# DRAFT DECISION

## Power and Water Corporation Distribution Determination 2019 to 2024

## Attachment 5 Capital expenditure

September 2018

AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 520
Melbourne Vic 3001

Tel: 1300 585 165
Email: AERInquiry@aer.gov.au

AER reference: 60610

# Note

This overview forms part of the AER's draft decision on the distribution determination that will apply to Power and Water Corporation for the 2019–2024 regulatory control period. It should be read with all other parts of the draft decision.

The draft decision includes the following attachments:

Overview

Attachment 1 – Annual revenue requirement

Attachment 2 – Regulatory asset base

Attachment 3 – Rate of return

Attachment 4 – Regulatory depreciation

Attachment 5 – Capital expenditure

Attachment 6 – Operating expenditure

Attachment 7 – Corporate income tax

Attachment 8 – Efficiency benefit sharing scheme

Attachment 9 – Capital expenditure sharing scheme

Attachment 10 – Service target performance incentive scheme

Attachment 11 – Demand management incentive scheme

Attachment 12 – Classification of services

Attachment 13 – Control mechanisms

Attachment 14 – Pass through events

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Attachment 16 – Negotiated services framework and criteria

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# Shortened forms

| Shortened form | Extended form |
|---|---|
| ACS | alternative control services |
| AEMC | Australian Energy Market Commission |
| AEMO | Australian Energy Market Operator |
| AER | Australian Energy Regulator |
| augex | augmentation expenditure |
| capex | capital expenditure |
| CCP | Consumer Challenge Panel |
| CCP 13 | Consumer Challenge Panel, sub-panel 13 |
| CESS | capital expenditure sharing scheme |
| CPI | consumer price index |
| DRP | debt risk premium |
| DMIAM | demand management innovation allowance (mechanism) |
| DMIS | demand management incentive scheme |
| distributor | distribution network service provider |
| DUoS | distribution use of system |
| EBSS | efficiency benefit sharing scheme |
| ERP | equity risk premium |
| Expenditure Assessment Guideline | Expenditure Forecast Assessment Guideline for Electricity Distribution |
| F&A | framework and approach |
| MRP | market risk premium |
| NEL | national electricity law |
| NEM | national electricity market |
| NEO | national electricity objective |
| NT NER or the rules | National Electricity Rules As in force in the Northern Territory |

| Shortened form | Extended form |
|---|---|
| NSP | network service provider |
| opex | operating expenditure |
| PPI | partial performance indicators |
| PTRM | post-tax revenue model |
| RAB | regulatory asset base |
| RBA | Reserve Bank of Australia |
| repex | replacement expenditure |
| RFM | roll forward model |
| RIN | regulatory information notice |
| RPP | revenue and pricing principles |
| SAIDI | system average interruption duration index |
| SAIFI | system average interruption frequency index |
| SCS | standard control services |
| SLCAPM | Sharpe-Lintner capital asset pricing model |
| STPIS | service target performance incentive scheme |
| WACC | weighted average cost of capital |

# 5 Capital expenditure

Capital expenditure (capex) refers to the investment made in the network to provide standard control services. This investment mostly relates to assets with long lives (30–50 years is typical) and these costs are recovered over several regulatory periods.

On an annual basis, the financing cost and depreciation associated with these assets are recovered (return of and on capital) as part of the building blocks that form Power and Water Corporation's (Power and Water's) total revenue requirement.[1]

This attachment sets out our draft decision on Power and Water's total capex forecast. Further detailed analysis is provided in the following appendices:

- Appendix A - Assessment techniques
- Appendix B - Assessment of capex drivers
- Appendix C - Engagement and information gathering process
- Appendix D - Repex Modelling Approach
- Appendix E - Demand
- Appendix F - Berrimah cost-breakdown - Confidential appendix.

Our draft decision is based on our analysis of the information we have received to date. We will be informed by Power and Water's revised proposal, submissions and further analysis in arriving at our final decision in April 2019.

## 5.1 Draft decision

In assessing forecast capital expenditure, we are guided by the National Electricity Objective and underpinning capex criteria and objectives set out in the NER. We must accept a distributor's capex forecast if we are satisfied that the total forecast for the regulatory control period reasonably reflects the capex criteria.

This criteria outlines that a distributor's capex forecast must reasonably reflect the efficient costs of achieving the capex objectives, the costs that a prudent operator would require to achieve the capex objectives, and a realistic expectation of the demand forecast and cost inputs required to achieve the capex objectives.[2]

The capex objectives relate to a distributor's ability to comply with regulatory obligations and maintain the quality, reliability and security of supply of standard control services.[3]

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1 NT NER, cl. 6.4.3(a).
2 NT NER, cl. 6.5.7(c)(1).
3 NT NER, cl. 6.5.7(a).

Where a distributor is unable to demonstrate that its proposal complies with the capex criteria and objectives, the NER requires us to set out a substitute estimate of total capex that we are satisfied reasonably reflects the capex criteria, taking into account the capex factors.[4]

Power and Water has not justified that its total net capex of $383.0 million ($2018-19) for the 2019–24 regulatory control period reasonably reflects the capex criteria.[5] Our substitute estimate of $315.6 million is $67.3 million or 18 per cent below Power and Water's forecast. We are satisfied that our substitute estimate reasonably reflects the capex criteria, taking into account the capex factors. Table 5.1 outlines our draft decision.

### Table 5.1 Draft decision on Power and Water's total forecast net capex ($2018-19, million)

| | 2019 | 2020 | 2021 | 2022 | 2023 | Total |
|---|---|---|---|---|---|---|
| Power and Water's proposal | 94.0 | 72.5 | 94.6 | 63.7 | 58.2 | 383.0 |
| AER draft decision | 74.7 | 64.0 | 75.8 | 49.6 | 51.5 | 315.6 |
| Difference | -19.3 | -8.4 | -18.8 | -14.1 | -6.7 | -67.3 |
| Percentage difference (%) | -20.5% | -11.6% | -19.9% | -22.1% | -11.6% | -17.6% |

Source: Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 66.

Note: Net capex excludes equity raising costs, capital contributions and asset disposals. For our assessment of equity raising costs, see attachment 3. Numbers may not add up due to rounding.

Table 5.2 summarises our findings and the reasons for our draft decision by 'capex driver' (e.g. augmentation, replacement and connections). This reflects the way we have assessed Power and Water's total capex forecast.

Our findings on the capex category drivers are part of our broader analysis of total forecast capex and should not be considered in isolation. We do not approve an amount of forecast expenditure for each capex driver.

Our assessment highlighted that we are satisfied that some aspects of Power and Water's proposal would form part of a total capex forecast that reasonably reflects the capex criteria. We found other capex drivers associated with Power and Water's proposal, such as augmentation and replacement expenditure, are likely to be higher than an efficient level, and do not reasonably reflect the capex criteria, taking into account the capex factors, and the revenue and pricing principles.[6] Having regard to our assessment of the individual capex drivers, we consider that Power and Water's total forecast capex does not reasonably reflect the capex criteria.

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4 NT NER, cl. 6.12.1(3)(ii).
5 NT NER, cl.6.12.1(3)(ii).
6 NEL, ss.7(a) and 16(2).

