engage in active trading equities. Overall ownership of equities, however, is dominated by those who trade infrequently. As such there is no reason to believe that the value placed on franking credits by active traders of equities is the same as that placed on franking credits by those who trade infrequently.

On the third point, listed firms are also only part of the stock of Australian equity. Data from the ABS's 'Australian National Accounts: Financial Accounts' indicates that as at June 2014 unlisted shares comprised 44.5 per cent of the total value of shares in private firms (rising to 49.7 per cent if equity in government non-financial corporations is included).

Due to the unrepresentative nature of both traders in stock, and the ownership of listed stock, we believe that dropped dividend studies cannot be assumed to be informative about the value placed by median investor in the 'benchmark efficient entity'. As such, **we recommend that estimates derived from dropped dividend studies be disregarded.**

We consider that there is sufficient evidence in the expert views quoted above to suggest that SFG's dividend drop off study is subject to this limitation.

These studies can be data intensive and employ complex and sometimes problematic estimation methodologies.

We consider the idea that the SFG dividend drop off study is data intensive is evident in pages 4 to 14 of the 2011 version of that study and section 3 of the updated 2013 version.³⁹³

³⁹¹ J. Handley, *Report prepared for the Australian Energy Regulator: Further advice on the value of imputation credits*, 16 April 2015, p. 18.

³⁹² SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015, p. 17.

³⁹³ SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011; SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

Regarding whether the SFG study employs a complex and potentially problematic estimation methodology, we have regard to the views on dividend drop off studies expressed by academics and other regulators. A wide selection of these views is set out in section A.14.6 below. All but one of these views were expressed subsequent to SFG's dividend drop off study. It is not clear why experts would continue to canvass the methodological issues associated with dividend drop off studies in general if SFG's dividend drop off study overcame these issues. This notwithstanding, we also have regard to the Tribunal's acceptance of the results from SFG's dividend drop off study in 2011.

Therefore, we consider that there is evidence both for and against the idea that this limitation applies to SFG's dividend drop off study.

It is only the value of the combined package of dividends and imputation credits that can be observed in the market, and there is no consensus among experts on how to separate the value to the market of dividends from the value to the market of imputation credits.

Firstly, we note that it is strictly incorrect to say that the value of the combined package of dividends and imputation credits can be 'observed'. This is because this value is actually estimated based on assumptions about what the ex-dividend price change represents. In any case, because imputation credits are only ever distributed with franked dividends, all dividend drop off studies must make this allocation/separation. Therefore this limitation applies to SFG's dividend drop off study.

A.14.6 The views of academics and other regulators on dividend drop off studies

A number of academics and regulators have recognised the limitations of dividend drop off studies. Moreover, many of these concerns continue to be expressed even after the first version of SFG's dividend drop off study in 2011 (which was relied upon by the Tribunal in the Energex matter), and the 2013 update of that study (which was relied upon in service providers' current proposals).³⁹⁴ The comments of academics and other regulators support the lesser reliance we place on SFG's dividend drop off study in estimating the utilisation rate.

Some academics have identified a number of practical and methodological issues:

- Cannavan, Finn and Gray (2004).³⁹⁵

...it is unlikely that the traditional ex-dividend day drop-off methodology will be able to separately identify the value of cash dividends and imputation credits.

³⁹⁴ SFG, *Dividend drop-off estimate of theta, Final report, Re: Application by Energex Limited (No 2) [2010] ACompT 7*, 21 March 2011; Australian Competition Tribunal, *Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9*, May 2011, para. 38; SFG, *Updated dividend drop-off estimate of theta: Report for the Energy Networks Association*, 7 June 2013.

³⁹⁵ D. Cannavan, F. Finn, S. Gray, 'The value of dividend imputation tax credits in Australia', *Journal of financial economics*, vol. 73, 2004, p. 175.

