Electricity Network Performance Report 2020

September 2020

AUSTRALIAN ENERGY REGULATOR

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Contents

About Us

We, the Australian Energy Regulator (AER), work to make all Australian energy consumers better off, now and in the future. We are the independent regulator of energy network service providers (NSPs) in all jurisdictions in Australia except for Western Australia. We set the revenue requirements these NSPs can recover from customers using their networks.

The National Electricity Law and Rules (NEL and NER) and the National Gas Law and Rules (NGL and NGR) provide the regulatory framework which govern the NSPs. Our role is guided by the National Electricity and Gas Objectives (NEO and NGO).

NEO:[1]

> …to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
>
> (b) the reliability, safety and security of the national electricity system.

NGO:[2]

> …to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

The decisions we make and the actions we take affect a wide range of individuals, businesses and organisations. Effective and meaningful engagement with stakeholders across all our functions is essential to fulfilling our role, and it provides stakeholders with an opportunity to inform and influence what we do. Engaging with those affected by our work helps us make better decisions, provides greater transparency and predictability, and builds trust and confidence in the regulatory regime. This is reflected in our Stakeholder Engagement Framework and in the consultation process we have followed in this review.[3]

1 NEL, s. 7.
2 NGL, s. 23.
3 AER, *Revised stakeholder engagement framework*, September 2017.

1 This network performance report

The 2020 electricity network performance report is the first of what will be annual network performance reports for electricity networks. In it, we set out our analysis of key outcomes and trends in the operational and financial performance data we collect from electricity network service providers (NSPs). In forthcoming years we plan to prepare similar reports for the full regulated gas pipelines, when the relevant historical data is provided by the pipelines later this year.

This report includes data for electricity distribution networks (DNSPs) and transmission networks (TNSPs). The analysis is focussed on the provision of core regulated services. These are:

- Standard Control Services for electricity DNSPs, and
- Prescribed Transmission Services for electricity TNSPs.

NSPs do provide and collect revenue for other services, but these sit outside the revenue cap, are subject to other forms of regulation and, in some cases, are unregulated.

We encourage stakeholders to read this report alongside our annual benchmarking report which is focussed on network expenditure productivity.

1.1 Key findings

Our 2020 electricity network performance report shows that network regulation is improving outcomes for consumers. In particular, we observe that consumers are getting a more reliable supply of electricity and paying less for this supply than they have previously. At the same time, NSPs continue to attract sufficient investment to fund efficient expenditure in their networks. In future years, we will build on this initial report to address emerging issues such as the ongoing changes in the way energy is produced and consumed. This will assist us and stakeholders to be confident that network regulation continues to serve consumers' long term interests.

Specifically, our key findings in this report are that:

- In total, consumers are spending less on network services than they have done in previous years, largely driven by reductions in allowed rates of return.
- We expect the trend of declining returns to continue as many NSPs have their allowed returns reset in lower interest rate conditions.
- Total network expenditure is substantially down from its peak in 2012. There has been a minor increase in 2019 compared to 2017 and 2018.
- Network reliability has improved over recent years, both in terms of frequency and duration of network outages. However, there were on average longer and more frequent outages in 2019 compared to 2018.
- There has been a significant increase in the capacity of the electrical supply system since 2006. At the same time, peak demand has been growing at a slower rate. This has

meant that utilisation of networks is lower than in 2006, although there has been a modest increase in utilisation in the past three years as network investment has slowed.

- Regulated NSPs have become less profitable in recent years, following reductions in allowed rates of return.
- Nonetheless, our analysis of market evidence suggests that investors continue to view allowed returns as being at least sufficient to attract efficient investment.

1.2 Focus areas

To make the report accessible and useful for a range of stakeholders with varying levels of experience with our regime, we have tried to strike a balance between:

- regular high-level reporting on a core set of measures, and
- more detailed analysis on emerging issues of interest to stakeholders.

For this report, our focus areas are:

- The introduction of profitability measures as finalised in our 2019 review, and in particular our first reporting on an EBIT per customer measure
- The magnitude of incentive scheme payments
- Patterns of investment in the NEM.

These are topics which have been raised extensively in submissions from stakeholders across our network regulation work program. Our intention is to choose new and relevant focus areas each year to reflect important emerging issues and stakeholder interest. To best target those choices, we encourage direct feedback on topics or emerging issues of interest. In section 7, we set out our thoughts on key developments over regulatory year 2020 that might guide our focus areas for next year's report.

1.3 Stakeholder engagement on the report

Prior to developing the report, we have had extensive stakeholder engagement in:

- Developing our priorities and objectives for reporting on network performance
- Completing our profitability measures review, which has been an important input into this report.

In developing this report, we gave NSPs an opportunity to comment the accuracy of the data and on the accuracy of our analysis. We will continue to undertake this consultation for future reports.

We also engaged with a number of state and territory safety and technical regulators on the accuracy of the safety and reliability analysis within the report. The input we received will be useful in planning future reporting and we intend to continue engaging with these regulators.

For our 2021 report, we will look to engage early and widely with stakeholders on areas of interest.

2 Contents and structure of the report

2.1 The objectives of this report

Through this report and the accompanying data, we intend to advance the network performance reporting objectives, determined with the input of stakeholders.[4] These are:

Table 2-1 How we are advancing our objectives for network performance reporting

Objective	What we are doing
Provide an accessible information resource	We have drafted this report with the intent of making it both informative and accessible for stakeholders. Alongside this report we have published two data models covering: • Our operational performance data. • Our financial performance data. These cover much of the data captured in this report at a greater level of detail. We aim to present the data in a form that enables stakeholders to use it in their own analysis.
Improve transparency	Through the report and our published data, we are trying to illustrate the impacts and interactions of network performance under different regulatory tools or settings. The regulatory regime can be complex. Our objective through this reporting is to make network regulation and its outcomes more transparent for stakeholders. For example, in this report we have reported on actual NSP profits in a way we hope will assist stakeholders to: • Compare actual profitability against our allowed returns on capital. • Better understand the impact of incentive schemes on network profits. • Better understand the impact of inflation on NSP profitability.
Improve accountability	The focus of this report is on the effectiveness of network regulation as a whole, increasing our accountability for regulatory decisions and for the NSPs and their performance under those decisions. Further, our published data allows for comparisons of individual NSPs and, in our published data and analysis, we highlight particular areas where outcomes or efficiency appear to differ between NSPs.
Encourage improved performance	Similarly, by improving accountability and transparency we expect that these reports over time will contribute to improved performance by: • Informing ourselves and stakeholders about emerging trends which may require a regulatory response.

4 AER, *Objectives and priorities for reporting on regulated electricity and gas network performance—Final*, June 2020.

	• Contributing to the incentives on NSPs to improve performance. For example, in this report we have set out analysis of the relationship between utilisation and reliability to inform our thinking on whether those networks with greater aggregate spare capacity are producing better reliability outcomes.
Inform consideration of the effectiveness of the regulatory regime	In this report specifically, we consider whether the outcomes of network regulation are achieving the objectives of the regulatory regime. Where those outcomes depart from what we might expect, we are seeking to highlight this and explore possible drivers. For example, in this report we have begun investigations into the impact of our incentive schemes. We have identified opportunities to develop better reporting tools to assist in this analysis.
Improve network data resources	Through our analysis of the data, we have sought to: • Investigate and make use of a wide range of our network data sources. • Identify and manage differences in reporting which impede comparability of data provided by different NSPs. • Identify important questions on which we would like to form views but are limited by data availability or consistency. Over time, we expect this approach will also assist us to form a view on any data we currently collect which may be excessive or not useful.

In doing so, we recognise that this is our first such report. We encourage stakeholder feedback on the report and our accompanying data resources so that we can improve its usefulness over time. Following release of the report, we will consider how best to seek this input from stakeholders.

2.2 The structure of this report

In our view, an effective network regulatory regime contributes to customers paying no more than is necessary for safe and secure supply of energy.

Implicit in this vision is a balance between the costs of providing network services and the outcomes arising from those costs. We have structured the report to address a series of questions that, in our view, should assist us and stakeholders in reaching a view on whether this balance is being achieved. We have also sought to link these questions back to our performance reporting priorities, determined with the input of stakeholders.

This is as follows:

Table 2-2 The structure of this report

Section	Contents	Network performance reporting priority
1	This network performance report	n/a
2	Key findings	All
3	The costs of providing core regulated network services	Financial performance
4	Network expenditure	Operational performance and efficiency
5	Network service outputs	Operational performance and efficiency
6	Network profitability	Financial performance
7	Looking ahead to 2021	Emerging issues

Source: AER analysis.

2.3 How we refer to regulatory years

This network performance report covers network data for regulatory year 2019 which is:

- July 2018–June 2019 for financial year NSPs (all except Victoria)
- May 2018–April 2019 for AusNet Transmission (Victoria)
- January 2019–December 2019 for Victorian DNSPs.[5]

This is our naming convention wherever we refer to specific regulatory years in this report. So, for example, regulatory year '2016' refers to 2015-16 for a financial year NSP and 2016 for a calendar year NSP.

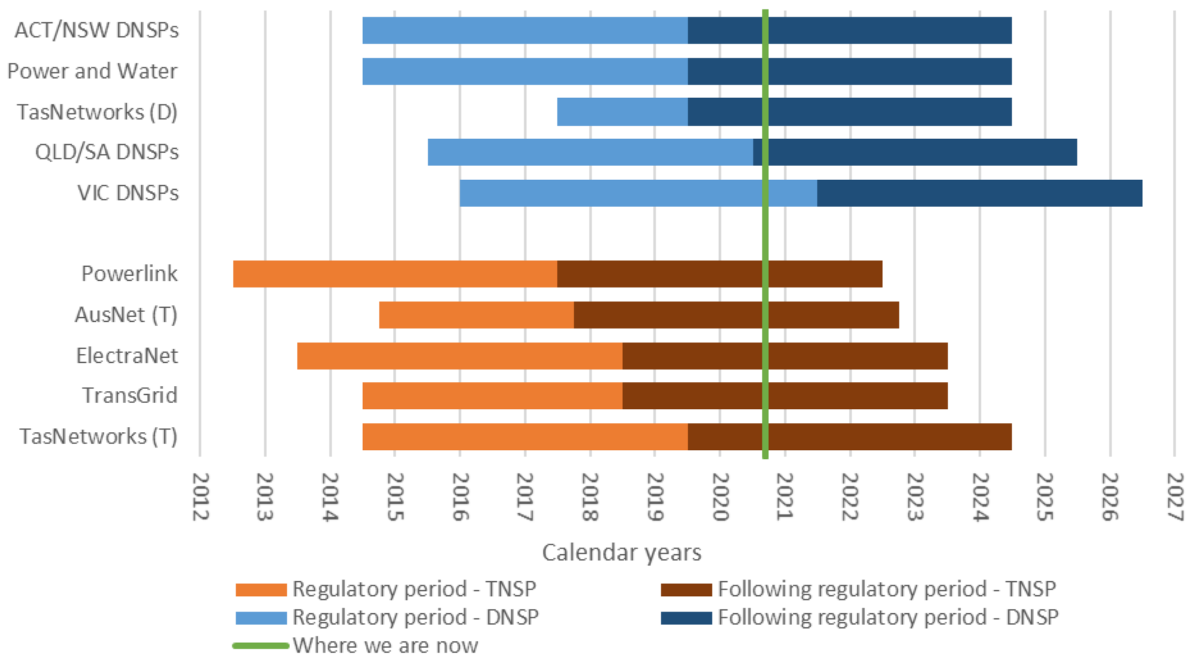
Where 2019 sits in the regulatory cycle

Generally, our regulatory determinations apply over 5 year periods. We make these decisions for regulated NSPs in a staggered cycle over time.

An important consequence of this approach is that changes in regulatory approaches or market conditions feed gradually into network determinations.

5 The Victorian Government is currently considering a delay to the timing of regulatory determinations for its DNSPs such that it would move onto a financial year basis. This will simplify regulatory reporting and allow us to report earlier in the regulatory year.

Figure 2-1 The staggered revenue decision timetable



Source: AER analysis.

Note: The Victorian Government is in the process of legislating a 6 month extension to the timing of determinations for Victorian DNSPs which would otherwise have commenced in January 2021. The result of this change will be the current regulatory period will be extended to finish on 30 June 2021 and commencement of the full five year regulatory period on 1 July 2021.

For convenience, we think of regulatory cycles as commencing with the determinations for a large number of the DNSPs, including those in New South Wales, Australian Capital Territory and now Tasmania and the Northern Territory. The determinations for those NSPs have over time been the first major decisions to incorporate substantial changes in regulatory settings (2013 better regulation; 2018 rate of return instrument).

Regulatory year 2019 is at the late end of the regulatory cycle for most regulated NSPs. Some NSPs have in 2019-20 commenced regulatory control periods made under this new regulatory cycle, but that data is not yet available and will be the focus of next year's report. For that reason, we consider regulatory year 2019 is a good baseline for us to commence reporting and against which we can observe the impacts of the most recent cycle of regulatory determinations.

2.4 Reporting on Northern Territory Power and Water Corporation

Last year we made our first determination for Northern Territory Power and Water Corporation (NT PWC), the Northern Territory's electricity distribution network. 2019-20 (regulatory year 2020) is the first year of its regulatory period. NT PWC has reported historical network data to us which relates to its previous regulatory control period. In this report, for ease of interpretation, 'total' or 'NEM-wide' values all refer to the set of NSPs we regulated in that year, which did not include NT PWC. We will include it in our reporting from next year.

3 The costs of providing core regulated network services

To assist stakeholders in forming a view on whether customers are paying no more than is necessary for safe and reliable supply of electricity, we have first set out some analysis on what they have spent on core regulated services.

All electricity NSPs are now regulated under revenue caps.[6] NSPs annually set their charges to target a total revenue amount determined under the revenue cap. The key drivers of the revenue target are set in our revenue determinations and are set so NSPs can recover the costs an efficient NSPs would require to provide core regulated services, including:

- Operating expenditure
- Costs associated with raising capital:
  - The return on capital (allowed returns on equity and debt)
  - The return of capital (depreciation)
- Costs of tax
- Revenue adjustments, including incentive schemes and sometimes adjustments for past revenue over or under recoveries.

We also update the revenue target each year to account for actual inflation, changes in the NSPs' required returns on debt, cost-pass throughs and other factors.

The proportion of total revenue collected from different types of customers varies between NSPs and over time. Also, most electricity customers pay network costs via a retailer, in which they are combined with other costs of supplying energy. This means it can be complex to make general observations about the impact of network costs on specific customer bills. However, the total revenue that NSPs recover is an informative measure of the overall costs NSPs are recovering from their customers. We have focussed our analysis on revenue for this reason.

Electricity DNSPs are also responsible for collecting from customers other costs, such as the costs of jurisdictional schemes, which we do not have a role in setting. Some of these schemes, such as jurisdictional solar bonus schemes, are not included in the revenue building blocks. For the purposes of this section, where we refer to 'network costs' we have focussed our analysis only on those costs arising from:

- DNSPs providing standard control services (SCS), and
- TNSPs providing prescribed transmission services.

Our key findings are that:

- Customers spent less on network costs in 2019 than they have in recent years, continuing a trend of decline in revenue since a peak in 2015.

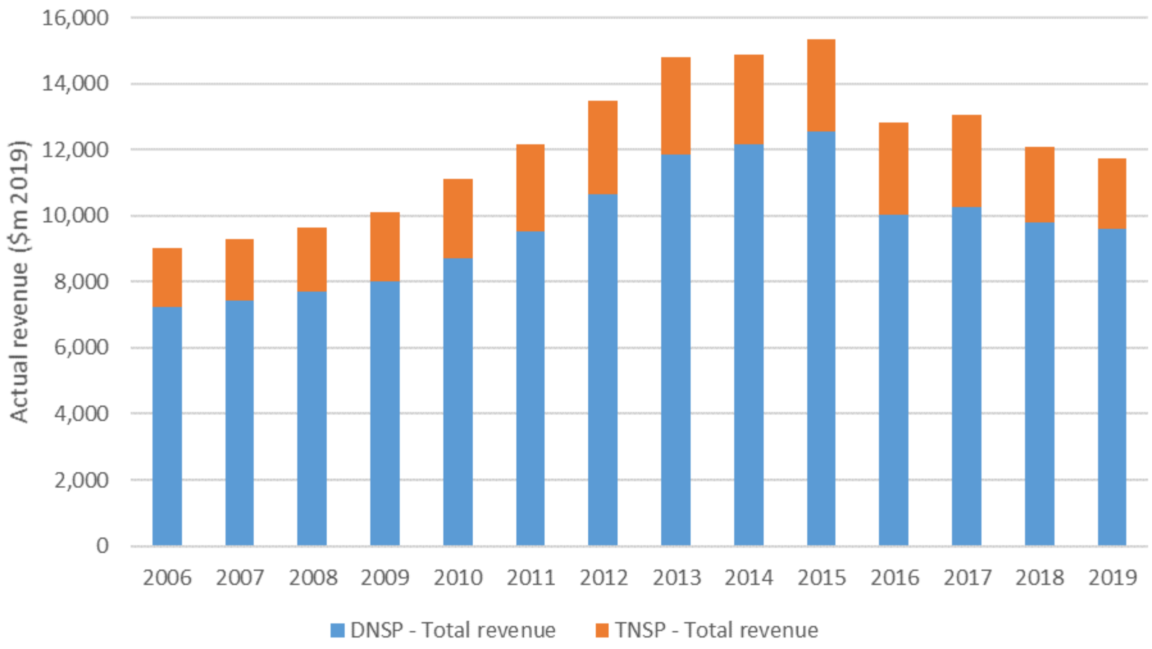
6 The last NSP to be moved to a revenue cap was Evoenergy at the commencement of its 2019-24 regulatory period.

- Those reductions in network costs have been driven mostly by reductions in allowed rates of return.
- Incentive schemes, while generally having an upward impact on revenue, remain a relatively small driver of network costs to customers.

3.1 Revenue recovered from customers

In regulatory year 2019, customers spent less in total on core regulated network services than they have since 2011. This outcome continues a general trend of declining revenue since 2015. Notably, total revenue declined below $12 billion ($2019) for the first time since 2010 (Figure 3-1).

Figure 3-1 Total core regulated network service revenue recovered from customers – DNSPs and TNSPs



Source: Operational performance data, AER analysis.

Note: These are the total actual SCS and prescribed transmission service revenue amounts collected from customers, as opposed to annual target revenue, the smoothed PTRM revenue target or the unsmoothed building block revenue total.