We have used our findings on the different capex drivers to arrive at a substitute estimate for total capex. We test this total estimate of capex against the requirements of the NT NER (see section B for a detailed discussion). We consider that overall our capex forecast achieves the capital expenditure objectives.[7] In making our draft decision, we considered the impact our decision will have on the safety and reliability of Power and Water's network. We consider this capex forecast should be sufficient for a prudent and efficient service provider in Power and Water's circumstances to be able to maintain the safety, service quality, security and reliability of its network consistent with its current obligations.

We are satisfied that our estimate represents a total capex forecast that as a whole reasonably reflects the capex criteria, taking into account the capex factors. As set out in appendix B, we are satisfied our total capex forecast forms part of an overall distribution determination that will or is likely to contribute to the achievement of the National Electricity Objective to the greatest degree.

## Table 5.2 Summary of AER reasons and findings

| Issue | Reasons and findings |
|---|---|
| Total net capex forecast | Power and Water proposed a total net capex forecast of $383.0 million ($2018-19) in its regulatory proposal. We do not accept this forecast as Power and Water has not justified that this forecast reasonably reflects the capex criteria.<br><br>We are satisfied our substitute estimate of $315.6 million ($2018-19) reasonably reflects the capex criteria. Our substitute estimate is 18 per cent lower than Power and Water's regulatory proposal.<br><br>The reasons for this decision are summarised in this table and detailed in the remainder of this attachment. |
| Forecasting methodology, key assumptions and past capex performance | We consider Power and Water's risk assessment methodology and underlying assumptions appear to be overly conservative (high risk scenarios assumed), which has tended to bring forward the timing of forecast expenditure. Where we identified specific areas of concern, we discuss these in the appendices to this capex attachment and section A. |
| Augmentation capex | Our draft decision includes forecast augex of $35.9 million ($2018-19). This is $24.7 million lower than Power and Water's proposed augex of $60.6 million ($2018-19). We are satisfied that our substitute estimate, which provides for a reduced expenditure requirement for the Wishart zone substation project and the fault level replacement program, would form part of a total capex forecast that reasonably reflects the capex criteria.<br><br>Specifically, based on the information available, we consider that Power and Water's assessment of forecast load and capacity in the Wishart area, and its analysis of feasible options, do not support the need for major network augmentation in this area in the 2019–24 regulatory control period. |
| Customer connections capex | We accept Power and Water's forecast of customer connections capex as a reasonable estimate of capex requirements in this category that would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $61.6 million ($2018-19) for connections capex in our estimate of total forecast capex, consistent with Power and Water's proposal adjusted for our updated |

[7] NT NER, cl. 6.5.7(a).

| | |
|---|---|
| | forecasts of real labour cost changes. |
| Replacement capex (repex) | We do not accept Power and Water's forecast repex of $148.6 million. We have included in our substitute estimate of overall total capex, an amount of $129.0 million ($2018-19) for repex. We are satisfied that this amount would form part of a total capex forecast that reasonably reflects the capex criteria.<br><br>In particular, we note that Power and Water's modelled repex is above our predictive modelling threshold, which compares distributors' asset categories on both unit costs and expected replacement lives.<br><br>We also conducted a bottom-up review of proposed repex projects and programs, and found that Power and Water has not adequately justified the full proposed repex for the Berrimah substation replacement project, or the Alice Springs pole and XLPE cable replacement programs. |
| Non-network ICT capex | We do not accept Power and Water's forecast non-network ICT capex of $37.5 million ($2018-19). We have included an amount of $25.7 million for ICT capex in our substitute estimate which we consider would form part of a total capex forecast that reasonably reflects the capex criteria. This is $11.7 million lower than Power and Water's proposed non-network ICT capex.<br><br>Our substitute estimate provides for an increased ICT capex program compared to historical expenditure in this category, but at a lower level than proposed by Power and Water. We consider this will ensure that this expenditure can be efficiently delivered in the 2019–24 regulatory control period. |
| Non-network other capex | We do not accept Power and Water's forecast non-network other capex of $69.4 million ($2018-19). We have included an amount of $54.8 million in our substitute estimate of total capex. This is $14.7 million lower than Power and Water's proposed non-network other capex. We are satisfied that our substitute estimate, which corrects errors in Power and Water's approach to estimating capitalised lease costs and excludes the 19 Mile property project, would form part of a total capex forecast that reasonably reflects the capex criteria. |
| Capitalised overheads | We accept that Power and Water's proposal to capitalise a portion of its overheads is consistent with its cost allocation method and industry practice. However, our substitute estimate of forecast capex includes capitalised overheads of $58.4 million, a reduction of $8.4 million from Power and Water's forecast capitalised overheads of $66.9 million. This reflects an error identified in Power and Water's base year estimate of capitalised overheads and a lower rate of expected growth in the 2019–24 regulatory control period. |
| Real cost escalators | We do not accept Power and Water's forecast real labour cost escalators. We have revised those estimates in line with our opex decision to use the most up-to-date Wage Price Index for the Northern Territory utilities industry forecast by Deloitte Access Economics.[8] This has a consequential impact on all categories of forecast capex. |

Source: AER analysis.

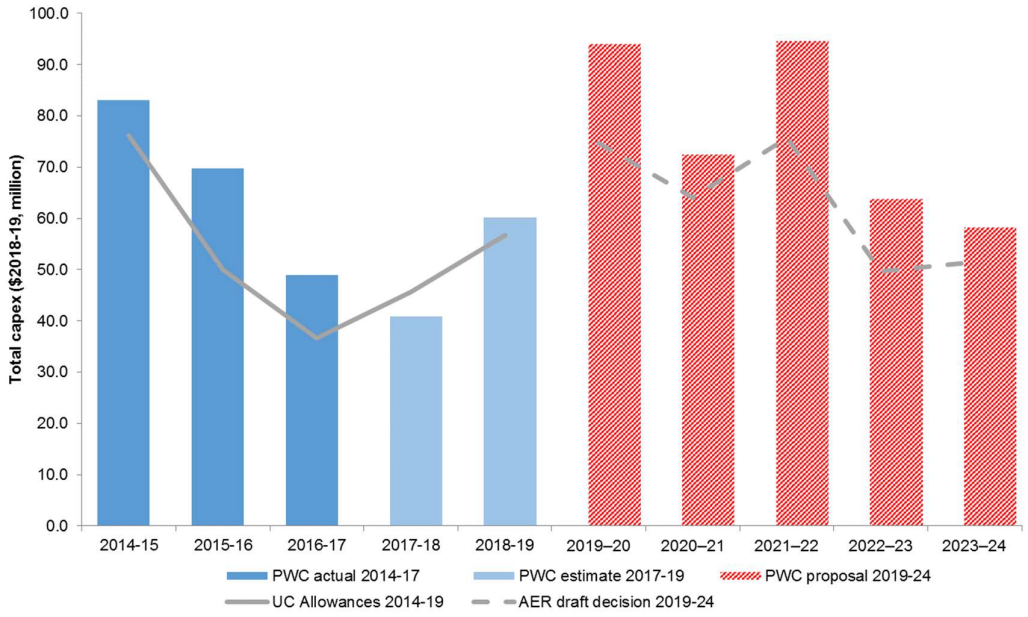
## 5.2 Power and Water Corporation's proposal

For the 2019–24 regulatory control period, Power and Water proposed total forecast net capex of $383.0 million ($2018–19). Power and Water's forecast of its total net capex requirements for 2019–24 is $80.1 million—or 26 per cent—higher than its

[8] Deloitte Access Economics, *Labour Price Growth Forecasts Prepared for the Australian Energy Regulator*, 19 July 2018, Table vii, p. xiv.

actual expenditure of $302.9 million in 2014–19. Of relevance is Power and Water's change in capitalisation policy for the forecast period, which has resulted in some non-network related expenditure being reclassified from opex to capex. Thus, the difference between current period and forecast capex should be viewed with this in mind.

