Regulated Australian Electricity Networks - Analysis of rate of return data published by the Australian Energy Regulator

Report for the Agriculture Industries Energy Taskforce

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This document represents a first draft for the purpose of seeking comments and feedback from a range of parties including the AER and consumer groups, including the Consumer Reference Group for the AER's 2018 ROR Guideline Review. This draft has been prepared with limited resources and additional resources are being sought. Comments on this draft are welcome and may be incorporated into a future revised and amended draft.

Glossary

ACCC	Australian Competition and Consumer Commission
AER	Australian Energy Regulator
2013 ROR Guideline	The Guideline setting the allowed network, ROR against which the 2018 AER ROR data may be assessed
2018 ROR Guideline	The output from the AER's 2018 ROR Guideline Review process, currently in Draft form
Allowed ROR	WACC times Opening RAB plus adjustment for depreciation and capital expenditure per the PTRM
Binding instrument	The proposed changes to the NEL under which the ROR Guideline would become a binding instrument
CAP model	Capital asset pricing model – the broad type of theoretical model specified in the Draft 2018 ROR Guideline for setting the allowed ROR.
Closing RAB	The RAB value at the end of each FY – the denominator used for AER's reporting of the rate of return
EBIT	Earnings before interest and tax – the common numerator used for deriving allowed and actual percentage returns
Economic profit	The difference between actual returns and efficient returns, the latter incorporating a 'normal' profit that is sufficient but no more than sufficient to fund suppliers of capital inputs, including a margin for systematic risk. A business making normal profits will remain in the industry, and will only exit the industry if it is making losses in the long run. Depending on their source, economic profits are super-normal and reflect monopoly or other sources of pricing power.
FY	Financial year – varies between networks
Model error	Errors arising from the CAP model under-specifying real world complexity
NEL	National Electricity Law
NEO	The National Electricity Objective
NER	National Electricity Rules operating under the NEL
Opening RAB	The RAB value at the start of each FY and with an adjustment used by the PTRM as the denominator for setting the allowed rate of return
ODRC	A method for setting the Opening RAB, where excess capacity relative to maximum demand is optimised
Parameter estimation error	Errors arising from the fact the CAP model requires inputs that are not observable and therefore applies proxy parameters, likely to diverge from unobservable parameters

PTRM	Post tax revenue model used by the AER to derive the allowed rate of return using a combination of the CAP model and the Opening RAB plus adjustments
RAB	Regulated Asset Base
ROR data	Data published on the rate of return by the AER in September 2018
The ROR	EBIT divided by closing RAB (per the AER data)
The ROR objective	As stated in the Rules, implies that WACC times Opening RAB plus adjustment (per the PTRM) should more or less equal EBIT divided by Opening RAB plus adjustment.
WACC	Weighted average cost of capital

Executive summary

Introduction

The present report on Australian Energy Regulator (AER) network rate of return data has been commissioned by the Agriculture Industries Energy Taskforce (the Taskforce).[1] The Taskforce consists of 14 organisations spanning different parts of the agricultural sector across multiple jurisdictions.

The Taskforce represents a sector of the economy sensitive to electricity prices. This sensitivity is reflected in food and fibre prices domestically. It also influences the international competitiveness of these products and national revenues from food and fibre exports. Respondents to a survey undertaken for the Taskforce earlier this year reported an average annual electricity bill of $30,000 per annum.

Network prices represent around half of a typical retail bill. Networks are capital intensive businesses – by far the largest input cost is capital (depreciation and the rate of return). The rate of return (ROR) represents the largest part of the network component of retail bills. If actual returns exceed allowed returns, then retail prices would not reflect efficient network costs and bills will be less affordable.

Key findings

Our analysis of the AER's rate of return data strongly implies that the method used by the AER to determine the allowed rate of return, as specified in the Draft 2018 ROR Guideline, materially over-estimates the systematic risk exposure of the networks. As a result, the rate of return Objective (ROR Objective) in the National Electricity Rules (NER) is being breached. This is also a breach of the National Electricity Objective (NEO).

The ROR Guideline uses a theoretical model to estimate the risk exposure of the regulated firms, based on a very limited sample. The model does not refer to any data on actual returns.[2]

In September 2018, the AER published data on *the* (actual) 'return on assets' for the 18 electricity network entities[3] for the four financial years preceding 30 June 2017. These allow an empirical estimate of the economic profit within actual returns, compared with the allowed rate of return (the estimated weighted average cost of capital or WACC).[4]

Over this four year period the aggregate actual returns significantly exceed the $21.4 billion allowed or normal returns by more than $2.1 billion or 9.9 percent. Excluding Ausgrid these economic or monopoly profits rise to more than $2.6 billion or 14.6 percent of normal returns of $18.1 billion.

In standard economic theory economic profit is defined as the difference between total revenue and total economic cost, that is, the sum of explicit costs plus implicit costs including a 'normal' profit to compensate for systematic risk. Over a period of time, a business making normal profits will remain in the industry and will only exit the industry if it is making losses in the long run. If, over time, total revenues exceed total economic cost, then the business may be described as

[1] See https://agenergytaskforce.org.au/

[2] See the technical notes in Section 5

[3] Some entities such as Ausnet hold both regulated distribution and transmission networks.

[4] See the technical notes in Section 5

making super normal profits. Depending on the source of such profits, they may be described as monopoly profits.