Since 2006, trends in customer spending on network costs can be divided into two periods:

- In the period to 2015, customers faced regular and material annual increases in network costs. During this period the NSPs' revenues increased by 66 per cent in real terms. The key drivers for this increase included increases in peak demand driven by large scale take-up of air conditioners, forecasts of continued growth in peak demand which did not eventuate, changed reliability standards and increased financing costs during the global financial crisis.
- Since 2015, customers have generally spent less on network services year-on-year. 2017 was an exception to this trend and appears to have been driven by over-recovery of revenue against allowance. This was a temporary impact since under a revenue cap

over-recoveries are returned to customers two years after they arise. From 2018 onwards the trend of declining network revenue resumed.

- The transition between these two periods was driven by reductions in the allowed return on capital and, more specifically, lower allowed rates of return which have declined roughly 35 per cent in real terms since a peak in 2014. The other components of building block revenues have remained relatively stable (Figure 3-2).

While this downward trend in NSP revenue means that customers are paying less for their network services, it has not consistently translated into reduced electricity retail bills. Customers' bills are made up of several components, also including wholesale market costs, retail margins and jurisdictional costs. Further information on these other bill components is set out in our State of the Energy Market report, and in our regular wholesale and retail reporting.

Allowed rates of return are the major driver of revenue reductions

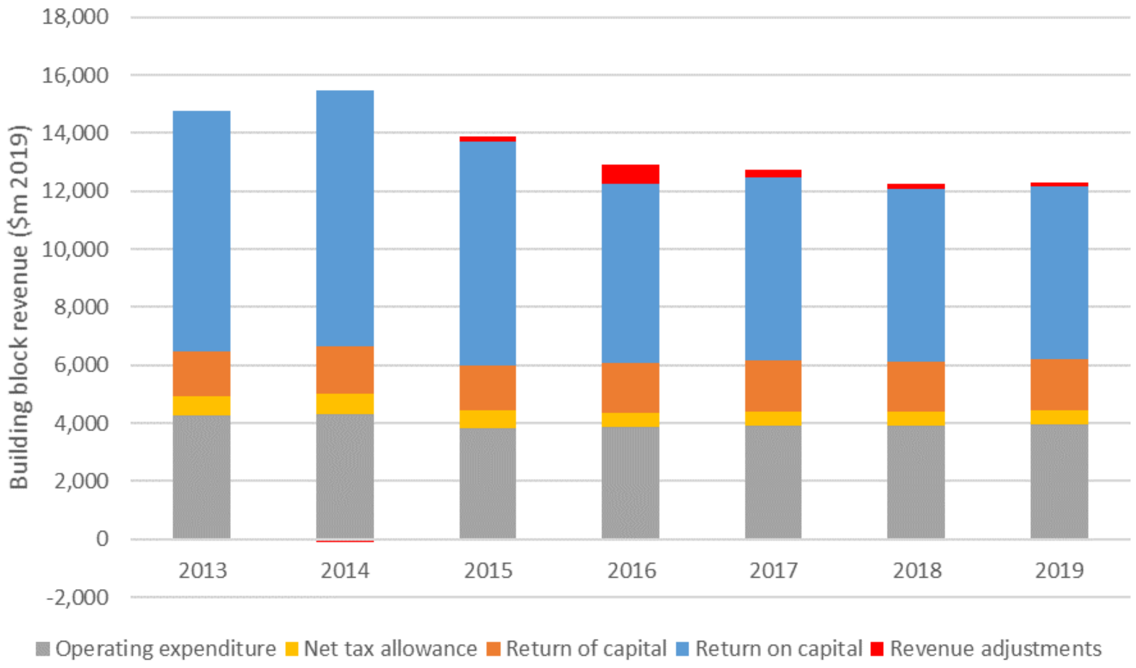
The allowed return each NSP is to receive on its regulatory asset base (RAB) is known as the returns on capital. The returns on capital are calculated by applying rates of return to the value of the NSPs' RABs.

The rate of return is estimated by combining the returns of two sources of funds for investment: equity and debt. The allowed rates of return provides the NSPs with a return on capital to service the interest on its loans and give a return on equity to investors.

For more information on returns on capital, how we set them and recent developments, see the work program underway to map out a pathway to the 2022 review of our binding rate of return instrument.[7]

[7] Available on our website at: https://www.aer.gov.au/publications/guidelines-schemes-models/rate-of-return-instrument-2022.

Figure 3-2 Allowed building block revenues – DNSPs and TNSPs



Source: AER decision PTRMs adjusted for inflation using ABS CPI, AER analysis.

Note: In any given year, recovered revenue will generally be different to the sum of the building block allowances for a number of reasons including revenue smoothing, over/under forecasts of demand and the impacts of factors in the revenue control mechanisms such as cost pass-throughs. However, the allowed building blocks are the best guide to the drivers of revenue allowances throughout a regulatory period.

- To illustrate why allowed returns on capital have declined,

Figure 3-3 shows the changes over time in the two key drivers of allowed returns on equity:

- The risk free rate— the risk free rate measures the return an investor would expect from a 'riskless' investment. We estimate this using yields on Commonwealth Government Securities. We set the risk free rate by averaging these yields over a short period close to the commencement of a regulatory period. This is a major driver of reductions in allowed returns, flowing from changes in market conditions.
- The equity risk premium—the incremental compensation that investors require to invest in equity where there is some level of risk. We determine the equity risk premium by multiplying two parameters: the market risk premium and equity beta. We determine the values of these parameters in our periodic reviews of the rate of return methodology.[8]

In combination, these show:

- Declines in the rates investors require to invest in our best proxy for a 'riskless' asset.
- Reductions in the equity risk premium that we estimate investors require for equity investment having regard to the risks faced by regulated networks.

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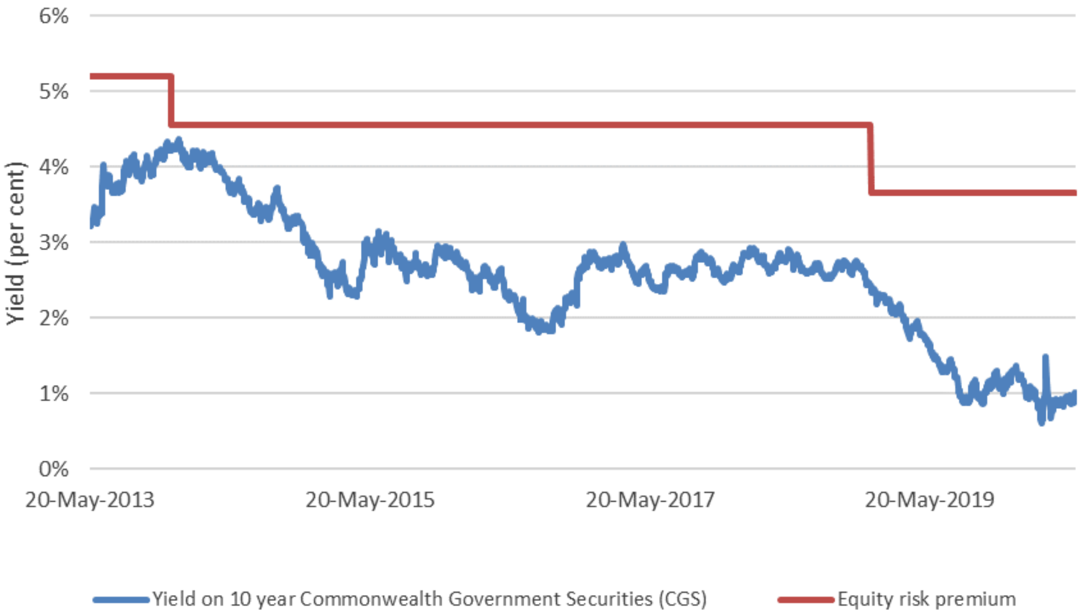
8 Under the current rate of return legislation which commenced in 2018, we set these parameters in our binding rate of returns instrument and are then required to apply them consistently until the next review of the instrument. Previously rates of return were set by reference to non-binding rate of return guidelines and could be reconsidered at each decision.

Figure 3-3 Declining risk free rates – 10 year yields on Commonwealth Government Securities (CGSs)



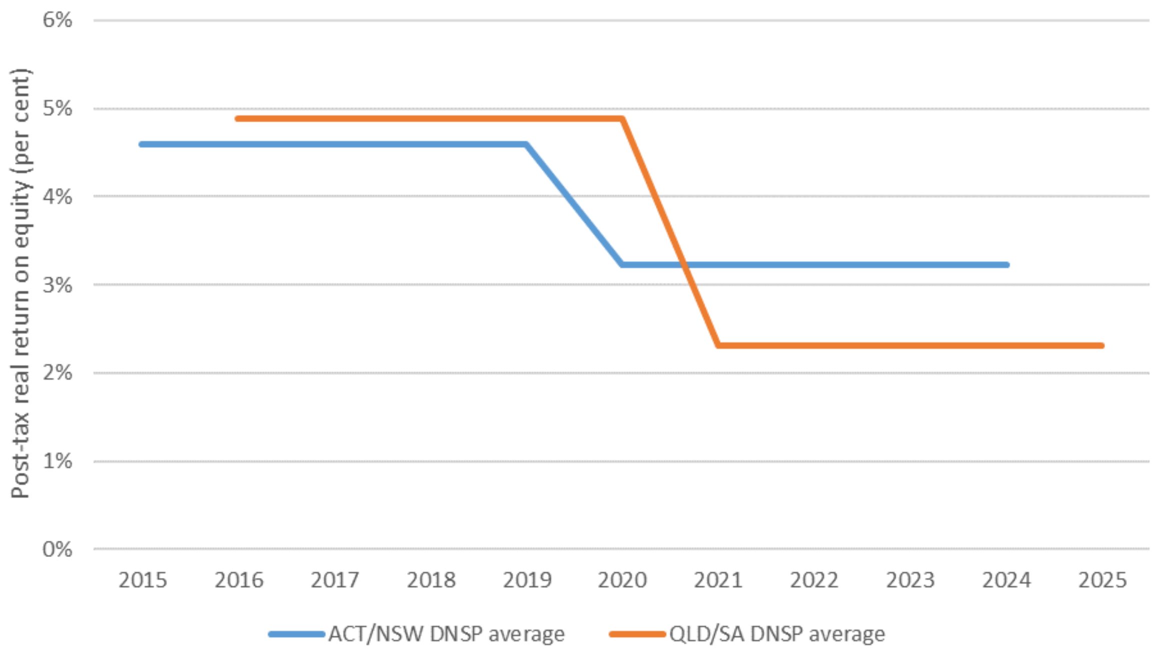
Source: RBA, F2— Capital Market Yields – Government Bonds – Daily, AER analysis.

Note: We use the return on Commonwealth Government Securities (CGS) with a term of 10 years as the risk free rate. See: AER, *Rate of return instrument - Explanatory statement*, December 2018, pp. 125-140.

Allowed returns on equity, once set, remain constant over the full regulatory periods to which they apply. Typically these are five year periods although there have been some recent exceptions while NSPs transition to different regulatory timing. This means that changes in market conditions, such as reductions in interest rates, can take some time to flow into NSP revenue targets.

For example, NSPs whose revenue decisions were last made in 2015 have revenue targets still based on those equity market conditions in 2019. However, as these allowed returns on equity are reset in the current lower interest-rate environment we have seen further decreases in allowed returns on capital. This has already begun to occur in recent revenue decisions for the Australian Capital Territory, New South Wales, Queensland, Tasmania, Northern Territory and South Australian DNSPs.

Figure 3-4 Changes in post-tax real return on equity across regulatory periods – Averages for ACT/NSW and QLD/SA DNSPs



Source: AER decision PTRMs, AER analysis.

These outcomes will continue to put downward pressure on allowed revenues and NSP profits in years to come.

3.2 Focus area—Impact of incentive scheme payments

In recent years, stakeholders have sought further insight on how much customers spend on the incentive schemes that we operate and what they get in return.

The regulatory framework is an incentive-based framework. At its simplest, this model of regulation is designed to promote the long-term interests of energy consumers through a repeat cycle of three steps:

1. Determining the NSPs' revenue allowances based on the best available information, recognising that the NSPs can outperform (underperform) those targets and keep (lose) some of the benefits.
2. Collecting accurate and reliable data on the networks' performance against those targets.
3. Using that information to inform future revenue setting processes, sharing the benefits of network efficiency gains with customers.

In general, the inherent incentives in this regime encourage NSPs to spend less than forecast and be financially rewarded through higher returns. Through our periodic resets, these benefits are then passed through to customers in the form of lower revenue targets. The opposite occurs if the NSPs spend more than the forecast.

The regulatory framework also includes targeted incentive schemes. These schemes are important regulatory tools designed to encourage desirable behaviours by the NSPs (namely to improve efficiency and reliability) which in turn will deliver better outcomes for consumers and promote achievement in the NEO.

Under these schemes, if an NSP is able to deliver its services at a lower cost than forecast, these lower costs of delivery should ultimately result in lower revenue requirements (holding other things constant) at the next revenue determination. Consumers should ultimately benefit from improved efficiency through lower regulated prices or through maintained or improved reliability of electricity supply.

Through the combination of inherent and targeted incentives in the regime, network regulation seeks to align the commercial goals of the NSPs to the NEO, centred on promoting the long-term interests of consumers.

Our analysis that follows is focussed on the payments the NSPs receive from the incentive schemes. This analysis is relatively straight forward as it is based on the payments data the NSPs report to us. In future reports we intend to advance this reporting to also include other aspects such as quantifying the outcomes for consumers as a result of these schemes. As set out at the end of this section, we intend to advance this reporting with the input from stakeholders.

Incentive scheme payments

To date, NSPs have received incentive scheme rewards or penalties under the following schemes:

- efficiency benefit sharing scheme (EBSS)
- service target performance incentive scheme (STPIS)
- demand management incentive scheme for the DNSPs[9]
- F-factor scheme for the Victorian DNSPs, and
- capital expenditure sharing scheme (CESS).

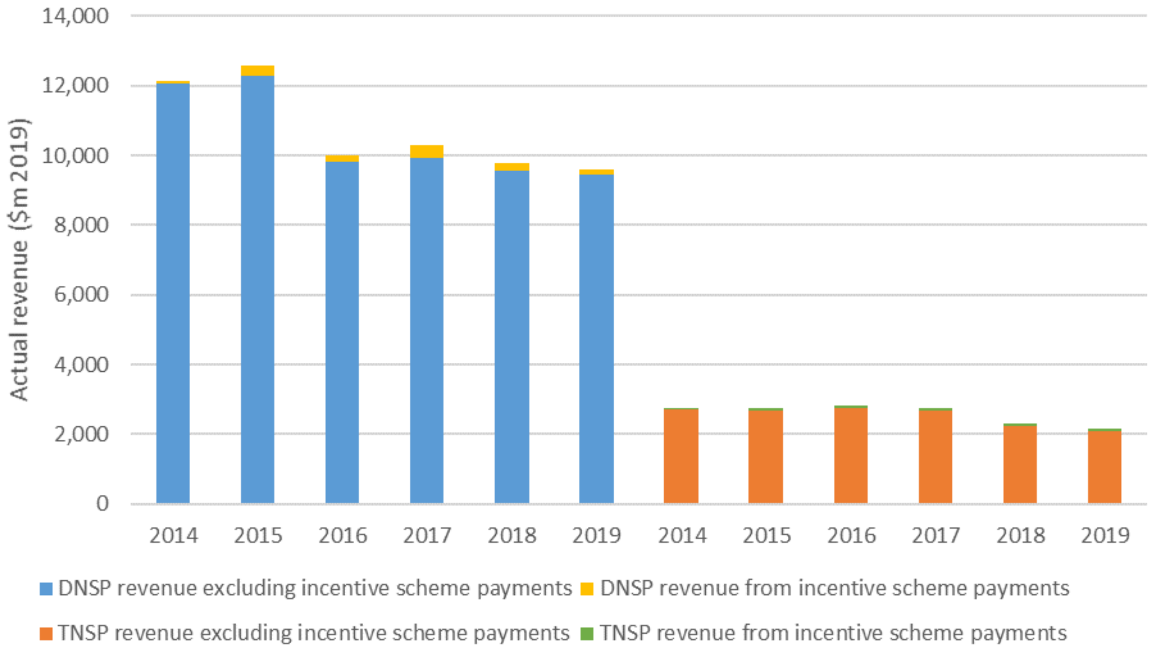
In aggregate, incentive scheme payments (either reward or penalties) have increased total revenues and consequently increased the relative customer spend on network services (Figure 3-5). These payments make up a higher proportion of TNSP revenue than for DNSP revenue, but lower total revenue impacts for customers.

Specifically, in regulatory year 2019, the payments represent approximately:

- 1.5 per cent of DNSPs' total revenues, and
- 1.8 per cent for TNSPs' total revenues.

9 Up to regulatory 2019, the DNSPs have only received payments in relation to the demand management innovation allowance aspect of the demand management incentive scheme.

Figure 3-5 Impact of incentive scheme payments on revenue allowances – DNSPs and TNSPs



Source: NSP Economic benchmark RIN responses, AER analysis.

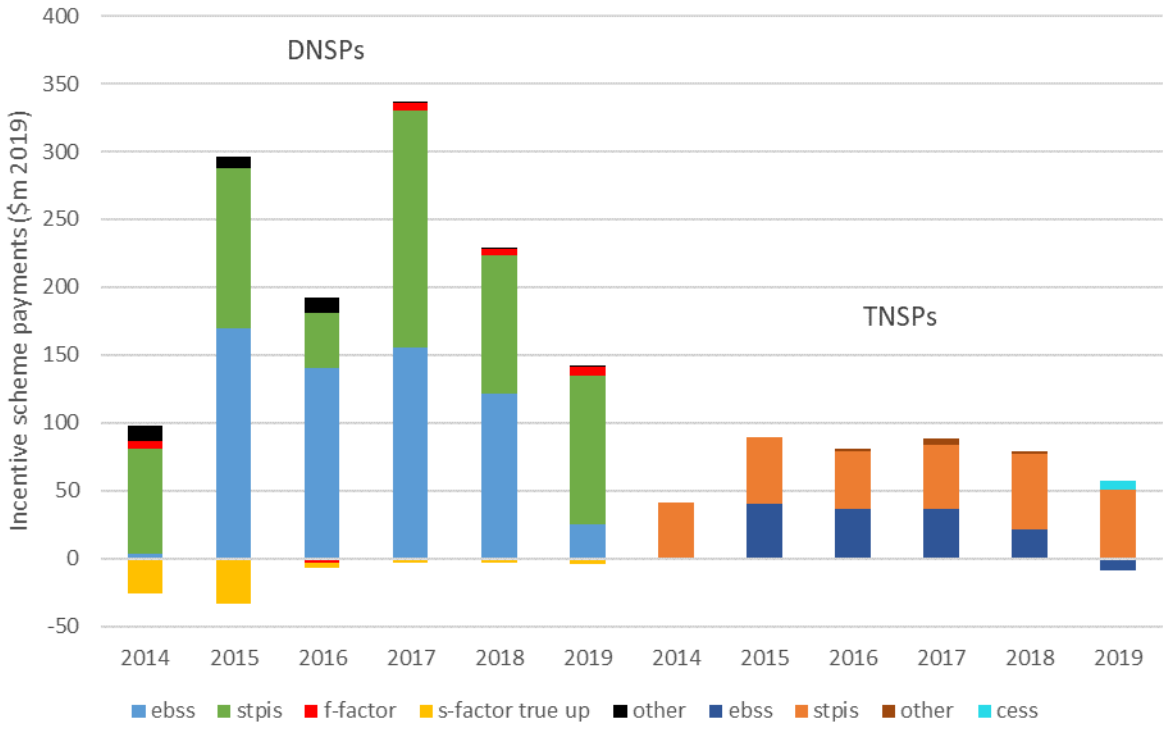
Note: Our analysis begins in 2014 to align with our time period for reporting on profitability in section 6.