### Figure 5.1: Power and Water's historical vs forecast capex, including 2014-19 allowance and AER draft decision ($2018-19, million)




Source: Power and Water, *Capex overview document*, 16 March 2018, pp. 11-14; and AER analysis.

The key drivers of Power and Water's forecast capex proposal are:

- About 32 per cent of total forecast capex is for asset replacement where Power and Water is forecasting $148.6 million for repex; this compares to its actual expenditure over the current period of $173.9 million, which is 15 below its forecast
- Forecast augex of $60.6 million, including targeted augex projects to meet expected demand in specific areas such as Wishart, and to meet power quality and reliability compliance obligations
- Forecast connections capex of $62.7 million for connection works for new and existing customers, a small reduction from the current regulatory control period. Power and Water proposed that this connections capex would be fully offset by customer contributions towards the cost of these connection works
- Non-network other capex of $69.4 million relating to vehicle fleet, buildings, property, tools and equipment assets. Forecast capex in this category reflects the capitalisation of vehicle and property leases (previously classified as opex) in accordance with new accounting standards

- Non-network ICT capex of $37.5 million, a significant increase from the current period driven by the need for compliance with NT NER requirements, and the replacement of ageing systems
- Capitalised overheads of $66.9 million, reflection an allocation of a proportion of network and corporate overheads to capex in accordance with Power and Water's cost allocation method.

## 5.3 Assessment approach

In determining whether Power and Water's proposal reasonably reflects the capex criteria set out in the NT NER,[9] we use various qualitative and quantitative assessment techniques to assess the different elements of Power and Water's proposal. Appendix B, we discuss the weight we placed on some capex factors relative to others and how we came to our position.

More broadly, we also take into account the revenue and pricing principles set out in the NEL.[10] In particular, we take into account whether our overall capex forecast provides Power and Water with a reasonable opportunity to recover at least the efficient costs it incurs in:[11]

- providing direct control network services; and
- complying with its regulatory obligations and requirements.

When assessing capex forecasts, we also consider that:

- the capex criteria relating to a prudent operator and efficient costs are complementary. Prudent and efficient expenditure reflects the lowest long-term cost to consumers for the most appropriate investment or activity required to achieve the expenditure objectives[12]
- past expenditure was sufficient for the distributor to manage and operate its network in previous periods, in a manner that achieved the capex objectives.[13]

### 5.3.1 Considerations in applying our assessment techniques

Appendix A outlines our assessment approach and appendix B details how we came to our position on Power and Water's capex forecast. In summary, some of these techniques focus on total capex, while other focus on high-level, standardised sub-categories of capex. Importantly, while we may consider certain programs and projects in forming a view on the total capex forecast, we do not determine which programs or projects a distributor should or should not undertake.

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9 NT NER, cl. 6.5.7(c).
10 NEL, ss. 7A and 16(2).
11 NEL, s. 7A.
12 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, pp. 8 and 9.
13 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 9.

This is consistent with our ex-ante incentive based regulatory framework. Our approach is based on approving an overall ex-ante revenue requirement that includes an assessment of what we find to be a prudent and efficient total capex forecast.[14] Once the ex-ante allowance is established, distributors are incentivised to provide services at the lowest possible cost because their returns are determined by the actual costs of providing services. If distributors reduce their costs to below the estimate of efficient costs, the savings are shared with consumers in future regulatory periods.

This ex-ante incentive-based regulatory framework recognises that the distributor should have the flexibility to prioritise its capex program given its circumstances over the course of the regulatory control period. The distributor may need to undertake programs or projects that it did not anticipate during the distribution determination process. The distributor may also not need to complete some of the programs or projects it proposed during the forecast regulatory control period if circumstances change. We consider a prudent and efficient distributor would consider the changing environment throughout the regulatory control period and make decisions accordingly.

Therefore, recognising the interplay between the broader incentive framework and program and project investment considerations, when reviewing a capex forecast we use a combination of bottom-up and top-down assessment techniques. Assessment of the bottom-up build of forecasts including underlying assumptions is an informative way to establish whether the forecast capex at the program or project level is prudent and efficient. Many of the techniques we apply at this level encompass the capex factors that we are required to consider. However, we are also mindful that a narrow focus on only a bottom-up assessment may not itself provide sufficient evidence that the forecast is prudent and efficient. Bottom-up approaches tend to overstate required allowances, as they do not adequately account for interrelationships and synergies between programs, projects or areas of work.

Thus, we also review the prudency and efficiency of aggregate expenditure areas or the total capex forecast.[15] Top-down analysis provides us with assurance that the entire expenditure program is prudent and efficient, and allows us to consider a distributor's total capex forecast. We use holistic assessment approaches that include a suite of techniques such as trend analysis, predictive modelling and detailed technical reviews. Consistent with our holistic approach, we take into account the various interrelationships between the total capex forecast and other components of a distributor's distribution determination, such as forecast opex and STPIS interactions.[16]

In the event that a distributor does not justify that the proposed capex forecast reasonably reflects the capex criteria, we are required to determine a substitute

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[14] AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. vii.

[15] For example, see AER, *Draft decision: Ergon Energy determination 2015−16 to 2019−20: Attachment 6 − Capital expenditure*, October 2015, p. 21; AER, *Draft decision: SA Power Networks determination 2015−16 to 2019−20: Attachment 6 − Capital expenditure*, October 2015, pp. 20–21.

[16] NEL, s. 16(1)(c).

estimate. We do so by applying our various assessment techniques. We then use our judgement to weight the results these techniques case-by-case, in light of all the relevant information available to us.

Broadly, we give greater weight to techniques that we consider are more robust in the particular circumstances of the assessment. By relying on several techniques, we ensure we consider a wide variety of information and take a holistic approach to assessing the distributor's capex forecast. Where our techniques involve the use of a consultant, their reports are considered when we form our draft decision position on total forecast capex.

Importantly, our decision on the total capex forecast does not limit a distributor's actual spending. We set the forecast at the level where the distributor has a reasonable opportunity to recover its efficient costs. As noted previously, a distributor may spend more or less on capex than the total forecast amount specified in our decision in response to unanticipated expenditure needs or changes.

The regulatory framework has a number of mechanisms to deal with these circumstances. Importantly, a distributor does not bear the full cost where unexpected events lead to an overspend of the approved capex forecast. Rather, the distributor bears 30 per cent of this cost if the expenditure is subsequently found to be prudent and efficient. Further, the pass through provisions provide a means for a distributor to pass on significant, unexpected capex to customers, where appropriate.[17]

Similarly, a distributor may spend less than the capex forecast because it has operated at a more efficient level than expected. In this case, the distributor will keep on average 30 per cent of this reduction over time, with the remaining benefits shared with its customers.

### 5.3.2 Safety and reliability considerations

We consider that our substitute capex forecast will provide for a prudent and efficient service provider in Power and Water's circumstances to maintain performance in line with the Utilities Commission performance targets.[18] The capex allowance should not be set at a level such that it would result in Power and Water systematically under or over performing against its jurisdictional reliability targets. Our substitute estimate includes forecast capex associated with Power and Water's proposed worst performing feeder improvement program, and other augex to enable Power and Water to comply with power quality and reliability obligations. More broadly, our analysis in appendix B outlines how our assessment techniques factor in network safety and reliability.

