How the AER will assess the impact of capitalisation differences on our benchmarking

Draft Guidance note

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AUSTRALIAN ENERGY REGULATOR

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Overview

Purpose of this draft guidance note

This draft guidance note sets out how we propose to address the impact of differences between distribution network service providers' (DNSPs) capitalisation practices on our economic benchmarking, and the reasons for this draft view. This follows our 29 November 2021 Consultation Paper which presented our preliminary views on the nature and extent of the impact of capitalisation differences on our benchmarking and how, at that time, we proposed to address the issue.

We are now seeking further stakeholder views on the analysis and conclusions we present in this paper, which will inform the development of a final guidance note in March 2023.

This draft guidance note also presents some key implementation issues in relation to our preferred approach and our preliminary position on these issues. Stakeholder views are also particularly sought on these implementation issues.

Draft position

For this draft guidance note, our preferred approach to address differences in capitalisation practices is to adapt our economic benchmarking by allocating a fixed proportion of overheads expenditure to the operating expenditure (opex) series for benchmarking purposes. We propose to adopt this approach for our electricity distribution annual benchmarking reports, starting from 2023.

This is a change from the position in the Consultation Paper, which was to use opex/capital ratios to adjust the benchmarking efficiency scores.

This change reflects the further thinking and analysis we have done since the Consultation Paper, including in response to stakeholder feedback, noting it remains an on-balance decision, with each of the different approaches considered having pros and cons.

The AER publishes benchmarking results each year in a report on the productivity growth and efficiency of DNSPs in the National Electricity Market (NEM). These results enable us to compare how productively efficient DNSPs are at delivering electricity distribution services over time and compared with their peers.

While DNSPs are broadly comparable, they differ on a range of characteristics, such as network size and aspects of their operating environment. The aim is that the benchmarking results should largely reflect differences in DNSPs' efficiency, with all other major sources of differences accounted for in the modelling or by adjusting the benchmarking results for differences in Operating Environment Factors (OEFs). It is therefore important for benchmarking to be carried out on the basis of data that is as consistent and comparable as possible.

What is the issue?

One possible difference between DNSPs that may impact the comparability of the benchmarking results relates to differences in their *capitalisation practices*. This includes differences between DNSPs' practices at a point in time and differences over time.

In this draft Guidance note, we use the term *capitalisation practices* to encompass the following:

- *capitalisation policy*, i.e. a business's policy and/or specific method of reporting/classification of expenditure as operating expenditure (opex) or capital expenditure (capex), which includes expensing/capitalising overheads
- *opex / capital trade-offs*, i.e. a business's utilisation of opex versus capital inputs, such as the choice for Information Communication and Technology (ICT) between the use of cloud computing (opex) and in-house equipment (capital inputs).

Through the initial consultation process and in this draft Guidance note we have examined:

- whether there are material differences in *capitalisation practices* between DNSPs
- whether these differences have a material impact on: (i) the comparability of the data on which the AER's DNSP benchmarking results are based and (ii) the benchmarking results
- if there are material impacts on the benchmarking results, what options there are for addressing these impacts and our preferred options and the reasons why.

We consider it is important to examine these issues as we draw on the benchmarking results when setting the maximum revenues DNSPs can recover from customers as a part of our revenue determination processes; in particular, when examining the efficiency of a DNSP's opex and whether an efficiency adjustment is required in setting maximum revenues that can be recovered.

We have developed this draft guidance note to set out how we propose to address any material impacts on the benchmarking results from differences between DNSPs in their *capitalisation practices*. The intention is that this will provide DNSPs with greater certainty about how we will assess this issue. This draft guidance note is the second step in our process, set out below, and follows the release of a Consultation Paper and submissions from stakeholders.

Background to this consultation

We first examined this issue in 2014 when we began to publish the annual benchmarking results. At that time we did not consider there were material differences in *capitalisation practices* or impacts on the benchmarking results, including in the context of our conservative approach to applying benchmarking. For revenue determinations we apply the benchmarking results with a margin to account for general limitations of any benchmarking with respect to the specification of outputs and inputs, estimation techniques, data imperfections, and quantification of OEFs.

Since then, there have been changes in the *capitalisation policies* of some DNSPs and future changes may occur. Further, over the last few years we have consistently received

submissions from DNSPs that differences in *capitalisation policies*, particularly in light of these changes, are a limitation of our benchmarking results.

We previously undertook some work to seek to understand how best to measure these differences and their impact on the benchmarking results. We used this work in revenue determinations for some DNSPs e.g. Jemena's 2021–26 revenue determination, but considered it was only fit for purpose in that context and that a broader examination of the issue was required.

Consultation Paper – November 2021

On 29 November 2021 we published a Consultation Paper setting out our initial views on the nature and extent of the impact of capitalisation on our benchmarking and how we propose to address the issue. We sought stakeholder views on a range of questions in relation to whether and to what extent there is an issue, and options for how it should be remedied.

In summary, our preliminary views in the Consultation Paper were that:

- there is sufficient information to form a view that some DNSPs' *capitalisation practices* are materially different to those of the comparator DNSPs (those who benchmark in the upper quartile of our results).
- differences in *capitalisation practices* can be considered a material factor in terms of their potential impact on the benchmarking results.
- applying an OEF adjustment to the benchmarking results, based on opex/capital ratios, best meets the principles we are proposing to use to assess the options to address the impacts of these capitalisation differences on the benchmarking results. However, we acknowledged there were issues with this approach, including the imperfections of the opex/capital ratios and as the benchmarking results would not be based on current or future capitalisation policies.

While we presented these preliminary views, we acknowledged that this is a relatively complex issue that would benefit from consultation and engagement.

Stakeholders' submissions on the consultation paper

Fifteen stakeholders responded to our Consultation Paper and provided written submissions. We also held some staff-level meetings following receipt of these submissions.

There was broad agreement in submissions that there is an issue in terms of capitalisation differences impacting the benchmarking results that needs addressing. There was not significant focus in the submissions on how best to determine that there are material capitalisation differences that are of concern, but rather on the best option for addressing the differences. In this regard, there was a diversity of views and no consensus in relation to the best option to address the issue, with support and opposition being expressed for all the options.

There was some support for the option proposed by the AER in the Consultation Paper (applying an OEF adjustment to the benchmarking results, based on opex/capital ratios, and opex under the 'frozen' 2014 CAMs). However, this support was limited as most submissions considered it was preferable, if possible, to directly include capitalisation in the benchmarking models or data adjustments pre-modelling, rather than making an OEF adjustment post-modelling. Many DNSPs also presented analysis that in their view cast doubt on the appropriateness of opex/capital ratios in terms of their being used in the OEF adjustment.

In terms of support for the other options identified in the Consultation Paper:

- Several stakeholders supported the option of including capitalisation differences in the econometric cost function benchmarking models. They considered that data from international jurisdictions appeared to be available to support this approach and that it was preferable to include the capitalisation adjustment ex-ante in the benchmark modelling.
- Several stakeholders supported the option of moving from benchmarking on the frozen 2014 CAMs to reflecting current CAMs.
- Several stakeholders supported the option of adjusting the opex used for benchmarking to reflect a common fixed proportion of corporate overheads. They considered that this would be a way to address what they considered were the most material capitalisation differences.
- Several stakeholders supported developing a common *capitalisation policy* that would apply to all DNSPs across the industry, but considered this was likely a longer-term outcome given it would be relatively resource intensive to develop.

Positions in the draft guidance note

Is there an issue?

We consider on the basis of the weight of qualitative and quantitative evidence, as well as stakeholder views, there are material differences in *capitalisation practices* between DNSPs, and these are having a material impact on our benchmarking results. This is indicated by observation of opex/capital ratios, which provide a high-level gauge of *capitalisation practices* when averaged over the benchmarking period. Supporting these ratios is observation of the significant differences in corporate overhead allocation between businesses, combined with the share of total opex that overheads total expenditure (totex) comprises. We therefore think that these differences pose an issue to the comparability of our benchmarking.

Proposed approach to addressing the issue

Since the Consultation Paper, we have further analysed each of the options, including an additional approach proposed by AusNet Services, in terms of how the options satisfy the criteria set out in the Consultation Paper. In undertaking this further analysis we have taken into account:

- The submissions to the Consultation Paper, and our views on these. We have carried out a range of quantitative and qualitative analysis in responding to stakeholder submissions.
- Results of sensitivity benchmark modelling we have carried out on these options. This has involved running our econometric opex cost function models to compute adjusted efficiency scores for each business under the various options (where possible) in order to see the impact on efficiency scores under each option.

Reflecting our further thinking and analysis, we have changed our preferred approach from that put forward in the Consultation Paper.

For this draft guidance note, our preferred approach to address *capitalisation practice* differences is to conduct benchmarking on the basis of allocating a fixed proportion of overheads expenditure to the benchmarking opex series. Our preferred implementation of this approach includes allocating 100% of corporate overheads (those expensed and

capitalised) to a frozen CAM opex for benchmarking purposes as discussed further below, noting we do have some specific implementation issues we are seeking stakeholder views on.

In summary, our preference for this option is that we consider it best meets the criteria due to its focus on a known, measurable and material source of capitalisation differences, namely differences in how DNSPs allocate corporate overheads between opex and capex. In addition, we now consider opex/capital trade-offs are to some but varying extent implicitly taken into account in our econometric opex cost function models, due to the high correlation of the outputs in that modelling and a capital input variable, meaning we consider a further adjustment is not warranted. The primary appeal of this option relative to the other options is the high level of certainty we have that it targets known and significant differences between DNSPs, and equally, limits inadvertently accounting for factors that are either not related to capitalisation practices, or are already accounted for otherwise in our benchmarking methodology.

In terms of the criteria which we have assessed each of the options against, we think this option of benchmarking on the basis of our preferred implementation of 100% of corporate overheads being allocated to a frozen-CAM opex performs well, as:

- Validity and fitness for purpose
  - The approach heightens comparability between DNSPs as it takes account of material key differences in capitalisation between DNSPs, and to some but varying extent opex/capital trade-offs are implicitly taken into account in our econometric opex cost function benchmarking. However, we recognise that while it addresses a material source of differences, it may not address all differences e.g. in relation to the allocation of network overheads.
  - Given that the benchmarking opex includes all corporate overheads expenditure, it limits the perverse incentives for DNSPs to change their *capitalisation policies* in response to their benchmarking results. However, we recognise that some incentive may remain for re-classification between corporate overheads and other categories such as network overheads. The latter may be mitigated, however, under our preferred implementation of continuing with frozen CAMs in all aspects of cost allocation other than capitalisation of corporate overheads
  - The approach allows our economic benchmarking tools to be applied to a category of capex (capitalised corporate overheads) as part of the top-down assessment of total opex.
- Accuracy and reliability: given the fixed allocation of corporate overheads to opex under this approach, we recognise there may not be perfect alignment with DNSPs' current reporting practices, as there are differences in DNSPs' actual allocations of corporate overheads. In addition, the underlying CAM used for benchmarking may depart from the current CAM, depending on how we implement this approach.
- Robustness: benchmarking results would not change where DNSPs change their capitalisation policy and/or CAM to expense or capitalise more corporate overheads
- Transparency: we consider it is a simple approach that is based on a transparent methodology that can be understood and replicated by stakeholders.
- Parsimony: we consider this a relatively simple technique, with few variables.

In contrast we now consider the option we preferred in the Consultation Paper, of applying an OEF adjustment (based on opex/capital ratios) to the benchmarking results under frozen 2014 CAMs, performs less well against the criteria in terms of:

- Validity and fitness for purpose:
  - While the opex/capital ratios provide a high-level measure of capitalisation practices, the precise use of these ratios for the purposes of adjusting the efficiency scores via a post-modelling OEF places an additional stringency on us to ensure the OEF works as intended. We are no longer as confident they are as fit for purpose as we were in the Consultation Paper. This is particularly because:
    - The econometric opex cost function models already implicitly capture opex / capital aspects of *capitalisation practices* to some but varying extent through the existing output variables, which are highly correlated with a capital input variable, meaning a further adjustment via the OEF which takes into account a business's utilisation of opex versus capital inputs may double-count this factor
    - The OEF adjustment via the opex / capital ratios may be capturing factors other than capitalisation practices, such as capex replacement cycles.
- Accuracy and reliability: benchmarking under this approach may adjust for factors already taken into account in the econometric opex cost function modelling or result in factors other than capitalisation differences being captured as a result of the OEF adjustment, leading to questions around the accuracy and reliability of the approach. Further, while applying the OEF adjustment to benchmarking results derived using DNSPs' opex under the frozen 2014 CAMs maintains a consistent benchmarking approach over time, it may not accurately reflect costs DNSPs are currently incurring.
- Robustness: our testing of the benchmarking results by applying the OEF adjustment to benchmarking results derived using DNSPs' opex under the frozen 2014 CAMs and current CAMs suggests they are relatively stable over time irrespective of the CAM basis being used.
- Transparency: while the OEF adjustment is based on a methodology that can be replicated by stakeholders, we consider the way in which the opex/capital ratios adjust for capitalisation differences may be less clear.
- Parsimony: while this a relatively simple technique, we do not consider it is as simple as the option of benchmarking on the basis of 100% of corporate overheads being allocated to opex.

We consider the preferred approach in this draft guidance note is an on-balance decision and we view the lack of consensus among stakeholders about a preferred option in submissions to the Consultation Paper adds weight to this view, and that none of the options is perfect, each having pros and cons. Further, we consider the preferred approach in this draft guidance note is more of an incremental approach (compared to the Consultation Paper) reflecting the further thought given to, and analysis undertaken, to what capitalisation differences are being addressed by the different options and our current benchmarking methodology.

Implementation issues with our preferred option

We are seeking stakeholder views on several issues in relation to the implementation of our preferred option:

- Which CAM basis to use for the benchmarking opex series, which breaks down into:
  - The more general question of whether the opex series should, as per our current approach, use a Cost Allocation Method (CAM) that is frozen and backcast versus the use of reported (CAM-of-the-day) opex
  - If the former, the more specific question of whether to use the frozen 2014 CAMs or the current (i.e. regulatory year 2022 CAMs (backcast))
- The allocation to opex of corporate overheads versus total (the sum of corporate and network overheads) overheads
- The percentage of capitalised overheads to be allocated to opex for benchmarking purposes
- Given that actual data on overheads only goes back to 2009, when and how to commence the opex series for benchmarking.
- In the context of efficiency assessments in revenue determinations:
  - Ensuring that capitalised overheads are included in base year opex, when comparing to modelled efficient opex
  - The interaction with our current approach to assessing proposed capitalised overheads forecasts.

In relation to whether the opex series should use a CAM that is frozen and backcast versus the use of reported (CAM-of-the-day) opex, we consider it is appropriate to continue our policy of adopting a frozen CAM for benchmarking. This is primarily due to the importance of maximising comparability for a given DNSP over time.

In relation to then whether to use the frozen 2014 CAMs or the current (i.e. regulatory year 2022 CAMs (backcast)), we acknowledge there are pros and cons to both approaches. However, an important factor in favour of moving to the current CAMs (backcast and re-frozen) is that our change in benchmarking approach provides an opportunity to update the CAM basis for benchmarking. This is because, in practice, our preferred new benchmarking approach in this draft guidance note aligns with most of the DNSP CAM changes to date; i.e. the move we have seen to expense corporate overheads. We particularly seek stakeholder views on the implementation issue of which set of CAMs – the 2014 or the current CAMs – to freeze under our preferred option. In relation to which overheads to include in total opex, we consider as corporate overheads are relatively homogeneous in nature, and demarcated relatively clearly from other cost categories, they should be included in opex for benchmarking purposes. The case for inclusion of network overheads in total opex is less clear, as the delineation between network overheads and other cost categories is less clear. However, we recognise the inclusion of network overheads may address any movements between corporate and network overheads that occur over time, including in response to the proposed approach for addressing capitalisation differences. Further, through the cost information we collect annually through the Regulatory Information Notice process we will be able to monitor whether there are any changes in overheads allocation and seek to understand the basis for these, including whether they are motivated by impacting the benchmarking results.

In relation to the percentage of capitalised overheads allocated to opex for benchmarking purposes, while any percentage would achieve comparability, our preference is for 100%, due to its simplicity, the recurrent nature of corporate overheads, and stakeholder support.

In relation to when and how to commence the opex series for benchmarking, data on overheads goes back only to 2009, rather than 2006, which is currently the start year of our benchmarking series. We are interested in stakeholder views on the following three options, or any others:

- To make 2009 the new start point of our long benchmarking period (retaining 2012 as the start of our "short" benchmarking period)
- To ask DNSPs to provide actual data for the three years prior to 2009 (2006–2008)
- Working with DNSPs, to estimate and use this estimated data for the three years prior to 2009 (2006–2008).

In relation to ensuring that capitalised overheads are included in base year opex when comparing to modelled efficient opex, we would ensure that capitalised overheads are added to base year opex.

In relation to the interaction with our current capitalised overheads assessment approach, our preliminary view is that incorporating capitalised overheads within our opex benchmarking approach could complement our standard capitalised overheads forecasting approach in resets.

Proposed process to develop a final guidance note

This draft guidance note sets out our proposed approach that we are consulting on prior to developing a final guidance note. The timing for the subsequent steps in the process, including receiving submissions on the draft guidance note and the AER issuing the final guidance note are set out in Table 1. Further detail is provided in the following section in terms of how stakeholders can make a submission over the next 8 weeks to this draft guidance note.

Table 1 Process for developing guidance note and indicative timeline

Key steps	Purpose	Indicative dates
Release consultation paper	Publish the consultation paper and seek submissions	29 November 2021
Submissions on consultation paper	The purpose of this period is to allow adequate consultation to receive views across the industry on matters that should be covered in a final guidance note	18 February 2022
Meet with stakeholders to discuss key issues	In light of submissions organise one-on-one or industry wide meetings as required to discuss key issues	Late February–April 2022
Draft guidance	Publish draft guidance and seek submissions	31 October
Submissions on draft guidance	Opportunity for stakeholders to provide feedback on the proposed draft guidance	23 December 2022
Final guidance	Publish final guidance	March 2023

How to make a submission

Interested parties are invited to make submissions on this draft guidance note by Friday 23 December 2022. In providing responses, please explain your reasons, including supporting evidence and data analysis where possible.

You do not need to comment on all issues in your feedback and we invite you to respond to the questions that are relevant to you and your circumstances.

We prefer that all submissions are in Microsoft Word or another text readable document format. Any submissions that include data should be provided in Microsoft Excel format. Submissions should be emailed to: AERInquiry@aer.gov.au with the subject heading "Attention: General Manager – Network Expenditure – Submission on the impact of capitalisation on the AER's benchmarking"

Alternatively, submissions can be sent to:

Arek Gulbenkoglu
General Manager
Network Expenditure
Australian Energy Regulator
GPO Box 520
Melbourne VIC 3001

We prefer that all submissions be publicly available to facilitate an informed and transparent consultative process. Submissions will be treated as public documents unless otherwise requested. Parties wishing to submit confidential information should:

- Clearly identify the information or data that is subject to the confidentiality claim and set out the reasons why this information is considered confidential
- Provide a non-confidential version of the submission in a form suitable for publication if applicable.

All non-confidential submissions will be placed on our website. For further information regarding our use and disclosure of information provided to us, see the ACCC/AER Information Policy (October 2008), which is available on our website.

Contents

1 Outline of this draft guidance note

In this draft guidance note we examine the following key questions, and the associated issues, and as a part of exploring these we set our analysis and the views that form our draft guidance:

- Section 2 – is there a problem posed by differences in *capitalisation practices* – encompassing both *capitalisation policy* and *opex / capital trade-offs* – between DNSPs, and over time, in terms of the impact on the comparability of our benchmarking results? We break this down into the following questions:
  - Are there material differences in *capitalisation practices* between DNSPs that drive material differences in opex, and if so, how material are these differences (Section 2.2)?
  - Are these differences having a material impact on the benchmarking results (Section 2.3)?
- Section 3 – if there are material differences in *capitalisation practices* between DNSPs, and over time, in terms of the impact on the benchmarking results, how should this be addressed? We summarise our preferred approach, including some of the key implementation issues in Section 3.2, which reflects our consolidated view after examining each of the following options proposed in the Consultation Paper and the additional option proposed by stakeholders:
  - Option 1 – Applying a post-modelling OEF adjustment for capitalisation to the benchmarking results under the DNSPs' 'frozen' 2014 CAMs using opex/capital ratios (Section 3.3)
  - Option 2 – Adding an explanatory variable to the econometric opex cost function modelling that directly captures capitalisation differences (Section 3.4)
  - Option 3 – Benchmarking on the basis of DNSPs' current CAMs (Section 3.5)
  - Option 4 – Applying a common opex/capital ratio to all DNSPs as a pre-modelling adjustment (Section 3.6)
  - Option 5 – Benchmarking on the basis of a fixed proportion of overheads classified as opex for benchmarking purposes (Section 3.7)
  - Option 6 – Introducing a common *capitalisation policy* (Section 3.8)
  - Option 7 – Identifying specific *opex / capital trade-offs* and applying a common corporate overhead proportion (Section 3.9).

2 Do differences in *capitalisation practices* impact our benchmarking results

2.1 Background

2.1.1 How we define *capitalisation practices*

One possible difference between DNSPs that may impact the benchmarking results is their *capitalisation practices*. In the Consultation Paper and in revenue determinations, we have used the term *capitalisation practices* to encompass two broad types of *capitalisation practices* undertaken by DNSPs:

- *capitalisation policy*, i.e. a business's policy and/or specific method of reporting/classifying expenditure as opex or capex, (e.g. expensing/capitalising overheads)
- *opex / capital trade-offs*, i.e. a business's utilisation of opex versus capital inputs, e.g. the choice between maintenance (opex) or replacement (capital inputs) of poles, the choice between cloud computing (opex) and in-house equipment (capital inputs) for non-network ICT, or the choice between demand management (opex) and augmenting existing circuit length or transformer capacity (capital inputs).

We adopt this terminology in this note and consider this definition to comprehensively cover the *capitalisation practices* of relevance to this consultation. This definition was generally supported in submissions to our Consultation Paper.[1] However, as discussed in Section 2.2, there were different views on how *capitalisation practices* should be measured and the regulatory treatment of different types of *capitalisation practices*, particularly in the context of distribution benchmarking. The different character of the two types of capitalisation practices also informs our analysis under our preferred approach, as discussed in Section 3.2.

2.1.2 Why differences in *capitalisation practices* might cause a problem for our benchmarking

Capitalisation practices can (and, as discussed below, do) differ among the DNSPs and change over time. While the scope for differences in DNSPs' *capitalisation practices* is not unlimited,[2] these variations can arise through differing capitalisation policies[3] and/or different opex/capital input mixes adopted by DNSPs in delivering required outputs. Our benchmarking techniques allow for separate benchmarking of the efficiency of opex and capital inputs. We recognised at the start of our economic benchmarking program in 2014

1 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4; Energy Queensland, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1.

2 This is because reported expenditure is prepared in accordance with applicable accounting standards and policies, the DNSP's AER-approved Cost Allocation Method (CAM) (assessed against our Cost Allocation Guidelines), and the AER's instructions on the various Regulatory Information Notices.

3 Which can exist both via a DNSP's CAM and outside it.

that the potential for variations in *capitalisation practices* between businesses, and over time, could pose two issues for the reliability of benchmarking:

- Cross-DNSP comparability: undermining like-with-like comparability between the businesses at a given point in time of benchmarking
- Time series comparability: potential to further reduce comparability in the benchmarking scores as DNSPs change their *capitalisation practices* over time.

Cross-DNSP comparability

Economic benchmarking relies on like-with-like comparability. This comparability may be compromised if *capitalisation practices* differ materially between DNSPs. All else equal, classifying and / or using more opex relative to capital will tend to worsen a DNSP's opex benchmarking results, and vice versa. For example, if a DNSP tends to expense rather than capitalise more of its corporate overheads compared to other equally efficient DNSPs, then this would result in a lower opex benchmarking result than otherwise, and make it appear less efficient on opex, even though its particular opex/capital mix does not reflect inefficiency. As a result, the manner in which a DNSP classifies and / or utilises inputs as either opex or capital potentially impacts its opex (and capital) benchmarking results.

Time series comparability

Even where DNSPs' *capitalisation practices* initially are broadly similar, a DNSP changing its *capitalisation practices* over time could impact the comparability of its benchmarking scores over time. This is because on changing its *capitalisation practices*, its benchmarking results may potentially change due to factors unrelated to opex efficiency. Given the differences in our approaches to assessing efficient opex and capex in revenue proposals, this may also give rise to strategic reactions by DNSPs, i.e. it may incentivise DNSPs to 'game' the benchmarking by changing their *capitalisation policies* over time.[4] To minimise the impact of changing *capitalisation policies* over time, we 'froze' DNSPs' CAMs (reflecting their *capitalisation policy*, to the extent they were incorporated into their CAMs) at the beginning of the benchmarking program in 2014.

Given these factors, it is important for our benchmarking that capitalisation differences are identified and quantified, and, where material and not otherwise accounted for, addressed. Failure to account for material differences in how DNSPs classify and utilise opex and capital could potentially give rise to misleading opex (or capital) efficiency scores. Our overall objective in identifying and accounting for any material differences in capitalisation is that a DNSP's decision of whether to employ an opex or capex solution should not influence, nor be influenced by, its benchmarking efficiency scores.