2019 is the last regulatory year prior to the commencement of incentive payments to DNSPs under the capital expenditure sharing scheme (CESS). Only TransGrid had generated incentive scheme payments under the CESS in 2019.

Because CESS payments are determined in advance of the relevant regulatory years, we know now that the CESS will lead to further increases in total incentive scheme payments in 2020. Those CESS payments will increase again in 2021 as they feed into revenue for the Queensland and South Australian DNSPs.

To date, the schemes generating the highest revenue impact are the EBSS and STPIS (Figure 3-6).

Figure 3-6 Composition of reported incentive scheme payments – DNSPs and TNSPs



Source: NSP Economic benchmarking RIN responses, AER analysis.

Although aggregate incentive scheme payments are consistently positive, there is substantial variation both between NSPs and year-to-year. Customers in different network regions have faced different impacts from the operation of incentive schemes. Further detail on overall incentive scheme impact by NSP is available in our financial performance measures data.

Further investigation into incentive scheme outcomes

Figure 3-5 and Figure 3-6 describe the total amounts customers have paid NSPs through our incentive schemes. By itself, that is not enough information to form a view on whether those incentive schemes have advanced the long-term interests of consumers.

To reach that view will require more analysis into the outcomes of incentive schemes, beyond simply what they have cost. At present, our view is that data indicates that:

- Expenditure productivity and efficiency has improved in recent years (more on this in section 4 and our annual benchmarking reports), and
- Network reliability has improved across most networks, most clearly in terms of the frequency of network outages.

Because the schemes interact with each-other and with other parts of our regulatory approaches,[10] it is difficult to quantify the extent to which these results are outcomes of the incentive schemes, or whether they could have been achieved at lower costs to customers.

We intend to work further in coming years to improve our reporting tools on incentive scheme outcomes, seeking to better understand the effect that those schemes are having on NSP outcomes.

10 For example, the use of the EBSS plays a role in supporting use of benchmarking and our base-step-trend methodology, which supports our operating expenditure forecasts over time.

4 Network expenditure

With the revenue collected from customers, NSPs undertake operating and capital expenditure in whichever way they determine to be most efficient in order to result in safe and reliable supply of electricity.

In this section, we report on those expenditure trends. In particular, we focus on recent patterns of capital expenditure to form a view on recent investment dynamics amongst regulated NSPs.

Our key findings are that:

- Overall network expenditure has declined materially since a peak in 2012, driven largely by a decline in augmentation capital expenditure.
- As per our economic benchmarking reports,[11] network expenditure productivity has continued to improve this year, though there remain different levels of productivity between jurisdictions.
- In recent years, the amount added to RABs through capital expenditure has been approximately offset by the amount removed from RABs through depreciation.
- This has led to slowed growth in RABs. Transmission RABs have, in total, declined in real terms.
- NSPs have demonstrated capacity and tendency to spend less capex than forecast in our determinations.

4.1 Overall expenditure

Total network expenditures declined in real terms from a peak in 2012 to a low in 2017. The immediate impacts of capital expenditure and operating expenditure on revenue are very different:

- Forecast operating expenditure requirements translate directly into overall revenue allowances in the years we expect they will be incurred.
- In contrast, capital expenditure is added to the RAB. NSPs fund this capital expenditure through debt and equity capital raising. They recover the costs associated with this capital raising (return on capital and depreciation) gradually over the economic lives of the assets. These lives can range from depreciating within a single regulatory period to upwards of 40 years depending on the asset category.

Nonetheless, in our view reporting on total levels of expenditure is useful because it presents an overall view of expenditure which is not impacted by changes in network capitalisation policy over time. It also illustrates the potential trade-offs between operating expenditure and

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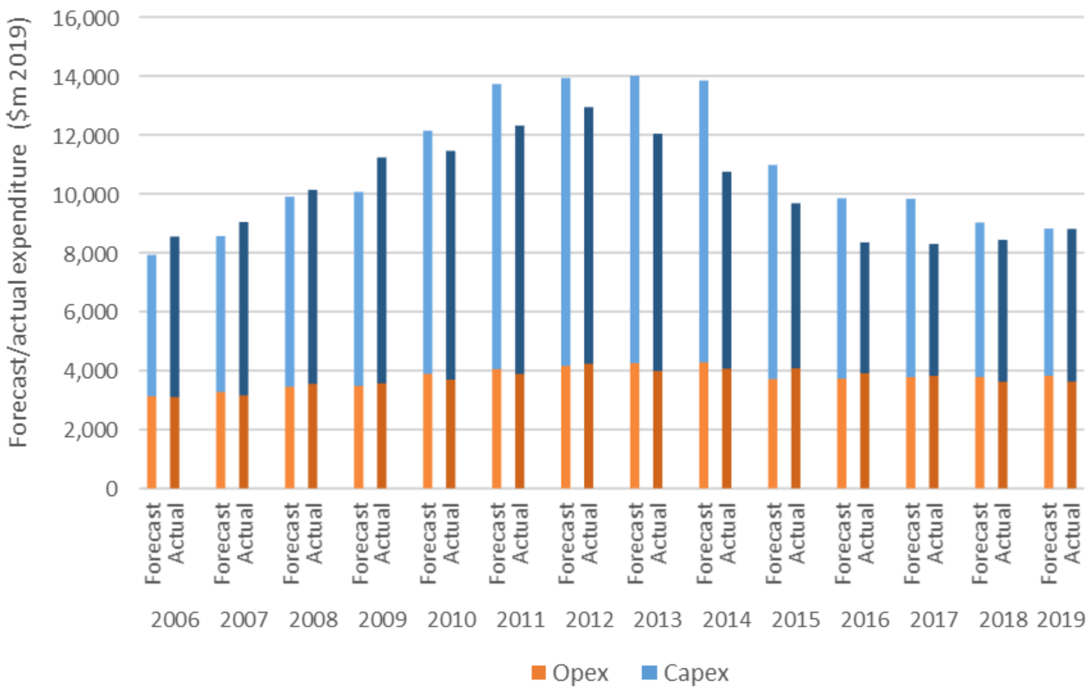
11 We also report annually on the productivity and efficiency of distribution and transmission network expenditure in our annual benchmarking report. Economic benchmarking gives us and stakeholders an additional source of information on the efficiency of historical network operating expenditure and capital expenditure and the appropriateness of using them in forecasts. We also use benchmarking to understand the drivers of trends in network efficiency over time and changes in these trends. We published our last annual benchmarking reports in November 2019. See: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/annual-benchmarking-report-2019

capital expenditure, which in some cases are substitutes for addressing particular network requirements. The most notable trend in this analysis is the decline in total actual network expenditure from a peak in 2012, followed by incremental increases since 2017.

Figure 4-1 Forecast and actual total expenditure – Total of DNSP and TNSPs



Source: Operational performance data, AER analysis.

A comparison of actual expenditure compared to forecast expenditure shows two distinct periods:

- From 2006 until 2009, actual expenditure exceeded forecast expenditure, driven largely by capital expenditure overspends associated with meeting previous jurisdictional reliability standards
- From 2010 until 2018, actual expenditure was consistently below forecast, driven by aggregate capital expenditure at levels materially below forecast.
- In contrast, operating expenditure (both forecast and actual) has been more consistent in absolute terms. That notwithstanding, actual operating expenditure does show a trend of decline in real terms since a peak in 2012.

In 2019, NSPs in aggregate spent slightly more than forecast, driven by capital expenditure exceeding forecast amongst a subset of networks. We discuss this further in section 4.3.

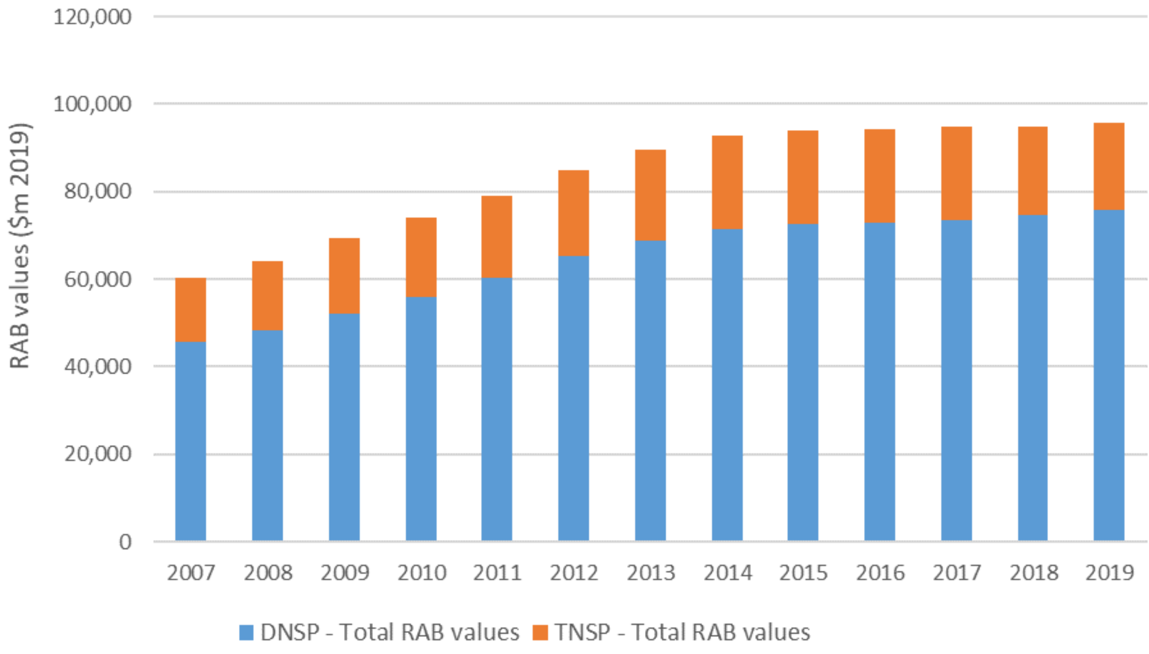
4.2 Regulatory asset bases

In this section, we analyse recent growth levels and drivers in the RABs of DNSPs and TNSPs.

RABs capture the total economic value of assets that are providing network services to customers. These assets have been accumulated over time and will be at various stages of their economic lives. Certain networks may be relatively older/newer than other networks depending on their growth and the phase of the replacement cycle they are in.

The value of the RABs substantially impacts NSPs' revenue requirements, and the total costs a network's consumers ultimately pay. Figure 4-2 sets out the combined real RABs across all electricity networks.

Figure 4-2 RAB values – DNSPs and TNSPs



Source: Operational performance data, AER analysis.

Over time, the RAB grows as NSPs undertake capital expenditure. Customers pay the costs of raising that capital through the return on capital and return of capital (depreciation) allowances. We also inflate the RAB each year to reflect the impacts of inflation. This increases the nominal value of the assets in order to maintain its real value through time.[12]

In recent years, capital expenditure has been lower than in previous regulatory periods. Though there has been a material reduction in actual capital expenditure since 2014, depreciation since 2014 has remained relatively steady. This is because of the accumulated impact of historical investments and because of the straight-line depreciation approach we use, which returns capital evenly over the life of an asset. As a result, real RAB growth has slowed.

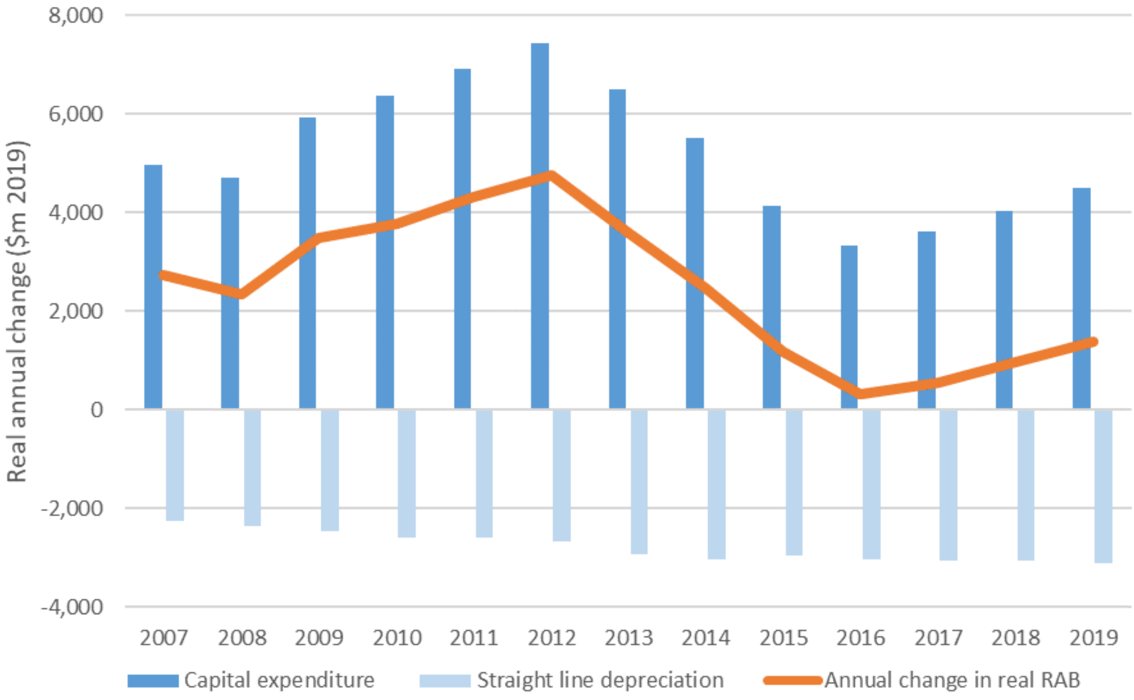
Total RAB growth in the years leading up to 2014 was driven materially by RAB growth in New South Wales and Queensland, driven by changes in reliability standards and forecast demand growth.

12 The indexation of the RAB is explained on our website, available on our website here: https://www.aer.gov.au/system/files/Fact%20sheet%20-%20Indexation%20of%20the%20regulatory%20asset%20base.pdf

The combination of these effects has contributed to:

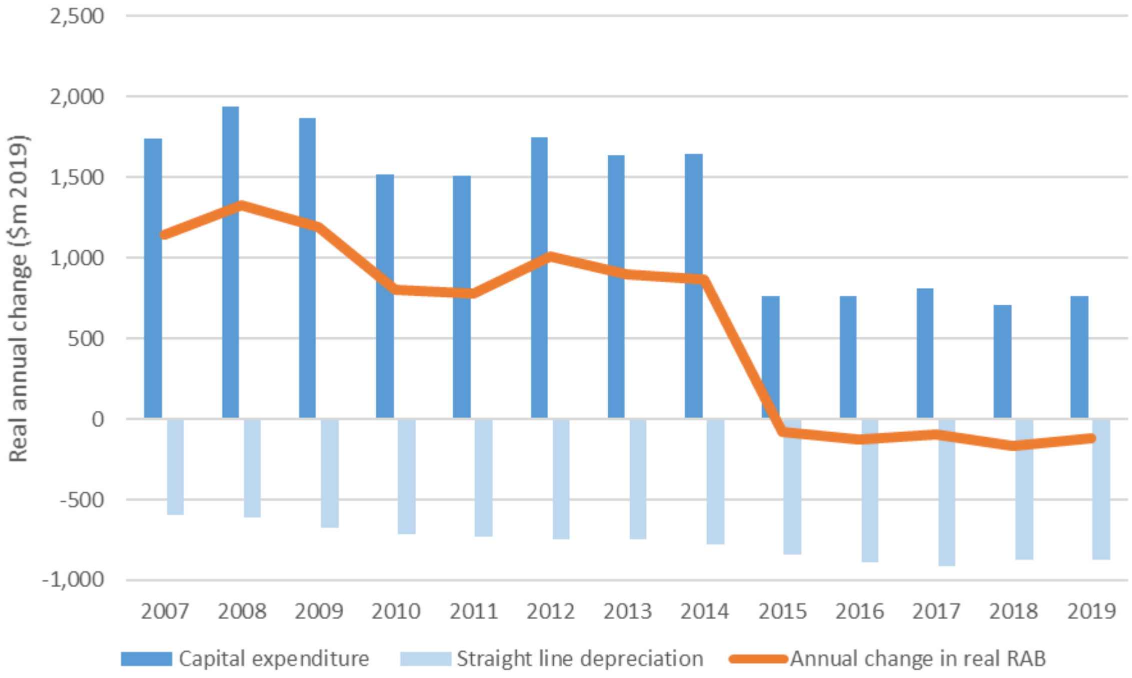
- the slowing real RAB growth for DNSPs (Figure 4-3), and
- the real RAB decreases for TNSPs (Figure 4-4).

Figure 4-3 Drivers of annual changes in the real RAB – DNSPs



Source: Roll forward models, AER analysis.

Figure 4-4 Drivers of annual changes in the real RAB – TNSPs



Source: RFMs, PTRMs, NSP Economic benchmarking RINs, AER analysis.

Note: Due to the timing of their regulatory determinations, for Powerlink, TransGrid (2019 only), AusNet (T) and ElectraNet, the straight line depreciation for the 2018 and 2019 regulatory years has been sourced from the PTRM and closing RAB balance has been sourced from the Economic Benchmarking RIN. These amounts may be subsequently updated in the final decision roll forward models of their next regulatory determination.