The data published by the AER (included in this report in the technical notes) understates the variances between allowed and actual returns. The data is presented only in terms of percentages and actual EBIT dollar data is not provided. This minimises the perception of super-profits in two ways.

First, the aggregate variance in percentage terms is less than one per cent, which may seem immaterial. Only by reversing the calculation, using the regulated asset base (RAB) to obtain allowed and actual returns in dollar values, is the difference shown to be clearly material at more than $2.1 billion. As noted above, this is $2.1 billion above the allowed returns of $21.4 billion including normal profit.

Second, the AER has derived the percentage actual return on assets using the closing RAB. For consistency we have also used closing RAB in our reverse calculation. However, the allowed ROR in the AER's Post Tax Revenue Model (PTRM) is applied to the opening RAB adjusted for depreciation and capital expenditure – crudely an average of opening and closing RAB. Where RAB is increasing, this means a larger denominator applied in the calculation of actual ROA results in a smaller percentage number and smaller economic profit in percentage terms. As a result, the estimates calculated in this report under-state the actual economic profit.

Except under limited conditions (discussed below), economic profits are inefficient and unfair. They transfer wealth from consumers to networks and result in deadweight losses, reducing Gross Domestic Product and the international competitiveness of Australian exporters. Economic profits may also lead to investment by consumers in substitute assets and services at higher levels than otherwise, reducing the utilisation of network assets. As a result, economic profits reduce dynamic efficiency or economic efficiency over the long run.

The bill impact of the observed economic profits is material – perhaps adding 3 - 5 percent to the typical retail bill.[5] This means that, for a typical irrigator paying $30,000 p.a., the excess network component in retail prices could be in the region of $1,500 per annum and $6,000 over the four year period being reported.

The test of the Draft ROR Guideline is whether the proposed changes are sufficient to correct the errors observed under the 2013 Guideline. We recommend that the AER should undertake this analysis before a 2018 Guideline is finalised.

The Rate of Return Consumer Reference Group highlighted that the existing Guideline is an error reinforcing process, not an error correcting process, precisely because actual returns are not measured.[6] This may be contrasted with New Zealand's economic value regulation of monopolies including energy network companies, where economic profits earned in one year are returned to consumers in the following year so that on average consumers pay the economically efficient cost of the provision of regulated services. Under such regulation, more than $2.1 billion would have been returned to Australian electricity consumers.

The 2018 Guideline should require regular reporting of actual returns, consistent with, for example, the ACCC's regulation of airports[7]. The Guideline should also establish a mechanism for amending parameter inputs used under the Guideline methodology, to align with empirical data. In other words, the Guideline should establish the principle that empirical data is superior to the outputs from a

5 In part because the economic profit component in regulated network prices may also increase retailer mark ups on network prices.

6 Rate of Return Consumer Reference Group, Submission to the Australian Energy Regulator Rate of Return Guideline Review, May 2018 https://www.aer.gov.au/system/files/Consumer%20Reference%20Group%20submission.pdf

7 See https://www.accc.gov.au/media-release/airport-profits-continue-to-grow

theoretical model and the model inputs need to be modified where there is misalignment with empirical data.

Consideration could also be given to the development of a rule change proposal under which economic profits other than those attributable to shareholders (due to higher productivity or performance) would be returned to consumers in the following period. There is no inconsistency between this proposal and the concept of incentive regulation.[8] Nevertheless, some tests would need to be developed to distinguish between earned and unearned economic profits (similar to the framework used by the New Zealand Commerce Commission).

A breach of the ROR Objective is also a breach of the NEO, under the National Electricity Law (NEL). The ROR Objective is useful in that it directly addresses the issue of whether actual returns are consistent with the NEO.

There is, however, an active proposal before the COAG Energy Council to remove the ROR objective from the Rules, via a change to the NEL as part of the package to change the status of the ROR Guideline. This would have the effect of institutionalising the existing flawed methodology for setting the allowed rate of return until there is a review of the 2018 Guideline sometime in the mid-2020s.

There is a further source of economic profits in addition to the economic profits discussed above. The AER analysis assumes that RABs are efficient. Under the present NER, the RAB is rolled forward, whereas under the forerunner to the NER (the National Electricity Code), RABs were typically set using an Optimised Depreciated Replacement Cost (ODRC) method.

The 2018 ACCC Electricity Supply Prices Inquiry found that RABs for networks in NSW, ACT and Queensland networks (both distribution and transmission) should be optimised (reduced).[9] It is also possible RABs for private sector firms are also excessive but the ACCC did not broach the topic of optimising the RABs of private firms. On the ACCC's analysis, economic profits are substantially greater than measured in this report.

Any excess in current RABs are in part a product of historical economic profits creating strong incentives to over-invest in capacity ('gold plate'). The potential on-going presence of economic profits under the Draft 2018 ROR Guideline means incentives may remain for the entire network sector to over-invest in future network capacity. This is a concern given that, according to the AEMO's 2018 Integrated System Plan, replacement generation requires substantial investment in new regulated network capacity. Future over-investment in network capacity would increase the cost of early action to decarbonise the Australian economy (and therefore possibly delay this).

Economic profits flow to equity holders. Under full profitability reporting, it would be possible and desirable for the AER to estimate the actual return on equity (total returns minus actual debt servicing costs), alongside the return on assets. Data for debt servicing costs should be reliable and accessible.

A large and increasing proportion of equity in regulated networks is now held by parent entities outside Australia. This suggests that a significant portion of economic profits from electricity networks are leaving Australia.