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17 NER, r. 6.6.

18 On 28 March 2018, the Utilities Commission approved Power and Water's performance targets, under clause 3 of the Electricity Industry Performance Code (EIP). The new performance targets for Power and Water's network apply during the 2019-2024 regulatory control period. See Power and Water, *IR017 Item 25 - Updated PWC13.32 - BNI - All Regions - Poorly Performing Feeder Improvement Program - Public*, 29 May 2018, p. 5.

We consider our substitute estimate will allow Power and Water to maintain the safety, service quality and reliability of its network consistent with its jurisdictional obligations.[19] Our provision of a total capex forecast does not constrain a distributor's actual spending—either as a cap or as a requirement that the forecast be spent on specific projects or activities. It is conceivable that a distributor might wish to spend particular capital expenditure differently or in excess of or less than the total capex forecast in our decision.

### 5.3.3 Interrelationships

Consistent with our holistic approach, we take into account the various interrelationships between the total capex forecast and other components of a distributor's distribution determination, such as forecast opex, forecast demand, the Capital Expenditure Sharing Scheme and STPIS interactions. For example, we had regard to our decisions on forecast labour input costs and the rate of change of input costs as set out in our decision on forecast opex.[20] We also had regard to the extent to which Power and Water has considered, and made provision for, efficient and prudent non-network options.[21]

## 5.4 Reasons for draft decision

We applied the assessment approach set out in section 5.3 and appendix A to Power and Water. In this draft decision, we acknowledge that Power and Water has submitted a robust regulatory proposal which reflects the understanding that Power and Water has of its network and therefore its capex requirements. Notwithstanding this, we have identified areas of improvement mainly around Power and Water's asset management framework, risk-based cost benefit analysis and overall forecasting approach.[22] Our assessment of the extent to which Power and Water's approaches in these areas have contributed to a forecast of total capex that we consider is likely to exceed the requirements of a prudent and efficient operator is set out in appendix B.

Based on the information before us, Power and Water has not justified the total capex forecast reasonably reflects the capex criteria. We outline how we have applied our assessment techniques and how we came to this position in appendix B. We are therefore required to set out a substitute estimate, which we are satisfied reasonably reflects the capex criteria.

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19 The Utilities Commission noted that the new targets are higher than current performance, except for the rural long feeder classification, Power and Water has indicated that it has consulted with customers in a general sense on performance levels. Customers have indicated that they are generally satisfied with the current level of performance, and are happy for Power and Water to concentrate its efforts on improving the worst feeders. Rather than accepting Power and Water's proposal, the Commission has approved a target consistent with the 5 year average.

20 NT NER, cl. 6.5.7(e)(6).

21 NT NER, cl. 6.5.7(e)(10).

22 In our review of Power and Water operating expenditure, we have made similar observations on Power and Water's risk assessment practices and how it affected its inspection and maintenance programs. Please see AER, *Distribution determination - Power and Water Corporation - Attachment 7 - Operating Expenditure*, p. 39.

In coming to our position, we appreciate the constructive engagement we have had with Power and Water. This includes on-site meetings, and informed and timely responses to our information requests. We acknowledge Power and Water's engagement with us on the areas of concern we have identified and its intention to work through these areas in preparing its revised proposal.

Table 5.3 sets out the capex amounts by driver that we included in our substitute estimate of Power and Water's total capex forecast for the 2019–24 regulatory control period. Our capex forecast has been constructed using the approach and techniques outlined in appendices A and B. We are satisfied that our substitute estimate reasonably reflects the capex criteria.

### Table 5.3 AER draft decision by capex driver 2019–24 ($2018-19, million)

| Category | 2019-20 | 2020-21 | 2021-22 | 2022-24 | 2023-24 | Total |
|---|---|---|---|---|---|---|
| Augmentation | 7.1 | 5.5 | 5.7 | 6.7 | 11.0 | 35.9 |
| Connections | 12.6 | 13.2 | 13.3 | 11.2 | 11.3 | 61.6 |
| Replacement | 28.9 | 33.6 | 30.2 | 19.4 | 17.0 | 129.0 |
| Non-Network other | 19.5 | 5.2 | 19.9 | 5.2 | 5.0 | 54.8 |
| Non-Network ICT | 5.1 | 5.1 | 5.1 | 5.2 | 5.2 | 25.7 |
| Capitalised overheads | 11.5 | 11.6 | 11.7 | 11.8 | 11.9 | 58.4 |
| **Total gross capex** | **84.7** | **74.2** | **86.0** | **59.4** | **61.3** | **365.5** |
| Capital contributions | 9.8 | 10.0 | 10.0 | 9.6 | 9.6 | 49.0 |
| Asset disposals | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.8 |
| **Total net capex** | **74.7** | **64.0** | **75.8** | **49.6** | **51.5** | **315.6** |

Source: AER analysis. Numbers may not add up due to rounding.

The main reasons for our substitute total net capex forecast of $315.6 million ($2018-19) are summarised below.

#### Augmentation

- Power and Water's proposed augex of $60.6 million ($2018-19) does not appear to be a reasonable estimate of the prudent and efficient costs required for this capex category. Power and Water has not justified that this augex forecast would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $35.9 million ($2018-19) in our substitute estimate of total capex. This reflects our conclusion that Power and Water has not justified the need for its proposed new zone substation at Wishart in the 2019–24 regulatory control period, or the full scope of the proposed switchgear fault level replacement program.

**Replacement**

- Power and Water's proposed repex of $148.6 million ($2018-19) does not appear to be a reasonable estimate of the prudent and efficient costs required for this capex category. Power and Water's proposed forecast repex is below actual and estimated repex over the 2014-19 regulatory control period. However, taking into account our various assessment techniques, our view is that Power and Water has not justified that this repex forecast would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $129.0 million ($2018-19) in our substitute estimate of total capex
- Power and Water's forecast for modelled repex ($92 million) lies $14 million above our 'repex model threshold' ($78 million)
- Power and Water's repex forecast differs from our modelled repex for transformers, poles and underground cables asset groups. Our modelling results informed our more detailed bottom-up assessment of those asset groups.
- We have identified that, despite the overall decline of forecast repex relative to the current period, Power and Water is forecasting a step up in replacement volumes and repex for underground cables and poles. In addition, Power and Water has not justified that the preferred option to replace the Berrimah Zone substation with a smaller capacity substation is the most efficient option, particularly as it increases the need for an augmentation in the Wishart area.

**Non-network other**

- Power and Water's proposed non-network other capex of $69.4 million ($2018-19) does not appear to be a reasonable estimate of the prudent and efficient costs required for this capex category. Power and Water has not justified that this non-network other capex forecast would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $54.8 million ($2018-19) in our substitute estimate of total capex
- Our substitute estimate of non-network other capex corrects for errors in Power and Water's approach to estimating capitalised lease costs. We have also not included the proposed 19 Mile depot and access road project. Based on the information available, Power and Water has not clearly justified the need for this investment in the 2019–24 regulatory control period.

**Non-network ICT**

- We have included an amount of $25.7 million for information and communication technology (ICT) capex in our substitute estimate which we consider would form part of a total capex forecast that reasonably reflects the capex criteria. This is $11.7 million lower than Power and Water's proposed non-network ICT capex
- Our substitute estimate provides for an increased ICT capex program compared to historical expenditure in this category, but at a lower level than proposed by Power and Water. We consider this will ensure that this expenditure can be efficiently delivered by Power and Water in the 2019–24 regulatory control period.