Significant increases in the RAB generally occur in periods where a significant proportion of assets in the RAB are replaced or if there is significant growth on the network. Of these two factors, for mature DNSPs, we would normally expect replacement capital expenditure to be the key driver of the RAB.[13] Exceptions to this case might be driven by substantial increases in demand. In contrast, we anticipate transmission RABs to grow in upcoming regulatory years driven by a number of priority transmission investments related to the Integrated System Plan.

In the long term, the RAB will decline if assets are not replaced at the end of their economic lives.[14] However, it is important to note that a level of capital costs arising from a stable RAB may allow declining real capital costs per customer if the customer base is growing. To illustrate this, in recent years RAB growth has slowed and distribution customer numbers have increased, leading to a slight decline in RAB per customer since a peak in 2015.

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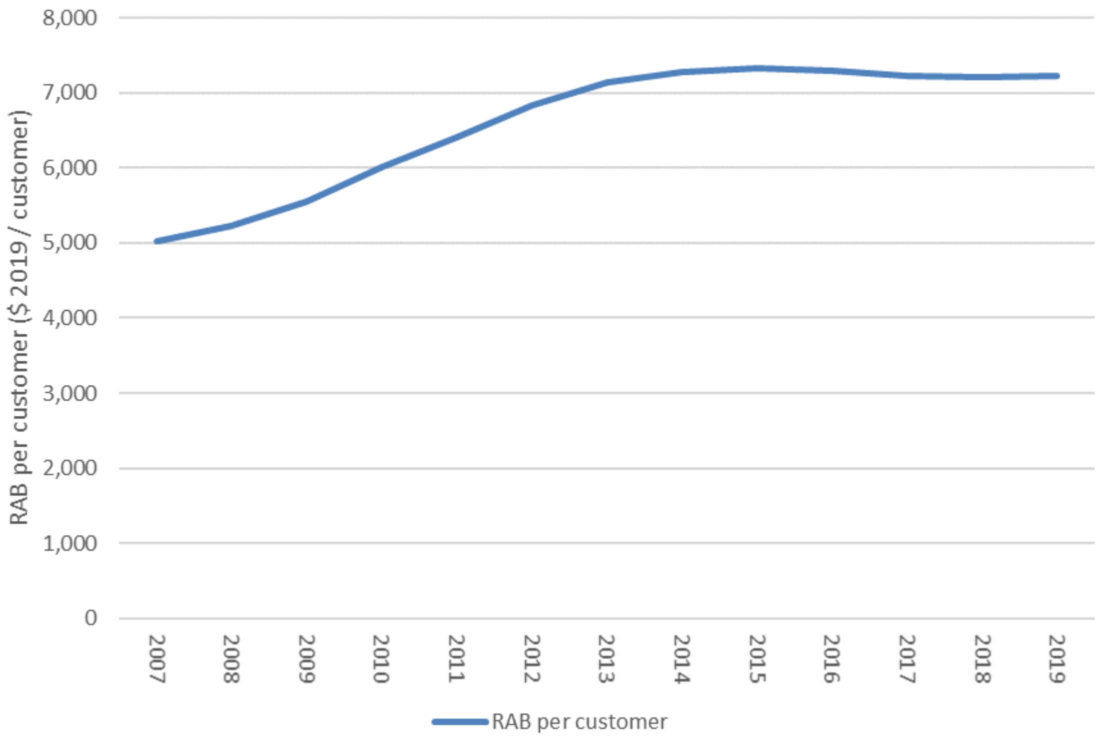
13 If an asset is replaced by an asset with the same real cost and expected life, then the real depreciation paid by consumers using the assets would not change. However, the return on capital will increase materially in the year after the asset is replaced. For example, an asset with a 40 year life is worth only 1/40th of its original cost in the final year of its life, but the replacement asset will be worth 100 per cent of its replacement cost, with the return on capital increasing at that time, reflecting the total balance of the replaced asset.

14 Accelerated depreciation can also reduce the RAB, but as noted above, customers usually pay more for a number of years/periods after they are introduced.

Figure 4-5 RAB per customer – DNSPs



Source: Operational performance data, AER analysis.

4.3 Focus area—Network investment

Each year, the electricity network performance report will focus on a different aspect of network expenditure. For this year, we have focussed on a set of topics relating to recent patterns of investment. In our view, this is a relevant and important topic at a time where:

- We have recently considered or are considering regulatory investment tests for a series of high-priority transmission investments associated with the Integrated System Plan.[15]
- We are undertaking extensive work and engagement with stakeholders to consider the most efficient timing and nature of investment to support the integration of distributed energy resources at distribution network level.

For these reasons, we have analysed our data to report on a set of topics which could help us and stakeholders better understand recent investment dynamics in regulated networks and the context in which these current investments are being considered. These topics are:

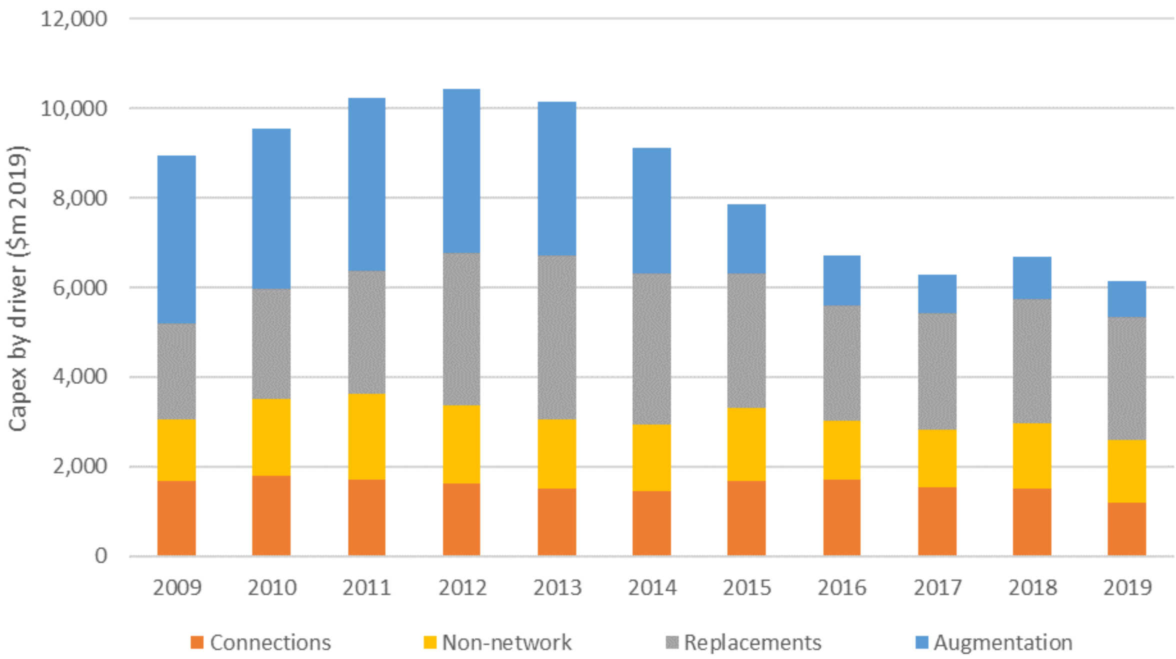
- What type of investments the NSPs have made.
- Timing and levels of capital expenditure incurred compared to our forecasts.

15 The integrated system plan is to deliver a strategic infrastructure development plan across the NEM to develop the TNSPs for the next 20 years and beyond. This will involve the Australian Energy Market Operator and the NSP identifying and completing projects in the upcoming regulatory years.

Composition of investment

We have also analysed data on the types of investment that NSPs are making. Recent capital expenditure is characterised by low levels of network augmentation and greater emphasis on replacement of existing assets (Figure 4-6).

Figure 4-6 Capital expenditure by driver – Total DNSPs and TNSPs



Source: Operational performance data, AER analysis.

Since a peak over 2009-2012, regulated NSPs have significantly reduced augmentation expenditure. This reflects a combination of:

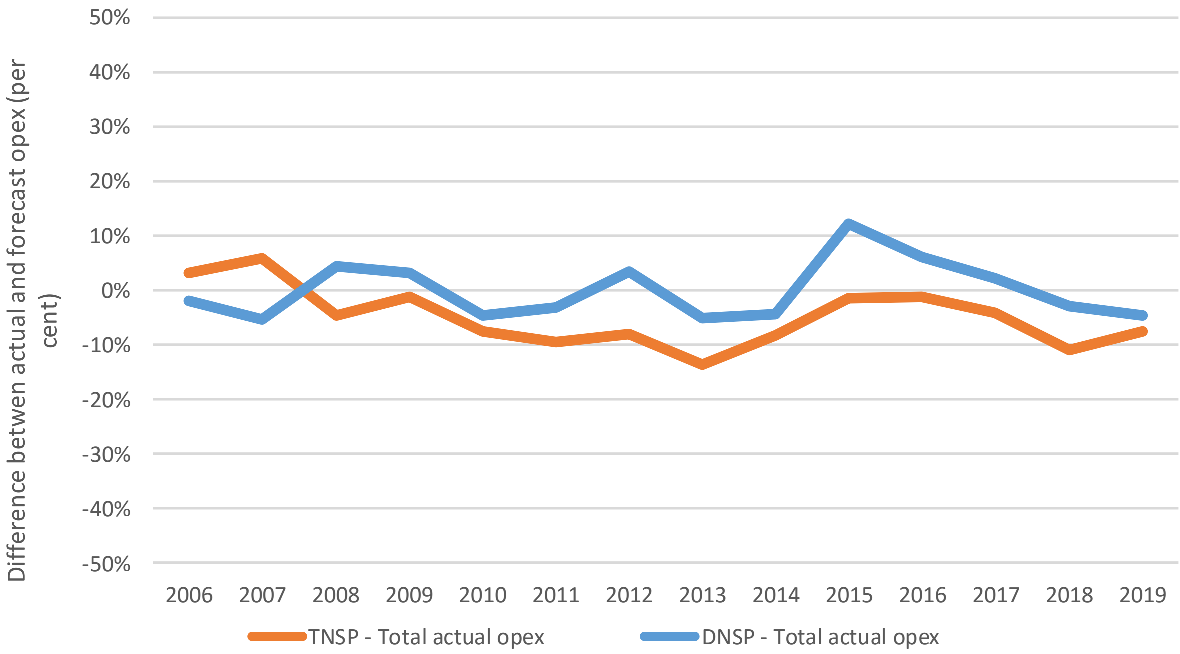
- changed reliability settings in Queensland and New South Wales, reducing the need for network augmentation, and
- lower growth in demand than was forecast in regulatory decisions.

Besides a temporary increase in replacement expenditure from 2011 to 2015, other capital expenditure categories have otherwise remained relatively steady over the past decade.

Actual expenditure compared to forecast

Compared to capital expenditure, operating expenditure is relatively recurrent in nature. We rely more heavily on 'top-down' economic benchmarking analysis when setting operating expenditure allowances. Figure 4-7 sets out a comparison of actual network operating expenditure compared to forecast.

Figure 4-7 Operating expenditure – Differences between actual and forecast operating expenditure

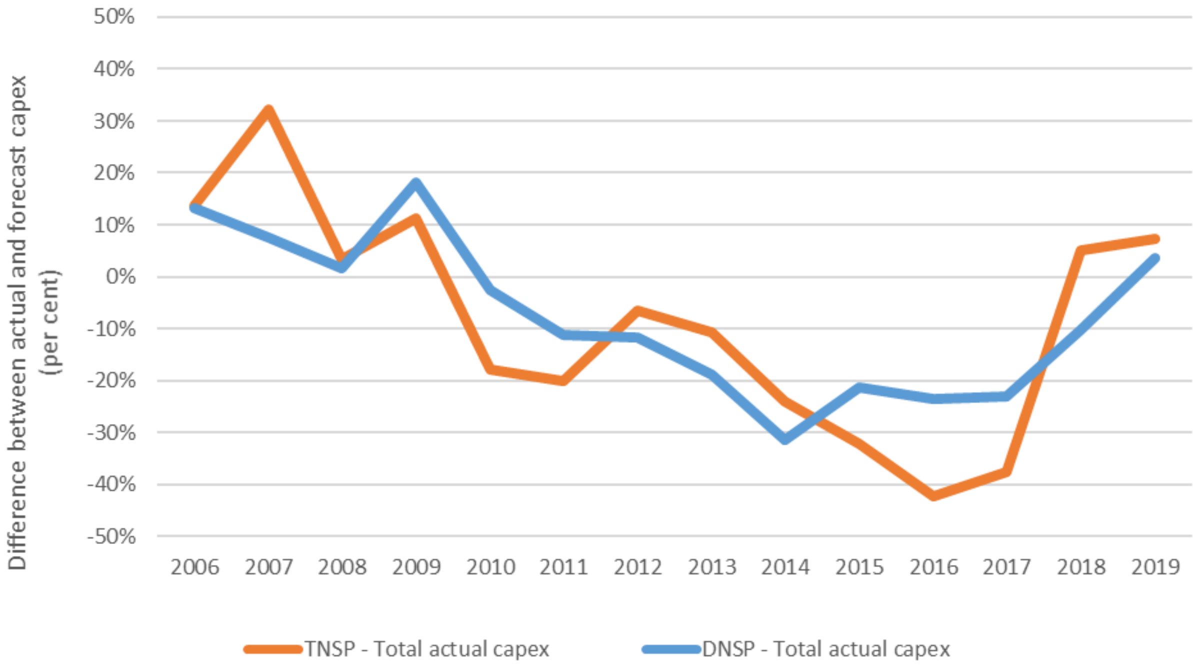


Source: Operational performance data, AER analysis.

Where NSPs make sustained efficiency gains compared to forecast allowances, they keep the benefits of doing so in the short term. These benefits translate to higher network profits and are evident in our estimated returns on assets and EBIT per customer (see section 6). The impacts of efficiency gains are then passed on to customers through either a lower base-year operating expenditure forecast or through the EBSS, contributing to lower long-term prices.

Figure 4-8 sets out a similar comparison of actual capital expenditure compared to forecast.

Figure 4-8 Capital expenditure – Differences between actual and forecast capital expenditure



Source: Operational performance data, AER analysis.

At the end of a regulatory period we roll forward the RAB using actual capital expenditure and forecast depreciation. So, to the extent NSPs invest less than forecast, the financial benefits are temporary and governed by the capital expenditure sharing scheme.

When interpreting this chart, we observe that:

- both DNSPs and TNSPs show considerable scope and tendency to depart from capital expenditure forecasts.
- there are a smaller number of TNSPs, and their expenditure is characteristically driven by a smaller number of large projects. As a result, single specific changes in project timing or scope can drive material changes in the comparison of forecast and actual expenditure for TNSPs.
- the most material distribution underspends against forecast were driven by particularly large underspends against allowance by the New South Wales DNSPs. NSP by NSP capital expenditure information is available in our operational performance data.

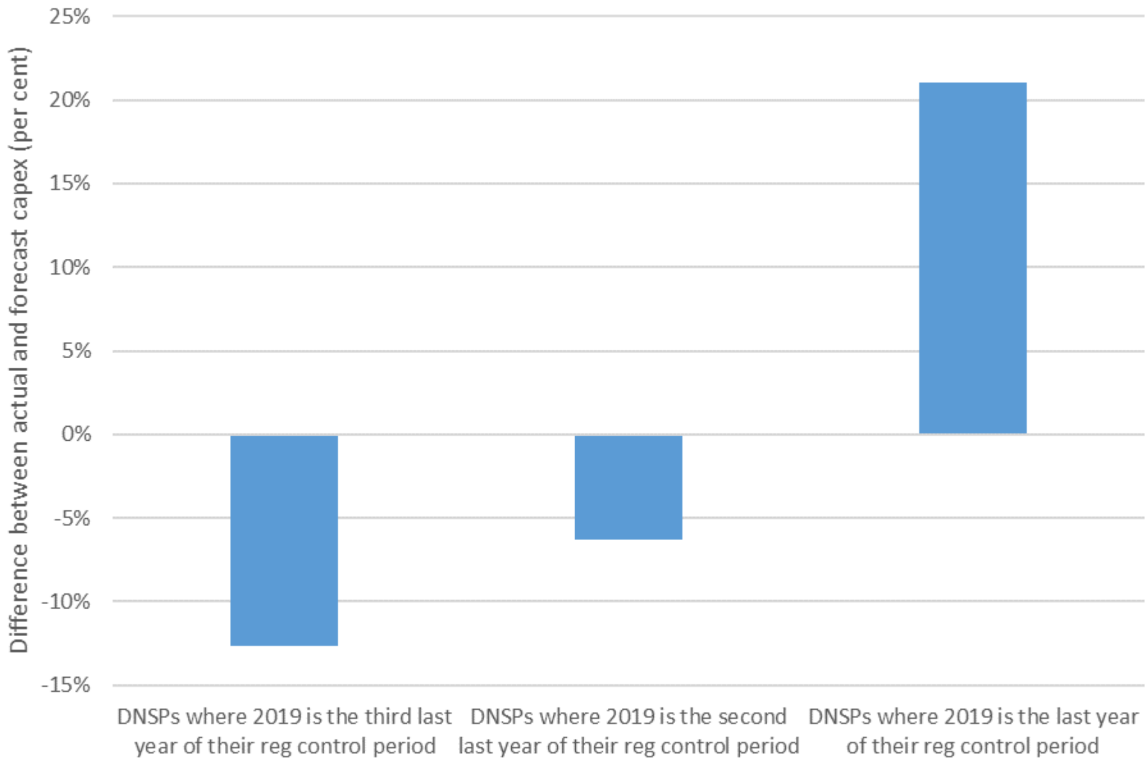
Timing of capital expenditure within regulatory control periods

Recognizing that NSPs are able to depart from capital expenditure forecasts, we have undertaken further analysis to test whether any patterns are evident in the timing of differences between actual and forecast capital expenditure. Our capital expenditure sharing scheme (CESS) is designed to create an even financial incentive to make capital expenditure efficiency gains through a regulatory period. To test whether this effect is evident in actual capital expenditure outcomes, we have analysed individual NSP results in their current regulatory period during which the CESS has applied for the first time.

In 2019, electricity NSPs in aggregate undertook more capital expenditure than forecast since 2009 (Figure 4-1). However, that aggregate overspend was not common across all NSPs. It was driven by a subset of NSPs in the last year of their regulatory periods.