8 The calculations here, for example, are based on actual returns after allowing for incentives.

9 See https://www.accc.gov.au/regulated-infrastructure/energy/electricity-supply-prices-inquiry

1. Publication of returns data and review of rate of return Guideline

1.1 Introduction

The Australian Energy Regulator (AER) is undertaking a review of the 2013 Rate of Return Guideline. The Guideline applies to a set of 33 Australian energy networks subject to price/revenue regulation by the AER.

Section 28V(1) of the National Electricity Law (NEL) states that:

> *the AER may prepare a report on the financial performance or operational performance of 1 or more network service providers in providing electricity services.*

NEL s. 28V(2)(a) specifies the content of a NSP performance report may:

> *(a) deal with the financial or operational performance of the NSP in relation to:*
>
> *(iii) the profitability and efficiency of NSPs in providing electricity network services.*

In September 2018, the AER published data on *the* 'return on assets', for the 18 electricity network entities,[10] for the year ending 30 June 2017, and the preceding three financial years, compared with the estimated weighted average cost of capital (WACC).[11]

The AER previously published some information on the profitability of network businesses:

- AER, Electricity Distributors 2011-13 Performance Report (June 2015)
- AER, Transmission Network Service Providers Electricity Performance Report 2010-11 (July 2013.

No recent rate of return data has so far been made available for gas networks. Aside from a brief technical report, there is no accompanying AER report analysing and commenting on variances between the *allowed* rate of return and *the* rate of return.

1.2 What is the rate of return Guideline?

The ROR Guideline forms a key component of revenue/price cap regulation. The purpose of revenue/price caps is to constrain energy networks, operating under the protection of statutory monopolies, from generating returns (profits) that *exceed* the returns necessary for capital funders (debt and equity) to finance network assets, including an adequate margin for risk. That is, earning economic or super-normal (monopoly) profits.

The Rate of Return Objective (ROR Objective) in the National Electricity Rules (NER) is:

The allowed rate of return objective is that the rate of return for a [regulated network] is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the [service provider] in respect of the provision of [regulated services].

The formulation with our emphasis highlights that the *allowed* rate of return is distinguishable from *the* (actual) rate of return. Variances between the two may exist and incentive regulation reflects the possibility such variances may be efficiency enhancing.

[10] Some entities such as Ausnet hold regulated distribution and transmission networks.

[11] Available at https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/profitability-measures-for-electricity-and-gas-network-businesses.

Under workably efficient competition, or effective regulation, *the* ROR is proportional to systematic or non-diversifiable risk. This means that, for the typical regulated entity in the typical year, returns are sufficient, but no more than sufficient, to fund efficient interest costs and returns to equity holders. Under incentive regulation, this means that more efficient firms may be able to earn economic profits while less efficient firms may experience economic losses.

In a publication dated February 2018, the AER noted that:[12]

The AER does not currently have in place a performance measurement framework to provide a clear picture of the profitability of regulated electricity and gas businesses.

The centrepiece of the ROR Guideline is a methodology for determining, *ex ante*, the allowed rate of return. The data for *the* (actual) rate of return provide the empirical test of whether the theoretical method set out in the 2013 ROR Guideline is delivering outcomes consistent with the ROR Objective. It also provides the empirical test as to whether changes to the method proposed in the AER's Draft 2018 ROR Guideline Determination would reduce risks of outcomes inconsistent with the ROR Objective.

The Rate of Return Consumer Reference Group highlighted that the 2013 ROR Guideline is an error reinforcing process, not an error correcting process, precisely because actual returns are not measured.[13]

In June 2018, the COAG Energy Council agreed to amend the National Electricity Law (NEL) to implement a binding instrument relating to the calculation of the rate of return on capital used in economic regulatory decisions made by the AER.[14] This means that errors in the Final 2018 ROR Guideline would not be able to be remedied until a review of the 2018 ROR Guideline due no earlier than 5 years after the binding instrument takes effect.

The AER data on the profitability of electricity network businesses allows an empirical estimate of the economic profit within actual returns compared with the allowed rate of return (the estimated weighted average cost of capital or WACC). This provides a test of the current Guideline, and whether historical economic profits in one year have been corrected or sustained, and therefore whether the risk of excessive prices for consumers may be locked in by proposed changes to the Guideline and the National Electricity Law.

It is unclear why the AER has not been reporting outcomes relative to the ROR Objective, since the ROR objective was introduced in around 2013. Before the release last week, the most recent profitability reporting was published in 2015 and related to outcomes ending in 2013. This may have reflected past AER resource constraints.

The data on network returns was not available (at least to the public) until September 2018. It has not been considered, for example, in the public discourse of AER's Review of the Rate of Return Guideline. This contrasts with New Zealand, for example, where the regulator publishes data on returns compared with allowed returns on a regular basis, and employs that data in revenue regulation.[15]

13 Rate of Return Consumer Reference Group, Submission to the Australian Energy Regulator Rate of Return Guideline Review, May 2018 https://www.aer.gov.au/system/files/Consumer%20Reference%20Group%20submission.pdf

14 See http://www.coagenergycouncil.gov.au/publications/binding-rate-return-guideline-1

15 See https://comcom.govt.nz/regulated-industries/electricity-lines/electricity-distributor-performance-and-data/profitability-of-electricity-distributors