- **Siau, Sault and Warren (2013):**³⁹⁶

Despite a large number of studies, the market value of imputation credits remains broadly disputed (see, for example, Gray and Hall, 2006; Lally, 2008; Partington and Truong, 2008; Gray, 2008). The majority of empirical studies have drawn inferences by focusing on the pricing of dividend distributions. This includes analysis of stock price declines around ex-dividend dates ('ex-dividend drop-off studies'); and comparative pricing of instruments that differ only in their dividend and imputation entitlements. These studies are subject to a number of issues, such as imprecise estimates that may be influenced by the presence of short-term traders arbitraging dividends and limited samples in the case of comparative studies.

...

The variability of estimates joins with issues over design to cast some doubt over estimates for the market value of imputation credits arising from drop-off studies. A key methodological issue is that price movements around ex-dividend events encapsulate not only the tax differential effect, but may also reflect the presence of traders seeking to arbitrage dividends and noise associated with trading activity around ex-dividend dates. Drop-off ratios can be distorted by the need to compensate traders for transaction costs (Eades, Hess, and Kim, 1984; Lakonishok and Vermaelen, 1986; Karpoff and Walkling, 1988, 1990; Bali and Francis, 2011); or the risk involved (Fedenia and Grammatikos, 1993; Grammatikos, 1989; Heath and Jarrow, 1988; Michaely and Vila, 1995). Transaction costs may be substantial, and can drive the drop-off ratio below one (Kalay 1982, 1984; Boyd and Jagannathan, 1994). Market microstructure effects may also complicate estimation of market value, as discrete tick sizes can bias drop-off ratios downwards (Dubofsky, 1992; Bali and Hite, 1998).

A further key methodological issue is the difficulty in attributing the observed drop-off value between cash dividends and imputation credits. Dempsey and Partington (2008) nominate this identification problem as a serious limitation of ex-dividend drop-off studies. Drop-off studies are afflicted by multicollinearity issues. Cannavan et al. (2004) and Bellamy and Gray (2006) reveal that imputation credits are nearly perfectly collinear with their respective cash dividends. This is exacerbated by corporate tax rates being almost constant and partially-franked dividends being the exception rather than the norm. Gray (2008) points out that the value attributed to imputation credits is conditional on the assumed value on cash dividends by design, to the extent that they are supplementary components within a single package. This notion is reinforced by evidence of offsetting variation in the value attributed to dividends and imputation credits across samples (see Bellamy and Gray, 2006; Gray, 2008).

- **McKenzie and Partington (2013):**³⁹⁷

³⁹⁶ K. Siau, S. Sault and G. Warren, 'Are imputation credits capitalised into stock prices', *ANU working paper*, 18 June 2013, p. 2 and pp. 8–9.

For over fifty years, academics have been trying to satisfactorily measure the market value of dividends. So far we have not reached a generally agreed consensus on the value or the method of measurement, which indicates the difficulty of the task. Thus, the basic task of measuring the package value of dividends and franking credits is a major challenge.

It is well understood that the market value of the package of dividends and franking credits mixes together not just dividends and credits, but the effects of income and capital gains taxes, transactions costs, discounting for time and risk and possibly market microstructure effects as well. This leads to what we call the allocation problem. That is how we attribute the value consequence of these effects between the value of dividends and the value of franking credits. All methods of splitting up the package value of dividends and franking credit involve an explicit or implicit allocation. The problem with allocations is that by their nature they are arbitrary. Thus, separating out the estimated value of the franking credits is also a major challenge.

One approach to the estimation of the value of dividends and franking credits is to measure the price drop when the stock goes ex-dividend. It is on the basis of [SFG's dividend drop off study] that theta was taken to be 0.35 and hence the value of gamma is given by 0.7×0.35 , which rounded up furnishes a value of 0.25 or 25%.