Further information on how we considered this issue when we introduced the benchmarking program in 2014, as well as issues that have been raised and changes in capitalisation that have come into effect since, is contained in Sections 1.4 to 1.7 of our Consultation Paper.[5]

4 Economic Insights, *Economic Benchmarking Results for the Australian Energy Regulator's 2020 DNSP Annual Benchmarking Report*, 13 October 2020, p. 14.

5 AER, *How the AER will assess the impact of capitalisation differences on our benchmarking*, 29 November 2021, pp. 4–10.

Views raised in submissions about whether there is an issue

Submissions to our Consultation Paper widely agreed that capitalisation differences between DNSPs are material, and that it is an issue that needed to be addressed in our benchmarking.[6]

2.2 How material are the differences in *capitalisation practices* between DNSPs

This section considers first our qualitative observations of differences in *capitalisation practices*, and second our quantitative findings, including the methods by which these differences can be measured.

2.2.1 Observed differences and changes over time

DNSPs have the scope to adopt different *capitalisation practices* and to change these over time, and we have observed these differences and changes.

As noted in Section 2.1, while the scope for differences in DNSPs' *capitalisation practices* – encompassing both *capitalisation policy* and *opex / capital trade-offs* – is not unlimited, differences in *capitalisation practices* between DNSPs are allowed under the National Electricity Rules (NER). There is a degree of flexibility under the NER and our Cost Allocation Guidelines[7] for DNSPs to adopt differing *capitalisation policies*, particularly with respect to overheads and other cost categories. In addition, the mix of opex and capital inputs is under the managerial control of the DNSPs.

We have observed both differences between DNSPs' *capitalisation practices* and changes in *capitalisation practices* over time. For example, based on our examination of DNSPs' CAMs, some DNSPs (e.g. CitiPower, Powercor, Ergon Energy, and Jemena) have changed their *capitalisation policies* to expense more (or all) corporate overheads. In addition, DNSPs have adopted somewhat different opex/capital input mixes in delivering required outputs, which may occur as a result of their response to ongoing changes such as input prices, industry trends and management approaches and decisions. For example, for ICT solutions, we have observed some DNSPs are increasingly opting for cloud solutions (opex) over investing in ICT assets (capital inputs). Further, recent guidance in relation to statutory accounting

6 Evoenergy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 2; Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; Energy Queensland, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; TasNetworks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; Network of Illawarra Consumers of Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 14 February 2022, pp. 3–4.

7 AER, *Cost allocation guideline (distribution)* 2008.

standards requires from 1 April 2021 certain Software as a Service (SaaS) expenditure to be classified as opex rather than capex.[8]

2.2.2 Measuring differences in *capitalisation practices*

We consider it is appropriate to first measure the differences in *capitalisation practices* to determine if they are material and need to be addressed to ensure the benchmarking results reflect relative efficiencies. If there are no material differences, then it would not be necessary to put in place a mechanism to address them.

As explained below, taking account of stakeholders' views in response to the Consultation Paper, we have modified our position on the relative merits of the different measures of capitalisation practices. In the Consultation Paper, opex/capital ratios were our primary measure. In this draft guidance note, we continue to recognise the opex/capital ratios (when averaged over the benchmarking periods) are reasonable if imperfect high-level gauges of capitalisation differences. However, we have also considered the importance of corporate overhead differences in explaining *capitalisation policies* differences as additional measures to those outlined in the Consultation Paper.

This change is also reflected in our change in preferred approach to addressing capitalisation practices, as discussed in Section 3. In particular, opex/capital ratios were used in the calculation of the OEF adjustment in our preferred approach in the Consultation Paper. However, for reasons explained in Section 3, our preferred approach in this draft guidance note does not incorporate these ratios.

Consultation Paper

The primary method for measurement of capitalisation practice differences that we have used in past revenue determination decisions, and put forward in the Consultation Paper, is various forms of opex/capital ratios, averaged over the relevant benchmarking period. We considered these provide a high-level view of the relative capitalisation differences across DNSPs in terms of opex to various measures of capital.

We considered the value of opex/capital ratios lies in their ability to capture net *capitalisation practices*, irrespective of specific sources, e.g. expensing/capitalising overheads, *opex / capital trade-offs*. All else equal, a higher opex/capital ratio indicates a greater use of opex relative to capital inputs, and vice versa. As noted in Section 2.1.3, the particular mix of opex and capital does not, in and of itself, indicate inefficiency. We stated in the Consultation Paper that we consider that high-level measures at the total level are generally preferable to partial measures. These partial measures focus on comparing the DNSPs on one particular category of opex, such as the proportion of corporate overheads expenditure that is expensed versus capitalised. We stated that while partial measures provide information on important sources of differences between the DNSPs, our concern was that these only

[8] For statutory accounting purposes, SaaS has been considered as capex but, depending on its nature, is now considered opex under new International Financial Reporting Standards (IFRS) guidance published in April 2021. We note there is no requirement in the NER to align regulatory reporting with statutory accounts. However, we generally expect NSPs' capitalisation policies to align with the relevant accounting standards. That said, for a variety of reasons we consider it is preferable if DNSPs do not implement any mid-regulatory control period accounting changes until the start of the new regulatory control period.

account for differences in some categories of opex or capex, and miss other potentially important sources of differences. For example, even under the same *capitalisation policy* regarding allocation of overheads to opex or capex, some degree of divergence in opex/capex would still be observed due to differing *opex / capital trade-offs*.

Submissions

As noted in Section 2.1, while stakeholders were in broad agreement that capitalisation differences were impacting on benchmarking, the use of the ratios for the purpose of measuring differences in *capitalisation practices* was a not a distinct focus of most submissions. Ausgrid noted that the three types of opex/capital ratio (discussed below) in combination may be useful for the purpose of assessing capitalisation differences.[9] Jemena submitted that all three ratios have their pros and cons, and that all three ratios provided useful information on capitalisation differences through different lenses.[10] Energex and Ergon Energy noted that while there are limitations with opex/capex ratios, it believed that they provide a simple and transparent approach for assessing the materiality of differences in capitalisation practices.[11] Rather, most submissions on the ratios focused on their use in the OEF approach to addressing capitalisation differences, as covered in Section 3. In this context, and as set out below, they criticised the opex/capital ratios for a variety of reasons. These submissions also did not put forward alternative measures of capitalisation differences.

In terms of the submissions that did specifically comment on the ability of the opex/capital ratios to measure capitalisation, AusNet Services opposed using these ratios to measure capitalisation differences between DNSPs due to the lack of evidence to support a correlation between these ratios and differences in capitalisation, as explained below.[12] Ausgrid did not consider that a threshold for assessing whether or not capitalisation differences were material was required, as it considered that directly incorporating capitalisation into the modelling was sufficient.[13] Endeavour Energy submitted there was no clear evidence to suggest these ratios – collectively or in isolation – are sufficiently representative of the capitalisation differences between DNSPs. It considered they could be impacted by factors which affect a DNSP's opex/capex mix including *opex / capital trade-offs*, asset replacement cycles, service reliability, capital contributions, customer growth rates, export service take up levels and constraints, and the efficiency of historical opex and capex. It noted that Cambridge Economic Policy Associates (CEPA), in its report for Jemena in the context of its 2021–26 revenue determination, considered it important to separate *opex*

9 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4.

10 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 4–6.

11 Energy Queensland, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1.

12 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 5.

13 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 10.

/ capital trade-offs and capitalisation issues.[14] While having concerns with the opex/capital ratios, these submissions did not suggest alternative approaches to measuring differences.

Draft guidance in relation to measures of capitalisation differences

For our draft guidance, we continue to recognise the usefulness of opex/capital ratios as reasonable if imperfect high-level gauges of capitalisation differences. For this draft guidance note, we have also included additional measures that focus on the variation in corporate overheads capitalised among DNSPs, as we consider these also shed light on a particularly important source of capitalisation practice and policy differences between DNSPs.

Opex/capital ratios

Below we outline the specific opex/capital ratios we consider are important to have regard to in measuring capitalisation differences, what they suggest in terms of whether there are material differences in *capitalisation practices* between DNSPs, and the criticisms that have been made (generally in the context of the ratios being used in some options for addressing the material differences).

Consistent with the Consultation Paper, we have identified three particular types of opex/capital ratios for measuring capitalisation differences that reflect three different ways of measuring inputs: one based on expenditure (opex/total expenditure (totex), which includes capex), one based on cost (opex/total cost, which includes capital cost), and one based on quantity (opex/total inputs, which includes capital input quantity as calculated in our Multilateral Total Factor Productivity technique). These are set out below, along with the average ratio over the 2006–20 period for each DNSP. Consistent with our views in the Consultation Paper we consider that all three ratios have their pros and cons as high-level measures of capitalisation differences, and consider that looking at all three is a useful gauge of the materiality of capitalisation differences. Further, the evidence below supports the view that the differences are sufficiently material to consider their impact on the benchmarking results.

Opex/totex

The opex/ totex ratio is an expenditure-based measure, where totex is the sum of opex and capex. The average opex/totex ratio for each DNSP is shown in Figure 1 for the 2006–20 period. The red line in Figure 1 shows the customer-weighted average opex/totex ratio over this period for the benchmarking comparator DNSPs, which is 41.6 per cent. These comparator DNSPs are those with a model-average efficiency score from our opex econometric cost function models over our benchmark comparator point of 0.75 – for the 2006–20 benchmarking period, these were Powercor, SA Power Networks, CitiPower, TasNetworks, and United Energy. We observe a degree of variation in DNSPs' opex/totex ratios both above and below the comparator average, and eight of the 13 DNSPs had an opex/totex ratio of 7 per cent or more above or below the comparator-average ratio.

[14] Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 3–4.

Figure 1 Opex to totex ratios for distribution businesses, 2006–20[15]

Source: Economic Benchmarking RINs, all DNSPs; AER analysis.

The opex/totex ratio captures important dollar-for-dollar swings between opex and capex over the benchmarking period, such as capitalisation/expensing decisions on overheads as well as capex/opex trade-offs. We recognise that while opex is relatively constant over time, capex (the measure of capital inputs in this ratio) by nature fluctuates from year to year. We consider that examining this ratio over the benchmarking period e.g. 2006–20 mitigates the impact of these fluctuations to some degree. We also recognise, however, that the period-average opex/totex ratio may still be picking up factors other than capitalisation practices, such as capex replacement cycles.

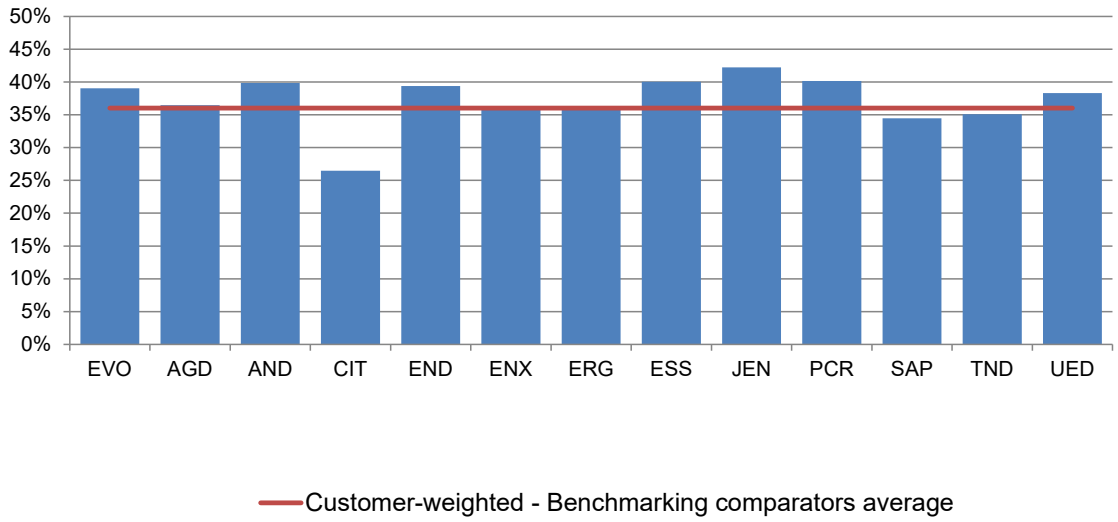
Opex/total cost

The opex/total cost ratio is a cost-based measure, where total costs is the sum of opex and capital costs (the latter measured by the annual user cost (AUC) of capital).[16] The average opex/total cost ratio for each DNSP is shown in Figure 2 for the 2006–20 period. The red line in Figure 2 also shows the customer-weighted average opex/total cost ratio over this period for the benchmarking comparator DNSPs, which is 36.0 per cent. We observe a degree of variation in DNSPs' opex/total cost ratios both above and below the comparator average, and seven of the 13 DNSPs had an opex/total cost ratio of 7 per cent or more above or below the comparator-average ratio.

15 Consistent with the opex series used for economic benchmarking, this chart uses 2014 CAMs backcast opex for those DNSPs who have since changed their CAMs.

16 The annual user cost of capital (AUC) is the return on capital, the return of capital and the benchmark tax liability, all calculated in a broadly similar way to that used in forming the building blocks revenue requirement.

Figure 2 Opex to total cost ratios for distribution businesses, 2006–20[17]



Source: Economic Benchmarking RINs, all DNSPs; AER analysis.

The opex/total cost ratio is consistent with the cost-based, rather than expenditure-based, approach to benchmarking. This is because the AUC of capital used as the capital cost element in the opex/total cost ratio is based on a stock measure for the capital input,[18] rather than the flow-based measure (capex) used in the opex/totex ratio. This usefully supplements the above flow-based measure (i.e. opex/totex). However, we recognise that the AUC of capital is an imperfect measure of capital inputs, due to potential inconsistencies among the DNSPs in approaches to (initial) regulatory asset base valuation.

Opex/total inputs

The opex / total inputs ratio is a physical quantity-based measure, where the total inputs measure reflects the weighted average of opex quantity and individual capital input quantity based on the input specification in economic benchmarking,[19] measured by the multilateral total factor productivity (MTFP) models as discussed in Section 1.1 and Appendix A of our Consultation Paper.[20] The average opex/total inputs ratio for each DNSP is shown in Figure 3 for the 2006–20 period. The red line in Figure 3 also shows the customer-weighted average opex/total inputs cost ratio over this period for the benchmarking comparator DNSPs. We observe a degree of variation in DNSPs' opex/total inputs ratios both above and

17 Consistent with the opex series used for economic benchmarking, this chart uses 2014 CAMs backcast opex for those DNSPs who have since changed their CAMs.

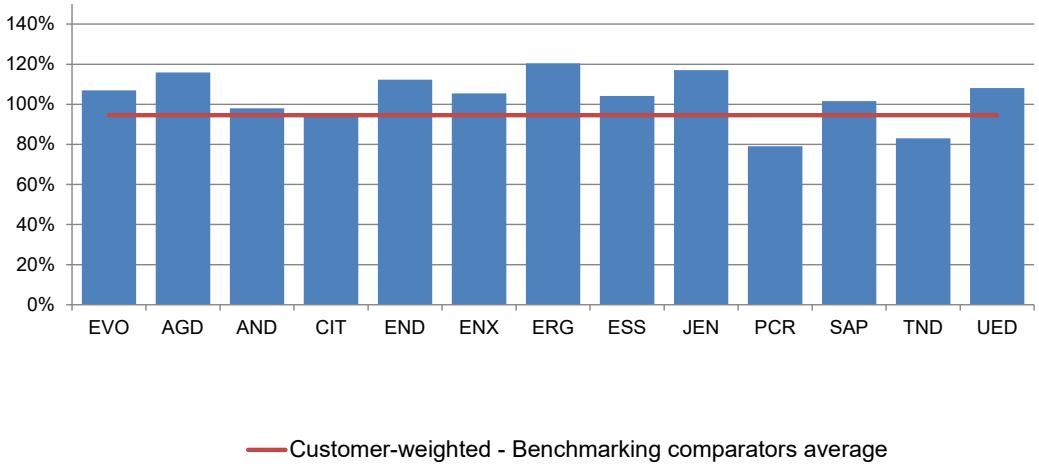
18 This assumes that the periodic flow of capital services is in proportion to the capital stock in place.

19 For each DNSP, MTFP for each year over the 2006–20 period is divided by opex MPFP for each year over that period. This gives the ratio of Opex/total inputs, since MTFP = Outputs/Total inputs, and Opex MPFP = Outputs/Opex.

20 AER, *How the AER will assess the impact of capitalisation differences on our benchmarking*, 29 November 2021, pp. 1–3 and pp. 39–43.

below the comparator average,[21] and that 11 of the 13 DNSPs had an opex/total inputs ratio of 7 per cent or more above or below the comparator-average ratio.

Figure 3 Opex to total inputs ratios for distribution businesses, 2006–2020[22]



Source: Economic Benchmarking RINs, all DNSPs; AER analysis.

The opex/total inputs ratio, as a quantity based measure, reduces some of the issues set out above in relation to the value-based measures (particularly in relation to asset valuation), as quantity measures do not directly rely on asset valuation which can involve a degree of subjectivity.[23] However, the capital input quantity constructed may be relatively insensitive to changes in *capitalisation policy* as these changes would not directly translate to a change in the capital input quantity measured by our economic benchmarking. This is because capitalised overheads is only incorporated indirectly into the capital input index,[24] which limits the usefulness of the opex/total input ratio as it fails to capture *capitalisation policy* differences.

Differences in overhead allocation between DNSPs

In this section we present measures of the differences in the allocation of overheads as additional measures to those outlined in the Consultation Paper, reflecting the views of stakeholders that overheads, particularly corporate overheads, are an important part of differences in *capitalisation policies*.

Overheads are an important source of differences in capitalisation between DNSPs and have a material impact on the level of DNSPs' reported opex. We consider that as they are likely

21 As a ratio of two indexes rather than of absolute levels, the opex/total input ratios in themselves do not resemble those for the opex/totex or opex/total cost forms of the ratio.

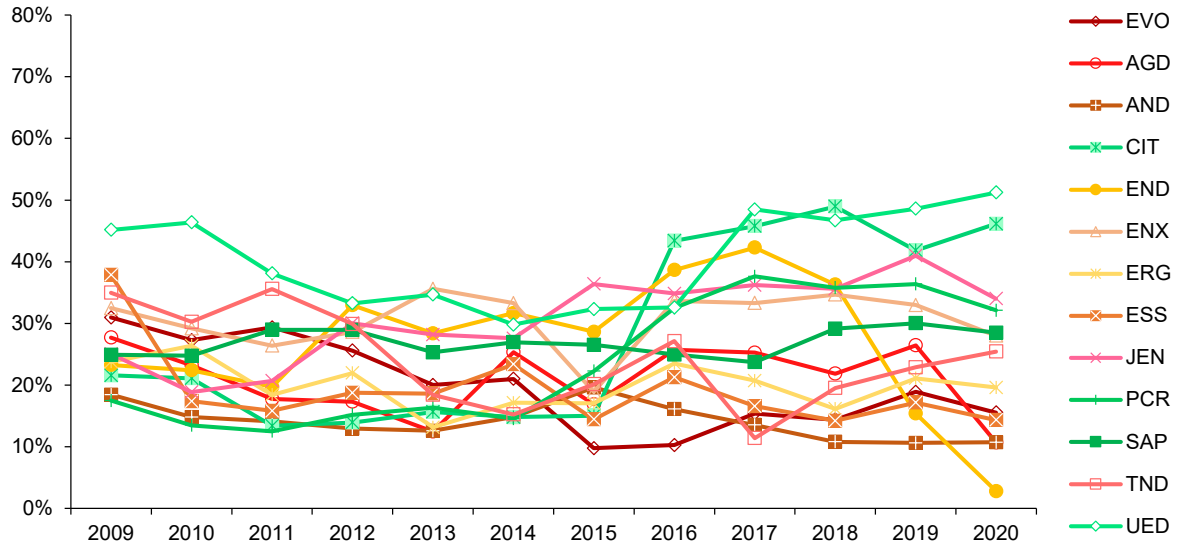
22 Consistent with the opex series used for economic benchmarking, this chart uses 2014 CAMs backcast opex for those DNSPs who have since changed their CAMs.

23 AER, *Final Decision Jemena distribution determination 2021–26, Attachment 6 – Operating expenditure*, April 2021, p. 74.

24 It is incorporated within one of the weights used to weight the different types of capital inputs.

impacted by *capitalisation policy* differences, they are an important part of overall *capitalisation practice* differences that should be examined. This is illustrated in Figure 4 and Figure 5, which show that corporate overheads opex can comprise a material proportion of total opex (Figure 4) for DNSPs, combined with DNSPs having differing allocations of corporate overheads between opex and capex (Figure 5). As a result, we consider these also provide important information as measures of capitalisation differences.

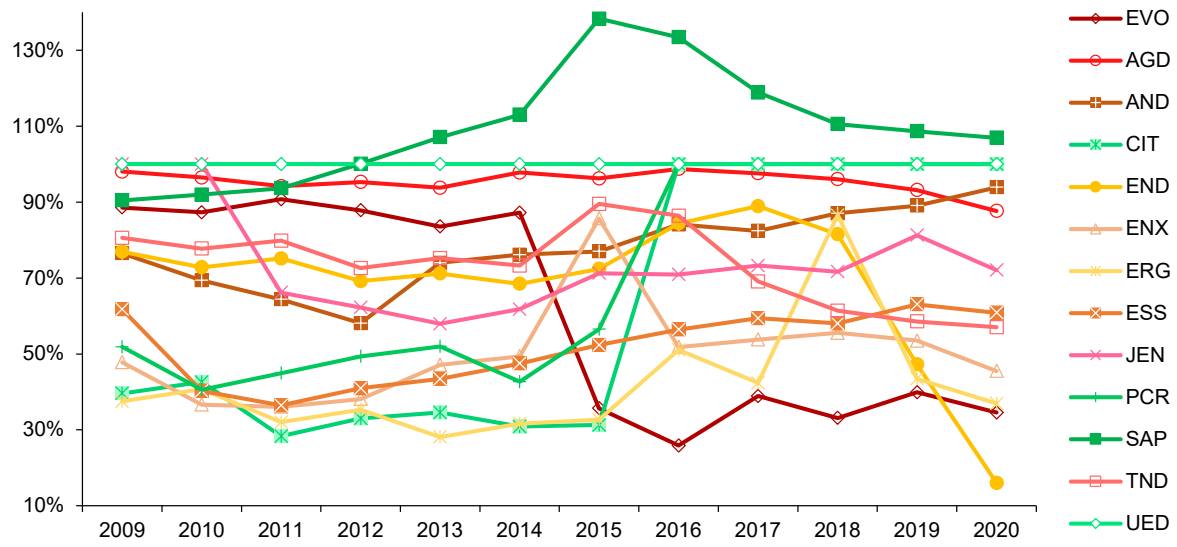
Figure 4 Corporate overheads opex as a proportion of total opex



Source: Category Analysis RINs, all DNSPs; AER analysis.

Note: Basis of reported expenditure is under the CAM applying in each year.

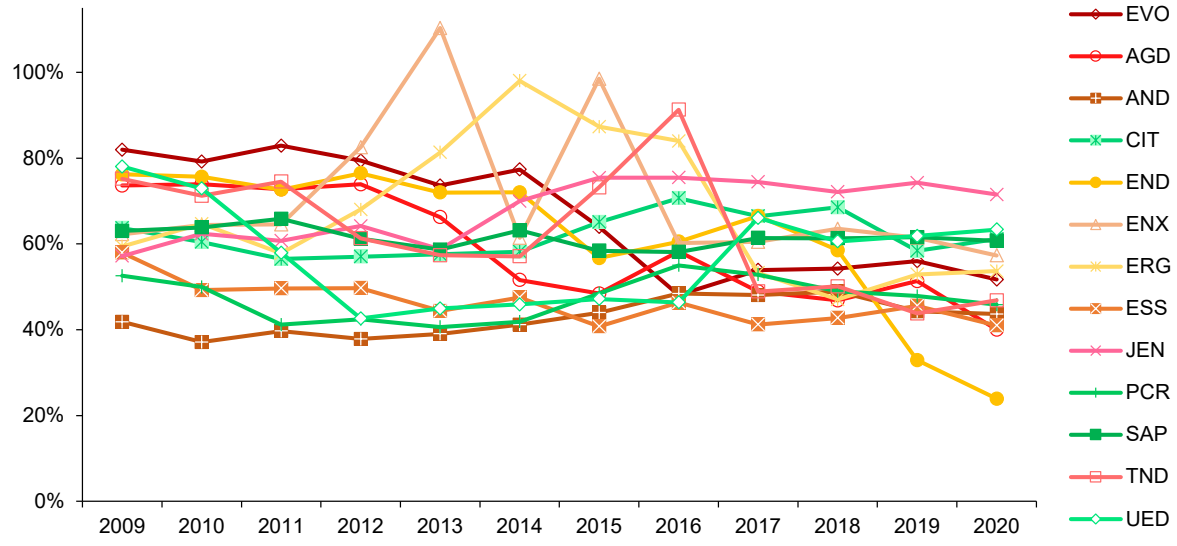
Figure 5 Expensed corporate overheads as a proportion of totex corporate overheads[25]



Source: Category Analysis RINs, all DNSPs; AER analysis.