2. Analysis of actual versus allowed network returns

2.1 Actual network returns significantly exceed allowed network returns

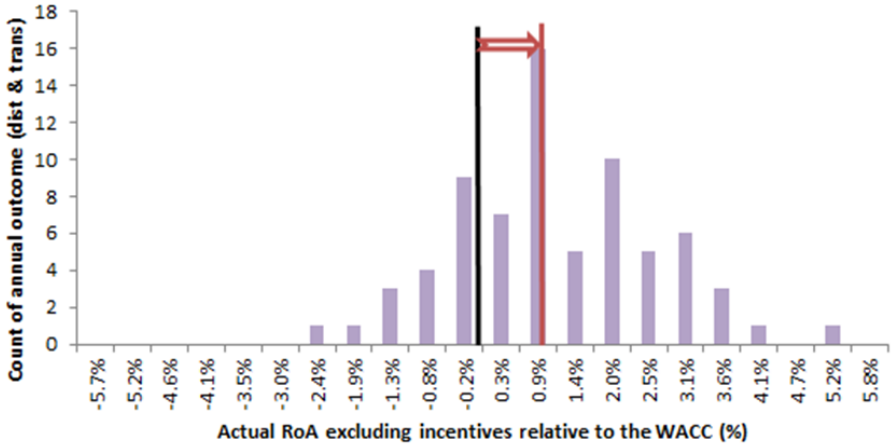
The AER's network returns data show that, over the four year period, actual network returns materially and consistently exceed allowed returns across the sector.[16]

This is illustrated in Figure 1 below that provides the frequency distribution of the difference between the actual and allowed returns in percentage terms, as published by the AER and reproduced in Table 5 in the technical notes below. Over a sample of 18 entities, some entities in some years would achieve positive economic profits while other entities in some years would achieve negative economic profits i.e. economic losses. If the ROR Objective were achieved, then for the average entity in the average year, the economic profit should be zero (i.e. there would be no material variance between the allowed and actual return). Graphically in Figure 1 the distribution of outcomes would be symmetrical about zero.

However, the actual data clearly illustrates this distribution is not symmetrical around zero economic profits. The average of actual returns (indicated by the red vertical line) is significantly higher than the average of allowed returns (zero on this axis, indicated by the black vertical line).

Across the 72 samples, if the ROR Objective were achieved, there would be no structural variance (positive or negative) between the allowed rate of return (black line) and the rate of return (red line). The observed variance represents structural economic profits. Except where economic profits are attributable to shareholders, they exceed returns commensurate with efficient financing costs, as required under the ROR Objective.

Figure 1 Distribution of actual compared to allowed returns



Source: Sapere visualisation of raw AER data.

While the percentage variance in Figure 1 may appear small, a variance on average of 0.82 per cent, this is nonetheless material and structural relative to the corresponding WACC values.

[16] This is a visualisation of the AER data labelled 'Actual ROA ex incentives relative to the WACC', combining both distribution and transmission into a single data set.

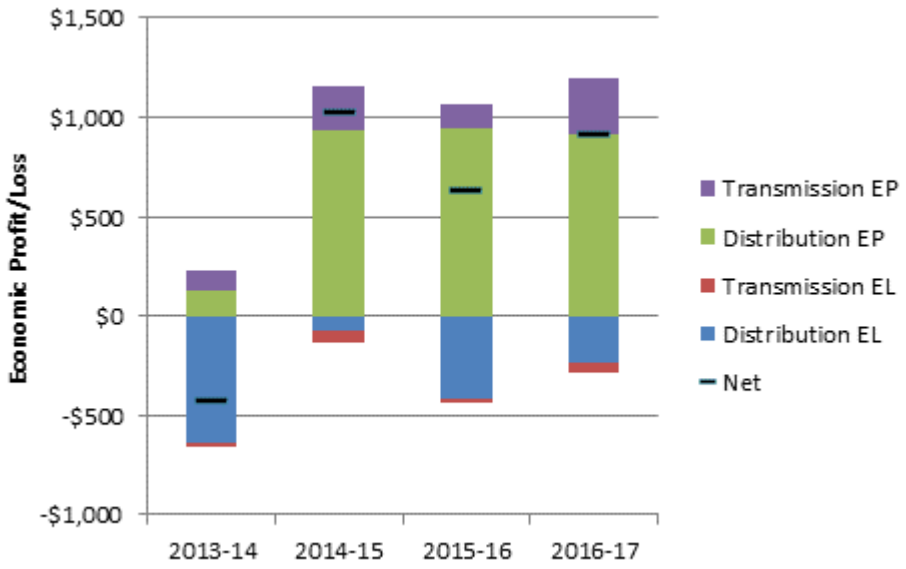
2.2 In dollar terms, excess network returns are material and sustained

The structural variance matters because the denominator in calculating these percentages is the aggregate Regulated Asset Base (RAB) of $91.8 billion dollars as at 30 June 2017. The rate of return percentages are derived by the AER from an estimation of Earnings Before Interest and Tax (EBIT) divided by the closing RAB. Using the same RAB denominator, differences between the allowed and actual EBIT in dollars terms may be calculated to yield the economic profits or losses for each of the 72 data points.

These are shown in Figure 2, aggregated into profits and losses for the distribution and transmission sectors. Consistent with Figure 1, it is evident that there are sustained and material economic profits in distribution and transmission well in excess of the economic losses. Moreover the economic losses over this period are significantly attributable to a single distribution company – Ausgrid.[17]

Table 1 below provides the economic profits for the overall sample. It shows the aggregate difference over four years is more than $2.1 billion. This includes a substantial economic loss from Ausgrid.