We have several problems with this estimate of gamma. First, given the difficulties in estimating theta, the estimate of theta and hence gamma should not be based on one study, or on one method. Rather, it should be triangulated across multiple studies and multiple methods. In particular the estimate of theta should not just be reliant on ex-dividend studies, which are afflicted with many problems. This issue is discussed extensively in McKenzie and Partington (2010). In this paper, we argue that it is very unlikely that an accurate and reliable estimate of the value of franking credits will come out of a traditional ex-dividend study due to a number of problems including the extremely noisy data (it is not unusual to have a price movement up or down of more than twenty times the dividend on the ex-dividend day). Results are also sensitive to data filtering, the choice of estimation method and whether the ex-dividend day price is measured at the open or close of trading. Biased results can also arise from market microstructure effects such as bid-ask bounce. There are also abnormal volumes and abnormal returns about the ex-dividend day, which clearly indicate that trading is abnormal about the ex-dividend date. Consequently, it is an open question whether an ex-dividend study gives a dividend and franking credit valuation that reflects the clientele of investors normally holding the stock. Finally, there are conceptual and econometric problems. For example, multicollinearity in the regression equation used to separate the value of the dividends and franking credits. Reflecting the inaccuracy of the ex-dividend method and associated regression technique, the standard errors of the estimates from the regression equations are typically quite large.

- Lally (2013):³⁹⁸

³⁹⁷ M. McKenzie and G. Partington, *Report to the Queensland Resources Council: Review of Aurizon Network's draft access undertaking*, 5 October 2013, pp. 33–34.

³⁹⁸ M. Lally, *The estimation of gamma*, 23 November 2013, p. 20.

The AER's third approach to estimating U involves estimates derived from market prices (AER, 2013, pp. 133-134, 239-247). The AER does not consider that these estimates are useful for a number of reasons. In respect of dividend drop-off studies, these include evidence that trading activity around dividend ex-days is abnormal, that correction is required for market movements, and the sensitivity of results to data, outliers and model choices. More generally these problems include the difficulties in separating the values of franking credits and dividends in these studies, the wide range of empirical results from such studies, the possibility of bias from 'bid-ask bounce, and the exposure of such estimates to the tax circumstances and transactions costs of tax arbitrageurs. Many of these problems are manifest in high standard errors on the estimates of the coefficients.

I concur with all of these concerns, and I have additional concerns about these studies or their interpretation.

Other academics have focussed on the specific issue of whether dividend drop off studies produce results that are reflective of investors in the market as a whole:

- Handley (2014):³⁹⁹

The second issue also concerns the correct interpretation of the regression coefficient – but at a more fundamental level. Adjusting the coefficient to remove the impact of differential personal taxes and risk gives us the (after-company-before-personal-tax) value of a dollar of imputation credits but the question is value to whom? In other words, there remains a residual concern as to whether the composition of investors around the ex-dividend date is reflective of the composition of (long term) investors in the benchmark market who supply capital to firms (including to the benchmark efficient entity) and therefore whether the implied value of imputation credits around ex-dividend dates is representative of the value of imputation credits to the market as a whole.

- South Australian Centre for Economic Studies (2015):⁴⁰⁰

In order for a dividend drop-off study to provide useful evidence of the value of franking credits to a representative owner of equity three conditions need to be met:

- the studies being drawn on need to be of high quality;
- the equity holders who buy shares in the period after dividends are issued need to be representative of the whole class of equity holders; and
- the equity for which data is drawn on for the dividend drop off study needs to be representative of the overall stock of equity in the Australian economy

We would contend that only the first of these three conditions is definitely met.

³⁹⁹ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 44.

⁴⁰⁰ SA Centre for Economic Studies (2015), *Independent estimate of the WACC for SA Power Networks 2015 to 2020: Report commissioned by the SA Council of Social Services*, January 2015, pp. 16–17.

The studies included by SFG consulting in their review of estimates for theta all appear to be of good quality and are undertaken in a manner which reflects the current best practice in the literature.

However, purchase of stocks in any given period is dominated by a relatively small share of equity holders who engage in active trading equities. Overall ownership of equities, however, is dominated by those who trade infrequently. As such there is no reason to believe that the value placed on franking credits by active traders of equities is the same as that placed on franking credits by those who trade infrequently.

On the third point, listed firms are also only part of the stock of Australian equity. Data from the ABS's 'Australian National Accounts: Financial Accounts' indicates that as at June 2014 unlisted shares comprised 44.5 per cent of the total value of shares in private firms (rising to 49.7 per cent if equity in government non-financial corporations is included).