In Figure 4-9 we compare actual capital expenditure against forecast in 2019. The figure groups NSPs by where in their regulatory period they are up to in regulatory year 2019. This shows that, in 2019, NSPs in the last year of their regulatory periods spent at or above forecast capital expenditure. NSPs earlier in their regulatory periods spent below forecast capital expenditure.

Figure 4-9 2019 actual capex compared to forecast – DNSPs



Source: Operational performance data, AER analysis.

Note: TasNetworks' distribution network was in its final year of a shortened (2017-19) transitional regulatory period to align the timing of its distribution and transmission determinations. We have included TasNetworks in the calculation for the final year of its regulatory period. We have also included its expenditure across the regulatory period in Figure 4-10 below.

To consider whether this pattern applies more widely, we have expanded this analysis to test whether there are any trends in capital expenditure timing at the NSP level. To do so, we have charted the differences between actual and forecast capital expenditure for the DNSPs current regulatory periods. Because the NSPs' regulatory periods commence at different times, we have grouped them by jurisdiction (Figure 4-10, Figure 4-11 and Figure 4-12).

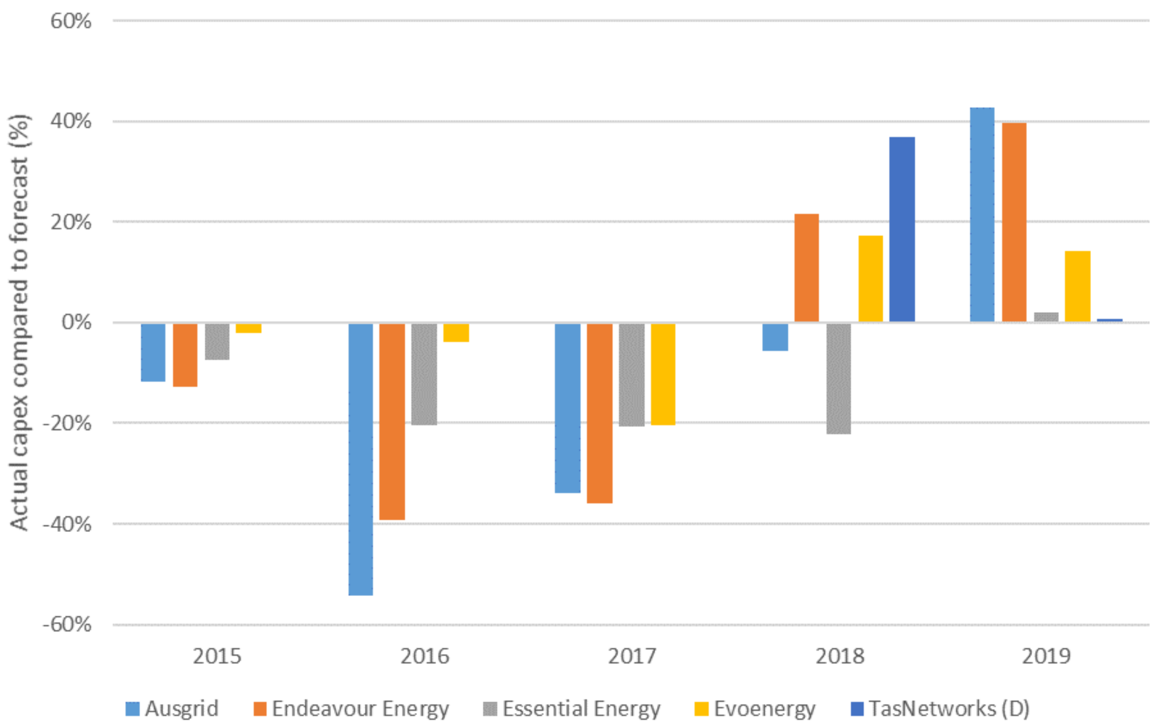
Having done so, we observe in patters of capital expenditure that a trend appears to be evident across most DNSPs despite different owners and operating environments.

Specifically, it appears amongst the DNSPs that:

- NSPs tend to underspend by a greater extent early in regulatory periods

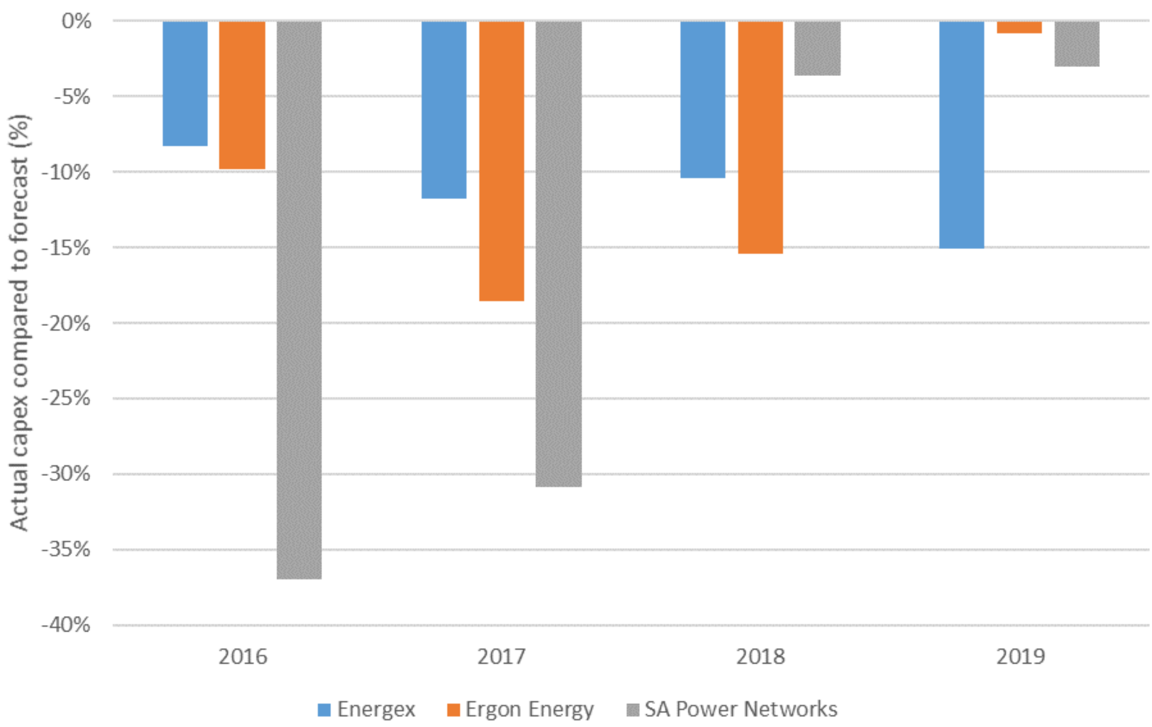
- NSPs tend to spend closer to, or above, capital expenditure forecasts later in regulatory periods.

Figure 4-10 Difference between actual and forecast capex over the current regulatory period – NSW/ACT and Tasmanian DNSPs



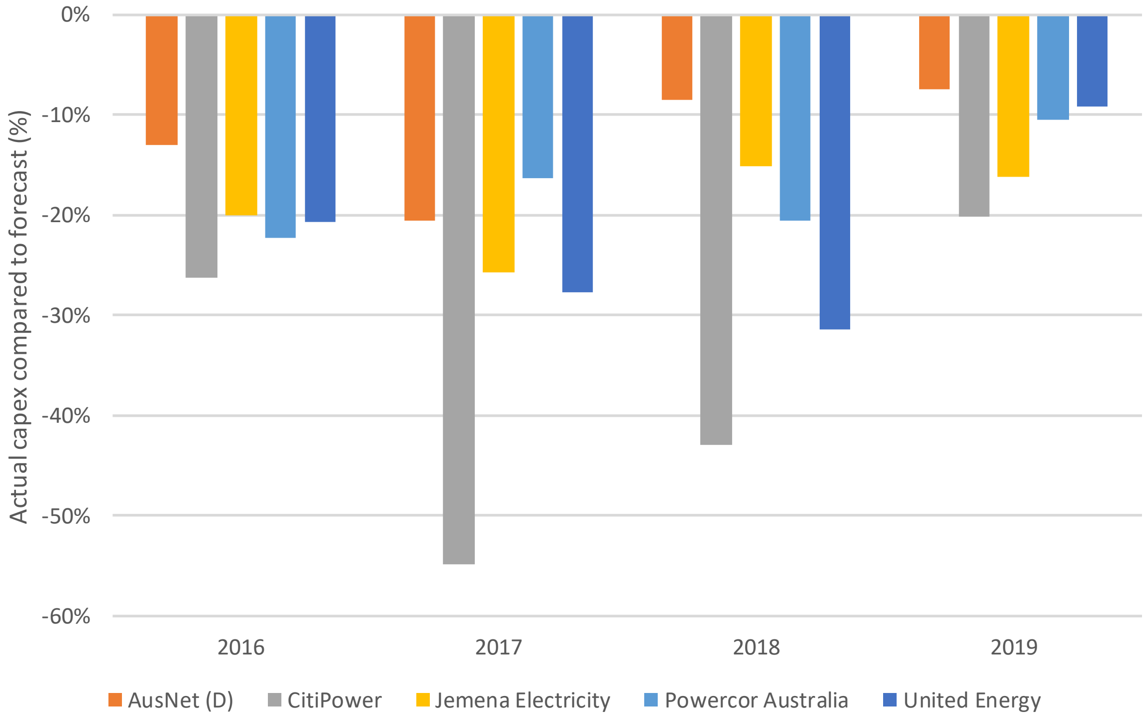
Source: Operational performance data, AER analysis.

Figure 4-11 Difference between actual and forecast capex over the current regulatory period – QLD/SA DNSPs



Source: Operational performance data, AER analysis.

Figure 4-12 Difference between actual and forecast capex over the current regulatory period – Victorian DNSPs



Source: Operational performance data, AER analysis.

We will continue to monitor patterns of capital expenditure within regulatory periods. We recognise that there are other factors beyond the CESS which could influence patterns of capital expenditure. However, this analysis can yield insight into factors that are relevant to our consideration of whether it is achieving its outcomes, including:

- whether there is evidence to suggest that capital expenditure incentives, financial or otherwise, vary through the course of the regulatory period
- whether patterns of actual expenditure compared to forecast suggest that the rewards under the CESS are properly calibrated.

In the next section, we set out our analysis of network outputs and expand on the effect that higher past levels of network augmentation appear to have had on distribution network utilisation.

5 Network service outputs

Section 3 set out the amount customers spend on their network services. Section 4 set out some analysis of network expenditure. In this section we consider the service outputs customers receive for funding that expenditure. In particular, we focus our analysis on distribution network reliability and utilisation.

We collect and report data on reliability and utilisation for both DNSPs and TNSPs. For this report, we have focussed our analysis on DNSPs, recognizing that most supply interruptions originate there. Through our reporting over time, we will capture a balance of distribution and transmission network service outcomes.[16]

Our key findings are that:

- Distribution network reliability has generally improved in recent years despite declines in allowed revenue.
- Distribution network utilisation levels had been declining over a number of years but have increased since 2014.
- We expect both of these outcomes reflect to some extent the high level of historical investment in the RABs, in particular with respect to augmentation capital expenditure. As augmentation capital expenditure has sharply declined, we are now observing increases in utilisation.
- In considering the range of reliability and utilisation levels between networks, it is not clear that networks with higher installed capacity relative to demand are more reliable.

5.1 Distribution network reliability

A key outcome that customers should expect for their investment is a reliable supply of electricity. In this context, reliability refers to the continuity of electricity supply and is typically measured by the interruptions to supply.

In this section we report on both:

- The total frequency and duration of outages experienced by distribution network customers—we refer to this as the 'customer experience', and it is important to give a complete picture of reliability. It includes all outages experienced by customers, including major events such as storms, fires, floods and cyclones.
- The duration and frequency of outages which we determine under our service target performance incentive scheme (STPIS) to be within the NSPs' control at their funding levels. This will exclude some outages, including some major events that are part of the total customer experience. We refer to these as 'normalised' measures of reliability:
    - SAIDI measures the average duration (minutes) of interruptions a customer experiences each year.
    - SAIFI measures the average number of interruptions a customer experiences each year.

[16] Further detail on transmission network reliability is set out in our State of the Energy Market 2020.

While consumers value a reliable electricity supply, maintaining or improving reliability may require expensive investment in network assets. As a result, there is a trade-off between electricity reliability and affordability. Reliability standards and the incentive schemes need to strike the right balance by targeting reliability levels that customers are willing to pay for.

Further detail on the reliability levels that customers are willing to pay for are set out in our report on the Values of Customer Reliability published in December 2019.[17]

Also, we recognise that at least two major events may materially impact reliability outcomes in the period to be covered by next year's report:

- The extreme weather and widespread bushfires of Summer 19/20— During regulatory year 2020, most jurisdictions experienced extreme weather conditions and bushfires. These included a storm that damaged transmission infrastructure which isolated South Australia from the rest of the NEM for 18 days. As well as the bushfires in New South Wales and Victoria which damaged both TNSPs and DNSPs.
- COVID-19 and its impact on network operations—As yet it is unclear how the impacts of COVID-19 may impact the consumption patterns of electricity or the operations of networks. Analysis of these potential impacts will be a focus of our 2021 report.

Duration and reliability of distribution outages

We collect data from DNSPs on total duration and frequency distribution network outages. Most customers are connected to distribution networks, and most supply disruptions occur there.

In our view, this data is important to understand how reliable the supply of electricity is that customers ultimately experience.

We also recognise that not all distribution network outages are within the control of DNSPs within their current funding levels. The system average interruption duration index (SAIDI) and system average interruption frequency index (SAIFI) are measures of distribution network reliability. These indices are components used in our service target performance incentive scheme (STPIS).[18] They are the basis for a set of targets that NSPs are rewarded for outperforming and penalised for underperforming against. More detail on our STPIS is available in our distribution reliability measures guideline.[19]

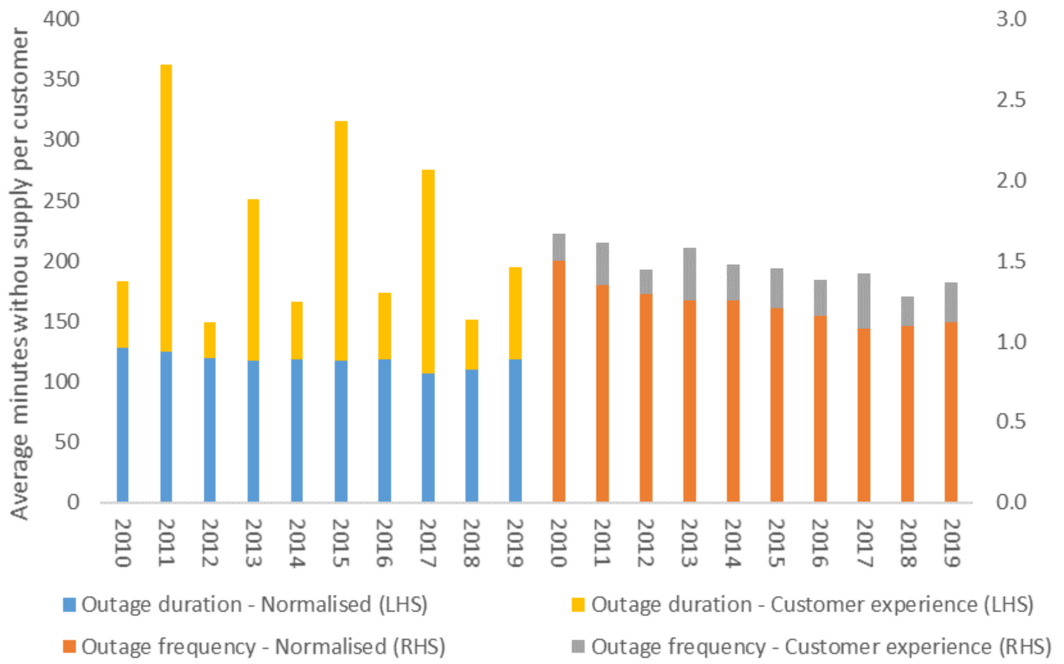
Figure 5-1 captures both of these levels of reliability and shows the extent of the differences between total customer experience and what is captured in SAIDI and SAIFI.

17 AER, *Values of customer reliability: Final report on VCR values*, December 2019.

18 For further details on the STPIS for distribution NSPs, see: AER, *Electricity distribution network service providers: Service target performance incentive scheme Version 2.0*, November 2018.

19 AER, *Distribution reliability measures guideline*, November 2018.

Figure 5-1 Reliability of supply as experienced by customers – DNSPs



Source: Operational performance data, Annual reporting RIN, AER analysis.

From this data, we observe that:

- Over time, customers have experienced fewer distribution network outages. This is driven by a clear trend of improvement in SAIFI, which is in the control of the DNSPs. This is the case even accounting for the total customer experience.
- SAIDI has also followed a general trend of improvement over time. However, in some years there have been high-impact supply interruptions resulting in a material difference between normalised reliability and the ultimate customer experience.
- Comparing the impact of excluded events on the frequency and duration of outages shows that we are excluding relatively few events, but these can have a substantial impact on the average duration of outages that customers experience. This is consistent with the impact of major events, such as the Queensland floods; Victorian bushfires or South Australian Black System Event.

The inclusion of these events in a NEM-average data series will also tend to understate their severity of impact on affected customers noting these major events are often specific to a particular jurisdiction or network. Our State of the Energy Market 2020 sets out a decomposition of Figure 5-1 by jurisdiction. This provides further context to which jurisdictions or networks experienced events that contributed to the peaks.