**Connections and customer contributions**

- We accept Power and Water's forecast of customer connections capex (adjusted for our updated forecasts of real labour cost changes) as a reasonable estimate of capex requirements in this category that would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $61.6 million ($2018-19) for connections capex in our estimate of total forecast capex
- Power and Water submitted a revised forecast of capital contributions from customers in the 2019–24 regulatory control period of $49.0 million, reflecting changes to its connections policy to align with NT NER requirements. We have accounted for Power and Water's revised forecast of customer contributions in our estimate of total forecast net capex in the 2019–24 regulatory control period.

**Capitalised overheads**

- Our substitute estimate of forecast capex includes capitalised overheads of $58.4 million, a reduction of $8.4 million from Power and Water's forecast capitalised overheads of $66.9 million. While we accept that Power and Water's proposal to capitalise a portion of overhead costs is reasonable, we have corrected an error identified in Power and Water's base year estimate of capitalised overheads and applied a lower rate of expected growth in these costs in the 2019–24 regulatory control period.

**Asset disposals**

- Power and Water did not propose a forecast of asset disposals in the 2019–24 regulatory control period. We have included forecast asset disposals of $0.8 million in our estimate of total forecast net capex, in line with Power and Water's average historical level of asset disposals.

Importantly, in the context of our assessment of key expenditure drivers, we understand that on 27 April 2018 the Northern Territory Government announced a long-term program to recommence undergrounding power lines in Darwin suburbs. This announcement occurred after Power and Water submitted its regulatory proposal on 30 January 2018, and was therefore not accounted for in this proposal. Power and Water has recognised the potential impact of this announcement, but has advised that it does not yet have sufficient information to identify the materiality of this decision.[23] Should implementing this program impact Power and Water's proposed capex (or opex) in the forecast period, we expect Power and Water would address this as part of its revised regulatory proposal, which we will assess on the basis of the information available to us at that time.

[23] Power and Water, *Letter to the AER - NTG announcement impacting Power and Water's 2019–24 regulatory determination*, 4 September 2018.

# A Assessment techniques

This appendix describes the approaches we applied in assessing whether Power and Water's total capex forecast reasonably reflects the capex criteria. Appendix B sets out in greater detail the extent to which we relied on each of these assessment techniques.

The assessment techniques that we apply in capex are necessarily different from those we apply when assessing opex. This is reflective of differences in the nature of the expenditure that we are assessing. We therefore use some assessment techniques in our capex assessment that are not suitable for assessing opex and vice versa. We outline this in the Expenditure Assessment Guideline (the Guideline).[24]

Below we outline the assessment techniques we used to assess Power and Water's capex forecast.

## A.1 Trend analysis

We considered past trends in actual and forecast capex as this is one of the capex factors under the NT NER.[25] We also consider trends at the asset category level to inform our view on the prudency and efficiency of a distributor's capex forecast.

Trend analysis involves comparing a distributor's forecast capex and volumes against historical levels. Where forecast capex and volumes are materially different to, whether above or below, historical levels, we seek to understand the reasons for these differences. In doing so, we consider the reasons the distributor provides in its initial proposal, as well as any potential changing circumstances.

In considering whether the total capex forecast reasonably reflects the capex criteria, we need to consider whether the forecast will allow the distributor to meet expected demand and comply with relevant regulatory obligations.[26] Demand and regulatory obligations (specifically, service standards) are key capex drivers. More onerous standards or growth in maximum demand will increase capex. Conversely, reduced service obligations or a decline in demand will likely cause a reduction in the amount of capex the distributor requires.

Maximum demand is a key driver of augmentation or demand-driven expenditure. Augmentation (augex) often needs to occur prior to demand growth being realised. Forecast demand, rather than actual demand, is therefore most relevant when a distributor is deciding the augmentation projects it will require in the forecast regulatory control period. However, to the extent that actual demand differs from forecast demand, a distributor should reassess project needs. Growth in a distributor's network will also drive connections-related capex. For these reasons, it is important to consider

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[24] AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 8.

[25] NT NER, cl. 6.5.7(e)(5).

[26] NT NER, cl. 6.5.7(a)(3).

how capex trends, particularly for augex and connections, compare with trends in demand and customer numbers.

For service standards, there is generally a lag between when capex is undertaken (or not) and when the service improves (or declines). This is important when considering the expected impact of an increase or decrease in capex on service levels. It is also relevant to consider when service standards have changed and how this has affected the distributor's capex requirements.

We analysed capex trends across a range of levels including at the total capex level and the category level, (e.g. augex, connections and repex). We also compared these with demand trends and any relevant changes in service standards.

## A.2 Category analysis

Expenditure category analysis allows us to compare expenditure across NSPs, and over time, for various levels of capex. The comparisons we perform include:

- overall costs within each category of capex;
- unit costs across a range of activities;
- volumes across a range of activities; and
- expected asset lives across a range of repex asset categories.

Using standardised reporting templates, we collect data on augex, repex, connections, non-network capex, overheads and demand forecast for all distributors in the NEM. Using standardised category data allows us to make direct comparisons across distributors. Standardised category data also allows us to identify and scrutinise different operating and environmental factors that affect the amount and cost of works that distributors incur and how these factors may change over time.

## A.3 Predictive modelling

### Background

The AER's repex model is a statistical based model that forecasts asset replacement capex (repex) for various asset categories based on their condition (using age as a proxy) and unit costs. We use the repex model to only assess forecast repex that can be modelled. This typically includes high-volume, low-value asset categories and generally represents a significant component of total forecast repex. The repex model is currently only used to forecast modelled repex for electricity distributors.

The repex model forecasts the volume of assets in each category that a distributor would expect to replace over a 20-year period. The model analyses the age of assets already in commission and the time at which, on average, these assets would be expected to be replaced, based on historical replacement practices. This is referred to as the calibrated expected asset replacement life. A total replacement expenditure forecast is derived by multiplying the forecast replacement volumes for each asset category by an indicative unit cost.

The repex model can be used to advise and inform us where to target a more detailed bottom-up review and define a substitute estimate if necessary. The model can also be used to compare a distributor against other distributors in the NEM.[27] In coming to our position, we also had regard to feedback from distributors on some of the underlying assumptions and modelling techniques.

## Scenario analysis

Our repex modelling approach analyses four scenarios that consider both a distributor's historical replacement practices and the replacement practices of other distributors in the NEM. In contrast to previous determinations, the current approach considers intra-industry comparative analysis for unit costs and expected asset replacement lives, rather than analysing inter-company historical performance. The four scenarios analysed are:

1. historical unit costs and calibrated expected replacement lives
2. comparative unit costs and calibrated expected replacement lives
3. historical unit costs and comparative expected replacement lives
4. comparative unit costs and comparative expected replacement lives.

We define comparative unit costs as the minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM. We define comparative replacement lives as the maximum of a distributor's calibrated expected replacement life and the median expected replacement life across the NEM.

The 'cost, lives and combined' scenarios rely on a comparative analysis technique that compares the performance of all distributors in the NEM. The technique analyses the two variable repex model inputs – unit costs and expected replacement lives.

The 'cost scenario' analyses the level of repex a distributor could achieve if its historical unit costs were improved to comparative unit costs. The 'lives scenario' analyses the level of repex a distributor could achieve if its calibrated expected replacement lives were improved to comparative expected replacement lives.