Due to the unrepresentative nature of both traders in stock, and the ownership of listed stock, we believe that dropped dividend studies cannot be assumed to be informative about the value placed by median investor in the 'benchmark efficient entity'. As such, **we recommend that estimates derived from dropped dividend studies be disregarded.**

The limitations identified have been recognised by other regulators and reflected in their respective approaches to determining the utilisation rate:

- QCA (2014):⁴⁰¹

Given the concerns identified, the QCA does not prefer an estimate of 0.35 for the utilisation rate. The estimate is the result from only one study from one class of evidence, and this class of evidence suffers from serious conceptual and empirical limitations. Therefore, the QCA has assessed and given more weight to alternative approaches to estimate the utilisation rate.

- The ERA, which until the publication of a revised draft Guideline in November 2014 preferred the use of dividend drop off studies, stated:⁴⁰²

...dividend drop-off studies are known to suffer from a variety of estimation issues that result in the estimated value of theta being vulnerable to the dividend sample, parametric form of the regression equation and regression technique used. As a consequence, the Authority is of the view that it is more appropriate to use a range of dividend drop-off studies.

⁴⁰¹ Queensland Competition Authority, *Cost of capital: Market parameters*, August 2014, pp. 27–28.

⁴⁰² Economic Regulation Authority, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, para. 920. As noted, the ERA has published a revised draft Guideline, which no longer prefers the use of dividend drop off studies: Economic Regulation Authority, *Review of the method for estimating the weighted average cost of capital for regulated railway networks, Revised draft decision*, 28 November 2014.

A.15 Revised consideration of the conceptual goalposts approach

We placed a degree of reliance upon the conceptual goalposts approach when coming to an estimate for the utilisation rate in the Guideline. However, we do not rely on the conceptual goalposts approach in this final decision. This is mainly to be consistent with Handley's advice on the conceptual framework, which we have accepted in making this final decision. Further, we do not consider this to be a significant departure from the Guideline given we placed only limited reliance on the conceptual goalposts approach in the Guideline. We note we do not consider Lally's support of the conceptual goal posts approach, upon which we do not rely, supports the proposition that our conceptual analysis is confused and unsafe.⁴⁰³ We also note the preference for Handley's advice over Lally's is to the benefit of the service providers as it results in a lower estimate of the value for imputation credits than would have been the case had we followed Lally's advice on this issue. Our revised consideration of the approach is set out in this section.

A.15.1 Description of the approach

The conceptual goalposts approach to informing estimates of the utilisation rate is based on a test devised by Lally to consider the 'reasonableness' of such estimates. To explain the approach, however, we must first explain some theoretical aspects of the modelling framework that we employ. The starting point for a CAPM is a given set of assets and a given set of investors who hold them.⁴⁰⁴ In the Officer CAPM, the given set of assets is the domestic market and Lally considered that the given set of investors is domestic investors; that is, the domestic market is assumed to be 'fully segmented' from international markets.⁴⁰⁵

Lally considered it paramount to estimate the utilisation rate consistently with the underlying theoretical framework.⁴⁰⁶

In my view, the most important requirements in selecting a methodology for estimating U [the utilisation rate] are that the estimate be consistent with the definition of U , as a value-weighted average over the utilisation rates of all investors who are relevant to the Officer CAPM, that the parameter estimate is likely to give rise to an estimated cost of equity from the Officer model that lies within the bounds arising from either complete segmentation or complete integration of equity markets, and that the estimate is reasonably precise.

The importance of theoretical consistency led Lally to recommend that the optimal estimate of the utilisation rate is 1, on these conceptual grounds.⁴⁰⁷

⁴⁰³ SA Power Networks, *Revised regulatory proposal 2015-20*, July 2015, p. 373.

⁴⁰⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 22.

⁴⁰⁵ Note that the standard Sharpe–Lintner CAPM also assumes segmented capital markets. In effect, the Officer CAPM is the standard Sharpe–Lintner CAPM adjusted to incorporate imputation credits.

⁴⁰⁶ Lally, *The estimation of gamma*, 23 November 2013, p. 3.

⁴⁰⁷ Lally, *The estimation of gamma*, 23 November 2013, pp. 3 and 4.