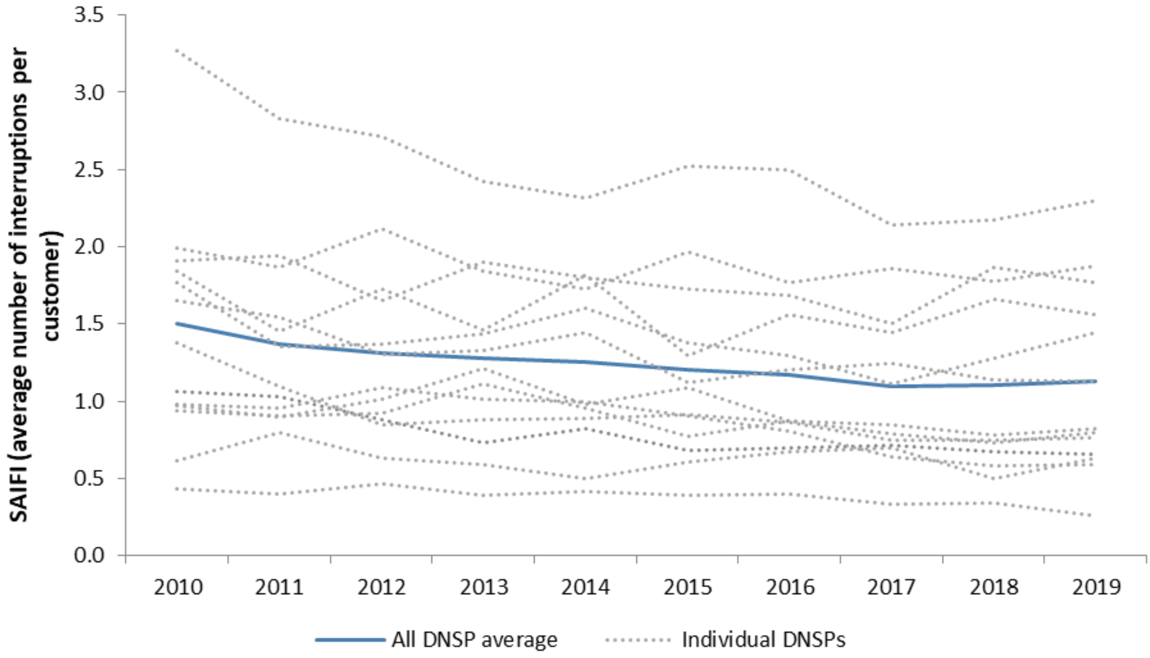
Recognizing the potential impacts of the widespread weather events and bushfires in 2019/2020, we will continue to monitor both scheme measures of reliability and ultimate customer experience.

Different experiences of reliability across NSPs

Customers in different network regions have experienced different reliability outcomes when compared to the average. Figure 5-2 illustrates this impact using normalised frequency of supply disruptions amongst the different DNSPs. This shows that:

- The frequency of outages has declined over time across most networks, however
- There remain persistent differences between networks at points in time.

Figure 5-2 Different levels of reliability across DNSPs — SAIFI (number of interruptions per customer)



Source: Operational performance data, AER analysis.

Reliability outcomes are driven by a number of factors including the reliability standards set by state and territory governments, the characteristics of the network (especially if the network serves remote customers), the levels of investment by NSPs in their networks and the incentive schemes we apply.[20]

The mix of these factors vary across NSPs which can impact their individual reliability outcomes. As can individual network characteristics such as customer density and environmental factors.

Recent changes to the regulatory regime has moved to address one of the differences in measuring reliability across NSPs. Of note, in 2018 we adopted the AEMC's recommended definitions for distribution reliability measures. This change allows a more consistent

20 For further information, see AER, *State of the Energy Market Report 2020*, July 2020.

approach to setting reliability targets across jurisdictions and NSPs, such as those reliability targets developed for the STPIS.[21]

Further detail of these definitions are set out in our Distribution Reliability Measures Guideline.[22]

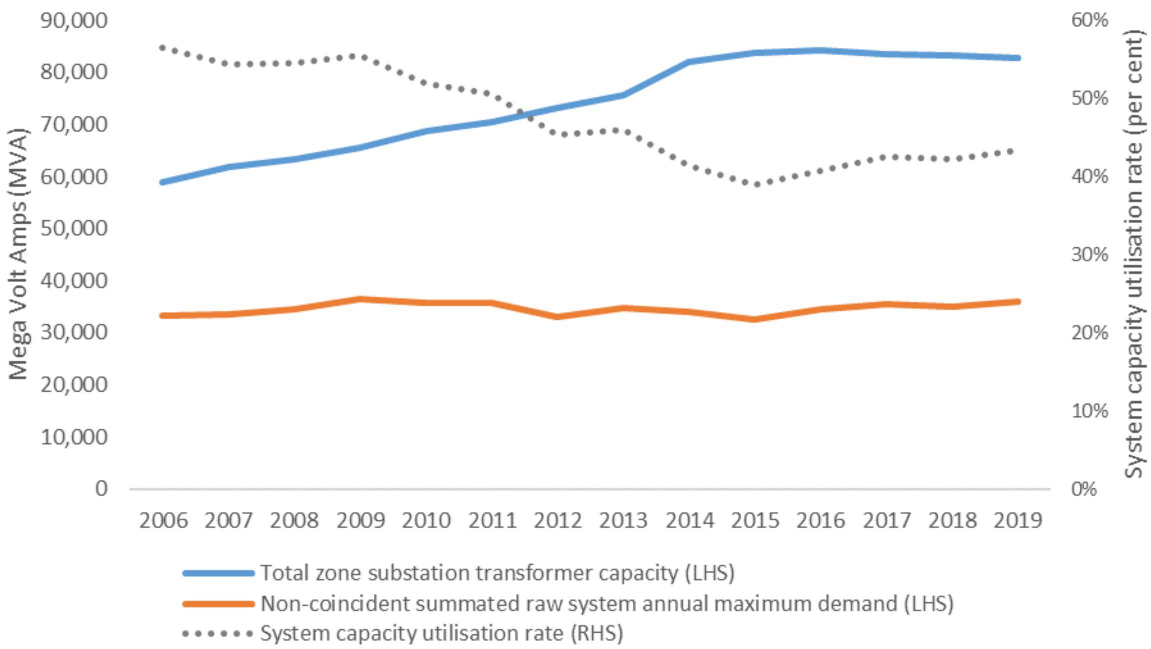
5.2 Distribution network utilisation

Network utilisation measures the extent to which an NSP's assets are being used to meet maximum demand.[23]

In our view, it is an informative but incomplete measure of the network assets' preparedness to respond to shocks. We consider this an important service output customers can expect for funding investment in the networks. However, we recognise that it is an aggregated network-wide measure, which can mask localised issues. In years to come we hope to work with stakeholders to improve our reporting tools on the health of the networks.

Figure 5-3 shows the network utilisation (per cent) against the two inputs, of non-coincident maximum demand (MVA) to total zone substation transformer capacity (MVA).

Figure 5-3 Distribution network utilisation – Total DNSPs



Source: Operational performance data, AER analysis.

It shows two key phases in the recent history of distribution network utilisation:

21 AER, *Amendment to the service target performance incentive scheme (STPIS) / Establishing a new Distribution Reliability Measures Guideline (DRMG)*, November 2018.

22 AER, *Distribution reliability measure guidelines*, November 2018.

23 For DNSPs we measure network utilisation as the ratio of reported level of non-coincident maximum demand (MVA) to total zone substation transformer capacity (MVA).

- The period up to 2014, characterised by high levels of augmentation capital expenditure.
- The period since 2014, since which augmentation capital expenditure has declined to lower levels (Figure 4-6).

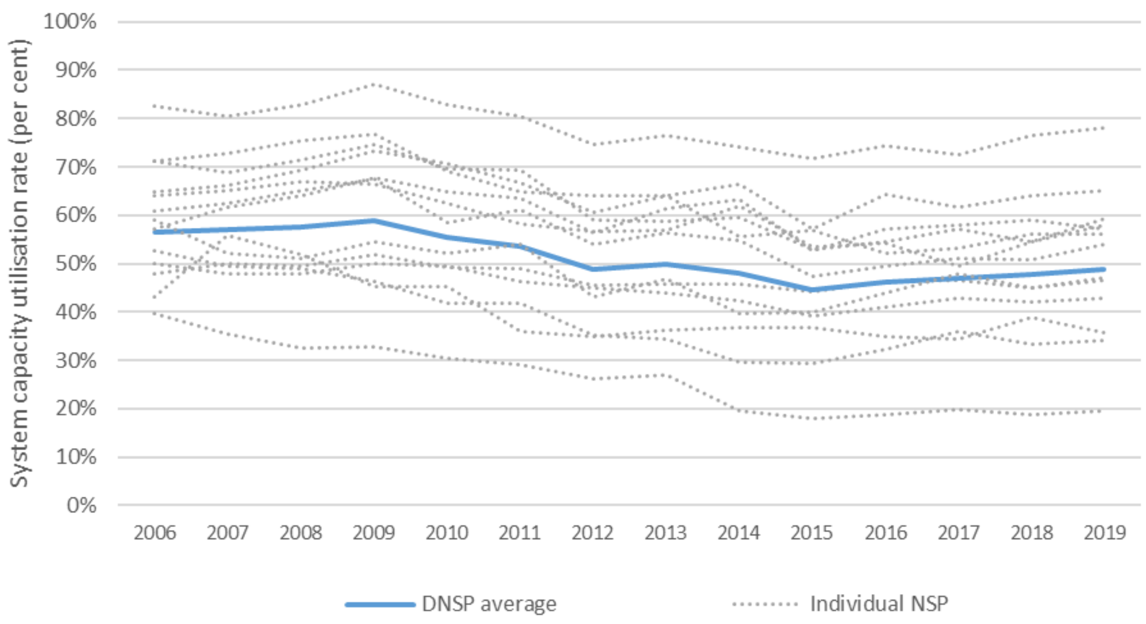
The material decline in network utilisation from 2006 to 2015 was driven by two key factors:

- High levels of augmentation capital expenditure led to increases in network capacity—Network capacity as measured by zone substation transformer capacity (MVA) increased annually by 2.5 per cent on average from 2006 to 2019. We discuss the drivers of this growth in section 4.3; and
- Actual maximum demand remained relatively flat— the level non-coincident maximum demand (MVA) grew by 0.5 per cent per annum. This result is notable in a context where customer numbers rose across the NEM, growing 1.2 per cent per annum over the same period.

Different levels of utilisation between networks

Within this aggregate view, there remain different levels of utilisation between networks. Figure 5-4 shows that average network utilisation started to increase from 2015 after reaching its lowest level since 2009. This pattern is evident across many of the networks, however there are persistent differences between network utilisation across different networks.

Figure 5-4 Different levels of network utilisation across DNSPs



Source: AER analysis.

There are a number of factors which might influence the 'baseline' levels of utilisation within our dataset and the varying rates of change. For example, jurisdictional reliability settings were a major influence on the substantial increases in augmentation capital expenditure in previous regulatory cycles. The extent of these increases varied between jurisdictions.

Overall, the period up to 2014 was marked by substantial increases in capacity driven by forecast growth in demand that did not eventuate, and by reliability standards which have since been amended. This contributed to declines in network utilisation across most networks. However, it is important to note that:

- To date, the cost impacts of the substantial augmentation capital expenditure have been contained by ongoing declines in the costs of capital (see section 3.1)
- The NEM-average level of utilisation has continued to rise in recent years since the sharp reduction in augmentation capital expenditure.

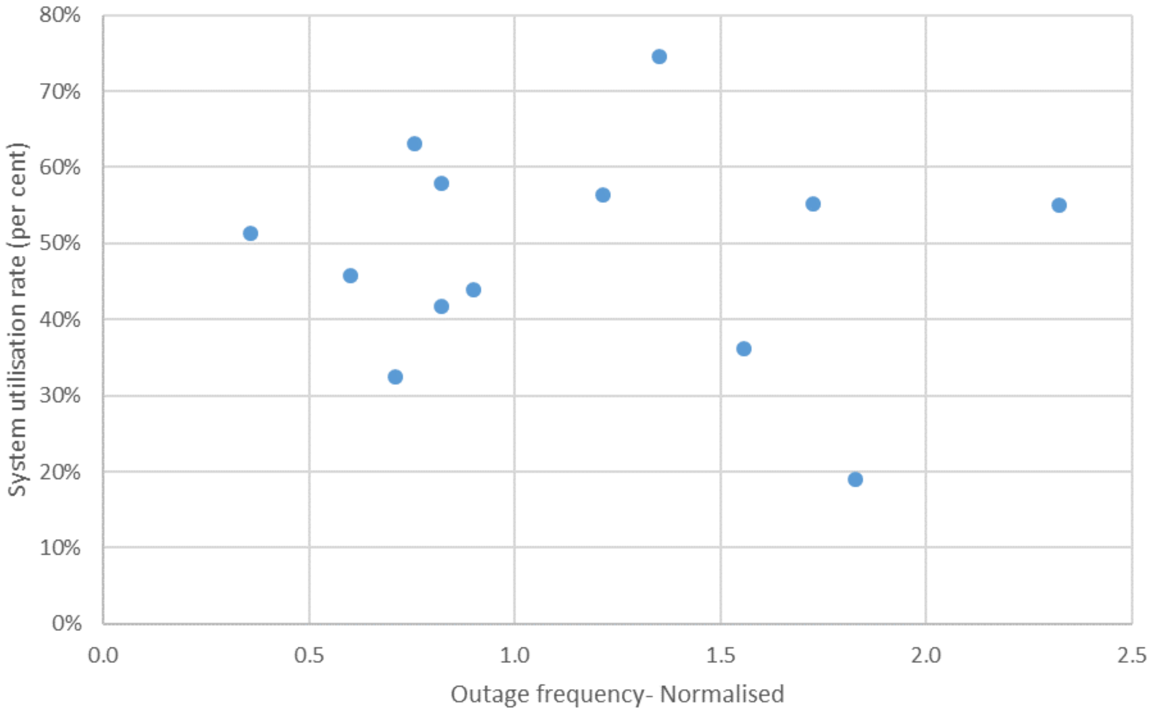
Further, while this describes the relationship between capital expenditure, maximum demand and network utilisation, it does not completely answer the question of whether this expenditure and the resulting decline in utilisation is efficient or inefficient. For further insight on that question, we consider it is also useful to consider whether there is a systematic relationship between lower (or higher) utilisation levels and higher (or lower) reliability.

5.3 Focus area—Relationship between utilisation and reliability

If a clear relationship existed between utilisation levels and network reliability, it might support a conclusion that NSPs have pursued a range of different but still efficient trade-offs. The evidence to date suggests that networks with higher utilisation, or lower levels of spare capacity, have not clearly been less reliable. Conversely, networks with lower levels of utilisation or more spare capacity have not been more reliable.

Figure 5-5 plots individual DNSPs' utilisation levels against the (normalised) frequency of supply outages. It uses averages of annual utilisation and reliability outcomes from 2014–19 so it is less sensitive to the impact of specific events in a particular year impacting the conclusion.

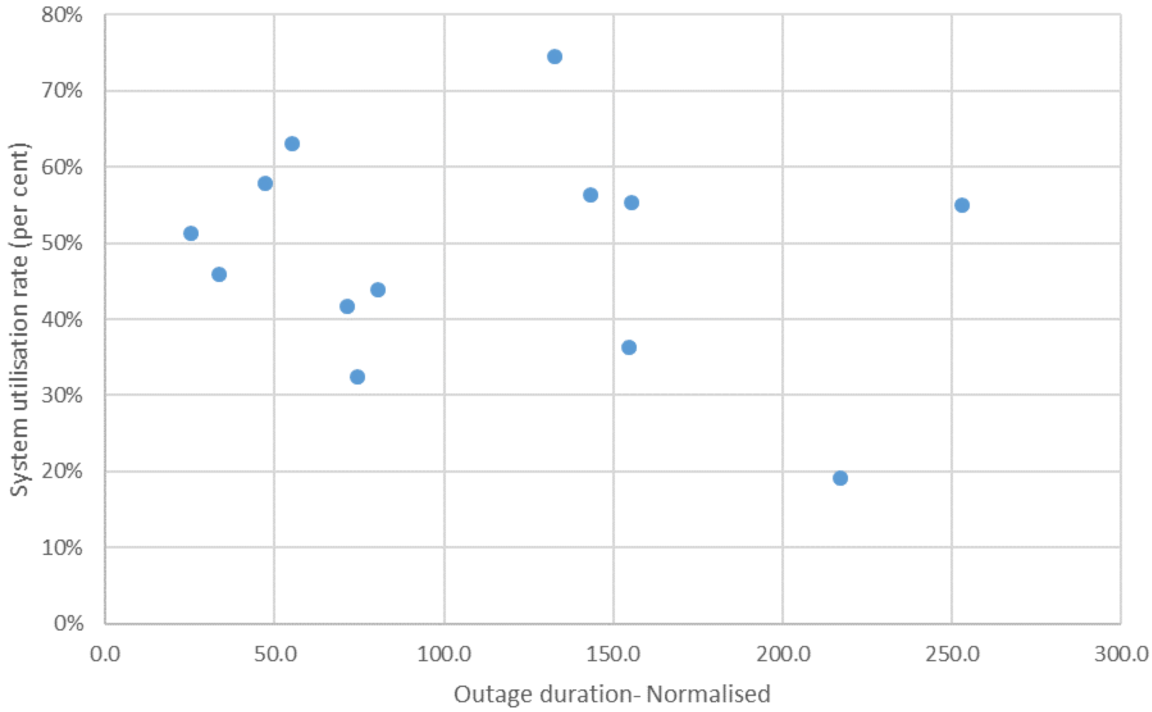
Figure 5-5 Comparison of distribution network utilisation and normalised distribution network outage frequency (SAIFI) - Average outcomes (2014-19)



Source: Operational performance data, AER analysis.

Figure 5-6 repeats this analysis with the normalised duration of distribution network outages.

Figure 5-6 Comparison of distribution network utilisation and normalised distribution network outage duration (SAIDI) - Average outcomes (2014-19)



Source: Operational performance data, AER analysis.

In neither comparison do we observe a clear relationship to suggest that high utilisation systematically leads to better or worse reliability outcomes. For example, amongst networks with utilisation above 50 per cent there is a range from:

- Networks experiencing the shortest and most infrequent outages; to
- Networks experiencing the longest and most frequent outages.

6 Network profitability

Finally, having considered trends in network expenditure and the resulting service outputs, we consider the levels of profitability that NSPs have been able to generate from the revenue allowances paid by customers.

The regulatory framework is designed to compensate NSPs in expectation for efficiently incurred costs (such as operating expenditure, depreciation, interest on debt and tax) and to provide them with an expected profit margin in line with the required return in the market for an investment of similar risk. The expected profit margin, if set at an appropriate level and supported by appropriate incentives, should attract efficient investment.

As a feature of the incentive-based regulatory framework, we expect NSPs' actual outcomes to differ from the forecasts and benchmarks we set. The revenue requirement is not a guaranteed return, as the NSPs actual returns are determined in part by whether they spend more or less than the forecasts and benchmarks used to determine their revenue allowances. Nonetheless, to the extent that profitability results are systematically and materially higher or lower than forecast, this would prompt us to investigate the causes in more detail.

As such, our view is that reporting on profitability measures will contribute to achievement of the NEO and the NGO by making the NSPs' returns and their drivers transparent. The information should assist us and stakeholders as an additional source of information with which to review the overall effectiveness of the regulatory regime.