Previous distribution determinations where we have used the repex model have primarily focused on the 'historical scenario'. This scenario forecasts a distributor's expected repex and replacement volumes based on its historical unit costs and asset replacement practices (which are used to derive expected replacement lives).

Our refined comparative analysis repex modelling approach builds on this previous analysis and now introduces the historical performances of other distributors in the NEM into the forecast period. The 'cost, lives and combined' scenarios rely on a comparative analysis technique that compares the performance of all distributors in the

[27] This includes Power and Water Corporation.

NEM. The technique analyses the two variable repex model inputs – unit costs and replacements lives.

The 'cost scenario' analyses the level of repex a distributor could achieve if its historical unit costs were improved to comparative unit costs. The 'lives scenario' analyses the level of repex a distributor could achieve if its calibrated expected replacement lives were improved to comparative expected replacement lives.

### Repex model threshold

Our 'repex model threshold' is defined taking these results and other relevant factors into consideration. For the 2019–24 determinations, our proposed approach is to set the repex model threshold equal to the highest result out of the 'cost scenario' and the 'lives scenario'.[28]

This approach considers the inherent interrelationship between the unit cost and expected replacement life of network assets. For example, a distributor may have higher unit costs than other distributors for particular assets, but these assets may in turn have longer expected replacement lives. In contrast, a distributor may have lower unit costs than other distributors for particular assets, but these assets may have shorter expected replacement lives.

Further details about our repex model are outlined in appendix D.

## A.4 Assessment of bottom-up and top-down methodologies

In assessing whether Power and Water's capex forecast is prudent and efficient, we examined the forecasting methodology and underlying assumptions used to derive this forecast. In particular, some of the evidence that we can use to justify the prudency and efficiency of a bottom-up forecast at the program or project level is:

- identifying and quantifying all reasonable options in a cost-benefit analysis, including deferral or 'do nothing' scenarios;
- cost-benefit analysis that incorporates a proper quantified risk assessment, where the most beneficial program or project is selected, or clear and justified reasoning as to why another option was chosen; and
- reasons to support the expenditure timing for the forecast regulatory control period, particularly if the expenditure may have been deferred in previous regulatory control periods.

Our industry practice application note, which relates to asset replacement planning, aims to assist network businesses with this bottom-up forecast. At the time of this draft decision, the draft industry practice application note is open for consultation. The final

[28] Our modelling approach means the 'historical scenario' will always be higher than the 'cost scenario' and the 'lives scenario', and the 'combined scenario' will always be lower than the 'cost scenario' and the 'lives scenario'.

industry practice application note will be published in late November 2018. We therefore encourage Power and Water to have regard to the final application note and the consultation process in its revised proposal.[29]

In addition to a bottom-up build, a holistic and strategic consideration or assessment of the entire forecast capex portfolio would be evidence that some discipline has been applied at the top-down level. In particular, a top-down challenge would give us confidence that:

- the bottom-up builds have been subject to overall checks against business governance and risk management arrangements;
- synergies between programs or projects have been identified, which may reduce the need for, scope or cost of some programs or projects over the forecast regulatory control period;
- subjectivity from the bottom-up forecasts has been addressed; and
- the timing and prioritisation of capital programs and projects have been determined over both the short and long term, such that delivery strategy has been considered.

## A.5 Economic benchmarking

Economic benchmarking is one of the key outputs of our annual benchmarking report. The NT NER requires us to consider the annual benchmarking report, as it is one of the capex factors.[30] Economic benchmarking applies economic theory to measure the efficiency of a distributor's use of inputs to produce outputs, having regard to the operating environment and network characteristics.[31]

Economic benchmarking allows us to compare the performance of a distributor against its own past performance and the performance of other distributors. It also helps us to assess whether a distributor's capex forecast represents efficient costs.[32] The AEMC stated:

> "Benchmarking is a critical exercise in assessing the efficiency of an NSP".[33]

Several economic benchmarks from the annual benchmarking report are relevant to our capex assessment. These include measures of total cost efficiency and overall capex efficiency. In general, these measures calculate a distributor's efficiency with consideration given to its inputs, outputs and its operating environment.

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29 This Application Note does not replace published guidelines. Rather, it supplements the guidelines by outlining principles and approaches that accord with good asset management and risk management practices. Good asset management and risk management practices are often aligned with international standards of practice, such as ISO 55000 for asset management and ISO 31000 for risk management.

30 NT NER, cl. 6.5.7(e)(4).

31 AER, *Better regulation: Explanatory statement: Expenditure forecasting assessment guidelines*, November 2013, p. 78.

32 NT NER, cl. 6.5.7(c).

33 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 25.

We consider each distributor's operating environment in so far as there are factors outside of a distributor's control that affects its ability to covert inputs into outputs.[34] Once these exogenous factors are taken into account, we expect distributors to operate at similar efficiency levels. One example of an exogenous factor we consider is customer density. For more information on how we derive these measures, refer to our annual benchmarking report.[35]

At this stage we have not reviewed Power and Water performance against other NEM distributors on specific capex productivity metrics, which is set out in the AER's annual benchmarking report. The most recent annual benchmarking report does not include Power and Water given that it has only recently transitioned to the National Electricity Rules.

## A.6 Other assessment factors

We considered several other factors when assessing Power and Water's total capex forecast. These factors included:

1. safety and reliability statistics (SAIDI and SAIFI);
2. internal technical and engineering review;
3. external consultant review;
4. submissions made by various stakeholders; and
5. other information provided by Power and Water.

[34] AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 113. Exogenous factors could include geographic factors, customer factors, network factors and jurisdictional factors.

[35] AER, *Annual benchmarking report: Electricity distribution network service providers*, December 2017.

# B Assessment of capex drivers

This appendix outlines our detailed analysis of the categories of Power and Water's capex forecast for the 2019–24 regulatory control period. These categories are augmentation capex (augex), customer connections capex, replacement capex (repex), capitalised overheads and non-network capex.

As we discuss in the capex attachment, Power and Water has not justified that the proposed total capex forecast reasonably reflects the capex criteria. In this appendix, we set out further analysis in support of this view. This further analysis also explains the basis for our substitute estimate of Power and Water's total capex forecast, which we are satisfied reasonably reflects the capex criteria. In coming to our views and our substitute estimate, we applied the assessment techniques outlined in appendix A.

This appendix sets out our findings and views on each capex category. The structure of this appendix is:

- Section B.1: substitute estimate
- Section B.2: forecast augex
- Section B.3: forecast customer connections capex, including capital contributions
- Section B.4: forecast repex
- Section B.5: forecast non-network other capex.
- Section B.6: forecast non-network ICT
- Section B.7: forecast capitalised overheads

In each of these sections, we explain why we are satisfied the amount of capex that we have included in our substitute estimate reasonably reflects the capex criteria.

## B.1 Substitute estimate

Our substitute estimate of Power and Water's total forecast net capex for the 2019–24 regulatory control period is $315.6 million ($2018-19). We analysed Power and Water's proposal and determined that we were not satisfied that it reflects the capex criteria. We then set out our substitute estimate of capex, which we are satisfied reasonably reflects the capex criteria, taking into account the capital expenditure factors.[36] We have based our substitute estimate on the assessment techniques explained in section 5.3 and appendix A. Our weighting of each of these techniques is set out under the capex drivers in appendix B.

[36] NT NER, cl. 6.5.7(e).