In respect of U , there are five possible approaches to estimating it. The first of these arises from the definition of the parameter as a weighted average across all investors; coupled with ignoring foreigners (consistent with the Officer CAPM), this yields an estimate of 1 (the utilisation rate of local investors).

...

Using the three criteria described above, my preferred estimate is 1 from the first approach...

An alternative to the 'domestic' Officer CAPM is an international CAPM, whereby the relevant set of assets is all assets in the world and the relevant set of investors is all investors in the world; that is, the domestic market is assumed to be 'fully integrated' with international markets. Using this model would require inputs based on international benchmarks, including a utilisation rate of 0 because the proportion of global investors eligible to make use of domestic imputation credits is close to zero.

Both in the Guideline and in this final decision, we propose an approach to estimating the utilisation rate that recognises foreign investors to the extent that they invest in the Australian market. Thus, our approach sits between the alternative positions of Lally's interpretation of the Officer framework (where only domestic investors are recognised) and an international framework. This was recognised by Lally:⁴⁰⁸

The AER (2013, section 8.3.1, page 120) also includes foreign investors to the extent that they invest in the Australian market, to reflect the empirical reality of their existence. However this involves use of a model (the Officer CAPM) that assumes that national markets for risky assets are segmented along with the definition for a parameter (U) that is inconsistent with this model.

Lally considered the overarching concern is whether the inconsistency between input parameters and model definitions might produce an unreasonable outcome. That is, even if the individual components are each justified in isolation, the combination might produce an overall result that is no longer reasonable.⁴⁰⁹

The Officer (1994) CAPM implicitly assumes that national markets for risky assets are completely segmented, in the sense that investors are precluded from purchasing foreign risky assets. However, most estimates of U reflect the presence of foreign investors. Consequently the potential for economically unreasonable estimates of the cost of equity arises, i.e., values that lie outside range of those arising under complete segmentation and complete integration of national markets for risky assets. In this event the partial recognition of foreign investors would effectively constitute cherry-picking that maximises the revenue or price cap, i.e., ignoring foreign investors when it is favourable to regulated firms (choosing the CAPM) and also estimating U by a methodology that reflects the presence of these investors when it is also favourable to

⁴⁰⁸ Lally, *The estimation of gamma*, 23 November 2013, p. 14.

⁴⁰⁹ Lally, *The estimation of gamma*, 23 November 2013, p. 38.

regulated firms. We therefore assess whether various estimates of U lead to this outcome.

To do so it is necessary to consider the implications for the cost of equity of complete integration and complete segmentation of national markets for risky assets.

Lally pointed out that, while there is some uncertainty about the return on equity in a partial integration scenario, it must lie within two boundaries. At one end, there is the return on equity that would be required if the domestic market was fully segmented from international markets. At the other extreme is the return on equity if the capital market was fully integrated with international markets. To assess whether the approach in the draft Guideline passed this test, Lally estimated for the average Australian firm:⁴¹⁰

- The return on equity under segmentation, using a domestic-only (segmented) CAPM populated with domestic parameters. That is, a market risk premium for a segmented Australian market, an equity beta relative to the Australian market, and a utilisation rate of 1.
- The return on equity under integration, using an international CAPM (based on Solnik, 1974) populated with global parameters. That is, using a market risk premium for an integrated (global) market, an equity beta relative to the global market and a utilisation rate of 0.
- The return on equity using a segmented (Officer) CAPM, populated with parameters that accord with our 'partially integrated' market definition. That is, a market risk premium and an equity beta that reflect the domestic market, but recognising foreign investors to the extent that they invest in the domestic (Australian) market.