Figures 6 and 7 present the equivalent charts for total (the sum of network and corporate) overheads. We consider these tell a similar story in terms of their relative materiality and differences between businesses.

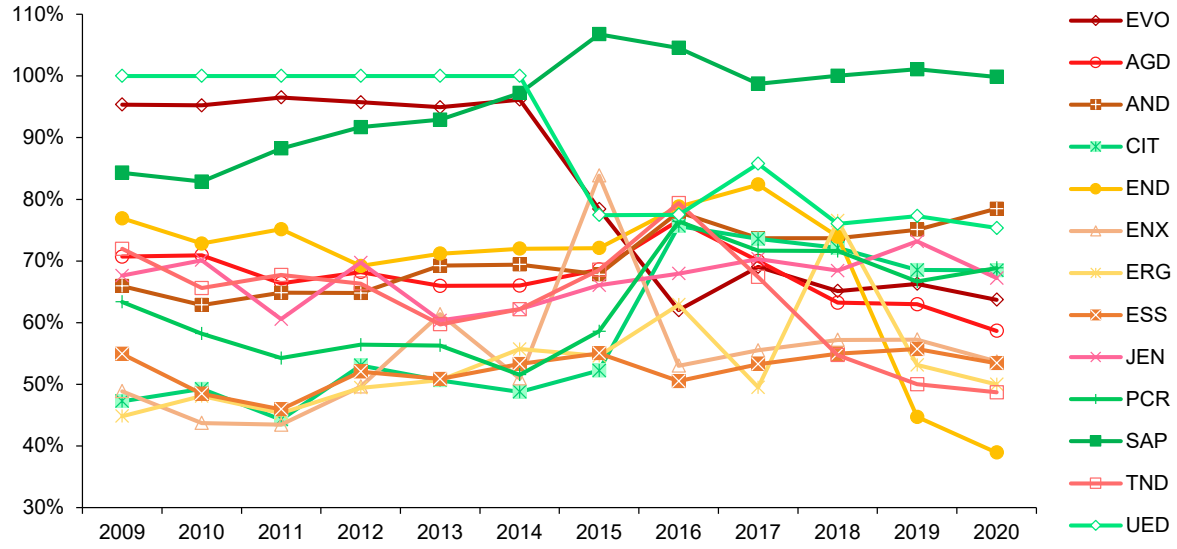
Figure 6 Total (corporate and network) overheads opex as a proportion of total opex



Source: Category Analysis RINs, all DNSPs; AER analysis.

[25] Note that SA Power Networks' (SAP) proportion exceeds 100% in most years. This is because it records negative capitalised corporate overheads in those years.

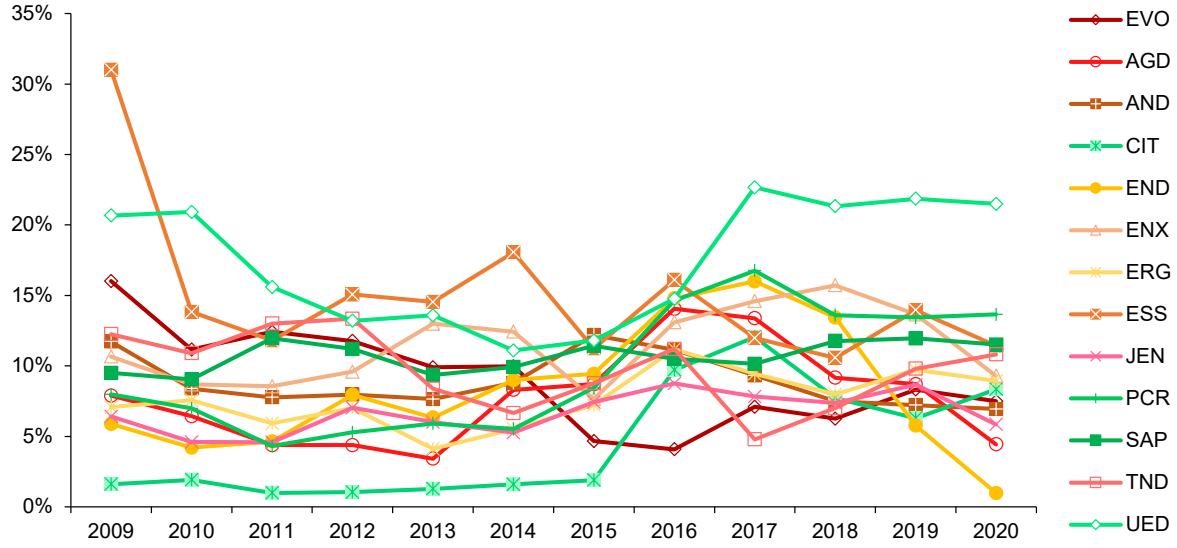
Figure 7 Expensed total (corporate and network) overheads as a proportion of totex total overheads



Source: Category Analysis RINs, all DNSPs; AER analysis.

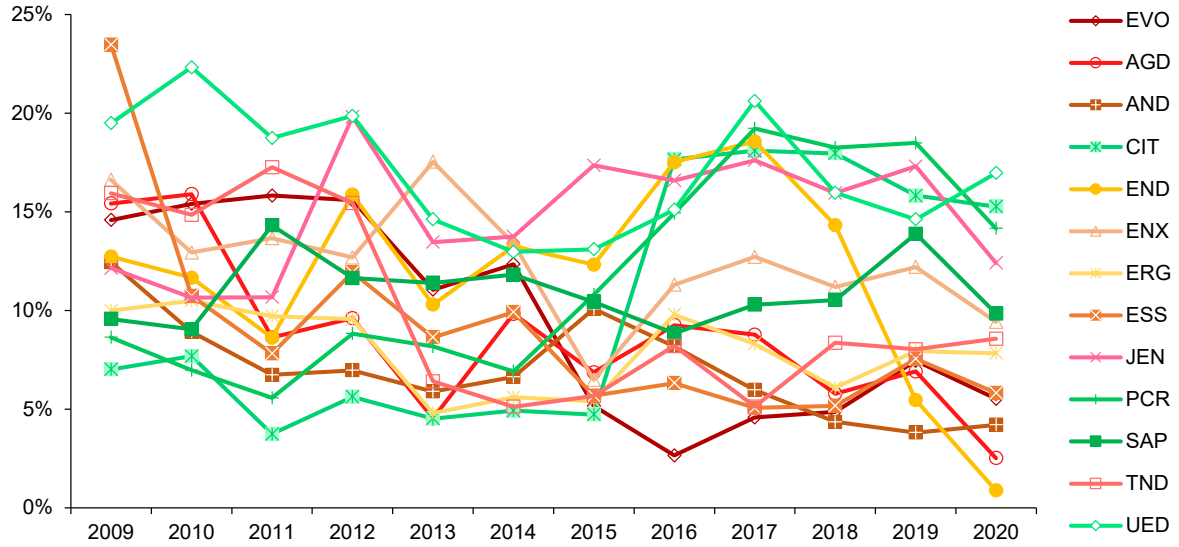
As further illustration of the importance of corporate overheads expenditure, we also present expensed corporate overheads as a proportion of totex and total costs, in Figures 8 and 9, respectively. These also indicate the both the relative importance of corporate overheads expenditure, and the variation between DNSPs in their expensing of corporate overheads expenditure.

Figure 8 Corporate overheads opex as a proportion of totex



Source: Category Analysis RINs, all DNSPs; AER analysis.

Figure 9 Corporate overheads opex as a proportion of total cost



Source: Category Analysis RINs, all DNSPs; AER analysis.

We discuss the advantages and disadvantages of corporate overheads versus total overheads as measures of capitalisation policy in Sections 3.2 and 3.7.

Criticisms of ratios raised in submissions and our response

As noted above, many submissions to the Consultation Paper criticised the opex/capital ratios, particularly in the context where the ratios underpinned the OEF adjustment approach (set out in Section 3) that we had indicated in the Consultation Paper as our preference for addressing capitalisation differences. While the ratios are no longer employed in our new preferred approach to addressing capitalisation practices for this draft guidance note, these criticisms and our response are relevant both to our assessment of the ratios' usefulness as high-level measures of capitalisation practices and of the advantages and disadvantages of the OEF approach.

Many DNSPs submitted that the opex/capital ratios lack the requisite validity and robustness. Across these submissions, DNSPs argued in particular that:

- The opex/capital ratios lacked robustness, indicated by undue volatility on various measures both over time and between the ratios
- The opex/capital ratios lacked validity as they do not appropriately reflect *capitalisation practices*. In particular:
  - The opex/capital ratios do not reflect *capitalisation policies*, indicated by the lack of correlation between the ratios and the degree of expensing of overheads
  - The opex/capital ratios reflect an element of business size, evidenced by the positive correlation between opex / totex ratio and business size
  - The opex/totex ratio is particularly sensitive to other factors unrelated to capitalisation; e.g. capex efficiency, capital contributions, asset replacement cycles, etc

- The opex/capital ratios inappropriately conflate *capitalisation policy* with *opex / capital trade-offs*.

Some more detailed comments were also made about the opex/total cost and opex/total inputs ratios.

We discuss and respond below to these criticisms. Our view is that, while the opex/capital ratios are not perfect measures of capitalisation, or capitalisation differences, they offer an effective means of providing a high-level gauge of materiality. We consider that the concerns raised by stakeholders are legitimate. In particular, we agree that opex/capital ratios would to some extent reflect factors other than capitalisation practices, particularly a range of influences on the level of capex. However, in the context of their use as high-level gauges of capitalisation, we consider these concerns are somewhat mitigated by taking the average ratio over as long a time period as available and drawing on multiple ratios to inform capitalisation differences. Further, as noted above, we consider, despite their weaknesses, these, along with measures of corporate overheads, are one of the two sets of comprehensive high-level measures available. In addition, we consider the findings are broadly consistent between these two measures.

Robustness of ratios

In terms of robustness, some DNSPs considered that there was undue year-to-year volatility, period-average volatility, and variability of results across the different ratios.

Year-to-year and period average volatility in the opex / totex ratio

In its submission, Endeavour Energy argued that the volatility in the opex / totex ratio from year to year would not be expected in a measure of *capitalisation practices* for those DNSPs that have maintained a consistent *capitalisation policy*, and that the presence of such volatility indicates the influence of factors unrelated to *capitalisation practices*.[26]

In its submission, Ausgrid raised the issue that the period average (e.g. for the period from 2006) itself is volatile when taken over slightly different periods.[27] Ausgrid calculated the period average for each ratio and each DNSP from 2006 to each of 2017, 2018, 2019 and 2020 respectively. It then calculated the percentage difference for each ratio and each DNSP relative to the customer-weighted benchmarking comparator average, and observed that these results varied across the four different periods created (years ending in 2017, 2018, 2019, 2020). We have replicated these calculations by Ausgrid.

We acknowledge that the opex / totex ratio fluctuates from year to year for DNSPs. However, some volatility in the ratios from year to year is not unexpected, even for those DNSPs that have maintained a consistent *capitalisation policy* over the time period. This reflects the definition of *capitalisation practices* that we have adopted, which includes not only *capitalisation policies*, but *opex / capex* trade-off decisions made by businesses. Given this definition, we would expect to see some volatility due to the presence of opex / capex trade-

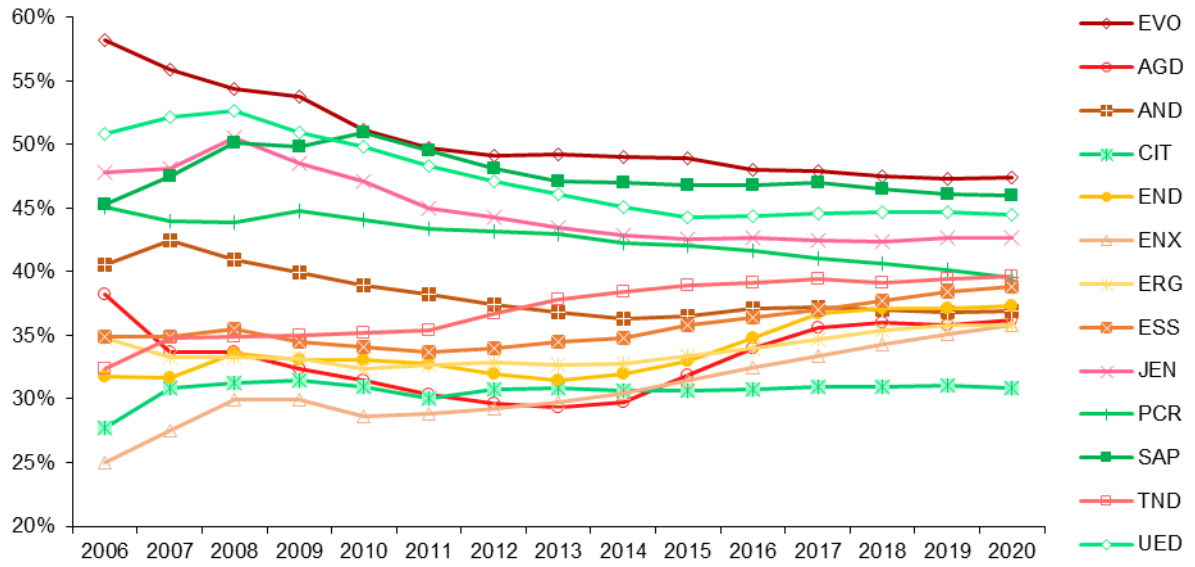
[26] Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4.

[27] Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 6.

offs. We also acknowledge that the ratios would fluctuate for reasons other than capitalisation practices, such as the lumpiness in capex that can occur, e.g. for replacement and augmentation cycles.

We consider, however, that as we are taking the period average of the ratios, the year-to-year volatility is somewhat mitigated and less important. Overall, we do not consider that observing year-to-year volatility in the ratios necessarily invalidates the period average as a high-level measure of DNSPs' underlying *capitalisation practices* from 2006 to 2020. As can be seen in Figure 10, the year-to-year volatility is mitigated with a longer averaging period. For each additional year that the 2006 to 2017 period is extended, additional data points are introduced that are used to calculate the percentage difference relative to the customer-weighted benchmarking comparator average. Figure 10 shows the period average opex / totex ratio for each DNSP from 2006 to 2020, and we can see that there is milder variation for each additional year that the 2006 to 2017 period is extended.

Figure 10 Cumulative period average opex / totex ratio for DNSPs, 2006–20



Source: AER analysis

Variability of results across ratios

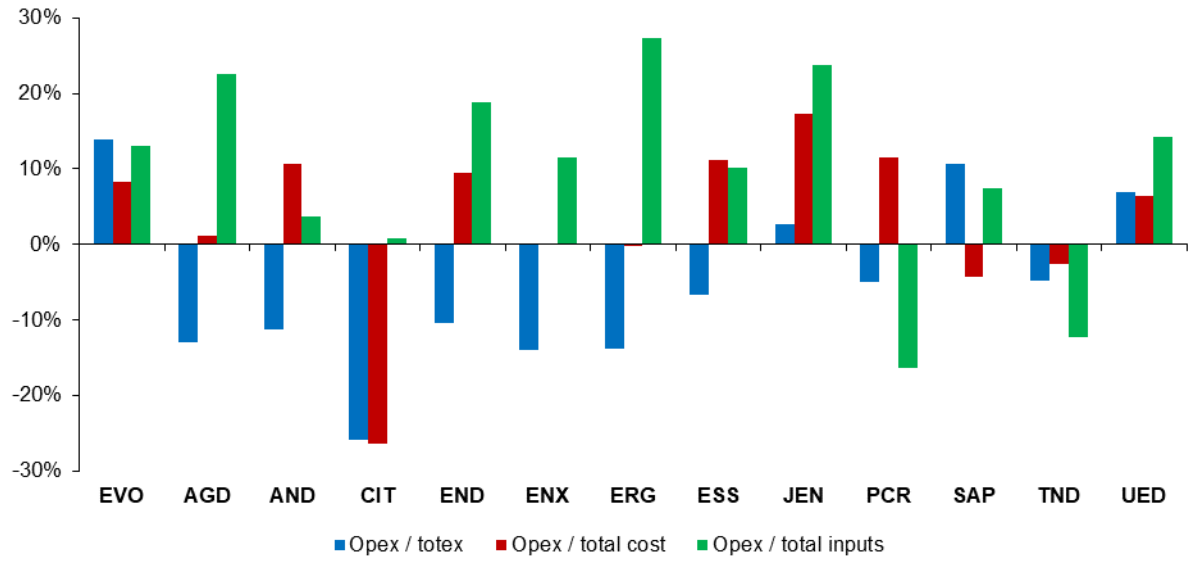
Ausgrid also raised concerns about the variability between the three different ratios for a given DNSP and period, and highlighted the significantly different outcomes that occur in the context of applying the ratios individually as an OEF adjustment.[28]

Figure 11 shows the percentage difference between the DNSP period-average opex / capital ratios (opex/totex, opex/total cost and opex/total inputs) and the period-average benchmarking comparator opex / capital ratios. Looking at Figure 11, we can see examples of significantly different outcomes across two or all three ratios, in both magnitude and direction. We consider this supports our approach of using all three ratios, rather than any

28 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 6–7.

one of the ratios individually, as high-level gauges of capitalisation, particularly as they all measure slightly different aspects of capitalisation. However, we also acknowledge that the variability across the ratios is not fully explained, and suggests caution in employing the ratios particularly within an OEF adjustment.

Figure 11 Percentage difference between DNSP 2006–2020 period-average ratio and benchmarking comparator ratio



Source: AER analysis

Validity of ratios

Lack of correlation between ratios and overheads

In their submissions, Ausgrid, AusNet Services and Endeavour Energy argued that if the ratios are an effective measure of *capitalisation practices*, and in particular *capitalisation policy* differences, then we would expect to observe a relationship between the ratios and other measures of *capitalisation policy* differences.[29] The submissions considered the relationship between the ratios and two other measures that they considered to capture *capitalisation policy* differences:

1. Total (network and corporate) Overheads Opex / Total overheads Totex; and,
2. Corporate overheads Opex / Corporate overheads Totex.

As noted above and set out further below, we agree that these two measures are likely to be effective measures of *capitalisation policy* differences, given that overheads is a category

[29] Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 4–5; AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 6–8; Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4.

where DNSPs have greater discretion about whether to categorise costs as opex or capex, and this is a category where we have seen DNSPs exercise this discretion in the past. However, given they capture a subset of *capitalisation policy* differences, do not capture opex / capital trade-offs, and that the opex/capital ratios take into account other differences beyond *capitalisation policies*, we would not expect to see a one-to-one relationship; but we would expect there to be some relationship.

In this light we have examined the relationships between the ratios and the above measures of capitalisation suggested by the DNSPs. These are set out in Table 2 and are similar to the results observed by the DNSPs. Table 2 shows the coefficient of determination (R^2) between each of the three ratios and the two measures. The coefficient of determination measures the proportion of variation in the partial measures that is explained by the ratios and ranges from 0 to 1: a value of 0 indicates no association, and a value of 1 indicates that the variation in the partial measures is perfectly explained by the ratios. The results in Table 2 indicate that:

- The opex / totex ratio explains some, but not most, of the variation observed in the proportion of total overheads categorised as opex
- The opex / totex ratio explains a small amount of the variation observed in the proportion of corporate overheads categorised as opex
- The opex / total cost and opex / total inputs ratios explain almost none of the variation observed in these measures.

Table 2 Correlation between opex / capital ratios and proposed measures for *capitalisation policy* differences[30]

Opex / capital ratio	Measure	R^2
1: Opex / totex	1: Total overheads Opex / Total Overheads Totex	0.47
1: Opex / totex	2: Corporate overheads Opex / Corporate overheads Totex	0.15
2: Opex / total cost	1: Total Overheads Opex / Total Overheads Totex	0.04
2: Opex / total cost	2: Corporate overheads Opex / Corporate overheads Totex	0.00
3: Opex / total inputs	1: Total Overheads Opex / Total Overheads Totex	0.01
3: Opex / total inputs	2: Corporate overheads Opex / Corporate overheads Totex	0.00

The results for the opex / totex ratio are not unexpected and we would expect these measures to explain some, but not all, of the variation in this ratio given we consider other *capitalisation practices* such as *opex / capital trade-offs* are also captured in the ratio. Further, given the basis of the opex / total cost ratio, which does not include capex but rather the AUC, we would not expect as strong a relationship; however, we would still expect to see some positive relationship which has not been found. Finally, given the quantity basis of the opex / total inputs ratio, there being no real correlation is not unexpected.

Correlation between opex / totex ratio and business size

30 Based on information from the Category Analysis Regulatory Information Notices submitted by the DNSPs for the period 2006–2020.

In their submissions, AusNet Services and TasNetworks argued that as the opex / totex ratio is correlated to business size, it is unsuitable for the purpose of making an OEF adjustment as the ratio accounts for business size not just *capitalisation practices*.[31]

AusNet Services suggested a causal relationship between business size, proxied by the Regulated Asset Base (RAB), and the opex / totex ratio is to be expected given economies of scale: smaller businesses have a higher proportion of fixed opex costs, and therefore a higher opex / totex ratio.[32]

We have some methodological concerns with AusNet Services' and TasNetworks' analyses, and have carried out our own analysis of these relationships. As explained below, based on these results, we consider that the effect of business size on the opex / totex ratio is not strong enough to invalidate the use of the opex / totex ratio as a high-level measure of *capitalisation practices*.

TasNetworks conducted analysis using a sample of only 5 DNSPs. We consider the set of all DNSPs to be a more appropriate set to analyse.

AusNet Services tested the correlation between the average opex / totex ratio from 2006 to 2019 and only 2020 RAB figures rather than period-average RAB figures. In addition, AusNet Services' RAB figures for some of the DNSPs depart from the expected metric; in particular:

- CitiPower and Powercor are presented as the sum of the two businesses' RABs
- Jemena's RAB figures include the Jemena Gas Network's RAB.
- AusNet Services and TasNetworks' RAB figures respectively include the RAB of those two businesses' transmission operations.

We have examined the calculations of a coefficient of determination (R^2) value to test the strength of the relationship suggested by AusNet Services and TasNetworks, and have identified differences in both the data and the methods used. Table 3 shows the coefficient of determination (R^2) between the opex / totex ratio and a measure of RAB size using a variety of methods and data sets. The coefficient of determination (R^2) here measures the proportion of variation in the opex / totex ratio that is explained by the measure of RAB size and ranges from 0 to 1: again, a value of 0 indicates no association, and a value of 1 indicates that the variation in the opex / totex ratio is perfectly explained by the measure of RAB size.

In Table 3 we have replicated TasNetworks' analysis with our own RAB data which is measured in real 2020 terms as opposed to nominal terms. AusNet Services' analysis has been replicated using the 2020 reported RAB for each distribution business directly out of the network performance report. The AER's method in Table 3 calculates the correlation between the period-average opex / totex ratio and the period-average real RAB for the 2009 to 2020 period and uses a data source drawn from the supporting files for the AER's

[31] AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 9; TasNetworks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 1–2.

[32] AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 9.

Electricity network performance report 2021.[33] We consider this method and data is a more appropriate basis to undertake this analysis than that done by AusNet Services and TasNetworks particularly as it incorporates the data for all DNSPs.

Table 3 Correlation between opex / totex ratio and RAB

Method	Dataset	R^2
1: AusNet Services	1: AusNet Services	0.47
2: TasNetworks	2: TasNetworks	0.38
1: AusNet Services	3: AER	0.24
2: TasNetworks	3: AER	0.27
3: AER	3: AER	0.10

In this light, the results in Table 3 indicate that:

- The data and methods used by AusNet Services and TasNetworks are not representative of, and in this case, overstate the amount of variation observed in the opex / totex ratio that is explained by business size, and
- Business size explains very little of the variation observed in the opex / totex ratio under the AER's method and data.

Further, in relation to AusNet Services' point that there are economies of scale in opex, this is contradicted by our opex econometric modelling results. These suggest near-constant returns to scale, as indicated by the sum of the output elasticities being at or near 1.

The level of capex is sensitive to other factors unrelated to capitalisation practices

Some DNSPs submitted that the opex/totex ratio in particular is sensitive to other factors unrelated to *capitalisation practices*. Endeavour Energy stated that factors which affect a DNSP's opex/capex mix include *opex / capital trade-offs*, asset replacement cycles, service reliability, capital contributions, customer growth rates, export service take up-levels and constraints, and the efficiency of historical opex and capex. Endeavour Energy argued that these factors are irrelevant to the assessment of opex efficiency but will influence capex levels and therefore impact the opex/capital ratios. Endeavour Energy stated that although they might give an indication of whether a DNSP might be adopting a greater level of opex solutions relative to capex solutions, the ratios do not provide insights into the specific question of whether the DNSPs' *capitalisation policies* impact on the opex benchmarking results. Rather, the ratios can mask the material differences in *capitalisation policies* and therefore the opex efficiency assessment.[34]

Jemena also raised that because of the lagged impact of capex, the opex / totex ratio does not fully capture the *opex / capital trade-offs*. For example, it noted capex invested prior to

33 AER, *Electricity DNSP Operational performance data - 2006-2020*, September 2021.

34 Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

2006 that resulted in opex savings post-2006 would not be captured by the opex / totex ratio calculated based on 2006–20 data. Similarly, capex invested in 2020 which reduces opex in future years will not be fairly reflected in the ratio based on 2006–20 data as it fails to recognise the future benefits delivered by the capex investment.[35]

We share the view that the level of capex from year to year reflects a range of factors other than *capitalisation practices*, reflecting the lumpy and cyclical nature of capex, including differences in how much capex was invested prior to 2006. In relation to their use as high-level measures, this is the key reason that we measure the opex/capital ratios by taking the average ratio over a relatively long period, namely the benchmarking periods starting respectively in 2006 and 2012. We consider this mitigates to some degree the year-to-year volatility in capex. In addition, we draw on multiple forms of the opex/capital ratios, recognising they each measure different aspects and there is no one perfect measure of *capitalisation practices*. However, as discussed further in Section 3.4, the uncertainty around what exactly is and is not captured in opex/capital ratios is a key reason why we have not maintained our Consultation Paper preference for the OEF-based approach to addressing capitalisation differences.