Figure 2 Economic profits/losses for the period FY2014-17



Source: Sapere calculation from AER profitability and RAB data.

Table 1 Economic profits and losses

Sector	*Allowed return*	*Economic Profit*	*Ratio*
Transmission	$4,996	$569	11.4%
Distribution	$16,424	$1,554	9.5%

[17] The AER is required to remake its decision on the electricity distribution determination that applies to Ausgrid, EvoEnergy, Endeavour and Essential for the 2014-19 regulatory control period, commencing 1 July 2014 to 30 June 2019 (the remittal). Allowed and actual returns for these networks are likely to increase, but the effect on actual returns is currently not in the public domain.

Sector	*Allowed return*	*Economic Profit*	*Ratio*
Combined	$21,420	$2,123	9.9%
ex Ausgrid	$18,071	$2,638	14.6%

Actual returns significantly exceed allowed returns. The raw aggregate economic profit over allowed returns is more than 9.9 per cent.[18]

Excluding Ausgrid, the aggregate economic profit is more than $2.6 billion or 14.6 per cent. It is reasonable to exclude Ausgrid as its actual returns for the periods in question are likely to increase, retrospectively, due to the requirement for the AER to remake its final decision (the remittal).

The economic profit component in bills represents a payment for a service (bearing risk) that is not actually being rendered by the networks. This may be a contravention of the Australian Consumer Law.

Under the economic value regulation applied, for example, by the Commerce Commission of New Zealand, economic profits earned in one year are returned to consumers in the following year so that on average consumers pay the economically efficient cost of the provision of regulated services. Under such regulation more than $2.1 billion would have been returns to Australian electricity consumers.

The economic profit results are consistent with, and help explain, market data on the value attributed to networks in reported asset sales. The values typically imply multiples of 1.1 to 1.6 times RAB.[19] As the AER itself notes, these multiples consistently exceed the free cash-flows implied by the AER's post tax revenue model (PTRM).

2.3 Our analysis under-states Economic Profits

The preceding analysis demonstrates that substantial and sustained economic profits exist in the Australian electricity network sector, based on nothing more than the AER's reported data in percentage terms. All of the estimates above understate economic profits across the sector. The actual economic profits are 'more than' $2.1 billion.

This is because the AER data is limited to percentage returns, and neither EBIT data nor the 'allowed return' in dollar terms, are provided. The percentage returns are derived from EBIT divided by closing RABs. The WACC is a theoretical percentage derived formulaically. Allowed returns in dollar terms as defined in the PTRM represent WACC times Opening RABs, plus an adjustment for depreciation and capital expenditure.

Closing RABs are typically higher than opening RABs for most entities and in most years. This means the AER data ('Actual RoA excluding incentives relative to the WACC') is understating the variances between allowed and actual returns. In the analysis of dollar economic profits, we consistently applied the AER percentage ROR and WACC data to the closing RABs.

When we applied the same percentage data to the average of opening and closing RABs for each of the 72 samples, the resulting economic profits are significantly higher than indicated above. This approach is also inconsistent with the method used to derive the allowed rate of return in the PTRM, because it does not precisely replicate the adjustments made in the PTRM, but less so than using the closing RAB.

[18] This excludes "earned" Economic Profits from incentives for exceeding performance benchmarks.

[19] See Table 2, page 14 of the AER's *2018 RoR Guideline Review – Financial performance measures (Discussion Paper)*, February 2018.

2.4 The impact of excessive returns

Except under limited conditions (see discussion above on incentives for out-performance), economic profits are inefficient and unfair. They transfer wealth and result in deadweight losses, reducing Gross Domestic Product and the international competitiveness of Australian exporters. Economic profits may lead to consumers investing in substitute assets and services at higher levels than otherwise, reducing utilisation of network assets. As a result, economic profits reduce dynamic efficiency or economic efficiency over the long run.

The bill impact of the observed economic profits is material. Monopoly or economic network profits mean that, averaged across the NEM, retail bills are around three to five (3-5) per cent higher than they should be.[20] This means that, for a typical irrigator paying $30,000 p.a., the excess network component in retail prices could be in the region of $900-1,500 per annum and $3,600-6,000 over the four-year period (the actual amounts will vary by network).

A large and increasing proportion of equity in regulated networks is now held by parent entities outside Australia. This suggests that a significant portion of economic profits from electricity networks are leaving Australia.

[20] This reflects three assumptions that are broadly accurate but vary across different networks, wholesale price regions and retailer: a) the capital charge component (WACC*Opening RAB) represents around half the total network price and therefore a 14% increase in the capital charge results in a 7% increase in network prices and b) increases in network prices are fully passed through in retail prices and c) network prices represent 50% of retail prices. The excess network component is also likely to increase retailer mark ups.

3. Implications of returns data for 2018 ROR Guideline Review

Our analysis of the AER's rate of return data demonstrates that the method used by the AER to determine the allowed rate of return, as specified in the Draft 2018 ROR Guideline, over-estimates the systematic risk exposure of the networks. The ROR Guideline uses a theoretical model to estimate the risk exposure of the regulated firms. The model does not refer to any data on actual returns.