## B.2 Forecast augex

Augmentation is typically triggered by the need to build or upgrade the network to address changes in demand and network utilisation. However, it can also be triggered by the need to upgrade the network to comply with quality, safety, reliability and security of supply requirements.

### B.2.1 Power and Water's proposal

Power and Water proposed a forecast of $60.6 million ($2018-19) for augmentation capex (augex), excluding overheads. This is a 21 per cent decrease compared to actual/estimated augex incurred in the 2014–19 regulatory control period.[37]

Power and Water's proposed forecast augex is driven by:[38]

- growth in maximum demand caused by population growth or specific development within localised parts of its distribution network where there are forecast to be capacity constraints
- compliance with the Network Technical Code and Network Planning Criteria
- meeting and managing its reliability and quality of supply obligations
- increasing connection of solar PV systems which are causing voltage issues in the low voltage distribution network
- a flat demand profile across its Darwin-Katherine network which limits traditional demand management opportunities for load shifting and demand management.

As set out in Table 5.4, Power and Water's proposed augex forecast is comprised of capex to meet load, compliance, and reliability and quality of supply drivers of expenditure.

**Table 5.4 Power and Water's proposed augex ($2018-19, million, excluding overheads)**

| Category | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | Total |
|---|---|---|---|---|---|---|
| Load driven | 2.9 | 1.2 | 10.7 | 11.8 | 10.6 | 37.3 |
| Compliance | 3.0 | 3.0 | 2.3 | 4.2 | 2.3 | 14.8 |
| Reliability and quality of supply | 1.5 | 1.50 | 2.5 | 1.5 | 1.5 | 8.5 |
| Total augex proposal | 7.4 | 5.8 | 15.5 | 17.6 | 14.4 | 60.6 |

Source: Power and Water, *Capex Overview 2019-20 to 2023-24*, 16 March 2018, p. 63.

[37] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, pp. 11 and 14.

[38] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, pp. 57–60.

Power and Water proposed four load driven augex projects, with the largest being construction of the Wishart zone substation to address expected demand growth in the Berrimah/Wishart area.[39] Power and Water proposed five compliance driven augex projects, the two largest of which are the Darwin distribution substation fault level replacement program and uprating the Darwin transmission line.[40] The forecast reliability and power quality driven augex includes three projects: the poorly performing feeder improvement program, the power quality compliance program and Katherine voltage rectification.[41]

### B.2.2 Position

Our draft decision includes $35.9 million ($2018-19) in forecast augex for the 2019–24 regulatory control period. This is $24.7 million lower than Power and Water's proposed augex of $60.6 million ($2018-19). We are satisfied that our substitute estimate, which provides for a reduced expenditure requirement for the fault level replacement program and the Wishart zone substation project, reasonably reflects the capex criteria.

Table 5.5 summarises Power and Water's augex proposal and our substitute forecast for augex in the 2019–24 regulatory control period.

**Table 5.5 Draft decision on Power and Water's total forecast augex ($2018-19, million)**

| | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | Total |
|---|---|---|---|---|---|---|
| Power and Water proposal | 7.4 | 5.8 | 15.5 | 17.6 | 14.4 | 60.6 |
| AER draft decision | 7.1 | 5.5 | 5.7 | 6.7 | 11.0 | 35.9 |
| Total adjustment | -0.3 | -0.3 | -9.7 | -10.9 | -3.4 | -24.7 |

Source: AER analysis

Note: Numbers may not add up due to rounding

We have included the majority of Power and Water's proposed augex projects and programs in our estimate of forecast augex, particularly where expenditure is driven by the need to maintain compliance with technical requirements, reliability and power quality obligations. However, in relation to the Wishart zone substation project and the fault level replacement project, we consider that:

- the scope and timing of the Wishart zone substation development is related to a repex project to replace the nearby Berrimah zone substation. As discussed in section B.4, we have provided for an alternative repex solution which maintains the existing capacity at Berrimah and is therefore likely to reduce or defer the potential need for augmentation at Wishart in the 2019–24 regulatory control period

[39] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 64.

[40] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 66.

[41] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 68.

- uncertainty around forecast demand, including the likely timing of spot loads, and the identification of a potentially viable and lower cost non-network solution also impact on the justification for Power and Water's preferred option to construct the Wishart zone substation
- Power and Water should adopt a broader strategic planning approach to identify and evaluate the full suite of potential options (including non-network options) for supplying the Berrimah/Wishart area into the future
- the proposed capex for the fault level replacement program is not likely to reflect an efficient level of capex. The fault level replacement program proposed by Power and Water is likely to overstate the number of switch gear units in need of replacement in the 2019–24 regulatory control period.

### B.2.3 Reasons for our position

We have reviewed Power and Water's historical expenditure, augex forecasting methodology, risk assessment practices, approach to demand management and network planning practices to assess whether the forecast augex is likely to meet the capex criteria, objectives and factors set out in the NT NER.[42] For specific capital projects and programs, we have assessed whether Power and Water has justified that:

- the project or program is reasonably required to achieve the capex objectives;[43] and if so
- the preferred option is likely to reasonably reflect the capex criteria.[44]

It is important to note that we do not approve Power and Water's specific projects or programs, but rather a total forecast for capex in the 2019–24 regulatory control period. While our review of specific projects and programs informs our estimate of total capex, it is for Power and Water to decide which projects and programs are actually required to be delivered within the 2019–24 regulatory control period to meet the capex objectives in light of changing circumstances and priorities.

#### Historical and forecast augex

We have used trend analysis to gauge how Power and Water's historical actual and expected augex compares to forecast augex for the 2019–24 regulatory control period.[45]

Figure 5.2 shows Power and Water's actual/estimated augex since 2008-09 and its forecast augex for the 2019–24 regulatory control period. This shows the trend of decreasing augex during the 2014-19 regulatory control period and lower forecast

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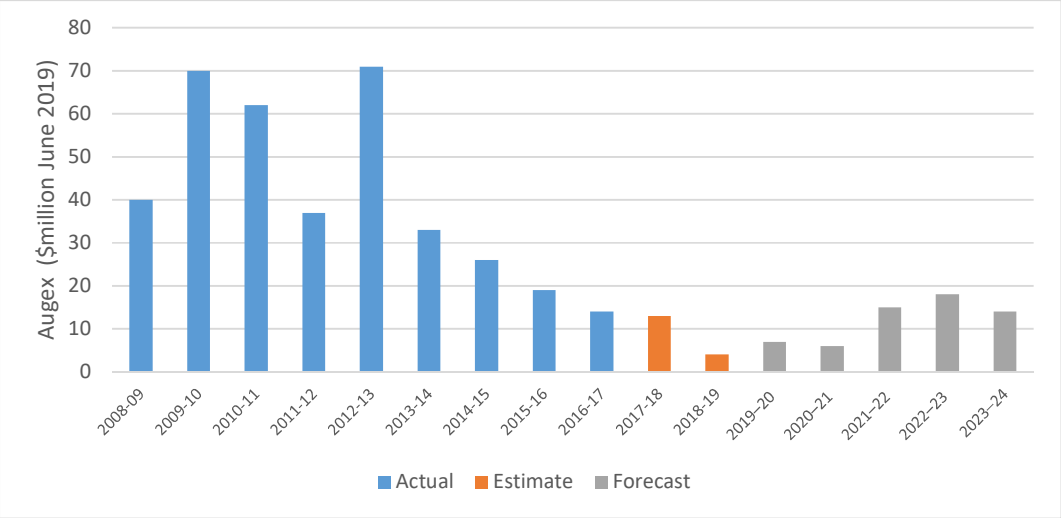
42 NT NER 6.5.7.
43 NT NER 6.5.7(a).
44 NT NER 6.5.7(c).
45 NT NER, 6.5.7(e)(5).

augex for the 2019–24 regulatory control period than previous regulatory control periods.