In relation to the specific factors which affect a DNSP's opex/capex mix that were raised in submissions:

- Replacement cycles and asset age: we acknowledge that asset replacement cycles would be expected to differ between DNSPs. This would impact on the level of capex, which means that opex/capital ratios would to some extent reflect factors other than capitalisation practices. However, the extent of this impact is unclear. As noted in the Consultation Paper, consistent with our finding in 2015, the current asset age profiles across the distribution businesses indicates that asset age is not likely to be a source of material differences in opex.[36] Our analysis suggests there are some significant variations across DNSPs in terms of asset replacement life and asset age, and thus remaining asset life, for a particular asset class. However, when looking at all assets as a group, the differences are less prominent. Figure 12 below shows that the weighted average remaining asset lives (WARL), as a percentage of calibrated[37] replacement life,[38] of DNSPs are very close to the median of 54%, with SAPN (49%) and United Energy (60%), showing the largest deviations. Thus, on average, the relative position within their respective asset replacement cycles may not differ too substantially across DNSPs. Where there is evidence that asset age differences are impacting the

35 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4.

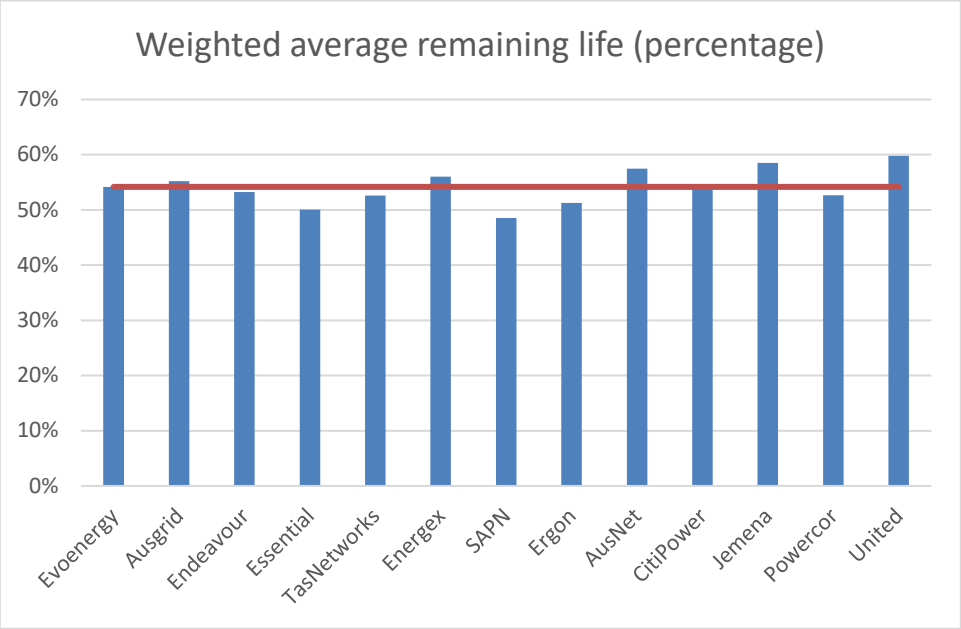
36 AER, Final Decision, *Ausgrid distribution determination 2015–16 to 2018–19, Attachment 7 – Operating expenditure*, April 2015, pp. 251–255.

37 The calibration process estimates the average age at replacement for each asset category using the observed historical replacement practices of a distributor. Calibrated expected replacement lives is different to the replacement lives that distributors report. For further details, see AER, *Repex model outline for electricity distribution determinations*, February 2020, p. 5–6.

38 By normalising WARL by network-specific calibrated asset life in percentage terms, it is less impacted by differences in calibrated life lengths. Compared to WARL, the WARL% better represents where a network is positioned in terms of asset replacement cycle.

benchmarking for one or more DNSPs, a separate OEF for asset age could be considered on a case-by-case basis.

Figure 12 Percentage weighted average remaining life across DNSPs



- Capital contributions: in relation to Endeavour Energy's submission that a DNSP's opex / capex ratio will be affected by capital contributions,[39] we note the opex/totex ratio that we have calculated incorporates net capex rather than gross capex, i.e. it is capex net of capital contributions and therefore does not include them. In addition, we consider the data collected from DNSPs on capital contributions is incomplete and inconsistent, and therefore its impact on the opex/totex ratio is difficult to determine using the data available to us.
- Relative efficiency of opex and capital: we have not been presented with evidence that capital or capex efficiency differs too widely to opex efficiency. We would expect that, in general, managerial inefficiencies in an organisation, if present, affect both opex and capex/capital in a broadly similar way. That is, the managerial ability and effort to reduce total expenditure or cost may not generally be expected to be systematically different according to whether the expenditure is related to opex or capex/capital input. To the extent that the level of efficiency is similar between opex and capital inputs, the opex/capital ratio would not be distorted. However, we recognise the point made in submissions that that there may be DNSPs which have asymmetric opex and capital efficiency. This is a further reason for caution in using the opex/capital ratios in an overly precise way, as discussed further in Section 3.2 and 3..

That opex/capital ratios inappropriately conflate capitalisation policy with opex / capital trade-offs

39 Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

Endeavour Energy, citing the CEPA report for Jemena in the context of Jemena's 2021–26 reset, submitted that opex/capital ratios inappropriately conflate *capitalisation policy* with *opex / capital trade-offs*. It argued that the ratios do not provide insights into the specific question of whether the DNSPs' *capitalisation policies* impact on the opex benchmarking results. Endeavour Energy referred to CEPA's stylised examples that show different DNSPs can have the same or similar opex/totex ratios despite having significantly different *capitalisation policies*.[40]

We consider differences between DNSPs in either form of capitalisation practice can potentially impact on our opex benchmarking efficiency scores. However, as discussed further in Section 3, in light of our further examination, we consider that given our current benchmarking methods, use of these ratios in an OEF adjustment may not be appropriate, particularly as we now consider opex/capital trade-offs are to some but varying extent implicitly taken into account in our econometric opex cost function models.

We question the methodological validity of the CEPA stylised examples, as they make the explicit assumption that the DNSPs are equally efficient in producing the same level of outputs, yet the capex amounts are markedly different.[41] We therefore query whether the models reflect a realistic scenario.

Other specific comments on the properties of the opex/ total cost and opex/total inputs ratios

Jemena considered the opex/ total cost ratio provides a more balanced measure for valuing capital inputs and opex since the AUC of capital reflects the cost of using the capex investment over one year which matches the utilisation period of opex. It was of the view this ratio therefore better reflects the *opex / capital trade-offs* than the expenditure-based opex/totex ratio. However, it noted the AUC is impacted by and sensitive to the rate of return assumption and the impact differs across DNSPs. It also questioned why tax is included in the AUC calculation as it does not have a direct impact on the consumption or cost of capital.[42]

Jemena also noted that the opex/total inputs ratio is less impacted by initial asset valuations or variation in the WACC and the choice of depreciation profile.[43]

We share Jemena's view that the opex/total inputs ratio is less impacted by financial measurement issues. This is why we have regard to it (along with the other two ratios) in gauging the materiality of capitalisation differences. We also agree in relation to the point on opex/total inputs ratio and asset valuations.

40 Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

41 CEPA, *The Australian Energy Regulator's operating expenditure benchmarking – a review of the impact of capitalisation and model reliability*, pp. 14–15.

42 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 4–5.

43 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 4–5.

In relation to Jemena's specific point on the inclusion of tax in the AUC calculation, this is included because the Weighted Average Cost of Capital (WACC) includes the gamma parameter, to account for the return to investors via the utilisation of imputation credits in Australia's franking credits system.

2.3 Are these differences having a material impact on the benchmarking results?

As set out in Section 2.2, while we acknowledge there are some issues with the opex / capital ratios and they are not perfect measures, we consider that these ratios, in combination with measures relating to differences in the capitalisation of overheads, indicate that there are material differences in *capitalisation practices* between at least some DNSPs. Given this, we have considered whether these differences are having a material impact on our benchmarking scores.

Our view in the Consultation Paper was that the differences in *capitalisation practices* that we observe are a material factor in terms of the potential impact on the benchmarking results, specifically on the DNSP efficiency scores from the opex econometric cost function models. We considered the degree of impact on any particular DNSP's efficiency scores will primarily depend on how divergent that DNSP's *capitalisation practices* are relative to the benchmark comparator DNSPs.

We identified the following approaches to measuring the materiality of the impact of capitalisation differences on the DNSPs' benchmarking scores:

- Consideration of a particular DNSP's opex/capital ratios relative to the benchmark comparators' opex/capital ratios, in the context of the impact on its opex and, in turn, its opex benchmarking efficiency score
- Consideration of the sensitivity of reported opex and associated opex benchmarking scores under current CAMs compared to using the frozen 2014 CAMs.

In past decisions, we have used these methods in a complementary way.[44]

As discussed in Section 2.2, submissions generally did not present quantitative evidence that capitalisation differences were material. They also did not provide evidence that any material differences were impacting the benchmarking results. However, consistent with our analysis below in relation to the econometric opex cost models, SA Power Networks provided the results of its modelling of opex multilateral partial factor productivity (MPFP) benchmarking that showed a high sensitivity depending on the CAM chosen for modelling.[45]

[44] AER, *Final Decision Jemena distribution determination 2021–26, Attachment 6 – Operating expenditure*, April 2021, pp. 32–34.

[45] SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 2–3.

For this draft guidance note, we consider the measures above remain useful as indicators of the impact of capitalisation differences on our benchmarking results, and have updated this analysis for the extra (2020) of data.

In relation to opex/capital ratios, as discussed above, we consider that, despite their shortcomings, these broadly indicate that *capitalisation practices* differ materially among the DNSPs. We also find many DNSPs' opex/capital ratios diverge materially from the comparator-average ratio. However, we note that any particular DNSP's differences should be interpreted with caution, due to the imprecision of the opex/capital ratios. This can also be seen when examining the differences between DNSPs in terms of corporate overheads as a proportion of opex and expensed corporate overheads as a proportion of totex corporate overheads.

In the Consultation Paper, we also presented a sensitivity analysis on the opex econometric cost function benchmarking results and efficiency scores for the period 2006–19, which we have now updated for 2006–20. It involved a variant of Option 4, as described in Section 3.6, where comparator-average opex / totex and opex / total cost ratios are applied to each DNSP's totex or total cost respectively to generate each DNSP's benchmarking opex. The variation to Option 4 is that this application is carried out one DNSP at a time prior to modelling, holding all else constant, and then iterating this process for all DNSPs. By not updating all the DNSPs' opex with the comparator-average opex/capital ratio simultaneously (as under Option 4), this isolates the impact on a DNSP's efficiency score resulting from its distinct *capitalisation practices* and avoids the additional impact of a shift in the frontier that results from a change in benchmark comparator opex (as illustrated in our sensitivity analysis using DNSPs' current CAMs below).

The results of this analysis are shown in Table 4, which presents the percentage difference to the benchmark comparator-averages for each DNSP for the opex/totex and opex/total cost ratios (columns 2 and 4). The impact of applying the comparator-average opex/totex and opex/total cost ratios respectively on each DNSP's model-average efficiency score, expressed as a percentage difference to the official model-average efficiency score, is also shown (column 3 and 5).

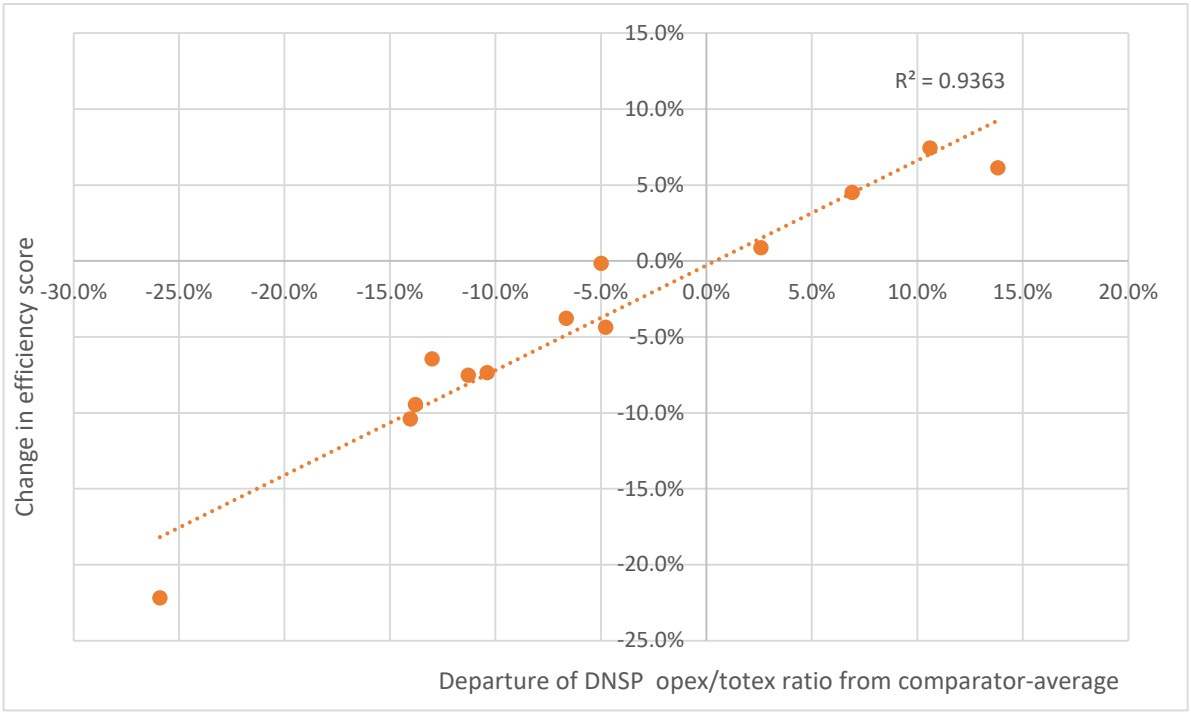
Table 4 Impact of applying the comparator-average opex/totex and opex/total cost ratios on each DNSP's model-average efficiency score (2006–20)

DNSP	Departure of DNSP opex/totex ratio from comparator-average	Change in efficiency score by benchmarking using comparator-average opex/totex ratio	Departure of DNSP opex/total cost ratio from comparator-average	Change in efficiency score by benchmarking using comparator-average opex/total cost ratio
EVO	13.8%	6.1%	8.3%	2.7%
AGD	-13.0%	-6.5%	1.2%	0.6%
CIT	-25.9%	-22.2%	-26.5%	-22.4%
END	-10.4%	-7.4%	9.4%	5.1%
ENX	-14.0%	-10.4%	0.2%	0.0%
ERG	-13.8%	-9.5%	-0.3%	0.7%
ESS	-6.6%	-3.8%	11.1%	7.0%

DNSP	Departure of DNSP opex/totex ratio from comparator-average	Change in efficiency score by benchmarking using comparator-average opex/totex ratio	Departure of DNSP opex/total cost ratio from comparator-average	Change in efficiency score by benchmarking using comparator-average opex/total cost ratio
JEN	2.6%	0.9%	17.2%	10.5%
PCR	-5.0%	-0.2%	11.4%	-0.6%
SAP	10.6%	7.4%	-4.3%	-4.3%
AND	-11.3%	-7.5%	10.6%	7.3%
TND	-4.8%	-4.4%	-2.6%	-1.9%
UED	6.9%	4.5%	6.4%	4.8%

We would expect the relationship would be positive between the impact on the efficiency scores and the extent of capitalisation difference (as measured by the departure from the comparator average opex/capital ratios). For example, the higher / lower a DNSP's opex / totex ratio is due to its *capitalisation practices*, the likely greater is the improvement / decline in its opex efficiency score when benchmarking on the basis of applying the comparator-average opex / totex ratio to its opex series. This positive relationship, shown for the opex/totex ratio, can be observed in Figure 13. We find a similar relationship for the opex / total cost ratio.

Figure 13 Relationship between the extent of DNSPs' capitalisation differences (as measured by the departure from the comparator average opex / totex ratios) and the impact on the efficiency scores

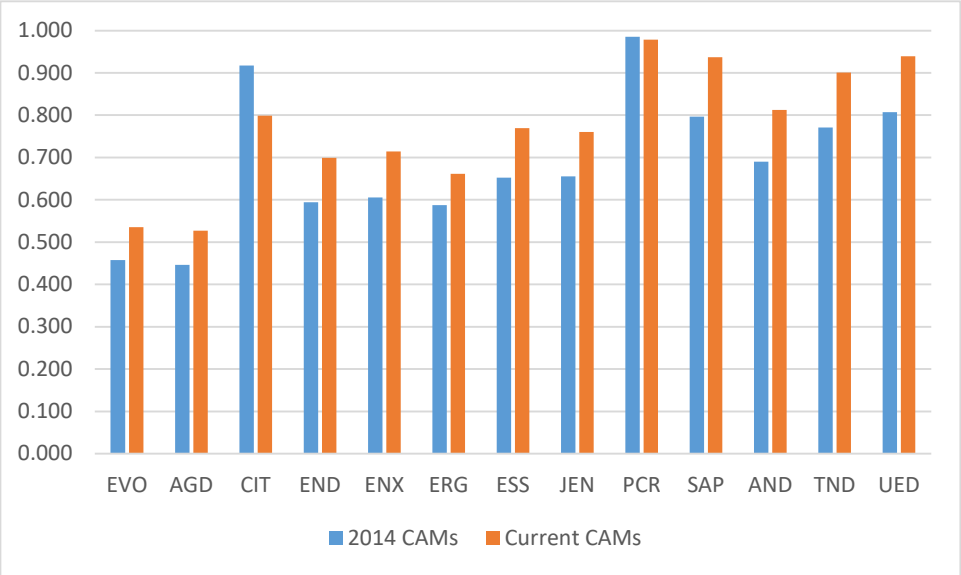


Source: Economic Benchmarking RINs; AER analysis.

As shown in Figure 13, we find a high correlation (measured by the coefficient of determination, R^2) between the opex/totex ratio divergence and the impact on the efficiency score.

In relation to the second approach, as set out in the Consultation Paper, our modelling indicates that reported opex and the opex benchmarking scores are sensitive to the set of *capitalisation policies* in place. This is expected and is the basis for our approach to date of freezing the CAMs for benchmarking purposes. To illustrate, we recast the historical opex series on the basis of DNSPs' current CAMs (backcast to 2006) and ran our econometric opex cost models using this series (instead of the frozen 2014 CAMs opex series). The results of this analysis are shown Figure 14.

Figure 14 Comparison of 'frozen' 2014 capitalisation and current CAM model-average benchmarking scores, 2006–2020



Source: Economic Benchmarking RINs; AER analysis.

Given the current CAM basis incorporates a change in *capitalisation policy* for three DNSPs (Powercor, CitiPower, and Ergon Energy), this analysis provides an insight into the impact of varying *capitalisation policy* on opex and opex benchmarking scores. We observe a significant change in the efficiency scores of all DNSPs, other than Powercor, which remains the frontier firm with a slightly reduced efficiency score, but close to 1.0. In particular, we observe that 11 of the 13 DNSPs have an improved efficiency score, of between 7 and 14 percentage points, under the current CAMs compared to the 2014 CAMs on which we currently undertake our benchmarking. Thus, the impact of the change in *capitalisation policy* made by the frontier firm on other DNSPs' efficiency scores is material. We note that CitiPower is the only DNSP (other than the frontier DNSP, Powercor) showing a reduction in its model-average score. This result would likely reflect CitiPower's relatively low expensing practices under its 2014 CAM, as indicated by its lowest opex / capital ratios among the DNSPs, and its move to fully expensing corporate overheads under its current CAM.

We discuss the issues with relying on benchmarking efficiency scores under the current CAMs to complement or replace the 2014-CAM benchmarking efficiency scores in Section 3. However, for the purposes of illustrating the impact of capitalisation differences, we consider

the material change in the benchmarking efficiency scores of most DNSPs indicates their sensitivity to *capitalisation policy* change and/or differences relative to the benchmark comparator DNSPs.

2.4 Conclusion

While our measures do not allow us to precisely measure any one particular DNSP's capitalisation practice differences relative to other DNSPs', we consider on the basis of the weight of qualitative and quantitative evidence, as well as stakeholder views, there are material differences in *capitalisation practices* – covering both *capitalisation policy* and *opex / capital trade-offs* – between DNSPs, and these are having a material impact on our benchmarking results. This is indicated by observation of opex/capital ratios, which provide a high-level gauge of *capitalisation practices* when averaged over a long period. This is further indicated through the observation of the significant differences in corporate overhead allocations between businesses, combined with the share of total opex that opex overheads comprises. The impact on the benchmarking is illustrated by the sensitivity of reported opex, and associated opex benchmarking efficiency scores, under current CAMs compared to using the 2014 CAMs.

We therefore consider these differences pose an issue to our benchmarking that needs to be addressed.

3 How we should address these differences in *capitalisation practices*

Given our conclusion that there are differences in *capitalisation practices* – defined as both *capitalisation policy* and *opex / capital trade-offs* – between the DNSPs that materially impact on the benchmarking results, we have considered how best to address these differences. This section presents our draft view of the most appropriate approach and our reasons.

For this draft guidance note, our preferred approach to address *capitalisation practice* differences is to benchmark on the basis of allocating a fixed proportion of overheads expenditure to the opex series for benchmarking purposes (Option 5). We propose to adopt this approach for our electricity distribution annual benchmarking reports, starting from 2023.

This is a change from the position in the Consultation Paper, which was applying a post-modelling OEF adjustment to the efficiency scores under the frozen 2014 CAMs (Option 1) using opex/capital ratios.

This change reflects our further thinking and analysis, including in response to stakeholder feedback, noting it remains an on-balance decision, with each approach having pros and cons.

We are seeking further stakeholder views on the options to address capitalisation, particularly in relation to our preferred approach.

This section also sets out some key issues of implementation in relation to our preferred approach, and our preliminary position on these issues, where relevant.

Stakeholder views are also sought on these implementation issues.

3.1 Background

Drawing on our analysis, previous approaches, and stakeholder feedback, we put forward in the Consultation Paper the following options for how to address the impact of differences in *capitalisation practices* on the benchmarking results[46]:

1) Option 1 – Applying post-modelling OEF adjustment to the impacted DNSPs' efficiency scores under our current benchmarking approach (based on frozen 2014 CAMs) using opex/capital ratios. Within this option are adjustments which could reflect different combinations of particular types of opex/capital ratio, including:
    a) Using the opex/totex and opex/total cost ratios, with a weight of 0.5 to each. This is the approach we adopted in the Jemena final determination.[47]

[46] AER, *How the AER will assess the impact of capitalisation differences on our benchmarking*, 29 November 2021, p. 27.

[47] AER, *Final Decision Jemena distribution determination 2021–26, Attachment 6 – Operating expenditure*, April 2021, pp. 32–34.

b) In addition to the opex/totex and opex/total cost ratios, incorporating the opex/total inputs ratio, with weights of 0.5, 0.25 and 0.25, respectively.

2) Option 2 – Adding an explanatory variable to the econometric opex cost function benchmarking models that directly captures *capitalisation practices*.

3) Option 3 – Benchmarking on the basis of DNSPs' current CAMs (incorporating their most recent *capitalisation policy*) and backcasting to historic years, to complement or substitute our current approach of backcasting opex for benchmarking based on DNSPs' 2014 CAMs, and applying an OEF adjustment to the benchmarking efficiency scores for remaining capitalisation differences under this set of CAMs.

4) Option 4 – Applying a common opex/capital ratio (based on the comparator-average ratio) to all Australian DNSPs' expenditure or costs as a pre-modelling adjustment.

5) Option 5 – Obtaining benchmarking efficiency scores on the basis of applying a fixed proportion of overheads expenditure in the opex series for benchmarking purposes. In terms of implementation, the simplest form of this approach would be to allocate 100% of total or corporate overheads to opex.

6) Option 6 – Developing and introducing a common *capitalisation policy* for benchmarking purposes.

We provided our initial thoughts around potential advantages and disadvantages of these options in the Consultation Paper. We did this taking into account the assessment principles set out in our Expenditure Forecast Assessment Guidelines, and in particular by considering which of these options best promotes the like-with-comparability goal that we have for our benchmarking, as discussed in Section 2.1. These were:[48]

- Validity and fitness for purpose
  - reasonably reflects the material differences, e.g. in capitalisation between DNSPs, and takes into account any issues with the estimation of these differences
  - does not create any perverse incentives for businesses to change their *capitalisation policies* or opex / capex mix in response to its benchmarking results
  - This criterion is of particular importance as it captures the goal of like-with-comparability
  - the extent to which it is consistent with our other assessment approaches e.g. for capex.[49]
- Accuracy and reliability: reflects / takes into account the most recent data and practices, and produces unbiased and consistent results

[48] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 15–16.