3.1 Limitations of the AER's methodology

The model set out in the ROR Guideline is a form of the Capital Asset Pricing (CAP) Model. The CAP model is technical and complex but the AER has so far never sought to verify or check the validity of its *theoretical* model for estimating returns against *empirical* data comparing actual and allowed returns.

The CAP model has two well-known limitations:

- Model error. The model is a representation or simplification of reality with limited explanatory power.
- Parameter estimation error. The model requires estimation of parameters for which there is either no data or only limited data, requiring use of proxy parameters.[21]

The CAP Model and the data used to derive the input parameters for the *ex ante* ROR are not useful or relevant to assessing the presence of actual economic profits. The CAP Model embeds the efficient markets theory and hence assumes that observed returns are efficient. On its own, the CAP Model cannot detect economic profits and it is therefore not fit for the purpose of assessing whether network returns incorporate structural economic profits.

A report by an AER appointed Independent Panel was required by the AER to address the following question:[22]

In the Panel's view, is the draft [ROR] guideline supported by sound reasoning based on the available information such that it is capable of promoting achievement of the national gas and electricity objectives?

The review Panel's report does not refer to the actual return data discussed above and it is therefore unknown whether this data was made available to the Panel. In any event, the Panel's report does not appear to consider applying any empirical testing of the theoretical method set out in the Draft 2018 ROR Guideline.

Similarly, the two 'evidence session's held by the AER earlier this year do not appear to have considered any empirical evidence on *the* rate of return under the 2018 Guideline.[23] It appears that no evidence that could contradict the AER's methodology was considered. In other words, the methodology was not tested against any evidence in the "evidence" sessions.

There are three possible sources of the economic profits implied by the AER data:

- The entire sector is outperforming efficient benchmarks; or
- The AER' allowances for non-capital costs (maintenance and operating expenditure or OPEX) are well above actual costs; or

[21] See for example *'Setting the WACC percentile for Vector's price-quality path'*, a report by Kieran Murray and Tony van Zijl, May 2014.

[22] See page 59 Independent Panel Report, 7 September 2018.

[23] See https://www.aer.gov.au/communication/aer-releases-discussion-papers-on-rate-of-return-guideline

- The AER's method for estimating risk includes risks that are not in fact being borne by capital providers.

Taking each point in turn:

- The entire sector has experienced falling productivity, due to excess capacity. It is highly unusual for a sector with falling productivity to generate large and widespread economic profits.
- Variances between actual and allowed OPEX affect economic profits, and explain the economic losses for Ausgrid (pre-remittal). These variances can be readily checked from actual, audited OPEX data available in Regulatory Information Notices.
- Actual payments paid by networks to debt holders (banks), relating to around 60 percent of the regulated asset base, are much lower than is being allowed by the AER under the CAP model. This would reflect a market outcome from the actual risk exposure for debt holders.

Our assessment of these points is that the AER's method for estimating risk (CAP model) includes allowances for risks that are not in fact being borne by capital providers. The methodology adopted under the 2013 ROR Guideline is over-compensating for risk.

3.2 Evidence-corrected estimates of efficient WACC

While it is complicated to calculate this over-compensation of the risk factor using the AER's WACC formula[24], Table 2 makes a first order estimate by assuming the average economic profit by sector and year in the reported data is reset to zero. The result is that in recent years the efficient WACC is likely to have been less than 4 and 5 percent respectively for distribution and transmission.

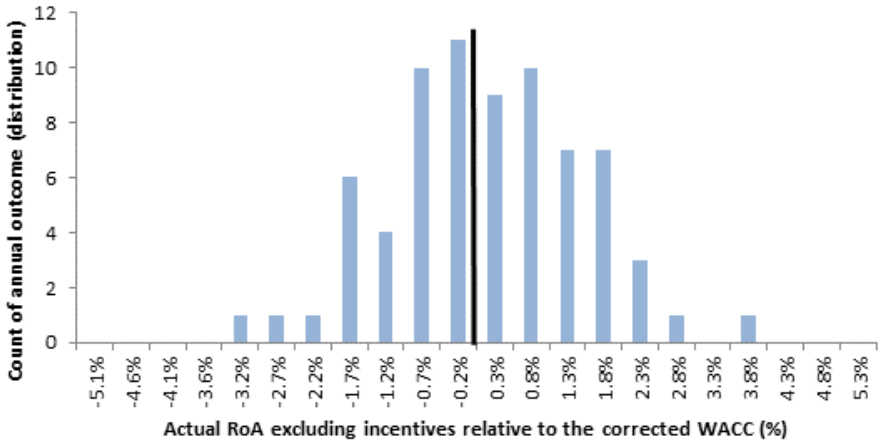
[24] One challenge is the discrepancy in the AER data between using the Closing RAB and the Opening plus adjusted RAB.

Table 2 Estimation of efficient WACC

	2013-14	2014-15	2015-16	2016-17	Average
Distribution					
Actual WACC	7.90%	6.95%	4.63%	4.60%	6.02%
Economic Profit	-0.58%	1.39%	1.22%	1.38%	0.85%
Efficient WACC	8.48%	5.56%	3.42%	3.22%	5.17%
Transmission					
Actual WACC	6.99%	5.25%	5.21%	5.19%	5.66%
Economic Profit	0.51%	1.06%	0.69%	0.72%	0.75%
Efficient WACC	6.48%	4.19%	4.52%	4.46%	4.91%

Figure 3 reproduces Figure 1 where the AER data in Table 5 has been corrected for each year by the estimates in Table 2. This distribution displays outcomes more consistent with the expected symmetrical distribution of economic profits and losses around an average value of zero.