Our key findings are that:

- Both allowed and actual NSP profits have declined over time. However, over 2014-19, actual profits have typically exceeded allowed returns.
- The decline in actual returns has been driven by reductions in the allowed rates of return.
- Based on market evidence, investors appear to view the expected returns from investing in regulated NSPs as being at least sufficient to attract investment.

6.1 Analysis inclusive on incentive scheme payments

Our analysis of NSP profitability in this report is based mainly on NSP returns including the impact of incentive scheme payments. The only exception is where we have sought to quantify the specific impact of those payments. In our view, returns including the impact of incentive scheme payments:

- best illustrate the actual profitability of the NSPs compared to our allowed returns, and
- allows a consistent basis of analysis throughout the report.

Our financial performance dataset, which is published with this report, includes analysis of the profitability measures both inclusive and exclusive of incentive scheme payments for the interest of stakeholders. It also includes the ability to calculate the profitability measures in both real and nominal terms.

We also encourage stakeholders to read the Explanatory Statements we have published for each of the profitability measures which sets out:

- our method for calculating each measure
- the source of information we have used to calculate the measure, and
- notes for interpreting the measure outcomes.

6.2 Background for profitability reporting

In December 2019 we completed our profitability measures review,[24] settling a group of measures that we will add to our annual reporting. These were:

- Returns on assets (RoA)
- EBIT per customer
- Returns on regulated equity (RoRE)
- RAB multiples.

These measures are all focussed on the profitability of the core regulated part of the NSPs. They are designed so that stakeholders can form a view of how profitable NSPs are compared to our allowed returns.

Only the return on regulated equity measure requires new data from the NSPs. Our intention was to collect this information and commence our reporting on all four measures this year. However, in managing the impact of COVID-19 on stakeholders, we have chosen to delay collection of the new information. Our intention is to do so over coming months and to begin reporting returns on regulated equity next year.

In the remainder of this section, we set out our analysis of:

- Returns on assets
- EBIT per customer
- RAB multiples.

6.3 Returns on assets

The return on assets is a simple, partial profitability measure allowing us to compare NSP profits against our allowed weighted average costs of capital (WACCs). It does not capture all potential drivers of network profit—in particular, it does not capture NSP performance against our allowances for the costs of debt (interest expense) or tax expense. However, it does capture the impact of incentive scheme rewards and penalties as well as NSP performance against operating expenditure allowances.

We also include in the calculation of our profitability measures all revenue and expenses that NSPs collect in the course of providing core regulated services. So, for example, DNSPs are responsible for collecting revenue on behalf of TNSPs and then passing that revenue through to TNSPs. Similarly, DNSPs are often required to administer jurisdictional schemes.

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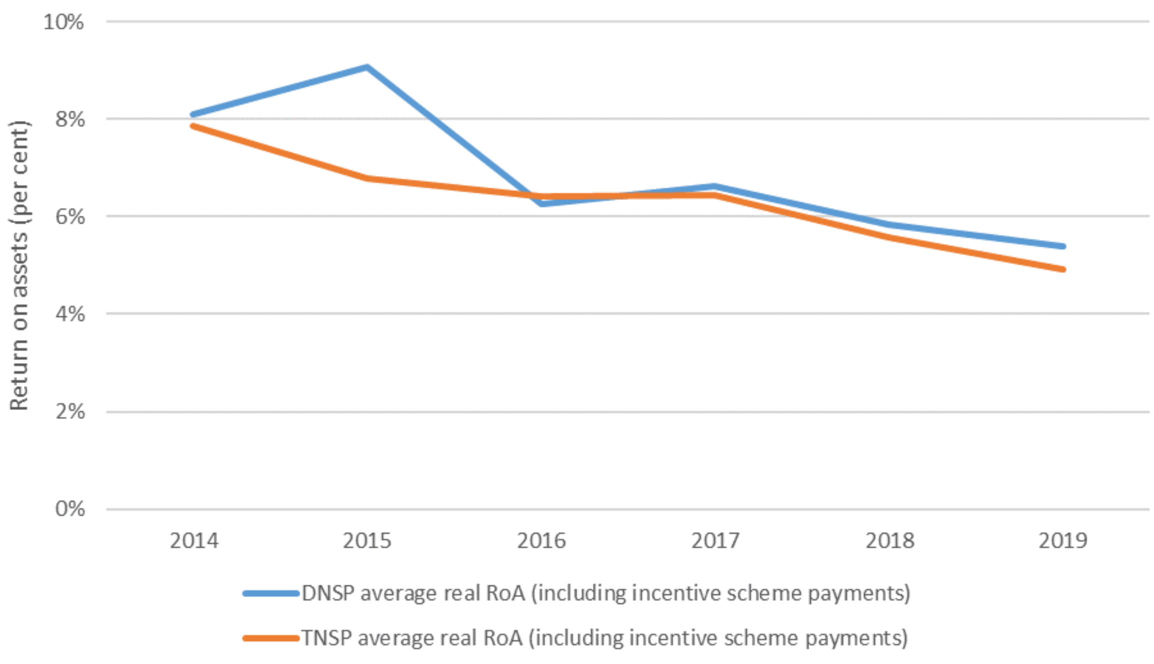
24 AER, Profitability measures review—Final position paper, December 2019.

These costs are not within the control of the DNSPs. However, in any given year, these revenues and expenditures may not match and may give rise to increases or decreases in profit. Over time they should be passed back to customers through unders and overs accounts. In our view, while these sources of annual variation should not impact longer-term NSP profits compared to our allowed returns, it is most useful to report profitability measures capturing the full range of revenue drivers for the DNSP to give a more informative picture of annual variations in NSP profit.

We first published ROA measures following publication of our profitability measures review draft position in 2018. We have subsequently published ROA in our annual distribution and transmission performance data reports. These measures were indicative, reflecting our analysis to that point in our review. Since then, through the completion of our profitability measures review, we have refined out methodology for calculating the measure, resulting in some changes from previously published estimates.

Having done so, our key finding is that actual electricity DNSPs and TNSPs ROAs have on average declined from 2014 to 2019. This is largely a consequence of reductions in revenue targets, which itself is driven primarily by the reductions in the allowed rate of return.

Figure 6-1 Real return on assets – DNSPs and TNSPs



Source: Financial performance data, AER analysis.

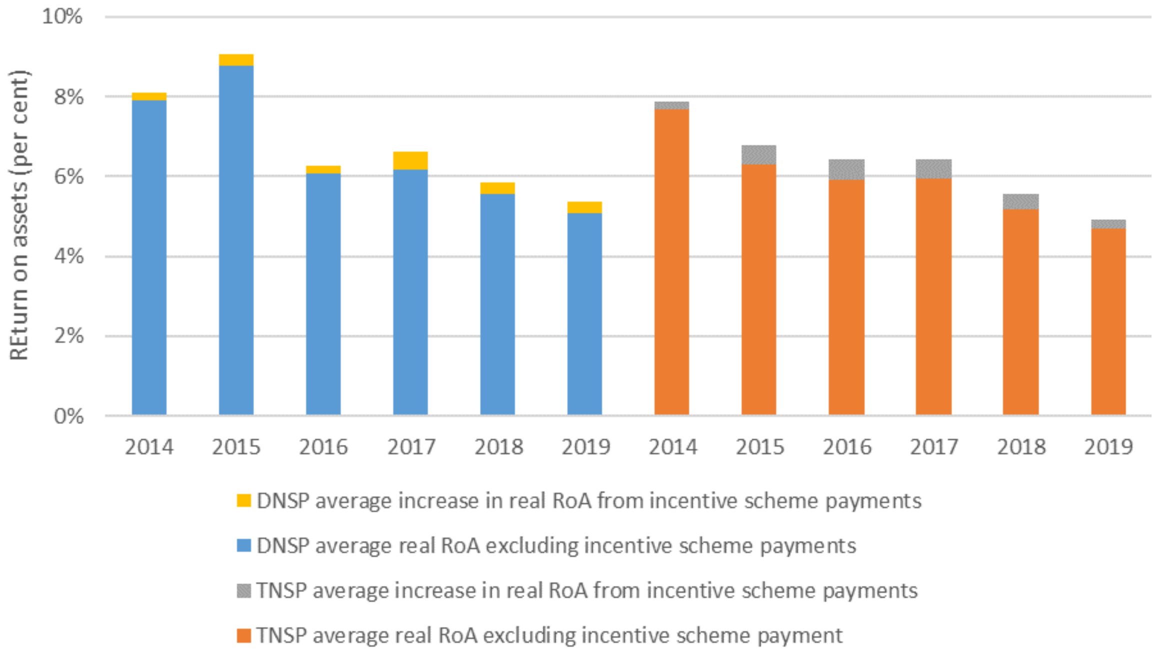
Within this aggregate view, the ROAs achieved by the NSPs differ materially between NSPs and from year to year. NSP specific results are available in our financial performance measures data.

Profit impact of incentive schemes

Since 2014, incentive scheme payments have consistently increased average NSP returns. Their effect on returns has been greater amongst TNSPs than DNSPs. Incentive scheme payments have increased average actual returns to NSPs by:

- DNSPs—0.18 per cent and 0.45 per cent (or 18 and 45 basis points)
- TNSPs—0.17 per cent and 0.51 per cent (or 17 and 51 basis points).

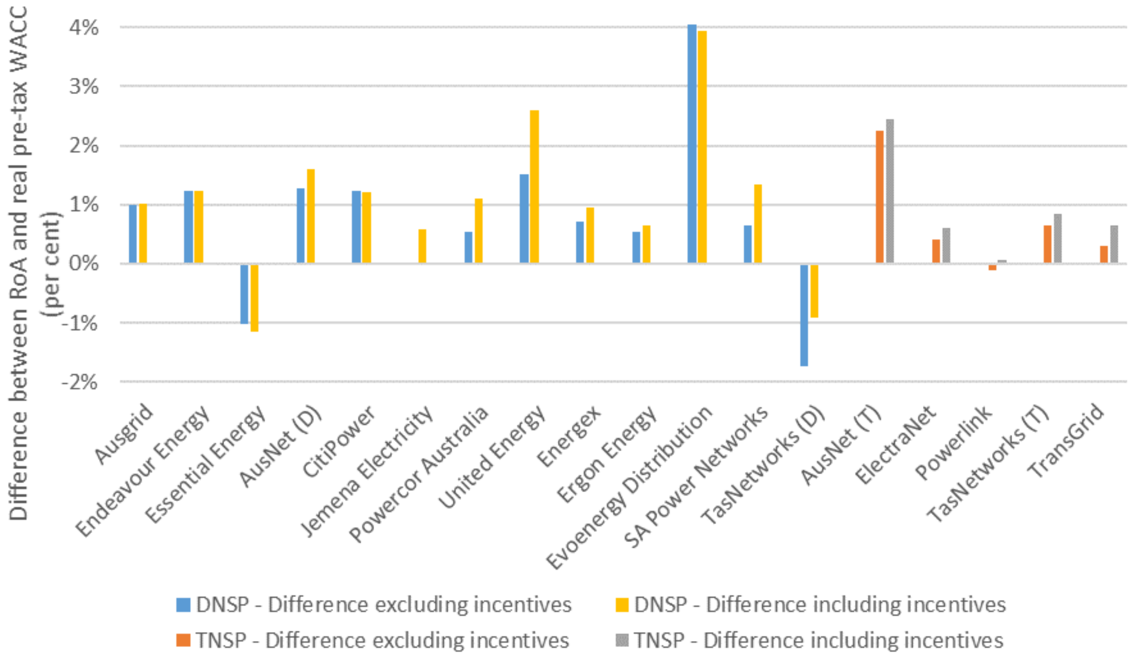
Figure 6-2 Return on assets – impact of incentive scheme payments – DNSPs and TNSPs



Source: Financial performance data, AER analysis.

In 2019 specifically, most electricity DNSPs and TNSPs were able to outperform their allowed real rates of return before the impacts of incentive schemes. Once we add the rewards and penalties under those schemes, we observe for almost all NSPs that they increase their returns.

Figure 6-3 2019 return on assets – actual return less allowed return – DNSPs and TNSPs



Source: Financial performance data, AER analysis.

Note: Evoenergy's 2019 result is driven materially by the transient impact of jurisdictional schemes. Evoenergy materially over recovered its jurisdictional scheme amounts, which had the effect of increasing its RoA compared to forecast by approximately 2.3 per cent. This over recovery will be returned to customers in future regulatory years.

Proportionally, incentive scheme rewards and penalties have a greater impact on profits than they do on revenue. In some cases, such as for United Energy, SA Power Networks and TasNetworks, incentive scheme payments are a fundamental driver of overall profits in 2019. However, for most NSPs in most years they remain incremental compared to other sources of return. We will continue to monitor incentive scheme payments over time, noting CESS payments to DNSPs has commenced in 2019/20 and should be evident in the data available for next year's report.

Effect of inflation on network profits

We are currently reviewing the regulatory treatment of inflation, examining three key issues:[25]

- Which method should we use to estimate expected inflation
- Whether the regulatory framework successfully delivers the expected real rate of return under the current approach
- Whether we should instead target a nominal or hybrid return.

25 AER, *Discussion paper—Regulatory treatment of inflation*, May 2020.

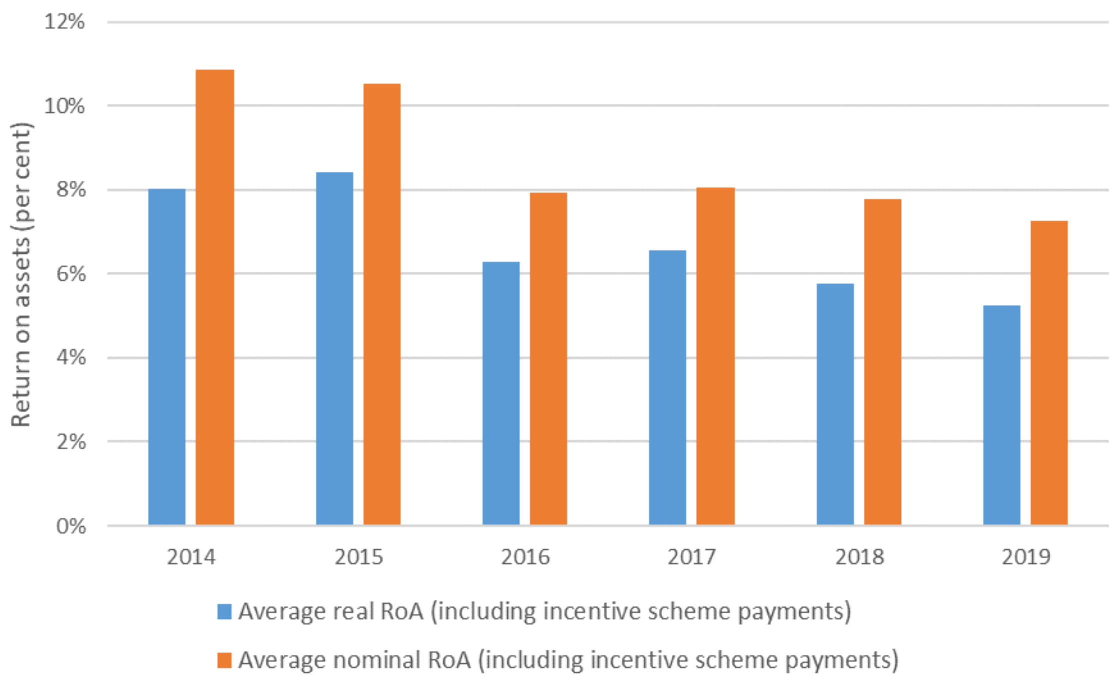
At present, our regulatory framework is designed to target a real rate of return. If a NSP's actual expenditure requirements were precisely equal to our forecast, it would generate the allowed real return for its investors. Networks are also compensated for actual inflation outcomes, via the annual escalation of revenue targets by CPI and indexation of the RAB—increasing it to account for inflation. This preserves the purchasing power of networks and investors regardless of actual movements in inflation.

To capture these two components of the overall compensation package, we report both real and nominal returns. Real returns exclude the impacts of RAB indexation. We compare these against allowed real returns made during our revenue determinations. Nominal returns include the effects of actual inflation. We compare those against allowed nominal returns made during our revenue determinations and which incorporate estimates of the levels of inflation that investors expect.

Figure 6-4 sets out the average real and nominal returns on assets amongst all electricity networks. It shows that:

- Both real and nominal returns on assets have declined over time
- Nominal returns typically exceed real returns because inflation (and its impact on the RAB) is generally positive.

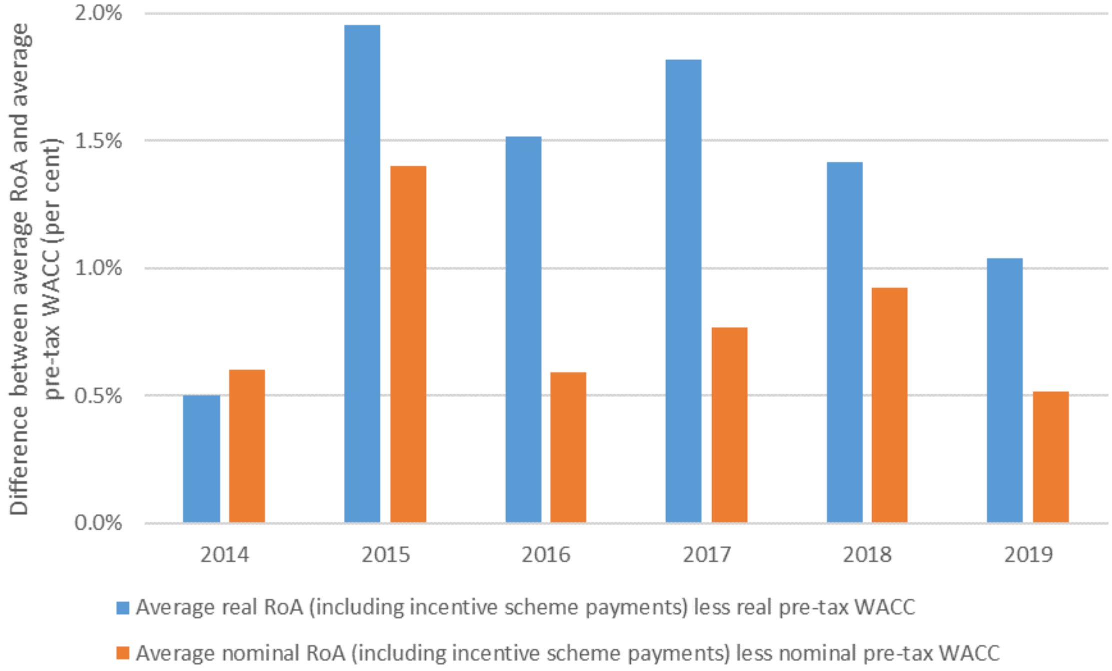
Figure 6-4 Average returns on assets – real and nominal – DNSPs and TNSPs



Source: Financial performance data, AER analysis.