[49] This is an issue that we will need to take account of under any of the approaches put forward above, and so these approaches are not differentiated against this principle. For example, under Option 1, it would be important to ensure that our assessment of a DNSP's capex efficiency takes account of any adjustment we make for capitalisation practices in the application of our benchmarking to assessing its opex efficiency.

- Robustness: remains valid under different assumptions and conditions and is stable over time.
- Transparency: is based on a transparent methodology that can be replicated by stakeholders.
- Parsimony: we will typically prefer a simpler technique (or one with fewer free parameters) over more complex techniques.

In light of these considerations, our preference in the Consultation Paper was Option 1. This was the approach we adopted and applied in our Jemena 2021–26 revenue determination, and reflected our view that *capitalisation practices* are a material OEF that is unrelated to efficiency and is not sufficiently accounted for otherwise in our benchmarking. We considered this approach addressed the identified problem. We also considered that it was a valid and fit for purpose measure, in that it involved numerical adjustment to the benchmarking efficiency scores, consistent with our approach to other OEFs, and provided for continuity in our benchmarking approach. We considered the other options offered only a partial solution, were less accurate and reliable, and/or less fit for purpose. However, we acknowledged that this option was imperfect, particularly as its robustness and accuracy was not clear given that opex/capital ratios are an imperfect measure of capitalisation, and it continued the divergence between actual opex (based on current CAMs) and opex for benchmarking purposes (based on 2014 CAMs).[50]

We sought stakeholder views on the relative merits of these options. We also invited stakeholders to put forward any additional options that they considered better addressed capitalisation differences having a material impact on the benchmarking results.

There was limited support in the submissions to the Consultation Paper for our preferred approach (Option 1) of applying an OEF.[51] There was, however, no consensus about which approach was preferred, with both support and opposition expressed across all the options. Submissions considered it was preferable, if possible, to directly include capitalisation in the benchmarking models, or pre-modelling data adjustments, rather than making post-modelling adjustments to the benchmarking scores via an OEF adjustment. Many DNSPs presented analysis that in their view cast doubt on the appropriateness of opex / capital ratios in terms of their usage as both a measure of capitalisation differences (discussed in Section 2) and in a post-modelling OEF adjustment. Stakeholders' views are incorporated into our assessment of these options in subsequent sections and are summarised in Appendix A.

50 AER, *How the AER will assess the impact of capitalisation differences on our benchmarking - Consultation*, 29 November 2021, pp. 28–29.

51 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 7; CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3; Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3; Network of Illawarra Consumers of Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 14 February 2022, p. 17; SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 5; TasNetworks, *Submission on the impact of capitalisation on the AER's benchmarking,* 18 February 2022, p. 1.

One new option (referred to below as Option 7) was also raised by AusNet Services in response to the Consultation Paper, which outlined a three-step process involving:

- Starting with reported opex, i.e. the actual opex incurred under the *capitalisation policy* in place in each given year (a variation on Option 3)
- Addressing opex/capital trade-off differences prior to modelling by applying to this reported opex a uniform treatment of specific *opex / capital trade-offs* for benchmarking purposes, e.g. SaaS, IT cloud, and non-network solutions could be treated as capex, and leases as opex
- If the AER seeks to address *capitalisation policy* (i.e. how expenditure is reported) differences, then this should be done by applying a common proportion of corporate overheads being allocated to opex (Option 5).[52]

3.2 Preferred approach to address differences

This section sets out:

- our preferred approach to address capitalisation differences and summarises our reasons (Section 3.2.1)
- the implementation issues associated with our preferred approach (Section 3.2.2) on which we are seeking stakeholder feedback.

3.2.1 Preferred approach

Since the Consultation Paper, we have further analysed each of the options, including the additional approach proposed by AusNet Services, in terms of how the option satisfies the criteria set out above. In undertaking this further analysis we have taken into account:

- The submissions to the Consultation Paper, and our views on these. We have carried out a range of quantitative and qualitative analysis in responding to stakeholder submissions.
- Results of sensitivity benchmark modelling we have carried out on these options. This has involved running our econometric opex cost function benchmarking models to compute adjusted efficiency scores for each business under Options 1-5 in order to see the impact on efficiency scores under each option.[53] We present these below.

Reflecting our further thinking and analysis, including in response to stakeholder feedback, we have changed our preferred approach from that put forward in the Consultation Paper.

For this draft guidance note, our preferred approach to address *capitalisation practice* differences is to conduct benchmarking on the basis of allocating a fixed proportion of overheads expenditure to the opex series for benchmarking purposes (Option 5). Our preferred implementation of this approach includes allocating 100% of corporate overheads

52 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 10–11.

53 We have not modelled Option 6 (common capitalisation policy), as the method with which to generate this opex series is not readily available or Option 7 given the details of its implementation would need to be determined.

(those expensed and capitalised) to a frozen CAM opex for benchmarking purposes as discussed in Section 3.7, noting we do have some specific implementation issues we are seeking stakeholder views on, including which specific set of CAMs to freeze and whether network overheads should also be allocated to opex for benchmarking purposes.

Our preference for Option 5 reflects that we consider it has higher relative merits than our former-preferred option, Option 1, and the other options, as assessed against the criteria. This change in view since the Consultation Paper reflects a combination of further accounting for the strengths of Option 5 as well as further examination of the weaknesses of Option 1.

We consider the key strength of Option 5 relative to Option 1 is its focus on a known, measurable and material source of capitalisation differences, namely differences in how DNSPs allocate corporate overheads to opex and capex. In addition, we now consider opex/capital trade-offs are to some but varying extent implicitly taken into account in our econometric opex cost function models, due to the high correlation of the outputs in that modelling and a capital input variable. The primary appeal of this option relative to the other options is the high level of certainty we have that this approach targets known and significant differences between DNSPs, and equally, limits inadvertently accounting for factors that are either not related to capitalisation practices, or are already accounted for otherwise in our benchmarking methodology.

At the same time, on further examination, including in response to stakeholder submissions, we consider that Option 1 (and 3), involving the OEF adjustment, entails risks that the opex/capital ratios used to make the adjustment are both potentially:

- Capturing factors other than capitalisation practices, such as capex replacement cycles
- To some but varying extent, duplicating what is already captured implicitly in the opex econometric model output specification, due to the high correlation we have found between the existing outputs and a capital input variable.[54]

In terms of our assessment against the criteria, we think Option 5 performs well, as:

- Validity and fitness for purpose
  - The approach heightens comparability between DNSPs as it takes account of material key differences in capitalisation between DNSPs, and to some but varying extent opex/capital trade-offs are implicitly taken into account in our econometric opex cost function benchmarking. However, we recognise that while it addresses a material source of differences, it may not address all differences e.g. in relation to the allocation of network overheads.
  - Given that the benchmarking opex includes all corporate overheads expenditure, it limits the perverse incentives for DNSPs to change their *capitalisation policies* in response to their benchmarking results. However, we recognise that some incentive

[54] Capital input variables may be physical or financial-based measures. Given data availability, for modelling purposes in this draft guidance note, we have used a financial-based measure, namely the real regulatory asset base (RAB).

may remain for re-classification between corporate overheads and other categories such as network overheads. The latter may be mitigated, however, under our preferred implementation of continuing with frozen CAMs in all aspects of cost allocation other than capitalisation of corporate overheads.
  - The approach allows our economic benchmarking tools to be applied to a category of capex (capitalised corporate overheads) as part of the top-down assessment of total opex

- Accuracy and reliability: given the fixed allocation of corporate overheads to opex under this approach, we recognise there may not be perfect alignment with DNSPs' current reporting practices, as there are differences in DNSPs' actual allocations of corporate overheads. In addition, the underlying CAM used for benchmarking may depart from the current CAM, depending on how we implement this approach..
- Robustness: benchmarking results would not change where DNSPs change their capitalisation policy and/or CAM to expense or capitalise more corporate overheads.
- Transparency: we consider it is a simple approach that is based on a transparent methodology that can be understood and replicated by stakeholders.
- Parsimony: we consider this a relatively simple technique, with few variables.

In contrast we now consider Option 1 which we preferred in the Consultation Paper (and Option 3 which uses the same OEF adjustment approach but applied to benchmarking based on current CAMs) performs less well against the criteria in terms of:

- Validity and fitness for purpose:
  - While the opex/capital ratios provide a high-level measure of capitalisation practices, the precise use of these ratios for the purposes of adjusting the efficiency scores via a post-modelling OEF places an additional stringency on us to ensure the OEF works as intended. We are no longer as confident they are as fit for purpose as we were in the Consultation Paper. This is particularly because:
    - The econometric opex cost function models already implicitly capture opex/capital aspects of *capitalisation practices* to some but varying extent through the existing output variables, which are highly correlated with a capital input variable. This means that a further adjustment via the OEF which takes into account a business's utilisation of opex versus capital inputs may duplicate what has been captured in the modelling.
    - The OEF adjustment via the opex/ capital ratios may be capturing factors other than capitalisation practices, such as capex replacement cycles
- Accuracy and reliability: benchmarking under this approach may adjust for factors already taken into account in the econometric opex cost function modelling or result in factors other than capitalisation differences being captured as a result of the OEF adjustment, leading to questions around the accuracy and reliability of the approach. Further, Option 1 is based on DNSPs' opex under the frozen 2014 CAMs and while maintaining a consistent benchmarking approach over time, it may not accurately reflect costs DNSPs are currently incurring.
- Robustness: our testing of the benchmarking results by applying the OEF adjustment to benchmarking results derived using DNSPs' opex under the frozen 2014 CAMs and

current CAMs suggests they are relatively stable over time irrespective of the CAM basis being used.

- Transparency: while the OEF adjustment is based on a methodology that can be replicated by stakeholders, we consider the way in which the opex/capital ratios adjust for capitalisation differences may be less clear.
- Parsimony: while this a relatively simple technique, we do not consider it is as simple as Option 5.

In terms of Option 2, adding an explanatory variable to the econometric opex cost function, while we understand the appeal of an option that directly includes *capitalisation practices* in the benchmarking models, we consider the model specification that uses opex/capital ratios as explanatory variables as put forward by Frontier Economics raises endogeneity concerns, as opex appears on both the left and right side of the equation. We also consider this option lacks reliability and robustness, as it is unclear whether the opex / total cost and opex / totex ratios are the best representation of the trade-off between opex and capital inputs for the econometric modelling. Ideally, the short-run opex cost function should be modelled by including a capital quantity input measure to capture the gross substituting relationship between opex and capital input. In addition, we do not consider the international data required to support this general approach (particularly for capital costs) is sufficiently consistent across the jurisdictions (Australia, Ontario, New Zealand) to be relied on.

In relation to Option 4, which involves applying a common opex / capital ratio to the opex series of all DNSPs as a pre-modelling adjustment, raises essentially the same issues with the ratios as discussed for Option 1 and 3. This includes not performing as well in terms of validity / fitness for purpose and accuracy. As for Option 2, consistent data for measuring the capital input is not available, which is required to apply this approach to DNSPs in the three jurisdictions.

In terms of Option 6, we consider this lacks accuracy and parsimony and while there would be some benefits in greater harmonisation of *capitalisation policies*, it would not capture *opex / capital trade-offs* and likely be a complex and resource-intensive exercise.

Further, we are concerned that Option 7 lacks parsimony, as it may potentially involve what could be intrusive and complicated process to disentangle the opex impact of individual opex / capex trade-offs from each other, including those that we consider are to some extent accounted for in the econometric opex cost function benchmarking. We consider this would require additional investigation that may need to occur on a case-by-case basis, moving away from the more top-down benchmarking approach we currently have in place.

We consider the proposed approach of using Option 5 to address the differences in *capitalisation practices* to be an on-balance decision. In this regard, we recognise the opex/capital ratios that underpin the OEF approach are reasonable if imperfect high-level measures of capitalisation differences, as discussed in Section 2. However, we consider the more precise use of opex/capital ratios for the purposes of adjusting the efficiency scores via a post-modelling adjustment places a heavier burden on us to ensure the OEF adjustment works as intended. We are not sufficiently comfortable that the opex/capital ratios reflect only capitalisation practices. Further, and importantly, we recognise that the econometric opex cost function models implicitly capture capitalisation to some extent through the existing output variables which are highly correlated with capital inputs. As a result, further

adjustment may not be required. Equally, we recognise that our preferred option of Option 5 does not comprehensively capture all sources of capitalisation differences, but that it captures a known and major source of capitalisation practice.

This on-balance decision reflects the lack of consensus among stakeholders' submissions to the Consultation Paper, which adds weight to this view, and that none of the options is perfect, each having pros and cons. Further, we consider the preferred approach in this draft guidance note is more of an incremental approach to our current benchmarking (compared to the Consultation Paper) reflecting the further thought given to, and analysis undertaken, to what capitalisation differences are being addressed by the different options.

Table 5 summarises our assessment of the options against the criteria pictorially by Harvey balls, where blacker represents greater fulfilment of that criterion.

Table 5 Summary initial assessment of options to address capitalisation differences against the identified principles

Option / Principle	Validity /Fitness for purpose	Accuracy/ reliability	Robustness	Transparency	Parsimony
1. OEF adjustment and using 2014 CAMs	◐	◐	◕	◐	◐
2. Adding an explanatory variable	◐	◔	◔	◐	◐
3. Using current capitalisation CAMs	◐	◐	◕	◐	◔
4. Benchmarking with a common opex/capital ratio	◔	◔	◐	◐	◐
5. Benchmarking with a fixed proportion of overheads	◕	◐	◕	◕	◕
6. Common *capitalisation policy*	◐	◔	◐	◐	○
7. Identifying specific *opex / capital trade-offs* and applying a common corporate overhead proportion	◔	◐	◐	◔	○

To provide further context and assurance around the efficiency scores under the various options, we note the similarity of econometric opex cost function efficiency scores across the options, particularly for Options 1, 3 and 4. This is shown in Table 6.

Table 6 presents the DNSPs' efficiency scores based on our econometric cost function sensitivity modelling of Options 1, 3, 4 and 5,[55] and Frontier Economics' modelling of Option 2 (which we have replicated). The scores for Options 1 and 3 are shown post-capitalisation OEF adjustment as described in Section 3.3. The scores for Option 4 are an average of the scores under the two opex series generated by applying the comparator-average opex/totex and opex/total cost ratios to Australian DNSPs respectively.

We observe that the efficiency scores for Options 1, 2, 3 and 4 are generally similar. This is not unexpected as all are using the opex / capital ratios to address capitalisation. However, we are concerned that the use of the ratios through the OEF adjustment to these scores means that the efficiency scores are impacted to a greater extent than is appropriate. We observe greater differences with respect to these options and Option 5. This may reflect the nature of the data adjustment under Option 5, where a common adjustment is made (under our preferred implementation) just for corporate overheads.

Table 6 Results of sensitivity modelling of Options 1 to 5, 2012–2020 (short period)[56]

DNSP	Option 1*	Option 2	Option 3*	Option 4	Option 5
EVO	0.53	0.48	0.51	0.53	0.48
AGD	0.45	0.45	0.44	0.44	0.55
CIT	0.63	0.66	0.63	0.67	0.73
END	0.65	0.64	0.64	0.64	0.66
ENX	0.61	0.62	0.60	0.61	0.56
ERG	0.59	0.61	0.58	0.61	0.55
ESS	0.69	0.70	0.68	0.72	0.67
JEN	0.66	0.60	0.65	0.66	0.63
PCR	1.00	1.00	1.00	1.00	1.00
SAP	0.80	0.83	0.79	0.81	0.93
AND	0.66	0.65	0.65	0.66	0.76
TND	0.81	0.78	0.80	0.82	0.87
UED	0.81	0.75	0.80	0.82	0.93

Note: * post-modelling adjustment for capitalisation OEF.

3.2.2 Implementation issues

This section discusses the following aspects of the implementation of this approach:

55 For the purposes of this sensitivity analysis, we have modelled Option 5 as reported opex (i.e. under the CAM in operation in each year) series with 100% of corporate overheads allocated to opex.

56 We present the short benchmarking period results as it is not possible to carry out econometric modelling of Option 5 over the 2006–2020 (long benchmarking period) given the data we have on overheads does not extend further back than 2009. We discuss this implementation issue in Section 3.2. However, in addition we have also carried out modelling of Options 1, 2, 3, and 4 for the long period, and the results are very similar in relation to Options 3 and 4, and broadly similar for Option 2.

- Which CAM basis to use for the benchmarking opex series, which breaks down into:
  - The more general question of whether the opex series should, as per our current approach, use a Cost Allocation Method (CAM) that is frozen and backcast versus the use of reported (CAM-of-the-day) opex
  - If the former, the more specific question of whether to use the frozen 2014 CAMs or the current (i.e. regulatory year 2022 CAMs (backcast))
- The allocation to opex of corporate overheads versus total (the sum of corporate and network overheads) overheads
- The percentage of capitalised overheads to be allocated to opex for benchmarking purposes
- Given that actual data on overheads only goes back to 2009, when and how to commence the opex series for benchmarking
- In the context of efficiency assessments in revenue determinations:
  - Ensuring that capitalised overheads are included in base year opex, when comparing to modelled efficient opex
  - The interaction with our current approach to assessing proposed capitalised overheads forecasts.

For each of these implementation issues, we have outlined below the issue, options for how it could be addressed and pros and cons of these options, and put forward our preliminary preference, where we have one, and our reasoning. In the discussion below, we have taken account of any stakeholder views in response to the Consultation Paper.

In considering these implementation options, we have had particular regard to which approach most promotes like-with-like comparability for our benchmarking.

On each of these issues, we are seeking further stakeholder views, to inform the development of our final guidance note.

Whether the opex series should use a Cost Allocation Method (CAM) that is frozen and backcast versus the use of reported (CAM-of-the-day) opex

As discussed in Section 2.1, under our current benchmarking approach, we freeze and cast a given CAM (the 2014 CAMs) as the basis for the opex series. We consider it is appropriate to continue this policy (we discuss the issue of which specific CAM below), relative to CAM-of-the-day opex, in the implementation of our preferred option in this draft guidance note. That is, in all aspects of cost allocation other than capitalisation of corporate overheads, a set of frozen CAMs would continue to apply to opex for benchmarking purposes, historically and each successive year. This is due to the importance of maximising comparability for a given DNSP over time in our (or any) benchmarking, as discussed in Section 2.1.4.

If benchmarking opex for a DNSP could change in response to CAM changes, it would give rise to breaks in the opex series, meaning it would be difficult to determine whether its benchmarking performance, across time and relative to other DNSPs, were due to efficiency changes or due to accounting re-allocations. In addition, in the absence of freezing a CAM for benchmarking purposes, the opportunity is created for DNSPs to strategically change their CAMs (other than capitalisation of corporate overheads, which is fixed under our

preferred approach), in response to actual or anticipated benchmarking performance. While we have presented our view in this draft guidance note that, to date, corporate overheads are one of the most material sources of capitalisation differences between the DNSPs, we consider that continuing to use a frozen set of CAMs for benchmarking limits the incentive for other sources of accounting policy differences to emerge, thus maximising like-with-like comparability over time.

Whether to use the frozen 2014 CAMs or the current (i.e. regulatory year 2022 CAMs (backcast))

Given our preference for the use of a frozen CAM in implementing our preferred approach, the question arises of which set of CAMs to use for this purpose.

The pros and cons of the choice between the 2014 CAM versus switching to current CAMs (subsequently frozen) is covered in Section 3.3 and 3.5, in the discussion of Option 1 and 3, and these considerations largely apply here. In the context of that discussion, we marginally favour the continuation of the 2014 CAMs. However, in the context of changing our benchmarking approach by allocating all corporate overheads to opex for all DNSPs, additional considerations apply. In particular, an additional factor in favour of moving to the current CAMs (backcast and re-frozen) is that our change in benchmarking approach provides an opportunity to refresh and update the CAM basis for benchmarking. This is because, in practice, our preferred new benchmarking approach in this draft guidance note aligns with most of the DNSP CAM changes to date. In particular, five DNSPs have made material CAM changes up to 2021, and three of these relate exclusively to corporate overheads capitalisation:

- CitiPower and Powercor's revised CAMs in 2016 entailed expensing all of its corporate overheads
- Jemena's revised CAM in 2021 (which formed the basis of our upcoming 2022 Annual Benchmarking Report) entailed expensing all of its corporate overheads
- The changes in Ergon and Energex's (Energy Queensland) combined new 2021 CAM are, however, broader than capitalisation, covering the allocation methods to allocate costs between different services.

Thus, in practice, a move to the current CAMs would mean that for three of the five DNSPs (CitiPower, Powercor and Jemena), the process of backcasting to 2006 would be straightforward and the opex series used for benchmarking would be aligned with their actual CAMs. This would enhance the accuracy/relevance of our benchmarking approach. Under this implementation, the backcasting of Ergon and Energex's new CAM to 2006 would, however, require some focused engagement with Ergon and Energex to ensure a level of transparency in their revised opex series.

We particularly seek stakeholder views on the implementation issue of which set of CAMs – the 2014 or the current CAMs – to freeze under our preferred option.

The allocation to opex of corporate overheads versus total (the sum of corporate and network overheads) overheads

The choice here is between allocating to opex for benchmarking purposes total (corporate and network) overheads expenditure or only corporate overheads expenditure. We consider one potential risk of the latter is that there may be changes in corporate overhead

classifications over time which may reflect a strategic response by the DNSP. That is, DNSPs may have incentives to allocate more or less to corporate overheads, depending on where they are likely to sit on benchmarking results. This may provide an argument for allocating total (corporate and network overheads) overheads to opex under this approach. Further, including only corporate overheads may not adequately account for differences in the allocation of other costs between DNSPs, such as in relation to direct costs and network overheads (noting that we are aware from our consultations with DNSPs that reallocations can be and have been made between network overheads and corporate overheads).

However, we consider as corporate overheads are relatively homogeneous in nature and demarcated relatively clearly from other cost categories they should be included in opex for benchmarking purposes. In contrast, we consider there is less consistency in the classification of network overheads, and their delineation from other cost categories. Several of the DNSPs contended this was the case in their submissions to the Consultation Paper.[57] Further, through the cost information we collect annually through the Regulatory Information Notice process we will be able to monitor whether there are any such changes and seek to understand the basis for these, including whether they are motivated by impacting the benchmarking results. We could also potentially consider 'freezing' corporate overheads allocation methods if we observe material re-allocations between corporate overheads and network overheads or other categories (where this would not otherwise be achieved under the freezing of the underlying CAM, as discussed above).

Our preliminary view, for the above reasons, is not to include network overheads as a part of this option. However, we particularly seek stakeholder views on the pros and cons of these implementation options.

The percentage of capitalised overheads to be allocated to opex for benchmarking purposes

In theory, the percentage of capitalised overheads that could be allocated to opex for benchmarking purposes ranges from 0 to 100%. Our clear preference is for 100% of capitalised overheads to be allocated to opex for benchmarking purpose. While any percentage would achieve comparability, our preference for 100% is due to its simplicity, the recurrent nature of corporate overheads, and stakeholder support (discussed in Section 3.7).

Given that actual data on overheads only goes back to 2009, when and how to commence the opex series for benchmarking

Data on DNSPs' overheads expenditure is found in our Category Analysis Regulatory Information Notices. This data goes back only to 2009, rather than 2006, which is currently the start year of our benchmarking series, and is the starting point of our "long" benchmarking period starting 2006. This raises the question of whether and how to conduct benchmarking from 2006 under this approach. We consider there are three options:

- To make 2009 the new start point of our long benchmarking period (retaining 2012 as the start of our "short" benchmarking period)

[57] For example, see SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022 pp. 2–3.

- To ask DNSPs to provide actual data for the three years prior to 2009 (2006–2008)
- Working with DNSPs, to estimate and use this estimated data for the three years prior to 2009 (2006–2008).

We seek stakeholder views on this implementation issue, including any other options not outlined above. While we would prefer to be able to continue to benchmark from 2006, our view on this implementation issue will be influenced by the response of stakeholders and particularly DNSPs in terms of data availability and/or robustness of any estimation.

Ensuring that capitalised overheads are included in base year opex, when comparing to modelled efficient opex

In undertaking our efficiency assessment of estimated or actual base year opex, when comparing against modelled efficient opex from our annual benchmarking results (which under this approach includes capitalised overheads), we would need to ensure that capitalised overheads are added to proposed base year opex. We note we have the required information of capitalised overheads in our RINs. We seek stakeholder views as to whether they have any concerns with this approach.

The interaction with our current approach to the assessing proposed capitalised overheads forecasts

In the context of resets, we generally adopt a standard approach to assessing DNSPs' proposed capitalised overheads forecasts.[58] This essentially involves an approach that includes trend analysis and adjustments for movements in total forecast capex, which is broadly similar to our opex assessment approach. As described in Section 3.2.1, under our preferred approach to addressing capitalisation differences, capitalised overheads would be incorporated into our total opex benchmarking techniques. This raises the question of whether and how to adapt our current assessment approach to capitalised overheads within resets.

Our preliminary view is that incorporating capitalised overheads within our opex benchmarking approach could complement our standard capitalised overheads forecasting approach in resets. In particular, the benchmarking results could inform our efficiency assessment of historical capitalised corporate overheads within the assessment approach. We particularly seek stakeholder views on this issue.