Figure 3 Distribution of actual compared to corrected WACC



Source: Sapere visualisation of adjusted AER data.

4. Implications for content of 2018 ROR Guideline

The test of the Draft 2018 ROR Guideline is whether the proposed changes are sufficient to correct the material errors observed under the 2013 ROR Guideline. We recommend that the AER should undertake this analysis before a 2018 ROR Guideline is finalised.

The Rate of Return Consumer Reference Group highlighted that the existing Guideline is an error reinforcing process, not an error correcting process, precisely because actual returns are not measured.[25] This may be contrasted with New Zealand's economic value regulation of monopolies including energy network companies, where economic profits earned in one year are returned to consumers in the following year so that on average consumers pay the economically efficient cost of the provision of regulated services. Under this form of regulation, more than $2.1 billion would have been returned to Australian electricity consumers. This form of regulation nevertheless retains incentives for networks to outperform and to earn economic profits.

4.1 Required changes to the Draft Guideline

The Draft 2018 ROR Guideline should be amended to require regular reporting of actual returns. The Draft Guideline should also establish a mechanism for amending parameter inputs used under the Guideline methodology, using empirical data for actual outcomes. In other words, the Guideline should establish the principle that empirical data is superior to the outputs from a theoretical CAP model and CAP model inputs need to be modified where there is misalignment with empirical data.

Economic profits flow to equity holders. Under full profitability reporting, it would be possible and desirable for the AER to estimate the actual return on equity (total returns minus actual debt servicing costs), alongside the return on assets. Data for debt servicing costs should be reliable and accessible from the networks under modest enhancements to existing regulatory information notice requirements.[26]

Consideration could also be given to the development of a rule change proposal under which unearned economic profits would be returned to consumers in the following period. There is no inconsistency between this proposal and the concept of incentive regulation. Nevertheless, some tests would need to be developed to distinguish between earned and unearned economic profits (similar to the framework used by the New Zealand Commerce Commission).

4.2 Changes are required before elevation of ROR Guideline to binding instrument

A breach of the ROR Objective is also a breach of the National Electricity Objective (NEO) under the National Electricity Law (NEL). The ROR Objective is nevertheless useful in that it directly addresses the issue of whether actual returns are consistent with the NEO. There is, however, an active proposal

[25] Rate of Return Consumer Reference Group, Submission to the Australian Energy Regulator Rate of Return Guideline Review, May 2018 https://www.aer.gov.au/system/files/Consumer%20Reference%20Group%20submission.pdf

[26] The main challenge would be allocating debt (and hence debt servicing costs) but this challenge equally applies under the existing ROR Guideline.

before the COAG Energy Council to remove the ROR objective from the Rules, via a change to the NEL, as part of the package to change the status of the ROR Guideline. This would have the effect of institutionalising the existing flawed methodology for setting the allowed rate of return.

4.3 Economic profits and excess network capacity

There is a further source of economic profits in addition to the economic profits discussed above. The AER analysis assumes that RABs are efficient. Under the present NER, the RAB is rolled forward, whereas under the forerunner to the NER (the National Electricity Code), RABs were typically set using an Optimised Depreciated Replacement Cost (ODRC) method.

The 2018 ACCC Electricity Supply Prices Inquiry found that RABs for networks in NSW, ACT and Queensland networks (both distribution and transmission) should be economically optimised (reduced).[27] It is also possible RABs for private sector firms are also excessive but the ACCC did not broach the topic of optimising the RABs of private firms. As the dollar value of normal and economic profits scale with the value of RAB, the implication of the ACCC's analysis that the RABs could be lowered already is that the actual economic profits are substantially greater than measured in this report.

Any excess in current RABs are in part a product of historical economic profits creating strong incentives to over-invest in capacity ('gold plate'). The potential on-going presence of economic profits under the Draft 2018 ROR Guideline means incentives may remain for the entire network sector to over-invest in future network capacity. This is a concern given that, according to the AEMO's 2018 Integrated System Plan, replacement generation requires substantial investment in new regulated network capacity. Future over-investment in network capacity would increase the cost of early action to decarbonise the Australian economy (and therefore possibly delay this).

[27] See https://www.accc.gov.au/regulated-infrastructure/energy/electricity-supply-prices-inquiry

5. Data sources and technical notes

Relationships between percentage and dollar ex ante allowed ROR and ex-post actual ROR

1. For the allowed ROR under the Post-Tax Revenue Model (PTRM):

allowed EBIT$ (allowed return on capital)

$$= WACC\% \times opening\ RAB\$ + adjustment\ for\ depreciation\ and\ capital\ expenditure$$

or $allowed\ \%\ rate\ of\ return = Pre-tax\ WACC\%$

2. For the reported actual ROR, the AER has calculated:

$$actual\ \%\ rate\ of\ return\ as\ EBIT\% = {EBIT\$}/{closing\ RAB\$}$$

3. Whereas for comparability with allowed ROR above:

$$actual\ \%\ rate\ of\ return = EBIT\% = {EBIT\$}/{(opening\ RAB\$ + adjustment\ for\ \ deprec\ \&\ capex)}$$

As noted above, where RAB is increasing the EBIT% will be lower under 2 than 3.

The $EBITs under 1 and 3 are directly comparable – any divergence is "commensurable". The $EBITs under 2, on the one hand and 1 and 3, on the other are not comparable but we have been unable to measure the difference on the available information.