Lally's aim was to ascertain what utilisation rates under the third scenario will result in a return on equity that lies between the two 'goalposts' represented by the return on equity from the first two scenarios (full segmentation and full integration). This is how Lally presented the results of this assessment:⁴¹¹

In summary, in the face of an inconsistency between the use of the Officer model (which assumes that national equity markets are segmented) and an estimate of the utilisation rate on imputation credits that is less than 1 (which reflects the presence of foreign investors), a minimum requirement is that the results from this approach should lie within the bounds arising from complete segmentation of national equity markets and complete integration (to ensure that the cost of capital results are consistent with some scenario regarding segmentation or integration). However, estimates of U that are significantly less than 1 fail this test in virtually every case examined, and are therefore deficient. In effect, combining Officer's CAPM with a utilisation rate that is significantly less than 1 constitutes a defacto form of cherry-picking of parameter values and models that maximises the price or revenue cap for regulated businesses. By contrast, if the Officer model were combined with a

⁴¹⁰ Lally, *The estimation of gamma*, 23 November 2013, pp. 38–47.

⁴¹¹ Lally, *The estimation of gamma*, 23 November 2013, pp. 46–47.

utilisation rate on imputation credits of 1, or close to it, the test described here would be satisfied in most cases. All of this suggests that, if the Officer model is used, the only sensible estimate of the utilisation rate is at or close to 1.

This analysis contributes to Lally's conclusion that the utilisation rate should be 1 or close to it. To refine this estimate, we undertook further analysis using the approach set out by Lally. This indicated that utilisation rates between 0.8 and 1 generate a reasonable return on equity (that is, one that lies between the goalposts) in the majority of permutation scenarios. Further, when interpreting this sensitivity analysis, it is also relevant to consider whether each particular scenario has arisen from an extreme permutation—that is, if the individual parameters are all at their highest (or lowest) possible values. Such a scenario is much less likely than a permutation where most of the parameters are at their expected values. A utilisation rate of 0.6 or below generates very few return on equity results that are reasonable (between the goalposts), and these all arise at extreme permutations.

In conclusion, in the Guideline we considered that the conceptual goalposts approach supported an estimate of the utilisation rate in the range 0.8 to 1. We considered also that it suggested that a utilisation rate of 0.6 or below was unreasonable.

A.15.2 Advice received since the Guideline

In advice received since the Guideline's publication, Handley advised that he does not consider the conceptual goalposts approach to be a reasonable approach to estimating the utilisation rate:⁴¹²

I do not consider the conceptual goalpost approach to be a reasonable approach to estimation as first, it is motivated by a faulty premise – that the CAPM suggested by Officer implicitly assumes that national markets for risky assets are completely segmented in the sense that all domestic assets are held by domestic investors only and all foreign assets are held by foreign investors only – and second, that it seeks to sure up one uncertain estimate by reference to two other estimates (the “goalposts”) which themselves are subject to substantial uncertainty.

Handley expanded on his first point elsewhere in his advice:⁴¹³

Lally (2013) adopts an unnecessarily narrow interpretation of segmentation in suggesting that foreign investors should be excluded completely. But once you choose a proxy for the market portfolio you define not only the set of assets that are relevant for pricing purposes but you also define the set of investors that are relevant for pricing purposes – in other words, it is a joint assumption. Lally's suggestion that we include the full set of n assets but only a subset of the of m investors not only contradicts the starting point of the CAPM but also does not accord with the reality that foreign investors are present in and influence the pricing of assets in the

⁴¹² J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 31–32.

⁴¹³ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, p. 23.

domestic market. This notion of (complete) segmentation – that only domestic assets are held by domestic investors – is an assumption of Lally but is not an assumption of the CAPM.

Thus, Handley's first point is that he does not consider the return on equity yielded by a domestic CAPM that ignores foreign investors to be a reasonable goalpost against which to assess the return on equity yielded by our approach. Handley's second point appears to accord closely with his view that estimation of the utilisation rate and the value of imputation credits is imprecise.⁴¹⁴

Gray (for SFG) also raised concerns with the approach, and a number of these have been responded to by Lally.⁴¹⁵

⁴¹⁴ J. Handley, *Report prepared for the Australian Energy Regulator: Advice on the value of imputation credits*, 29 September 2014, pp. 3 and 32.

⁴¹⁵ SFG, *An appropriate regulatory estimate of gamma*, 21 May 2014, pp. 88–93; M. Lally, *Review of submissions to the QCA on the MRP, risk-free rate and gamma*, 12 March 2014, pp. 31–33.