The following sections set out our consideration of each of the options 1 to 7 including the issues raised in stakeholder submissions.

3.3 Option 1: Applying a post-modelling OEF adjustment for capitalisation to the efficiency scores under the frozen 2014 CAMs using opex/capital ratios

This option treats *capitalisation practice* differences as an OEF. This involves making an OEF adjustment to the efficiency scores obtained under the 2014 frozen CAMs[59] to account for a DNSP's *capitalisation practices* being materially different to the benchmark comparator

58 As a recent example, see Section A.7 of AER's final decision for CitiPower.

59 We adjust the benchmark comparison point (currently 0.75) upwards for negative OEFs, downwards for positive OEFs.

DNSPs'. This approach draws on the opex/capital ratios to inform the size of the OEF adjustment for each DNSP. Specifically, the adjustment is based on the percentage divergence of the DNSP's opex/capital ratios relative to the comparator-average ratios.

We put this option forward as our preferred option in the Consultation Paper. As outlined above, on further examination, including analysis put forward in submissions, we no longer prefer this option. Below we consider stakeholder submissions to the Consultation Paper in relation to this option and three key aspects of this approach:

- The general use of opex/capital ratios to inform an OEF adjustment
- The specific ratios we propose to use for the adjustment
- The use of frozen 2014-CAMs as the basis for the opex series used in the benchmarking.

3.3.1 Use of opex/capital ratios to inform an OEF adjustment

The OEF approach relies on the use of the opex/capital ratios to derive the adjustment. Discussion of stakeholder views and our response on the validity and robustness of the opex/capital ratios in establishing whether there are capitalisation differences is largely covered in Section 2.2. This is also relevant to the advantages and disadvantages of the OEF approach. As discussed, we consider that opex/capital ratios, of three different types used in combination and calculated over the benchmarking periods, provide a useful high-level measure of capitalisation practice differences. We acknowledge that these ratios are not perfect; however, we consider they are one of the two tools we have available to gauge if material differences in all types of capitalisation practices exist. For this reason we have used them for that purpose. We also consider them appropriate candidates for use in the context of the OEF approach.

Beyond those specific views in relation to the opex/capital ratios, we also received the following feedback in relation to the OEF adjustment option:

- Evoenergy submitted that applying an OEF adjustment to the benchmarking results, based on opex/capital ratios, is the most reasonable and pragmatic approach to address the impact of capitalisation differences on the benchmarking results, and consistent with broader OEF approach. However, Evoenergy noted that this should not prevent the AER from undertaking further work in the future to determine whether all OEF adjustments could be implemented in an ex-ante fashion.[60]
- CitiPower, Powercor, and United Energy submitted that applying an ex-post OEF adjustment based on opex/capital ratios will in practice adjust for inefficiency as networks with relatively higher levels of opex, reflecting inefficiency and being reflected in high opex/capital ratios, will receive a favourable OEF adjustment due to their high opex/capital ratio. Similarly, opex-efficient networks that thereby have a relatively lower level of opex and lower opex/capital ratios would receive an unfavourable OEF

[60] Evoenergy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

adjustment; i.e. they would effectively be penalised for achieving efficiencies through a negative adjustment resulting in lower adjusted efficiency scores.[61]

- AusNet Services submitted that the use of an OEF rather than a direct adjustment to benchmarking inputs introduces complexity and is also less accurate than amending input data to adjust for differences.[62]

We have considered this option in terms of whether it is consistent with our broader OEF approach, where material exogenous factors unrelated to efficiency that are not already otherwise accounted for (e.g. in the modelling) are addressed through post-modelling adjustments to the benchmarking efficiency scores. In relation to the first criterion of exogeneity, we characterise *capitalisation practices* as an exogenous factor in that while it is somewhat under managerial discretion, this factor is unrelated to efficiency, at least in the short run. Choices on accounting policies and capital inputs are management decisions, and therefore would not ordinarily be seen as an exogenous. However, because these differences may lead to differences in opex or capital unrelated to efficiency, we considered this factor could be treated as if it was exogenous when assessing them separately under the building block model.

In relation to the materiality criterion, we consider that *capitalisation practices* are a material factor driving measured opex differences between DNSPs, as discussed in Section 2.

The performance of this option in relation to the third criterion of non-duplication is, however, more complex and less clear. We consider that whether *capitalisation practices* are already captured in the modelling differs depending on the type of capitalisation practice, i.e. *capitalisation policy* or *opex/capital trade-offs*. On further examination since the Consultation Paper, we consider that opex/capital trade-offs are to some extent implicitly captured in the output specification of the econometric opex cost function model. This is due to the high correlation we have found between a capital input variable and the outputs in the model. If the omitted capital input is closely correlated with the outputs, then to some extent it may be accounted for in the measurement of opex efficiency through the opex cost function model as currently specified. This suggests that differences between DNSPs in the mix of opex and capital inputs may to an extent, which varies across DNSPs, be captured in the output coefficients of the opex cost function. By implication, an additional adjustment outside the model runs the risk of double-counting the impact of opex/capital trade-offs to some extent. However, we do not consider that *capitalisation policy* (e.g. expensing or capitalising of overheads expenditure), is accounted for in the econometric modelling. We discuss this point further in Section 3.7. We therefore have concerns with the OEF adjustment approach on the criteria of validity and accuracy.

Similarly, we recognise the relationship between opex/capital mix and efficiency as also being complex. We recognise that a DNSP's mix of opex and capital may reflect a degree of inefficiency in the longer term. In this regard, we note CitiPower, Powercor, United Energy's

61 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

62 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 2.

combined submission that the OEF adjusts for inefficiency, although we do not necessarily agree on the details.

In terms of the transparency criterion, we note the concerns raised by some submissions that the OEF approach is not sufficiently transparent, given the high-level nature of the opex/capital ratios being used in the derivation of the OEF, and the degree of uncertainty in what the ratios may be capturing in addition to capitalisation practices.

3.3.2 The specific ratios we would use for the adjustment

In relation to how to derive the OEF adjustment were we to adopt this approach, we consulted on an approach that draws on two opex/capital ratios (opex/totex and opex/total cost). The adjustment was based on the percentage divergence of the DNSP's opex/totex and opex/total cost ratios relative to the respective comparator-average ratios, with a weighting of 0.5 applied to each of these ratios. More specifically, we calculated the OEF adjustment by taking the midpoint of the percentage differences between DNSP's opex/totex and opex/total cost ratios and the respective customer-weighted comparator-average ratios (all measured as average ratios over the relevant benchmarking period). We considered that this calculation method was consistent with our standard OEF adjustment method of calculating the percentage impact of the OEF on a DNSP's opex relative to the comparator-average.

In its submission to the Consultation Paper, Ausgrid stated that if the AER continues with the OEF adjustment option in the interim, then it is more appropriate for the AER to apply equal weighting to each of the three opex/capital ratios. Ausgrid agreed that none of the three ratios is a perfect measure, but that in combination they may be useful for the purpose of assessing capitalisation differences.[63]

Jemena submitted that all three ratios have their pros and cons, that all three ratios provided useful information on capitalisation differences through different lenses and considered therefore all three should be used together to inform an unbiased estimate of the OEF.[64]

Although Jemena saw merit in all three indicators, it observed that the opex/total inputs ratio 'better reflects the difference in opex/capital trade-offs and is less sensitive to rate of return assumptions as it measures the difference in the usage of physical assets and opex inputs'. It also argued that the multilateral nature of the total inputs index should not impact the usefulness of the opex/total inputs ratio in deriving the OEF adjustment, similar to how the MTFP measure is used for comparing productivity levels between DNSPs in the AER's annual benchmarking report. It considered bilateral comparison is an example of multilateral comparison. That is, if two or more DNSPs can be meaningfully compared to each other through the sample average (i.e. multilateral), it implies that any two DNSPs can be sensibly compared to each other (i.e. bilateral).[65]

63 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4.

64 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 4–6.

65 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 4–6.

Jemena also noted the opex/total inputs ratio is more useful in capturing *opex / capital trade-offs* than the opex/totex ratio, which is useful for capturing the *capitalisation policy* impact. It submitted that, therefore, giving weight to both the opex/totex and opex/total inputs ratio along with opex/total cost ratio will help capture the impact of both *capitalisation policy* impact and *opex / capital trade-offs* in a more balanced and unbiased way.[66]

As discussed, Option 1 is no longer our preferred option. However, were we to adopt it, we consider the approach of using the two ratios (opex/totex and opex/total cost) to inform the OEF adjustment recognises that each has advantages and disadvantages, as discussed in Section 2. Consistent with the Consultation Paper, if it were to be adopted we would not propose to incorporate the opex/total inputs ratio in the calculation of the OEF adjustment. While a useful gauge of *capitalisation practices*, we consider that as an index-based measure, the opex / total inputs ratio may be problematic if used in quantification of any OEF adjustment. This is because the ratio is from the productivity index, measured by the multilateral index number method, rather than direct observations, as is the case for measuring the opex/totex and opex/total cost ratios.

Multilateral indexes of this type are designed with a focus on preserving comparability of productivity levels across all businesses and over time. This is enabled by doing all comparisons through the sample average (e.g. average opex across all businesses and years), rather than directly between pairs of observations (e.g. between two DNSPs in the same year). This property (to preserve transitivity at a cost of characteristicity) ensures multi-lateral comparability of the *index numbers* across the DNSPs and across time.[67] However, for deriving an OEF adjustment for capitalisation, it is preferable to measure the ratio directly and apply it in either bilateral or multilateral comparison.

We agree with Jemena that the opex/total inputs ratio is particularly useful in capturing *opex / capital trade-offs*. This is why we have regard to it (along with the other two ratios) in evaluating the materiality of capitalisation differences, as discussed in Section 2.2. However, due to the technical concerns as outlined above, if we were to adopt this approach we would not propose to use this ratio in the derivation of the OEF adjustment. Rather, we would prefer the use of the opex / totex and opex / total cost ratios, with a 50:50 weighting applied to each. In the Consultation Paper, we noted a possible alternative method that could incorporate the opex/total inputs ratio, whereby an OEF adjustment method could be based on the weighted average of the opex/totex (0.5 weight), opex/total cost (0.25) and opex/total inputs (0.25) ratios. We put forward this particular weighting to reflect that the opex/total cost and opex/total inputs ratios both incorporate a measure of the capital stock, set against the opex/totex ratio which is expenditure-based. However, due to the issues of using the opex/total inputs ratio in deriving the adjustment, we did not propose to adopt this weighting alternative and continue to take this view should an OEF approach be adopted.

66 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 4–6.

67 Transitivity states that direct comparisons between two observations should be the same as indirect comparisons via an intermediate observation. Characteristicity requires that when comparing two observations, the index should use sufficient information relating to just those two observations.

3.3.3 Use of frozen 2014 CAMs as the basis for opex

Under this option, we would continue to benchmark using opex under DNSPs' 2014 CAMs, for reasons described in Section 2.1. We note that we propose to use a frozen set of CAMs (whether 2014 or current) as the basis for opex under Option 5, our preferred option in this draft guidance note, as discussed further in Section 3.2 and 3.7.

Several DNSPs made submissions on this issue. Jemena was supportive of using the frozen 2014 CAMs as the basis for opex. We discuss its preference for this approach over using current CAMs in Section 3.5.[68] Ausgrid, Endeavour Energy, Ergon Energy and Energex, AusNet Services, and CitiPower, Powercor and United Energy raised concerns with using the frozen 2014 CAMs as the basis for opex, and expressed a preference that we should use current CAMs, in most cases the CAM-of-the-day without backcasting.

Ausgrid submitted that the use of frozen 2014 CAMs does not reflect actual opex, and so is not an accurate estimate of efficiency. It considered it illustrated this point by presenting a comparative analysis of CitiPower and Powercor's opex MPFP under the frozen 2014 CAMs versus current CAMs, which showed that CitiPower and Powercor perform considerably better under the frozen 2014 CAMs.[69]

Endeavour Energy submitted that the changes made by DNSPs to *capitalisation policies* after 2014 have generally involved a reallocation of overheads from capex to opex. It considered this may suggest the frozen 2014 CAM approach has been effective in eliminating any gaming incentive, (since the more obvious incentive would be to reallocate opex to capex in order to improve opex benchmarking scores). Endeavour Energy submitted it is, however, more likely the case that *capitalisation policies* are primarily driven by accounting standards and a range of commercial factors. It considered that freezing CAMs is an overreaction – that there are a range of powers and counter-veiling incentives to check gaming, e.g. networks must disclose changes in *capitalisation policy* changes annually. Endeavour Energy stated that even if gaming is a concern, freezing the 2014 CAMs is becoming an increasingly tenuous solution, as DNSPs are being benchmarked on opex derived from increasingly outdated accounting approaches that are no longer representative of their current corporate structures and cost allocation practices. It noted that in failing to capture the recent trend to expense more overhead expenditure, the AER's current approach results in the opex efficiency scores of these DNSPs being artificially overstated and in turn those of other networks being understated. It noted that, significantly, the CAM changes have been made by some comparator DNSPs, including Powercor, which as the frontier firm, lower the opex efficiency scores of other DNSPs.[70]

Endeavour Energy also submitted that the frozen 2014 CAMs are an artificial construct that are not reflective of DNSPs' actual costs or *capitalisation policies*. It noted that not only would benchmarking on current *capitalisation policies* allow efficiency scores to reflect actual opex

[68] Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

[69] Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 3–4.

[70] Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 5–6.

performance, but it also avoids the comparability issues encountered under the AER's (then-preferred) OEF option whereby capitalisation impacts on modelled scores would only be considered and quantified at the time of a DNSP's reset which limits the cross-DNSP comparability of the benchmarking report.[71]

In their combined submission, Ergon Energy and Energex submitted their preferred option was to benchmark based on current CAMs and *capitalisation policies* and applying a post-modelling OEF for material differences in the current *capitalisation policies* (if any). In their view, the shortcomings of freezing the 2014 CAMs outweigh the benefits set out by the AER in the Consultation Paper. It submitted that opex used in benchmarking models should be consistent with the allowances set by the AER and what customers ultimately fund over the regulatory period. It also noted that some changes to *capitalisation practices*, CAMs and corporate structures cannot be backcast with a high degree of accuracy. It considered continuity in benchmarking scores is desirable; however, changes are essential to the extent that they improve the accuracy of the benchmarking. It submitted the AER has already made changes that reduced comparability of benchmarking reports, e.g. the MTFP coding error impact.[72] Regarding the latter, CitiPower, Powercor and United Energy made a similar point.[73]

CitiPower, Powercor and United Energy submitted that using current *capitalisation policies* would be more robust than the AER's Options 1 or 4. They submitted that this approach would effectively bring forward the benchmarking methodology to reflect DNSPs' current capitalisation approaches. They also noted that the underlying issues of DNSPs having different approaches to capitalisation would, however, not be addressed under this approach.[74]

We consider that continuing to benchmark on the basis of frozen CAMs as against non-frozen CAMs is appropriate. A key advantage is that it would continue to anticipate and respond to any incentive of DNSPs to shift expenditure from opex to capex to improve their benchmarking performance – doing so will not improve their efficiency scores if their CAMs, to the extent they incorporate their capitalisation policies, are frozen for benchmarking purposes. As explained by Economic Insights at the time the DNSPs' CAMs first started changing after the commencement of our benchmarking:[75]

71 Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 5–6.

72 Energy Queensland, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 1–2.

73 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 6.

74 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 5–6.

75 Economic Insights, *DNSP MTFP and Opex Cost Function Results, Memorandum prepared by Denis Lawrence, Tim Coelli and John Kain for the Australian Energy Regulator*, Eden, 13 November 2015, p. 2.

> To reduce the scope for potential gaming of both reporting and price resets, Economic Insights recommends the AER require all DNSPs to report Economic Benchmarking RIN data on the basis of the CAMs in place for the initial Economic Benchmarking RINs.

We discuss this point further in Section 3.5.1.

> In terms of which set of CAMs to freeze, the continued use of the 2014 frozen CAMs for benchmarking has a relative advantage over the use of the current CAMs as there is less chance that the 2014 CAMs would have been conditioned by responses to the benchmarking scores.

Another advantage is that the continued use of the 2014 CAMs provides for continuity of benchmarking scores since the start of our benchmarking.

However, we consider that there are potential downsides with using the frozen 2014 CAMs that relate to its robustness and accuracy. As pointed out in submissions, it means a growing divergence between the CAMs used for setting opex allowances and the CAMs used to assess the efficiency of opex via the benchmarking. We recognise the views of stakeholders that opex being based on 2014 CAMs is less than fully transparent as it may give the misleading impression that we are benchmarking actual opex. Similarly, the 2014 CAMs are not reflective of the DNSPs' current corporate structures and updated CAMs. In addition, we are concerned benchmarking on frozen 2014 CAMs may create the incentive to revise CAMs to allocate more expenditure to opex, as this opex will not be captured under our benchmarking. We also note that the accuracy of using the frozen 2014 CAMs is imperfect as it does not use the most recent actual data (as it is based on actual data adjusted to be in 2014 CAM terms). If the trend for DNSPs to move towards fully expensing corporate overheads continues, then this would further reduce the accuracy of such an approach.

We note, however, the results of the sensitivity modelling of the benchmarking scores under Options 1 to 5, shown in Table 6 of Section 3.2. The adjusted benchmarking efficiency scores using the OEF are very similar between Options 1 and 3, providing assurance that the OEF-adjusted efficiency scores under the frozen and current CAMs would not be materially different.

3.4 Option 2: Adding an explanatory variable to the econometric benchmarking models that directly captures *capitalisation practices*

This approach involves directly incorporating *capitalisation practices* as an explanatory variable in the econometric opex cost function benchmarking models, alongside the other key explanatory variables of outputs and share of undergrounding.

There was both support and opposition to this option from stakeholders in submissions to the Consultation Paper.

Essential Energy, Ausgrid and CitiPower, Powercor, and United Energy put forward this approach as a preferred option, submitting that the data required to carry out this approach is available if the opex/capital ratios are used as the explanatory variables.

Essential Energy submitted it was its preferred approach. This was because it considered it directly captures *capitalisation practices* in the benchmarking analysis. [76] It considered the econometric opex cost function approach has two key advantages:

- it takes *capitalisation practices* into account when estimating the opex efficiency of the Australian DNSPs, and
- it does not impose a common opex/capital ratio; instead, it determines the efficiency of each DNSP conditional on its opex/capital ratio.

Essential Energy submitted modelling of the econometric approach carried out by Frontier Economics that added the opex/total cost and the opex/totex ratios as explanatory variables (respectively) to our opex econometric benchmarking models. Frontier Economics considered, contrary to the AER's assessment in the Consultation Paper, the data required to compute the two ratios preferred by the AER is available in relation to Option 2, and hence the approach is feasible and merits further investigation.[77] It found that these ratios have a highly statistically significant impact on opex. Essential Energy argued that, in contrast, the ex-post OEF approach (discussed in the previous section) excludes these significant ratios from the specification of the benchmarking models. It noted that excluding a significant variable from an econometric model is likely to result in omitted variable bias. This could lead to biased estimates of the output elasticities, used as output weights in the AER's roll-forward model and misleading estimates of opex efficiencies.[78] Essential Energy also considered that this approach is simple to implement, as the data is now available.[79]

Essential Energy noted that the main potential limitation of this approach is that the variables added to capture *capitalisation practices* (the opex/capital cost ratios) may not be independent of opex (i.e. not exogenous), since changes in opex could influence the ratios. This could lead to biased estimates. However, it considered by taking the average of these ratios over a long period (specifically, the relevant benchmarking periods), any dependence of the opex/capital ratios on opex would be greatly reduced. Moreover, the same opex/capital ratios (opex/totex and opex/total cost ratios) are used in the AER's (then-preferred) OEF adjustment approach which is also subject to this potential limitation.[80]

Ausgrid submitted that the data required to compute the opex/totex and opex/total cost ratios for all of the overseas DNSPs is available on the respective regulators' websites. It considered that the AER could use the benchmarking period-average for the opex/totex and opex/total cost ratios of each DNSP directly as an explanatory variable. It noted that an advantage of the econometric approach is that capitalisation differences are accounted for

76 Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 3–4.

77 Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 3–4.

78 Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 5.

79 Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 3–4.

80 Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 3–4.

directly within the econometric models, rather than derived through a comparison with a comparator average. It was of the view this means that the estimated efficiency scores derived using the models will have already controlled for differences in *capitalisation practices* between DNSPs and will therefore produce more reliable estimates of the true level of efficiency for each of the Australian DNSPs—without requiring any further OEF adjustments.[81]

CitiPower, Powercor, and United Energy considered the econometric approach, as modelled by Frontier Economics, had several advantages, particularly over Option 1:

- It reduces the risk of the OEF adjustments conflating inefficiency and capitalisation practices, improving the logic and robustness of benchmarking outcomes.
- It better accounts for the correlation between drivers of different opex/capital ratios, such as line length and customer numbers as these are also directly included in the model, i.e. it better accounts for the genuine reasons why opex/capital ratios would be expected to be higher or lower for different types of networks.
- It allows each DNSP's efficiency to be assessed relative to other networks with similar opex/capital ratios, as noted by Frontier Economics in Essential Energy's submission.
- It avoids relying on an industry benchmark opex/capital ratio which is derived based on analysis that doesn't factor in capitalisation differences.
- The efficiency scores produced from econometric models under different inputs (short/long period and inclusion of the opex/totex and opex/total cost ratios) have lower variance between themselves when compared to the variance of the efficiency scores produced by ex-post OEF adjustments with similar periods and ratios.[82]

Jemena and Endeavour Energy expressed concerns with this option.

In relation to model specification, Jemena submitted that including opex/capital ratios within the regression analysis gave rise to significant potential for distortion of regression parameters. This was due to its observation of much larger dispersion in the opex/capital ratios of international DNSPs compared to Australian DNSPs. Jemena also submitted that this option is infeasible due to a lack of data, as noted by us in the Consultation Paper.[83] It had concerns in relation to significant differences in the calculation of capex and annual user cost (AUC) between Australian, New Zealand and Ontario electricity distribution businesses. In particular, it pointed to differences across jurisdictions in depreciation methods (straight-line versus declining value), quality of capex information (use of actual versus estimated capex and asset base), and the scope of services included.[84] Similarly, Endeavour Energy

81 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 8.

82 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 8 April 2022, p. 1.

83 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

84 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 12 August 2022, p. 1.

stated that data issues make the introduction of a capitalisation explanatory variable in econometric models complex and problematic.

As noted in the Consultation Paper[85], we understand the appeal of this option in that its purpose is to account for capitalisation directly in the modelling, thus removing the need for post-modelling adjustments.

Given its appeal, we have investigated it further to determine whether the opex/capital ratios should and could be incorporated into the econometric opex cost function models as an explanatory variable (using the Australian and international data that is available) and relied on for the benchmarking results. However, we have the following concerns with the viability of implementing this option:

- **Model specification**: We do not consider Frontier Economics' approach of using opex/capital ratios, which includes opex, as part of the explanatory variables to be an appropriate model specification, due to concerns about endogeneity. We consider that the relationship between opex and capital inputs in the short-run opex cost function would be more directly modelled by including a capital quantity input measure as the explanatory variable rather than an opex/capital ratio, consistent with the original Economic Insights specification.[86] In this regard, we consider that the substitutability relationship between capital and non-capital inputs may potentially be estimated in a long-run opex cost function, using an input price ratio as an additional explanatory variable.
- **Data consistency issues**: Due to the lack of capital data consistency across the international jurisdictions used in our econometric modelling, we do not currently consider that econometric modelling would be sufficiently reliable with a capital quantity input measure included in specification.

In summary, in relation to the method outlined by Frontier Economics, we consider it has the following shortcomings:

- as a model specification its consistency with economic theory has not been established
- there is endogeneity of the measures it proposes to include as explanatory variables
- there is insufficient consistency of the cross-jurisdictional data, especially for Ontario.

Our view is that further examining the inclusion of a capital quantity input measure could be included as part of our econometric opex cost function development work. That said, as discussed further below, the inherent inconsistencies of measurement of the capital data (including Ontario capital data and the RAB values for Australia and New Zealand) suggest that, even if such an approach is feasible and informative, it would be a less reliable approach because of its use of inconsistent data. If feasible, we consider it might be used as supplementary analysis, but not as a change to the main benchmarking method.

85 AER, *How the AER will assess the impact of capitalisation differences on our benchmarking*, 29 November 2021, p. 34.

86 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, Report prepared for the AER, 17 November 2014, p. 25.

We discuss these points in turn further below.

3.4.1 Appropriate model specification

We do not consider the opex/total cost and opex/totex ratios, as modelled by Frontier Economics for Essential Energy, are the best representation of the trade-off between opex and capital inputs. We consider that in the context of the econometric opex cost function modelling, using the opex/capital ratios as an explanatory variable for opex/capital intensity may not well capture the trade-off between opex and capital inputs in providing network services. We consider that to capture the gross substituting relationship between opex and capital inputs, the short-run opex cost function would be more directly modelled by including a capital quantity input measure as the explanatory variable rather than an opex/capital ratio, consistent with the original Economic Insights specification.[87] Consistent with the 'one-hoss shay' assumption – that capital maintains, rather than degrades, its working capacity throughout its useful life – we consider a physical quantity measure or gross capital stock measure is the most appropriate basis for the capital input variable. Other proxies include depreciated capital stock measure (e.g., RAB deflated by a capital good price index) may be used where data on physical quantity of capital inputs are not available or limited.