4. So for consistency with the AER reported ROR above we have calculated:

$$EBIT\$ = AER\ reported\ \%\ rate\ of\ return\ as\ EBIT\% \times closing\ RAB\$$$

Allowed pre-tax real weighted average cost of capital (WACC)[28]

The AER calculates the allowed pre-tax real weighted average cost of capital (WACC) as an estimate of efficient financing costs for a benchmark efficient entity providing regulated network services.

$$Pre-tax\ WACC\% = E(k^e)\frac{1}{(1-T_e)(1-\gamma)}(1-G) + E(k^d)G$$

Where

- $E(k^e)$ is the expected return on equity
- $E(k^d)$ is the expected return on debt
- G is the proportion of debt in total financing, otherwise referred to as the gearing ratio
- T_e is the effective tax rate
- γ is the value of imputation credits (gamma).

The pre-tax real WACCs have been sourced from the post-tax revenue model (PTRM) applying for the relevant regulatory years for each network service provider.

Reported ex ante allowed ROR and ex-post actual ROR

28 AER, Return on Assets for electricity network businesses Explanatory not, 2018

The following tables reproduce the AER's reported data on ex ante allowed ROR and ex-post actual ROR and the resulting "Actual RoA excluding incentives relative to the WACC" that is analysed in Figure 1.

Table 3 Actual Return on Assets excluding incentives

Network	2013-14	2014-15	2015-16	2016-17
Ausgrid *	7.31%	5.52%	2.69%	3.21%
Ausnet (D)	6.46%	8.84%	3.93%	5.45%
Citipower	7.16%	8.37%	5.89%	5.97%
Endeavour *	8.07%	7.19%	5.02%	4.84%
Energex	5.39%	7.44%	7.59%	6.60%
Ergon	6.91%	8.37%	5.72%	6.69%
Essential *	9.01%	9.74%	3.38%	4.27%
Evo Energy (ActewAGL) *	5.18%	6.77%	7.37%	7.97%
Jemena	6.91%	8.42%	6.14%	7.76%
Powercor	7.97%	8.92%	7.12%	6.24%
SAPN	10.10%	11.12%	6.48%	5.20%
Tasnet (D)	6.96%	9.35%	9.98%	7.06%
United Energy	7.75%	8.43%	4.76%	6.54%
Ausnet (T)	9.45%	7.23%	6.34%	6.10%
ElectraNet	5.98%	5.83%	5.65%	5.53%
Powerlink	6.62%	5.37%	6.89%	9.06%
Tasnet (T)	7.63%	6.46%	6.07%	4.89%
Transgrid	7.81%	6.64%	4.57%	3.97%

Table 4 AER allowed pre-tax real WACC

Network	2013-14	2014-15	2015-16	2016-17
Ausgrid *	8.13%	4.73%	4.66%	4.66%
Ausnet (D)	7.80%	7.80%	4.51%	4.46%
Citipower	7.86%	7.86%	4.45%	4.39%
Endeavour *	8.15%	4.78%	4.72%	4.63%
Energex	8.02%	8.02%	3.97%	4.00%
Ergon	7.89%	7.89%	3.94%	3.97%
Essential *	8.07%	4.74%	4.68%	4.59%
Evo Energy (ActewAGL) *	6.91%	4.63%	4.53%	4.53%
Jemena	8.70%	8.70%	4.72%	4.66%
Powercor	7.76%	7.76%	4.35%	4.29%
SAPN	8.98%	8.98%	4.35%	4.36%
Tasnet (D)	6.55%	6.55%	6.55%	6.55%
United Energy	7.91%	7.91%	4.82%	4.76%
Ausnet (T)	7.66%	5.62%	5.62%	5.62%
ElectraNet	5.18%	5.18%	5.18%	5.18%
Powerlink	6.13%	6.13%	6.13%	6.13%
Tasnet (T)	7.93%	4.39%	4.29%	4.25%
Transgrid	8.04%	4.92%	4.83%	4.75%

Table 5 Actual RoA excluding incentives relative to the WACC

Network	2013-14	2014-15	2015-16	2016-17
Ausgrid *	-0.82%	0.79%	-1.97%	-1.45%
Ausnet (D)	-1.34%	1.04%	-0.58%	0.99%
Citipower	-0.70%	0.51%	1.44%	1.58%
Endeavour *	-0.08%	2.41%	0.30%	0.21%
Energex	-2.63%	-0.58%	3.62%	2.60%
Ergon	-0.98%	0.48%	1.78%	2.72%
Essential *	0.94%	5.00%	-1.30%	-0.32%
Evo Energy (ActewAGL) *	-1.73%	2.14%	2.84%	3.44%
Jemena	-1.79%	-0.28%	1.42%	3.10%
Powercor	0.21%	1.16%	2.77%	1.95%
SAPN	1.12%	2.14%	2.13%	0.84%
Tasnet (D)	0.41%	2.80%	3.43%	0.51%
United Energy	-0.16%	0.52%	-0.06%	1.78%
Ausnet (T)	1.79%	1.61%	0.72%	0.48%
ElectraNet	0.80%	0.65%	0.47%	0.35%
Powerlink	0.49%	-0.76%	0.76%	2.93%
Tasnet (T)	-0.30%	2.07%	1.78%	0.64%
Transgrid	-0.23%	1.72%	-0.26%	-0.78%