In practice, actual inflation will often differ from the forecasts included in our allowances. Where these differences occur, we will observe differences in profit outcomes against allowances in real and nominal returns. Figure 6-5 illustrates this comparison.

Figure 6-5 Average return on assets – comparison of actual returns against allowed returns – Real and nominal returns – DNSPs and TNSPs



Source: Financial performance data, AER analysis

In combination, this shows that:

- Even before the impacts of RAB indexation, NSPs' real returns have, on average, exceeded their allowed real rates of return
- The same is true of nominal returns, but the margins of outperformance have generally been smaller. From 2015 onwards, nominal returns have exceeded real returns, but by a smaller extent than forecast at the time of the determinations. This is what we would expect under a scenario where inflation outcomes are less than forecast.

This also highlights the importance of analysis of real returns, noting this is what the framework is presently designed to target.

6.4 Focus area—Introducing EBIT per customer

EBIT per customer is a measure of the operating profit of a NSP over its customer base. It is a complementary measure to the return on assets, capturing the same measure of profit (earnings before interest and tax, or EBIT) over a different cost-driver. Consistent with other revenue and profitability measures, we see a downward trend in EBIT per customer across electricity NSPs.

In particular, we observe that that:

- The EBIT per customer declined across most DNSPs from 2014-19.

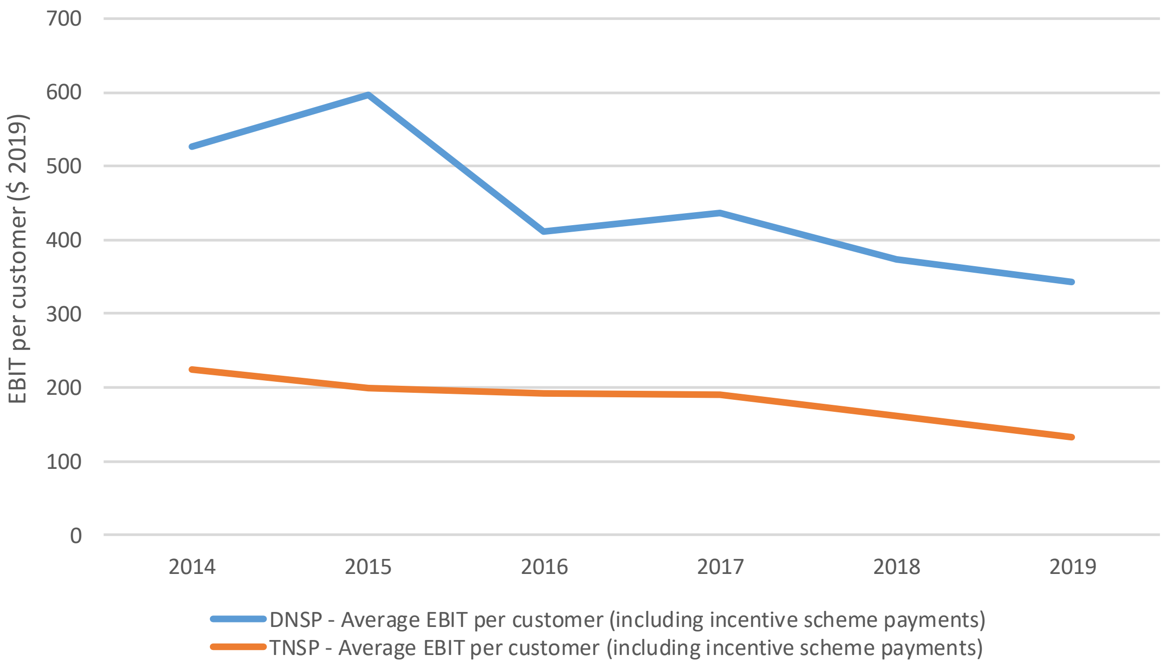
- EBIT per customer has also converged between the DNSPs. In 2014 the range of EBIT per customer was $855, whereas in 2019 the range was $511.[26]

We would expect both of these trends to continue as allowed returns on capital are reset under the 2018 binding rate of return instrument.

Importantly, EBIT per customer is *not* a measure of the profit that individual residential customers contribute to the network. It is an average of all customers, including SMEs and large customers who contribute a substantially greater proportion of NSP revenue per customer despite their smaller numbers.

Figure 6-6 sets out the average real EBITs per customer, including incentive scheme payments and excluding the impacts of RAB indexation. In our view, this is the most informative single version of the EBIT per customer measure. It uses an estimate of EBIT that is consistent with how it is calculated in estimation of the real returns on assets.

Figure 6-6 Average EBIT per customer – Including incentive scheme payments and excluding impacts of RAB indexation – DNSPs and TNSPs



Source: Financial performance data, AER analysis.

Our estimates of EBIT per customer for TNSPs are materially lower than for DNSPs. This is a consequence of the larger customer bases to which TNSPs provide services. However, it does not mean that TNSPs are less profitable than DNSPs for the same levels of investment (see Figure 6-3).

26 Excluding Ergon Energy from the sample of DNSP earnings per customer the range was $569 in 2014, compared to $216 in 2019.

Differences in EBIT per customer between networks

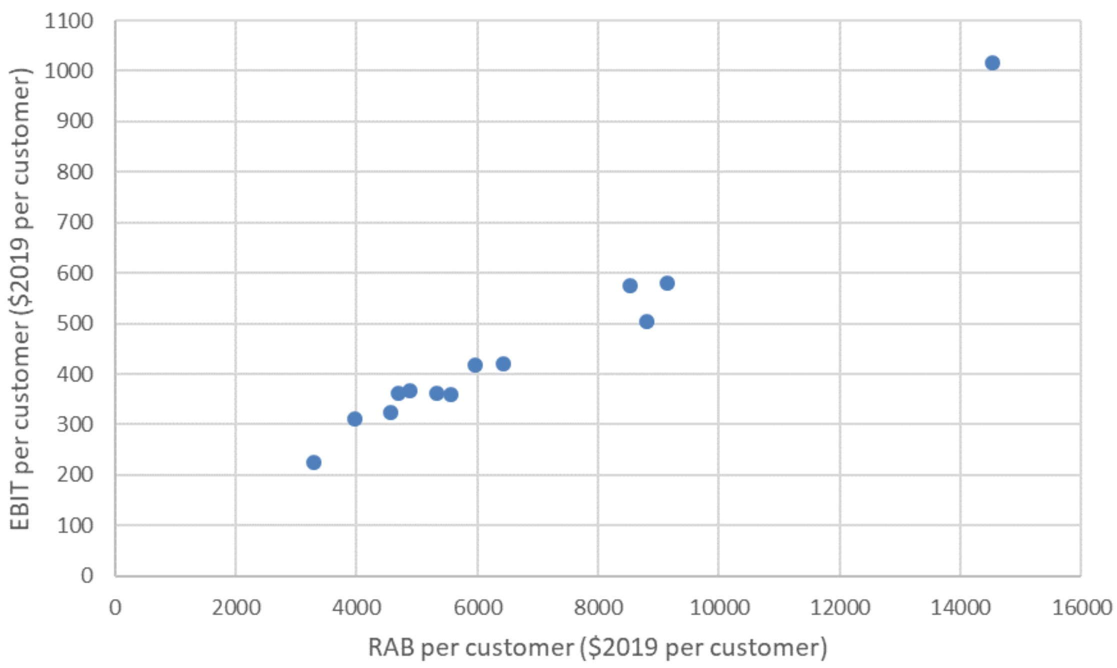
EBIT per customer varies materially between NSPs. In part, this likely reflects differences in network characteristics including the size of the RAB, customer density, and the mix of customers served by the network.[27] This is a new measure, and we intend to explore the range of these potential drivers over time.

Nonetheless, the factor which best explains differences in EBIT per customer is the size of the RAB per customer. This is because capital costs (allowed returns on capital and depreciation) combined account for the majority of expenses in businesses as capital intensive as regulated networks. It is also why those NSPs with the highest EBITs per customer are not always those with the highest returns on assets.

Figure 6-7 illustrates one part of this relationship amongst DNSPs. It compares:

- The average EBITs per customer of DNSPs over 2014-19
- The RABs per customer for those same DNSPs over 2014-19.

Figure 6-7 EBIT per customer and RAB per customer- DNSPs



Source: Financial performance data, Operational performance data, AER analysis.

6.5 RAB multiples

Sections 6.3 and 6.4 allow comparisons of allowed returns against actual returns, and as a trend over time. However, they are not straightforwardly able to address the question of whether those allowed returns have been sufficient.

27 AER, *Final positions paper - Profitability measures for regulated gas and electricity networks - Measures and technical issues*, 16 December 2019, pp. 8-13.

This is important because, for example, actual NSP returns may be low in absolute terms but—in an environment where investors do not expect high returns, either from NSP specifically or in financial markets more generally—they may nonetheless be sufficient to attract investment. Equally, actual returns may be high in absolute terms but fall below the requirements investors would require to invest. For this reason, we have sought additional market evidence of whether investors perceive NSP returns over time to be sufficient.

RAB multiples are a measure of investor expectations about a NSPs future returns and are widely used by market analysts in connection with regulated utilities. They are forward-looking, where the other profitability measures are based on historical outcomes. However, most of our regulatory approaches are predictable and set out in guidelines. As a result, in an environment where returns had been systematically insufficient, we expect that this might be evident in RAB multiples.

A RAB multiple of 1—holding other things constant—is the theoretical benchmark which indicates returns are exactly sufficient.[28] In practice there are a number of factors which impact RAB multiples and not all of those factors are directly relevant to the regulatory regime. For that reason, we have regard to RAB multiples allowing for imprecision and company-specific factors which might explain variation around a theoretical benchmark of 1.

This is consistent with the approach followed by a range of other regulators that use RAB multiples as a reasonableness check or input into allowed rates of return.

To draw on the largest possible body of market evidence, we have reported on two types of RAB multiples, sourced from Morgan Stanley:

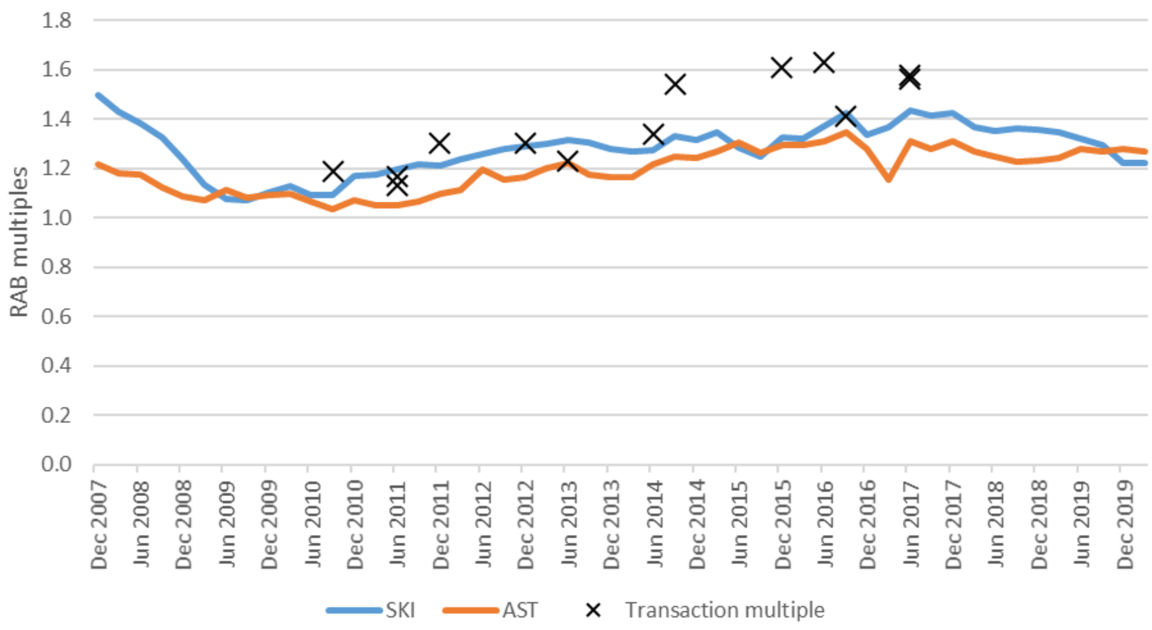
- Transaction multiples - RAB multiples arising from the transaction of a discrete component of an ownership group including regulated NSPs. These typically relate to a specific regulated NSP or a proportion of a NSP, so they are highly relevant. However, there are a number of bidder-specific factors which might impact these multiples but are not specifically relevant to the sufficiency of regulated returns.[29]
- Trading multiples - RAB multiples generated using market value data on the enterprise value of publicly listed entities. These are based on the trading values of listed entities which typically generate some proportion of unregulated earnings. The greater the extent of these unregulated earnings, the less informative these multiples are about the regulatory framework. However, in our view, the trading values of listed equities are less likely to be affected by the bidder-specific factors impacting trading multiples. In this way, they are complimentary. We have reported only data for Spark Infrastructure (SKI) and AusNet Services (AST), both of which typically generate the majority of earnings from within the regulated framework.

Figure 6-8 combines our time series of both trading and transaction RAB multiples.

28 A formal explanation of this relationship is set out in Biggar, *Understanding the role of RAB multiples in the regulatory processes*, February 2018.

29 Biggar, *Understanding the role of RAB multiples in the regulatory processes*, February 2018.

Figure 6-8 AER regulated NSPs – transaction and trading multiples



Source: Morgan Stanley Research, AER analysis.

Note: SKI is Spark Infrastructure, which holds ownership stakes in SA Power Networks (49%), Victoria Power Networks (49%) and TransGrid (15%). AST is AusNet Services, which owns a Victorian electricity distribution network, electricity transmission network and gas distribution network.

Recognising that the drivers of RAB multiples are difficult to quantify precisely, we consider the evidence on RAB multiples in combination with the other analysis in this report. In aggregate, we consider these measures support a view that investors view regulated returns as being at least sufficient to attract investment. Put conversely, it would be difficult to explain the persistence of premiums in both trading and transaction multiples if investors perceived systematic deficiencies in allowed returns.

In particular, we note that:

- Transaction multiples, while infrequent, have typically increased over time under the national regulatory framework.
- Trading multiples have varied through time but, since 2014, have been relatively steady despite material declines in allowed returns on capital over the same period.
- Differences in trading multiples over time between AST and SKI suggest that there are some company-specific factors which impact trading multiples. However, it remains the case that even the lower of the two multiples over time is trading at a premium to the RAB.

In the wave of acquisitions over 2015–17, acquisitions generally took place at a premium even above trading multiples at the time. There are a range of possible drivers for this, including that:

- Investors perceive those specific regulated assets as having prospects to achieve sustained cost savings compared to those included in the revenue targets
- A range of factors relating to the specific circumstances of the bidders including:
    - A premium for control of an asset, enabling the successful bidder to enact strategic objectives
    - 'Winner's curse' where, by definition, the parties winning in a tendering process are those that have bid the highest
    - The financing structure and options available to the bidder and how these relate to the allowed returns for the regulated asset.

Biggar (2018) includes extensive discussion of the types of factors which might cause a RAB multiple to depart from the theoretical benchmark of 1.

It is difficult to precisely test the validity or materiality of these potential drivers to the extent they depend on the specific views or circumstances of participants in the transactions. However, over time we expect that our profitability reporting should allow us to form clear insight about the profitability specifically of the NSPs core regulated services and how investors might account for them.

7 Looking ahead to 2021

Each year, we collect data from the regulated NSPs spanning the entire regulatory year just completed. It takes several months for the NSPs to compile and report this data. Once they have done so, we then undertake our analysis on the data reported.

As a result, by time we release a report on a regulatory year, we are in a position to identify some of the important developments that could shape the focus of next year's report.

In the 2021 report, covering data from regulatory year 2020 (2019-20), we expect our focus areas to address some or all of the following issues:

- Impacts of COVID-19
- Impacts of Summer 19-20 bushfires
- Introduction of the return on regulated equity profitability measure
- A greater number of NSPs should begin reporting incentive scheme rewards or penalties from the CESS
- Commencement of the first regulatory period for Northern Territory Power and Water Corporation (NT PWC) under an AER determination, at which time we will include them in our reporting
- Commencement of new regulatory periods for New South Wales, Australian Capital Territory and Tasmanian DNSPs.

As set out in section 1.3, we will seek to engage stakeholders on whether these and/or other emerging issues should be focusses for our analysis in future performance reports.

Shortened Forms

Shortened Form	Extended Form
ACCC	Australian Competition and Consumer Commission
AER	Australian Energy Regulator
Benchmark gearing ratio	The benchmark ratio of the value of debt to total capital (currently 60 per cent) set in the rate of return instrument.
Core regulated services	Standard Control Services for electricity distribution network service providers; Prescribed Transmission Services for electricity transmission network service providers; Haulage Reference Services for gas distribution pipeline service providers; and Reference Services for transmission pipeline service providers.
EBIT	Earnings before interest and tax
Gearing	The ratio of the value of debt to total capital.
Income statement	Statement of profit or loss and other comprehensive income of the service provider. Also known as the statement of financial performance.
NEL	National Electricity Law
NEO	National Electricity Objective
NER	National Electricity Rules
Network service provider or NSP	In the electricity sector the network service provider is the regulated network service provider (as defined under the NEL). For the gas sector, the network service provider is the scheme pipeline service provider (as defined in the NGL).
NGL	National Gas Law
NGO	National Gas Objective
NGR	National Gas Rules
NPAT	Net profit after tax

RAB	Regulatory Asset Base
Regulatory accounting information	Financial information that has been prepared in accordance with regulatory rules. Regulatory accounting information is to be prepared for the Network Service Provider and the core regulated services of the Network Service Provider.
RII	Regulatory Information Instrument
RIN	Regulatory Information Notice
RIO	Regulatory Information Order
RoA	Return on Assets
RoE	Return on Equity
RoRE	Return on Regulated Equity
Statutory accounting information	Financial information that has been prepared in accordance with the Corporations Act, including relevant accounting standards. Statutory accounting information is to be prepared for the Service Provider.
WACC	Weighted Average Cost of Capital