In contrast, including a ratio of opex to capital as an explanatory variable necessarily introduces endogeneity into the model, as the dependent variable includes opex. That is, opex appears on both the left and right-hand sides of the function being estimated. We consider this is circular, and the result of estimating such a model may be spurious and lead to biased results. We do not consider taking a period-average average of the ratio removes the cross-sectional endogeneity (across 69 DNSPs) caused by the inclusion of opex as an explanatory variable for opex.[88]

We note the econometric opex cost function used to measure opex cost efficiency is a short-run demand function for non-capital inputs (or short-run variable cost function), consistent with the Building Block Model methodology, in which capital and non-capital cost components are forecast separately, even though in principle there may be some degree of substitutability between them. Economic theory suggests that the effects of substitution between non-capital and capital inputs in the long-run can be taken into account by using a long-run opex function, which should include the ratio of capital and opex *input prices* (not the ratio of capital and opex quantities). It may be worth exploring whether it is feasible to estimate a long-run opex cost function for Australian and NZ DNSPs. As part of examining this, it could be explored whether, with some adjustments or assumptions (e.g., relating to the cost of capital), a reasonably comparable measure of AUC might be able to be constructed for New Zealand DNSPs.

87 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, Report prepared for the AER, 17 November 2014, p. 25. See the relevant literature including Von Thunen, JH, *Der isolierte staat* – partial English translation, 1826, in *Von Thunen's Isolated State*, Oxford: Pergamon Press, 1966; Coelli T., D.S.P Rao, C.J. O'Donnell, G.E. Battese, *An Introduction to Efficiency and Productivity Analysis*, Springer New York, 2005; Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, Report prepared for the AER, 17 November 2014.

88 Since cross-sectional variation (between DNSPs) is much greater than time series variation (between years for the same DNSP), it contains a great part of the variation in the sample.

3.4.2 Consistent data not available

Frontier Economics noted that the 'data availability limitations noted by the AER for this approach have been resolved.'[89] We do not share this view. Our further analysis indicates that while the data required for adding a capital input variable (whether in ratio or levels terms) is available, in our view it is not sufficiently consistent across the three international jurisdictions (Australia, New Zealand, and Ontario, Canada) to be relied on for econometric opex cost function modelling, particularly in relation to the calculation of the AUC.[90]

These data inconsistencies mean in our view that, depending on the jurisdiction, otherwise comparable DNSPs with the same asset mix and capex would record quite different capital costs, and drive differences in the explanatory variable. We consider many of these data issues to be inherent to the regulatory approaches and data sets that are available internationally, which poses a significant challenge to their being resolved.

Based on our recent review, we do not consider the data in relation to how AUC of capital[91] is measured across the relevant jurisdictions is of the required consistency for use in the econometric opex cost function modelling via a new capital input explanatory variable.[92] This is consistent with the original finding of our economic consultant involved in setting up the current benchmarking approach, who, in the specification of the cost function used for our benchmarking, noted:

> While the Ontario database has similar coverage of outputs (other than reliability) to that used above and has good detail on opex, it is much more limited with regard to capital input. …With regard to capital variables, due to the lack of comparable capital data available for Ontario, we were unable to include a capital measure in this instance.[93]

This inconsistency stems from the differences in the regulatory regimes, with Australia and New Zealand using Building Block Model regulation, whereas Ontario, Canada uses Total Factor Productivity incentive regulation. This leads to differences in the way that regulatory

89 Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

90 The econometric modelling differs from the other benchmarking techniques in that it uses Australian and overseas data. The lack of variability in the Australian DNSP data means that sufficiently robust results cannot be produced with Australian DNSP data alone using econometric methods. Economic Insights incorporated comparable data from electricity DNSPs in Ontario, Canada, and New Zealand to increase the size of the dataset and enable more robust estimation of the opex cost function models. However, all cost efficiency scores obtained are relative to Australian best practice and not relative to international best practice. This is because we have explicitly included country–level dummy variables (for New Zealand and Ontario) in our cost functions to control for possible cross–country differences/inconsistencies in accounting definitions, price measures, regulatory and physical operating environments, etc.

91 As a reminder, the opex/total cost ratio is a cost-based measure, where total costs is opex + capital costs (the latter measured by the AUC of capital).

92 AUC currently does not feed in to our opex econometric cost function models. Rather, it is used in our MTFP benchmarking models, where it acts as the weight on the capital inputs. See Appendix A of the Consultation Paper for an overview of our benchmarking approach.

93 Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and ACT Electricity DNSPs*, 17 November 2014, p. 29.

components are calculated and used. In particular, we observe differences in both the return of capital and return on capital components of the AUC, as discussed below.

In relation to the return of capital component (depreciation) in the AUC, we observe differences in how this is measured across jurisdictions. In particular, we note

- Differences in the assumed depreciation profiles. Under the Ontarian approach,[94] there is a geometric depreciation profile. This means that the annual capital service flow from an asset falls over time (with a greater rate in earlier years than later years). This differs significantly to the AER's and the New Zealand use of straight-line depreciation which spreads the initial asset cost over its asset life constantly over time.[95] Holding everything else constant, an asset depreciates faster under the geometric deprecation than straight-line depreciation. This difference means that the annual depreciation values being compared in the AUC are not like-for-like.
- Differences in the approach to measuring asset lives. The Ontarian and New Zealand regulatory approaches apply an industry-wide depreciation rate for asset classes. In contrast, the AER relies on regulatory depreciation reported by the DNSPs, where the asset lives assumed for the same type of asset classes can be different across DNSPs and can change over time.
- Depreciation measured based on actual versus forecast capex. Both the Ontarian and New Zealand regulatory approaches measure depreciation using actual capex. However, the AER has moved to give DNSPs the option to report depreciation based on either actual or forecast capex.

In relation to differences in the return on capital components of the AUC, we note there are differences to measuring the Weighted Average Cost of Capital (WACC) and the values adopted. The following are examples of the different approaching in measuring the risk-free rate, debt premium, the cost of equity and gearing:

- The New Zealand regulatory approach[96] has adopted a term to maturity matching the five-year regulatory period, while the AER uses the ten-year term, and the Ontarian regulatory approach uses 30-year term (for the long-term debt component).
- The averaging period is 3 months under the New Zealand regulatory approach and 20 business days for the AER, while the Ontarian regulatory approach has used the monthly average of business day data.
- The New Zealand regulatory approach updates risk-free rate and cost of debt annually, and the debt premium is calculated based on a five-year trailing average. For resets, the AER has moved from the on-the-day approach to the ten-year 'trailing average' approach to cost of debt (still in transition), which is updated annually. However, for

94 PEG, *Empirical research in support of incentive rate setting in Ontario – Report to the Ontario Energy Board*, May 2013, pp. 34–35.

95 NZCC, *Electricity distributors' information disclosure data 2008–2012*, 13 August 2013.Refer to spreadsheets titled, "Electricity distributors' information disclosure data 2008–2012".

96 NZCC, *Guidelines for WACC determinations under the cost of capital input methodologies - Regulation under Part 4 of the Commerce Act 1986 and Part 6 of the Telecommunications Act 2001*, 27 May 2021.

benchmarking, the AER instead computes the risk-free rate and cost of debt using yearly average for the year prior to the reporting year.

- The Ontarian WACC approach adopts a weighted average of return on equity, long-term debt, and short-term debt. Monthly values are weighted to arrive at an annual value.
- The methods and data sources used for measuring the cost of equity also differ across jurisdictions. For gearing, both the AER and the Ontarian regulatory approach use 60% debt, but the New Zealand regulatory approach sets leverage at 42%.

In addition to the impact of differences in depreciation on the return of capital component, as depreciation is an input into the value of the asset base or capital stock calculation used in the benchmarking, these differences also affect the comparability of the return *on* capital component in the AUC. This is because depreciation affects the size of the RAB measured used by the AER and in New Zealand, and the capital measure used under the Ontarian regulatory approach. Further, in relation to inflation of the RAB, both the AER and the New Zealand Regulatory approach adjust the RAB for inflation by indexing to economy-wide inflation (i.e., CPI), while the Ontarian regulatory approach accounts for capital asset price changes using a capital good price index.

In relation to the capex data, we expect methodological differences to be relatively minor. The AER uses the value of capex as incurred, while the New Zealand regulatory approach uses the value of capex commissioned, leading to timing differences in the reported values. It is unclear whether the Ontarian regulatory approach measure of actual total gross capital additions is based on the value incurred or commissioned. However, the impact of timing differences on the capex amount reported over a sufficiently long period for our benchmarking analysis would be expected to be relatively minor.

While we have concerns with reliance on the econometric option due to the comparability of the international data in relation to capital costs, we note that these concerns do not apply more broadly to the data on international DNSPs that we use in opex cost function econometric benchmarking. This data on DNSPs' opex and outputs has been used in our benchmarking since its inception, and we and our economic consultants consider this data to be of high quality and consistency. Our economic consultant involved in setting up the current benchmarking approach noted '[t]he long history of these databases and the extent of checking undertaken by the respective regulators' and the similarity to the AER's 'long and detailed' data collection processes in relation to its economic benchmarking program.[97] This reflects that issues of consistency are less likely for other benchmarking inputs as e.g. opex (input) and customer numbers, circuit length (outputs) given they are relatively standard metrics.

3.5 Option 3: Benchmarking on the basis of DNSPs' current CAMs, re-frozen for benchmarking purposes

This option modifies our current benchmarking approach by using information based on the DNSPs' current CAMs, re-frozen. This involves using the current CAMs (backcast where there has been a change in CAM) instead of the frozen 2014 CAMs used in our

97 Economic Insights, *Response to Consultants' Reports on Economic Benchmarking of Electricity DNSPs, 22 April 2015*, p. 26.

benchmarking. Under our preferred implementation of this approach, these CAMs are then re-frozen for benchmarking purposes, whereby if there are any further revisions to the 2022 CAMs in future, DNSPs would be required to continue casting opex under the 2022 CAMs for benchmarking purposes. Further, under our preferred implementation, an OEF adjustment, based on the approach described for Option 1 in Section 3.3, is applied to the benchmarking scores where there are differences in capitalisation practices to the comparator DNSPs.

As discussed in Section 3.3, there was support in submissions from Ausgrid, Endeavour Energy, Evoenergy, Energex and Ergon Energy, AusNet Services, and CitiPower, Powercor and United Energy, for moving from benchmarking on the frozen 2014 CAMs to reflecting current CAMs.

CitiPower, Powercor and United Energy submitted that if the AER believes it needs to make adjustments on a broader basis of capitalisation rather than just corporate overheads, it would be adequate to use the current capitalisation policies as incorporated in the current CAMs of each network. This approach would adjust for current network practices, while also being more robust than the AER's Option 1 or 4. They considered this approach would effectively bring forward the benchmarking methodology to reflect the current capitalisation approach of networks. It considered this approach is more likely to meaningfully address the treatment of corporate overheads without undermining the intent of benchmarking to assess relative efficiency. It noted that the underlying issues of networks having different approaches to capitalisation would, however, not be addressed under this approach. It was not concerned that future benchmarking report results (under the current capitalisation policies) would not be comparable to previous benchmarking report results because the results can be backcast from the year of the most recent benchmarking report. It noted that previously identified errors in the benchmarking models have already resulted in discontinuity between successive benchmarking reports, reducing the materiality of this issue further. It also noted that it was not aware of any stakeholders that refer back to previous iterations of benchmarking reports given each year's report provides the historical time series and results.[98]

Jemena noted that this option requires each DNSP to backcast its opex and capex series to 2006 every time a DNSP's CAM changes. To account for the remaining capitalisation differences, if the OEF adjustment is derived from opex/capital ratios, the OEF adjustments for all DNSPs also need to be re-calculated whenever any DNSP changes its CAM. Jemena noted that while using current CAMs as the basis for benchmarked opex has its merits, and it supported this approach previously in its 2021–26 regulatory proposal, it now understood that this approach is likely to create significant administrative burdens on DNSPs—to backcast historical data—and on the AER to update datasets and OEF adjustments for each CAM change.[99]

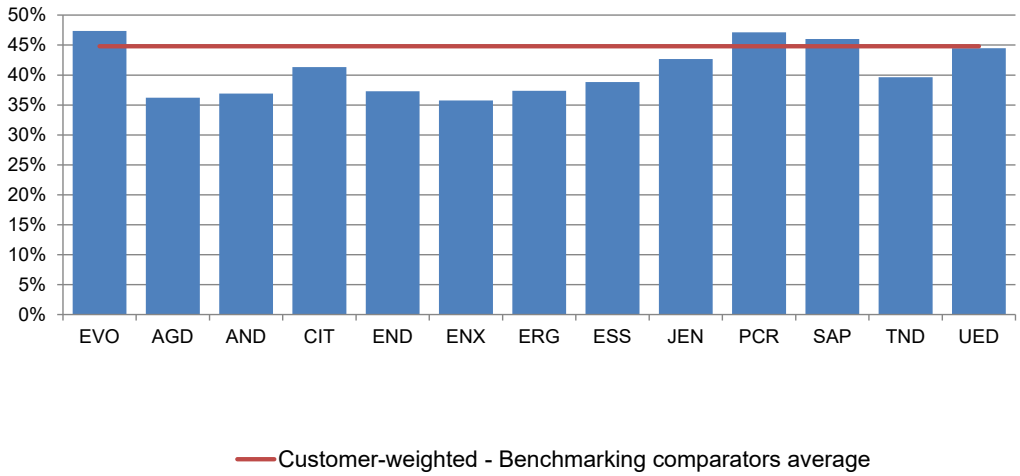
The rationale for benchmarking under the current CAMs is to better reflect DNSPs' opex as incurred in their current operations and corporate structures, which may be seen as more

98 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 5–6.

99 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

accurate and reliable (this is discussed further below). Benchmarking based on opex under the current CAMs is not, however, a remedy for differences in *capitalisation practices* among the DNSPs. This is because it would still need to take into account to what extent a DNSP's current CAM differs from the new benchmark comparators' (when benchmarking using the opex series under the current set of CAMs). This means a fresh analysis of the difference between the DNSP in question and the benchmark comparators would be required to inform a post-modelling OEF adjustment as put forward in Section 3.3. As evidenced by comparing the opex/capital ratios under the current CAM-opex in Figure 15 and Figure 16 with those under the frozen 2014 CAMs, in Figure 1 and Figure 2 in Section 2.2, we continue to observe variations between DNSPs on each of the opex/capital ratios. For example, as discussed in Section 2.2, under the 2014 CAMs, eight of the 13 DNSPs had an opex/totex ratio of 7 per cent or more above or below the comparator-average ratio, while under the current CAMs (Figure 15), this is also eight DNSPs. In addition, we observe that under the current CAMs, Powercor has the highest ratio across the opex/totex and opex/total cost ratios. Further, we note that as the frontier DNSP, its move to fully expense corporate overheads under its current CAM makes other DNSPs look more efficient based on the 'raw' efficiency scores.

Figure 15 Opex/totex, current CAMs, long period[100]



100 Note that the red lines in Figures 11 and 12 represent the customer-weighted *benchmarking comparators average*. These are the DNSPs with a model-average efficiency score from our opex econometric cost function models over our benchmark comparator point of 0.75. For the 2006–20 benchmarking period, these were Powercor, SA Power Networks, CitiPower, TasNetworks, and United Energy.

Figure 16 Opex / total cost, current CAMs, long period

As noted above, the primary motivation for drawing on the current CAMs for our benchmarking would be that the benchmarking better reflects DNSPs' current operations and corporate structures and may be seen as more accurate and reliable. As noted by stakeholders, this approach may provide for benchmarking of opex that is more reflective of the basis on which opex costs are currently incurred and reported. That said, it is not clear whether CAMs being current provides a significant advantage over frozen 2014 CAMs for our benchmarking. While the 2014 CAMs may be somewhat outdated for those DNSPs who have since revised their CAMs, it is still the case that benchmarking under those CAMs provides good information on the efficiency of the vast proportion of currently reported opex.

As noted by some stakeholders, and outlined above, where the frontier DNSP adopts a CAM which embeds a *capitalisation policy* of greater expensing of overheads, this has the effect of improving the efficiency scores for all other DNSPs. This is because the econometric models would measure the frontier DNSP's efficiency against a frontier that has shifted downwards as a result of the increased opex (potentially sufficiently far so that another DNSP is the frontier DNSP). This narrows the gap between the benchmark comparators and other DNSPs, and may raise the question of whether the benchmark comparison point of 0.75 should be increased under this benchmarking approach. This is because 0.75 is then a lower 'bar' to clear compared to under the 2014 CAMs, where the frontier DNSP expenses less of its overheads. As an example to indicate this sensitivity, while Jemena's opex is the same under the 2014 and 2019 CAMs (i.e. it had not yet changed its CAM), our modelling indicates that Jemena's opex efficiency score under the set of DNSPs' 2019 CAMs backcast is 15–20 per cent higher than under the 2014 CAM.[101] This change in Jemena's efficiency score reflects the increase in the benchmark comparator's opex and particularly that of Powercor under its current CAMs, rather any improvement in efficiency by Jemena.

101 This is consistent with the modelling put forward by Jemena in its revised proposal, noting that we have excluded from our calculation the models that did not satisfy the monotonicity requirement. Jemena, *Revised Regulatory Proposal – 2021–26 – Att 05–01 Operating expenditure,* December 2020, p. 13.

A concern we have under this approach is that the current CAMs may reflect some degree of endogenous response to our benchmarking approach. That is, CAMs that have been materially revised since 2014 may reflect a response to our benchmarking approach rather than only updates to cost allocation and categorisation or corporate structures. However, we also recognise the view of stakeholders that there are a range of powers and counter-veling incentives to check gaming. We have also observed that both CitiPower and Powercor, under their current CAMs, have allocated all corporate overheads to opex when previously some were capitalised.

We also consider that there would be increased complexity in accurately backcasting the data under this approach, relative to the backcasting required under the frozen 2014 CAM approach. This is because backcasting current CAMs involves applying a new CAM to the years backwards to start of our benchmarking series (2006). In contrast, under our current frozen 2014 CAM approach, in the event of a revised CAM, the opex backcasting involves continuing to generate opex as if the 2014 CAM continued to apply. In both instances we consider that in order to address transparency issues, DNSPs should clearly document the basis for the recast and backcast data. We acknowledge there would be an initial process required to establish this recast and backcast data, which will involve some effort by businesses; however, we consider that once this initial set-up work has been undertaken there would only incremental effort each year.

3.5.1 Re-freezing the current CAMs

We have also considered as an implementation issue under this option whether or not, for benchmarking purposes, to freeze current (2022) CAMs. Our view is that under this option, all DNSPs' CAMs should be refrozen for benchmarking purposes. Where there are any future changes in DNSPs' CAMs, these DNSPs would need to continue to cast opex for benchmarking purposes under the newly frozen (2022) CAMs. This is consistent with the rationale of the current approach, where freezing CAMs for benchmarking purposes is to provide time series comparability and continuity in the benchmarking series, even though actual CAMs have since changed for several DNSPs. It also provides a check against some gaming incentives, where a DNSP may have an incentive to improve its benchmarking performance by re-allocating expenditure from opex to capex in response to its benchmarking performance. It does not, however, provide a check against the incentives for DNSPs to re-allocate capex to opex in the knowledge that as the current (2022) CAMs are frozen this will not impact the benchmarking results. Therefore, over time it may reduce its validity and accuracy / reliability. We also acknowledge this approach may also eventually face the issue with our current approach that CAMs for benchmarking purposes diverge from those used for reported opex, as DNSPs' CAMs continue to change over time. In that sense it is not clear how robust this approach would be.

In summary, our implementation preference for re-freezing of current CAMs under this approach is that, in relation to *capitalisation policy*, it preserves time series continuity and comparability within the opex series used for benchmarking. If future CAM changes were admitted for benchmarking purposes, it would not be clear if changes to the benchmarking scores are the result of change in opex efficiency or due to a change in CAM and associated *capitalisation policy*.

3.6 Option 4: Applying a common opex/capital ratio to all DNSPs as a pre-modelling adjustment

This approach involves benchmarking using opex data for each DNSP that is adjusted to achieve a common opex / capital ratio across all DNSPs. This approach involves pre-modelling data adjustments which normalise the opex series for capitalisation differences. In our modelling, we have applied this ratio to each Australian DNSP's opex.

There was limited support for this option from DNSPs, largely reflecting their prior concerns with the validity of the opex/capital ratios that are used under this approach to adjust each DNSP's expenditure or costs prior to modelling, as discussed in Section 2.2 and 2.3. These are set out below in the context of this option of using a common opex/capital ratio to obtain efficiency scores.

Essential Energy submitted that the key advantage of the 'ex-ante' approach is that the efficiency scores it generates take account of differences in *capitalisation practices*. It considered that this guards against the possibility that a DNSP whose *capitalisation practices* lean towards reducing opex is assessed as being opex-efficient. Essential Energy also noted that the main limitation of the ex-ante approach is the selection of the common opex/capital ratios to be applied to all the DNSPs. It submitted that the results are likely to be sensitive to the choice of this common ratio. Since the opex/capital ratios for a given DNSP are the result of both its cost allocation method and allocative efficiency trade-offs between opex and capex, it considered care should be taken in deciding on the appropriate comparison group for determining the common opex/capital ratio.[102]

Jemena submitted that this approach aims at assessing changes to DNSPs' opex efficiencies when all DNSPs follow the same capitalisation practice as opposed to their actual practices. It noted, however, that while this approach is useful for understanding the impact of capitalisation differences on benchmarking results, it does not accurately reflect each DNSP's actual practices and therefore is not feasible for directly estimating efficient opex allowances under DNSPs' actual practices.[103]

CitiPower, Powercor and United Energy stated that they do not support the implementation of a common opex/capital ratio applied to all networks' opex because, consistent with its views on the ex-post OEF adjustment, network inefficiencies will be unintentionally captured and accounted for in the adjustment. In its view, the approach effectively lowers the opex of networks with relatively higher levels of opex and increases the opex of networks with a relatively lower level of opex, without any direct link to accounting treatment of overheads or identified opex-capex trade-offs.[104]

[102] Essential Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4.

[103] Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

[104] CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

Reflecting its concerns with opex/capital ratios, AusNet Services considered this option would yield a similar outcome (and disadvantages) to the option of applying an OEF adjustment for capitalisation using opex/capital ratios. It also noted that this approach is akin to totex, rather than opex, benchmarking. In AusNet Services' view, if this approach is adopted the role of the benchmarking in the AER's opex decisions will need to be reconsidered.[105]

Our draft view remains as in the Consultation Paper, that we do not support this approach. This approach would impose a form of uniformity of *capitalisation practices* between DNSPs. However, adjusting opex data prior to modelling using a common opex/capital ratio raises essentially the same issues with the ratios as discussed for Option 1 and 3.

We also share AusNet Services' view that applying the common ratio to all the DNSPs in the sample would be a form of totex benchmarking. This conflicts with our focus on having a benchmarking framework that examines the efficiency of total costs and also considers the partial efficiency of the capital and opex inputs.

Further, as discussed in Section 3.4, appropriate and consistent data to apply this approach to all the DNSPs in the sample, including international DNSPs, particularly on capital costs under the Ontarian and New Zealand regulatory approach, is not available to implement this option fully. Such data would be required in order to apply the ratios to international DNSPs to ensure that results are not biased. Application of the ratios to only Australian DNSPs (as has currently been modelled) would be a partial approach.

We note, however, that our modelling of this approach produced similar adjusted benchmarking scores to Options 1 and 3 as shown in Table 6, providing some corroboration on the results under all three approaches, noting the limitations of the ratios and of applying the ratios to Australian DNSPs only.

While we consider this approach does not score highly on validity, in terms of robustness it would remain relatively stable over time, as the opex/capital ratio which drive the DNSPs' opex series under this approach are relatively stable over time.

3.7 Option 5: Benchmarking on the basis of a fixed proportion of overheads

This option involves benchmarking on the basis of a common fixed proportion of overheads to each network.

There are a range of implementation issues with this approach. These are discussed above in Section 3.2.2. The main practical implementation of this approach that was put forward by stakeholders is where 100% of corporate (rather than corporate plus network) overheads are allocated to opex for benchmarking purposes. The implementation issue of whether to superimpose this option onto the frozen 2014 CAMs, current CAMs or to use opex as

[105] AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 13.

reported each year was not explicitly considered by stakeholders. In the discussion below, we have referred to our preferred implementation approach, where relevant.

There was a reasonable level of support for this option. Some DNSPs submitted that the allocation of corporate overheads is the most material and most pressing capitalisation related issue, and simple to rectify by allocating a fixed proportion, with support for 100%, of corporate overheads to opex. This approach was the preferred option for CitiPower, Powercor and United Energy (in the short term), TasNetworks and SA Power Networks. It also formed an element of AusNet Services' preferred approach.[106]

CitiPower, Powercor and United Energy submitted that the treatment of corporate overheads in benchmarking is expected to be the most material and most pressing capitalisation-related issue impacting the level of opex used in the benchmarking models. To illustrate this, CitiPower, Powercor and United Energy stated that expensed corporate overheads currently account for around 40 per cent of its networks' total opex. It also argued that it is an economically sound approach because it will not inadvertently capture any material inefficiencies in the adjustment, referencing its concerns with approaches based on the opex/capital ratios. It noted also that it can be implemented in a short timeframe, as data to undertake the analysis is readily available for all networks in the RINs.[107]

In relation to the AER's concern that this approach would not be reflective of actual costs or *capitalisation practices* for most DNSPs, and may be an artificial construct, CitiPower, Powercor and United Energy remarked that any type of adjustment to the treatment of capitalisation in benchmarking could be considered an artificial construct because, by the nature of adjusting the treatment of capitalisation policies in benchmarking, would no longer reflect actual *capitalisation practices*.[108]

In relation to the AER's concern that this approach would not adequately account for differences in the allocation or classification of other costs between DNSPs or account for *opex / capital trade-offs*, CitiPower, Powercor and United Energy agreed that these aspects of capitalisation also need to be addressed. It suggested that a broader review of capitalisation policies is warranted to directly address these concerns in a way that does not consequently account for network inefficiencies.[109]

TasNetworks submitted that the impact of capitalisation differences can be removed from the benchmarking series under this approach. Like CitiPower, Powercor and United Energy,

106 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 11.

107 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4–5.

108 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4–5.

109 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4–5.

TasNetworks noted that this approach may not account for differences in the allocation/classification of other categories, such as direct costs and network overheads.[110]

SA Power Networks observed that while DNSPs' capitalisation policies vary across the NEM, particularly in relation to the allocation of overheads, the core functions included within the build-up of corporate overheads are reasonably consistent. The build-up of network overheads tends to vary more significantly across DNSPs, with some DNSPs allocating a greater proportion of network support costs as a direct cost compared to other DNSPs. Given this, SA Power Networks were supportive of adopting a consistent corporate overhead allocation rate across DNSPs, reducing some of the non-efficiency related variability in benchmarking outcomes. It did not consider any adjustments are required for network overheads.[111]

Jemena did not support this option. It submitted that benchmarking based on a fixed proportion of overheads has the same shortcomings as Option 4, i.e. the opex would not be reflective of DNSPs' actual practices. It also noted this option also only accounts for the difference in capitalisation policies but not *opex / capital trade-offs*.[112]

Endeavour Energy agreed with CEPA and considered that *capitalisation policy* differences should be separated from other factors that drive *opex / capital trade-offs* as only the former affects the comparability of opex efficiency scores and benchmarking performance.[113]

As discussed in Section 3.2, we have changed our preferred approach for this draft guidance note and Option 5 is now our preferred approach on the basis of our assessment against our guiding criteria. In particular, as discussed in Section 2.2, overheads, particularly corporate overheads, are an important source of differences in *capitalisation policy* and, in turn, *capitalisation practices* between DNSPs. This approach recognises that the DNSPs' approaches to the allocation of corporate overheads would have a material impact on the level of DNSPs' opex and opex benchmarking results.

In addition, due to the high correlation we have found between a capital input variable and the outputs in the econometric opex cost function model specification, we consider that opex/capital trade-offs are, to some but varying extent, captured implicitly in the econometric modelling. This is further discussed in Section 3.2.

It is also a relatively robust approach, since under the proposed implementation where 100% of corporate overheads are allocated to opex, the benchmarking results would not change where DNSPs change their CAM to expense or capitalise more corporate overheads.

110 TasNetworks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 2.

111 SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022 pp. 2–3.

112 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

113 Endeavour Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

We have some concerns with this approach as described in the Consultation Paper, primarily that we consider it does not comprehensively encompass all forms of capitalisation policies and practices. While this approach would impose a form of uniformity over one important source of capitalisation, we do not consider that it would directly account for all *capitalisation practices*. As noted by many of the submissions, the approach does not account for all sources of capitalisation differences, with allocation of corporate overheads between opex and capex, as under our preferred implementation, being only one source. It would not adequately account for differences in the allocation of other costs between DNSPs, such as in relation to direct costs and network overheads. In relation to SA Power Networks' submission that corporate overheads are delineated from other cost categories, we largely agree, and we discuss this further in Section 3.2. However, we are aware from our consultations with DNSPs that reallocations can be and have been made between network overheads and corporate overheads. Examples of these reallocations include the consolidation of procurement functions and fleet management into corporate overheads.

We recognise that as the approach focuses on capitalisation policy, it would not directly account for all *opex / capital trade-offs*. However, our preferred approach emphasises differences in *capitalisation policy*, noting the differences in opex/capital trade-offs are partly accounted for in the existing benchmarking framework and the practical challenges with accurately making other broad adjustments for opex/capital trade-offs while avoiding unintended effects. We also note our current capex assessment approach, which has regard to the opex-capex trade-offs and relies on a suite of assessment techniques including DNSP-specific trend analysis.[114] As discussed above and in Section 3.2 we consider that opex / capital trade-offs are to some but varying extent captured in the output specification of the opex econometric cost function models and are therefore implicitly a part of Option 5.

3.8 Option 6: Introducing a common *capitalisation policy* for benchmarking

This option involves developing and putting in place a common *capitalisation policy* that would apply to all DNSPs for benchmarking purposes.

There was some support for this option in submissions, although most recognised that this was not an option that could be adopted in the short term.[115] CitiPower, Powercor and United Energy and SA Power Networks submitted that a common *capitalisation policy* was its first-best option, albeit in the longer term. In addition to *capitalisation policy*, it envisaged that it should include opex-capex substitutions, acknowledging that both differences are important. CitiPower, Powercor and United Energy recognised that this approach would be time- and resource-intensive for both the AER and stakeholders, and its practical viability would need

[114] AER, *AER capital expenditure assessment outline for electricity distribution determinations*, February 2020, pp. 6–8.

[115] CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 1; SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 5; Network of Illawarra Consumers of Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 14 February 2022, p. 4.

to be further assessed.[116] SA Power Networks considered this review should be targeted to focus on the material elements of capitalisation differences, and include opex / capex trade-offs. [117] SA Power Networks noted this review should also specifically consider the implementation costs associated with SaaS and how this should be treated for benchmarking purposes.[118] (We discuss the treatment of SaaS costs further in Section 3.9).

Jemena and AusNet Services did not support this option. Jemena noted its resource-intensiveness and in contrast to the above submissions, considered it can only normalise for the capitalisation policies, not the differences in *opex / capital trade-offs* and is therefore not fit for purpose.[119] AusNet Services considered it would not be a material improvement compared to its preferred approach (discussed in Section 3.9), and it would introduce a new set of systems and approaches and significantly increasing DNSPs' regulatory burden and compliance costs.[120]

We are not minded to adopt this option. We consider this option may have some benefits in terms of driving convergence of *capitalisation policy* approaches for benchmarking and providing transparency about the common approach. However, as noted by many submissions, the development and introduction of a common *capitalisation policy* for benchmarking would likely involve a process of detailed design, development and implementation, and considerable stakeholder consultation. In that sense it may not be fit for purpose or the simplest technique that could be used to address the issue at hand.

In addition, it is not clear to what extent a common *capitalisation policy* approach would be reflective of a DNSP's corporate structure and practices and may be a regulatory construct that does not accurately reflect how it conducts its business.

We have also considered the view of some stakeholders that the common policy could also cover stipulation of a common approach to *opex / capital trade-offs*. However, we consider that this would introduce further undue complexity, requiring further resourcing and raise possible compliance issues.

3.9 Option 7: Identifying specific *opex / capital trade-offs* and applying a common corporate overhead proportion

Some DNSPs argued that the opex/capital ratios used for the OEF adjustment under Option 1 and 3 are problematic as they do not separate accounting policies from factor input

116 CitiPower, Powercor and United Energy, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 5.

117 SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 5.

118 SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 5.

119 Jemena, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 3.

120 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 14.

choices, i.e. opex or capital inputs.[121] Further, some DNSPs (e.g. AusNet Services' proposed approach) submitted that some *opex / capital trade-offs,* if they are both material and relate to the specific circumstances of a network, should be excluded from benchmarking.[122] DNSPs highlighted the particular impact of the change in the accounting treatment of SaaS configuration costs, which were considered as capex but are now, under some circumstances, considered as opex under new International Financial Reporting Standards (IFRS) guidance published in April 2021.[123] In particular, some DNSPs were concerned about how this change might affect the comparability of benchmarking opex. This can potentially occur as DNSPs will transition from ICT capex to opex at different times.

AusNet Services advanced in the context of arguing against a post-modelling OEF capitalisation adjustment using the overall opex/capital ratios (Option 1) in favour of a more ex ante approach, namely where:

- Benchmarking is based on reported opex, not frozen 2014 or current CAMs backcast refrozen opex
- Taking a consistent approach to *opex / capital trade-offs* across DNSPs – i.e., making changes to the opex data prior to modelling to implement a common / consistent approach for specific and significant *opex / capital trade-offs* such as treating SaaS, IT cloud solutions and non-network solutions as capex for benchmarking purposes and leases as opex.
- Applying a common fixed proportion of corporate overheads to the opex benchmarked (e.g. 100%) to address any *capitalisation policy* differences.[124]

TasNetworks also considered allowing DNSPs to identify material *opex / capital trade-offs* that should be excluded from benchmarking should be further investigated. It was also of the view that decisions on *opex / capital trade-offs* (e.g. SaaS decisions) should not be distorted by the potential impact on benchmarking scores; i.e. while opex may rise as a result of adopting a SaaS solution, the AER's approach to capitalisation should identify and account for this.[125]

121 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4; AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 11–13; SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4–5; TasNetworks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 2.

122 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 1–2.

123 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 8; AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 11; SA Power Networks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 4–5; TasNetworks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 2.

124 AusNet Services, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, pp. 10–11.

125 TasNetworks, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 2.

In relation to SaaS, Ausgrid submitted that depending on where a DNSP sits in its SaaS implementation journey, the DNSP's reported opex may go up or down with SaaS implementation costs, impacting not only the comparability across businesses but also opex benchmarking of a series that has not included SaaS as opex before.[126]

We consider this approach has some limitations, particularly as in our view it does not score highly on parsimony. This approach would move away from the more top-down benchmarking approach we have in place at the moment and entail the need to micromanage which forms of capitalisation should be included or excluded in our benchmarking. This would include determining which *opex / capital trade-offs* need to be considered, which would include establishing those we consider are implicitly taken into account to some extent in our econometric opex cost function benchmarking (as discussed in Section 3.2 and 3.7). Further, if we consider opex / capital trade-offs are not accounted for, we would need to examine whether they are material and how this relates to DNSP-specific circumstances. Consideration would need to be given to how this should be done to ensure consistency. We consider this would require intensive investigation and further consultation with industry and stakeholders to determine if / how it is possible to disentangle the opex impact of individual opex-capex trade-offs from each other.

In relation to the recent guidance about the change in accounting treatment of certain SaaS configuration costs from capex to opex, we recognise that, in isolation, going forward this might affect the comparability of benchmarking opex where DNSPs transition to SaaS at different times. This includes as DNSPs will likely adopt different solutions with respect to ICT, including whether and when to switch from asset (capital) to cloud-based (generally opex) solutions, and that the type of cloud implementation will affect whether it is classified as opex or capex. Under our preferred option (Option 5), we understand these cost differences will not likely be explicitly addressed as these costs will in most cases not be treated as corporate overheads. However, there is a question as to the extent the econometric opex cost function benchmarking may implicitly take into account SaaS costs as an opex/capex trade-off in the future.

At this stage, we do not consider the SaaS accounting treatment changes will materially impact the historical data set given these changes are taking effect from 2021. However, given this will evolve over time it will require further consideration in our benchmarking and broader opex assessment approach within the context of resets. Important in this regard will be ensuring that relevant disaggregated cost information is collected as these changes occur to enable transparency around the magnitude of the cost impacts. This will assist in us determining the materiality of any issue and to possibly inform sensitivity testing about the impact on the benchmarking results.

In addition, we consider there is a risk of gaming under this approach. This approach requires pre-modelling data adjustments for opex of certain categories. As all the DNSPs would be required to report costs to these individual categories, the DNSPs may have incentives to over-allocate opex to these categories to be excluded from benchmarking (if there is no additional benchmarking analysis at the category level for these categories).

126 Ausgrid, *Submission on the impact of capitalisation on the AER's benchmarking*, 18 February 2022, p. 8.

In relation to the third part of AusNet Services' proposed approach, that of applying a common fixed proportion of corporate overheads to the opex benchmarked (e.g. 100%) to address any *capitalisation policy* differences, we note our discussion in Section 3.2 and Section 3.7 in relation to Option 5.

Glossary

Term	Description
Efficiency	A Distribution Network Service Provider's (DNSP) benchmarking results relative to other DNSPs reflect that network's relative efficiency, specifically their cost efficiency. DNSPs are cost efficient when they produce services at least possible cost given their operating environments and prevailing input prices.
Inputs	Inputs are the resources DNSPs use to provide services. The inputs our benchmarking models include are operating expenditure and physical measures of capital assets.
LSE	Least squares econometrics. LSE is an econometric modelling technique that uses 'line of best fit' statistical regression methods to estimate the relationship between inputs and outputs. Because they are statistical models, LSE operating cost function models with firm dummies allow for economies and diseconomies of scale and can distinguish between random variations in the data and systematic differences between DNSPs.
MPFP	Multilateral partial factor productivity. MPFP is a PIN technique that measures the relationship between total output and one input. It allows partial productivity levels as well as growth rates to be compared.
MTFP	Multilateral total factor productivity. MTFP is a PIN technique that measures the relationship between total output and total input. It allows total productivity levels as well as growth rates to be compared between businesses. In the 2021 annual benchmarking report, we also apply the method to time-series TFP analysis at the industry and State level and for individual DNSP to better capture large customer minutes off supply changes.
Network services opex	Operating expenditure (opex) for network services. It excludes expenditure associated with metering, customer connections, street lighting, ancillary services and solar feed-in tariff payments.
OEFs	Operating environment factors (OEFs) are factors beyond a DNSP's control that can affect its costs and benchmarking performance.
Outputs	Outputs are quantitative or qualitative measures that represent the services DNSPs provide.
PIN	Productivity index number. PIN techniques measure aggregated outputs relative to aggregated inputs using a mathematical index.
PPI	Partial performance indicator. PPIs are simple techniques that measure the relationship between one input and one output.
Ratcheted maximum demand	Ratcheted maximum demand is the highest value of maximum demand for each DNSP, observed in the time period up to the year in question. It recognises capacity that has been used to satisfy demand and gives the DNSP credit for this capacity in subsequent years, even though annual maximum demand may be lower in subsequent years.
SFA	Stochastic frontier analysis. SFA is an econometric modelling technique that uses advanced statistical methods to estimate the frontier relationship between inputs and outputs. SFA models allow for economies and diseconomies of scale and directly estimate efficiency for each DNSP relative to the estimated best practice frontier.
TFP	Total factor productivity is a PIN technique that measures the relationship between total output and total input over time. It allows total productivity changes over time or growth rates to be compared across networks. This method was used in previous annual benchmarking reports (up to 2019) to examine productivity change over time at the DNSP level and the industry level.

Appendix A – Summary of submissions to the Consultation Paper

- In the Consultation Paper we sought stakeholder views on the relative merits of the six options for addressing the impact of material differences in capitalisation practices on the benchmarking results and also invited stakeholders to put forward any additional options that they considered may better address these differences.
- We received submissions on 18 February 2022 to the Consultation Paper from all DNSPs and Illawarra Consumers of Energy. All submissions were supportive of the AER undertaking this work and examining the issues around the impact of difference in capitalisation approaches on the benchmarking results.
- All submissions considered there were impacts on the benchmarking as a result of differences in capitalisation approaches. Most submissions focused on proposed solutions to the material differences, and as outlined in Table 7, criticised the opex/capital ratios being used in that context for a variety of reasons. However, as set out in Table 8, there were differing views as to the best way to address the impact of these differences. In addition, our preferred option (Option 1) in the Consultation Paper received limited support in submissions and a reasonable amount of opposition. In the main, submissions considered it was preferable, if possible, to directly include in the modelling or adjust the data used for benchmarking to recognise the capitalisation differences rather than making an ex-post adjustment after the benchmarking modelling via an operating environment factor adjustment. This can be seen in the support for Options 2, 3, 4 and 5 in Table 8.

Table 7 Stakeholder submissions on effectiveness of using opex / capital ratios to measure differences in *capitalisation practices*

Arguments made by stakeholders
Too much year-to-year volatility in the opex / totex ratio Endeavour Energy argued that the volatility in the opex / totex ratio from year to year would not be expected in a measure of *capitalisation practices* for those DNSPs that have maintained a consistent *capitalisation policy*, and that the presence of such volatility indicates the influence of factors unrelated to *capitalisation practices*.
Too much volatility in the period average opex / totex ratio Ausgrid argued that the period average opex / capital ratio itself is too volatile when taken over slightly different periods.
Lack of correlation between ratios and overheads Analysis completed by some DNSPs of the opex/capex split of overheads (representing *capitalisation policy*) and the opex/total inputs ratio showed a limited correlation.
Correlation between opex / totex ratio and business size Some DNSPs suggested that the opex/totex ratio is correlated with business size (as proxied by the Regulatory Asset Base) which is a variable that is already accounted for in benchmarking.
The level of capex is sensitive to other factors unrelated to *capitalisation practices* DNSPs claimed that the opex/capex ratio is sensitive to *opex / capital trade-offs*, asset replacement cycles, capital contributions, DER take-up, etc.
That opex/capital ratios inappropriately conflate *capitalisation policy* with *opex / capital trade-offs* Endeavour Energy considered that *capitalisation policy* difference should be separated from other factors that drive *opex / capital trade-offs* as only the former affects the comparability of opex efficiency scores and benchmarking performance

Table 8: Stakeholder submissions on options to address capitalisation – arguments and support/opposition/not engaged

Option	Arguments made by stakeholders for/against option	Stakeholders in favour	Opposed	Did not respond
1. OEF adjustment using frozen 2014 CAMs	**The OEF adjustment adjusts for inefficiency** Some DNSPs argued that networks with higher relative levels of opex will appear more efficient as a result of the OEF adjustment. **The opex/total inputs ratio can be used in the adjustment from a technical perspective** Jemena submitted that the multilateral nature of the total inputs index should not impact the usefulness of the opex/total inputs ratio in deriving the OEF adjustment. **The opex/capital ratios should be calculated using reported opex rather than 2014-CAM opex** In order to control properly for actual *capitalisation practices* between DNSPs, some considered it is necessary for the AER to compute these opex/capital ratios using expenditure data that reflect 'unfrozen' CAMs in each year. This would ensure that the opex/capital ratios for each DNSP reflects the actual *capitalisation practices* adopted by that DNSP in each year, rather than opex/capital ratios derived using a CAM that has been 'normalised' over time. The use of data derived using 2014 frozen CAMs would fail to reflect the true capitalisation differences between DNSPs, thereby defeating the AER's attempts to account properly for these actual differences. **The adjustment should not adjust for some *opex / capital trade-offs* as these decisions would remove the impact of potential inefficiencies** Some DNSPs submitted that certain *opex / capital trade-offs* should not be	Jemena	Ausgrid, Endeavour, Essential, CitiPower, Powercor, United Energy, TasNetworks, SAPN, AusNet Services	PWC

Option	Arguments made by stakeholders for/against option	Stakeholders in favour	Opposed	Did not respond
	adjusted for as this practice would remove the impact of potential inefficiencies. **Better to make adjustments to the data ex-ante to address capitalisation than make an ex-post adjustment** DNSPs suggest that the use of an OEF adjustment introduces complexity when compared with a direct adjustment. Instead, input data should be amended to adjust for differences. **Ex-post adjustment does not impact headline efficiency scores** Essential Energy argued that a DNSP could be included in the comparison group even if the adjustment for capitalisation finds them to be inefficient. **Omitted variable bias** Essential Energy also submitted that an ex-post adjustment, like the one suggested under this option, could result in omitted variable bias due to an explanatory variable not being included in the model. **Volatility in outcomes depending on time horizon and combination of opex/capital ratios used** Some DNSPs were concerned with this approach as the choice of time horizon and opex/capital ratio will have a significant impact on benchmarking outcomes. This implied that the ratios are not robust or reliable measures of capitalisation. Many networks had different preferences regarding the combination of			

Option	Arguments made by stakeholders for/against option	Stakeholders in favour	Opposed	Did not respond
	opex/capital ratios to be used as well as the weighting that should be applied to these ratios. **Transparency and predictability** TasNetworks argued that the OEF approach is uncertain/unpredictable and not transparent.			
2. Adding an explanatory variable to the econometric models	**Econometric viability and viability data-wise** Several networks suggested that an econometric model solution using an explanatory variable for capitalisation differences is preferable and viable as data we did not consider was available appears to now be available. However, some DNSPs suggested that data issues make the introduction of a capitalisation explanatory variable complex and problematic.	Essential, Ausgrid, CitiPower, Powercor, United Energy	Jemena and Endeavour	PWC, AusNet Services, Ergon, Energex, Evoenergy, SAPN, TasNetworks
3. Using current capitalisation policies	**Should use current capitalisation, given growing divergence between benchmarking opex and reported opex** Some DNSPs submitted that this solution is easily implemented and brings the benchmarking forward to reflect current *capitalisation practices*. **Continuity of results from previous reports is not a significant issue** Some DNSPs argued that results under current capitalisation policies can be backcast to previous benchmarking reports if necessary and that in any event stakeholders rely on the most recent reports. One DNSP also noted that previous modelling errors (in relation to the MTFP models) had already reduced comparability with previous benchmarking reports. **Sensitivity of benchmarking scores to Powercor's *capitalisation policy* is problematic**	Ausgrid, Endeavour, Evoenergy, Ergon, Energex, AusNet, CitiPower, Powercor, United Energy	Jemena	PWC, Essential Energy, SAPN, TasNetworks

Option	Arguments made by stakeholders for/against option	Stakeholders in favour	Opposed	Did not respond
	Endeavour Energy submitted that the impact of capitalisation on a DNSP's efficiency score is sensitive to a *capitalisation policy* change made by Powercor and by extension, other 'efficient' comparator networks. It argued that the use of current capitalisation policies would remedy some of the issues brought about by a frozen CAM approach. **Lower quality of the backcast opex series under current capitalisation polices** Some DNSPs submitted that quality concerns arise with the use of a backcast opex series using current CAMs due to the lack of an external audit. **The AER overplays the concern with gaming – range of controls and curbs on this** Endeavour, in particular, saw the freezing of the 2014 CAMs as an overreaction and that current policies are as unbiased as the 2014 frozen CAMs. **Lower quality of the backcast opex series under current capitalisation polices** Some DNSPs submitted that quality concerns arise with the use of a backcast opex series using current CAMs due to the lack of an external audit. **Benchmarking should be based on reported actual opex incurred under the *capitalisation policy* in place in each given year** AusNet argued that the use of reported opex under the *capitalisation policy*			

Option	Arguments made by stakeholders for/against option	Stakeholders in favour	Opposed	Did not respond
	in each given year would prevent the unjustifiable exclusion of some businesses' opex from benchmarking calculations. **Benchmarking should be based on reported actual opex incurred under the *capitalisation policy* in place in each given year** AusNet argued that the use of reported opex under the *capitalisation policy* in each given year would prevent the unjustifiable exclusion of some businesses' opex from benchmarking calculations.			
4. Benchmarking with a common opex/capital ratio	**Ex-ante approach that takes into account capitalisation** Essential considered this option could account for capitalisation differences while avoiding issues related with ex-post adjustments (as raised above by many DNSPs). **Capturing of network inefficiencies** Some DNSPs considered this option would capture network inefficiencies unintentionally (as raised above by many DNSPs with the ex-post adjustments). **Use all-DNSP average, not comparator average** Essential submitted that the Australian industry average (customer weighted) should be used to determine a common ratio not the comparator average.	Essential	Jemena, CitiPower, Powercor, United Energy, AusNet Services	PWC, Ausgrid, Endeavour, Ergon, Energex, Evoenergy, SAPN, TasNetworks
5. Benchmarking with a fixed proportion of total overheads	**Materiality and simplicity** Some DNSPs suggested that this adjustment would not capture	CitiPower, Powercor, United Energy,	Jemena	PWC, Ausgrid, AusNet Services, Endeavour,

Option	Arguments made by stakeholders for/against option	Stakeholders in favour	Opposed	Did not respond
	inefficiencies, would target the material *capitalisation policy* issue and is a timely solution. **Network overheads can be volatile** A number of DNSPs suggest that benchmarking with a fixed proportion of corporate overheads allocated to opex may be desirable as opposed to total overheads that includes network overheads.	TasNetworks, SAPN		Ergon, Energex, Essential, Evonenergy,
6. Common capitalisation policy	**Controls for differences in a targeted way** Some DNSPs suggested that this may be the best option in the long term as it would control for differences in capitalisation policies between networks. **Resource requirements** Some DNSPs noted that this option is the most resource intensive to implement. **Accounting for *opex / capital trade-offs*** Some DNSPs noted that the common *capitalisation policy* would not account for *opex / capital trade-offs*.	CitiPower, Powercor, United Energy, SAPN, Illawarra Consumers of Energy	AusNet Services, Jemena	PWC, Ausgrid, Endeavour, Ergon, Energex, Essential, Evoenergy, TasNetworks