### Figure 5.2 Power and Water historical and forecast augex ($2018-19, million)




Source: Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 70.

Power and Water's forecast load-driven capex is relatively low compared to historical levels of expenditure, and appears consistent with the drivers of expenditure in this category.[46] This reflects AEMO's forecast of flat or declining overall peak demand in Power and Water's electricity network, but with growth in demand in some localised areas over the 2019–24 regulatory control period.

An increasing or decreasing trend in total augex does not, in and of itself, indicate that a service provider has proposed augex that is likely to reflect or not reflect the capex criteria. In the case of Power and Water, while it has proposed an average annual decrease in augex from the current regulatory control period consistent with forecasts of flat or declining demand, we must consider whether it has sufficiently justified that the forecast expenditure reasonably reflects the capex criteria.

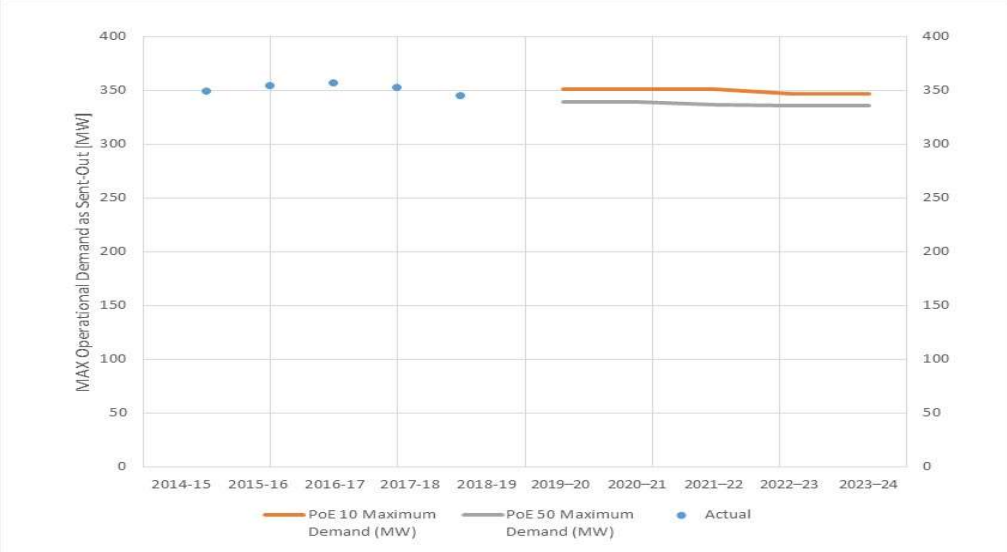
## Trend in maximum demand

Peak demand is a fundamental driver of a distribution business' forecast capex. Power and Water must deliver electricity to its customers and build, operate and maintain its network to manage expected changes in demand for electricity. In particular, the expected growth in demand is an important factor driving network augmentation expenditure and connections expenditure.

[46] NT NER, cl. 6.5.7(e)(5).

Figure 5.3 shows that Power and Water's system maximum demand increased over the period from 2014-15 to 2016-17, but has since declined. Power and Water is projecting maximum demand to be flat across the 2019–24 regulatory control period.

### Figure 5.3 Power and Water - Actual and forecast maximum demand (2014-15 to 2023-24)




Source: Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 56.

In an operating environment of expected flat or negative maximum demand growth, we would expect demand driven augmentation requirements to be low. However, localised demand growth can drive the requirement for specific projects or programs. Localised demand growth (non-coincident demand) is not uniform across the network; for example, future demand trends may differ between established suburbs and areas involving new residential and commercial developments. Accordingly, we have considered localised demand forecasts as part of assessing Power and Water's proposed augex projects and programs for the 2019–24 regulatory control period.

## Submissions

Table 5.6 provides a summary of the submissions we received in respect to Power and Water's proposed augex.

### Table 5.6 Submissions responding to Power and Water's proposed augex

| Submission | Comments |
|---|---|
| Consumer Challenge Panel 13 | CCP13 considered that the extent to which the AER accepts or amends AEMO's demand forecasts may impact on Power and Water's proposed augex. However, Power and Water's forecast augex of $60.6m is a reduction of 21 per cent from the current regulatory control period, reflecting the overall |

| | |
|---|---|
| | subdued demand growth forecast but with some localised demand growth areas in the Darwin region, including the new zone substation at Wishart. [47] |
| Anonymous | The anonymous submission noted that the construction of a new zone substation at Wishart, the augmentation of Archer zone substation and the replacement of the Berrimah zone substation appear to be closely related to each other. It is not clear that an attempt has been made to optimise a combined solution for these three.[48]<br><br>Considers that in respect to the Overloaded Feeders/Distribution Augmentation Program relating to a project to mitigate future excessive loading of feeders from the Archer, Berrimah and Alice Springs zone substations that it would be reasonable to include consideration of this project in a combined, optimised solution.[49]<br><br>In respect to the proposed capex to address the reliability of the most poorly performing feeders to ensure compliance with jurisdictional reliability targets, the submission considered that the regulator traditionally does not provide funding for reliability expenditure and that this precedent should continue.[50] |

We have considered these submissions as part of our assessment of the proposed augex detailed below.

## Load driven augex

Power and Water's proposed load driven augex of $37.3 million is 62 per cent of total proposed augex. Power and Water targeted projects in the areas of localised growth in the demand, specifically the Wishart and Archer zone substations where Power and Water consider capacity constraints will exist.[51] A significant majority of load driven augex relates to the construction of the Wishart zone substation to address expected demand growth in the Berrimah/Wishart area.[52] Our review of Power and Water's proposal therefore focussed on this project. Our assessment of the other minor load driven projects is summarised in Table 5.7.

### Wishart Zone substation

Power and Water submitted that peak demand in the areas surrounding the existing Berrimah Zone Substation has been increasing steadily over the last ten years due to the connection of customers in new and existing commercial and industrial estates.[53]

In 2015, Power and Water established a mobile 'NOMAD' 10MVA substation at Wishart to support forecast load growth in the Wishart and East Arm (port) areas, providing voltage support and alternate supply capacity in the event of a transformer failure at Berrimah Zone Substation. Power and Water considers that the NOMAD

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47 Consumer Challenge Panel subpanel 13, *Issues Paper – Power & Water Corporation (Power and Water) electricity network revenue proposal 2019–24*, 16 May 2018, p. 34.

48 Anonymous, *Submission on the Power and Water proposal*, 16 May 2018.

49 Anonymous, *Submission on the Power and Water proposal*, 16 May 2018.

50 Anonymous, *Submission on the Power and Water proposal*, 16 May 2018.

51 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 58.

52 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 64.

53 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 64.

mobile substation has prudently deferred the installation of a new substation at Wishart or a third transformer at Berrimah Zone Substation.[54]

As part of its forecast replacement capex, Power and Water has proposed a separate project to replace the Berrimah zone substation with a lower capacity substation by 2021. Power and Water considers that without additional transformer capacity in the Berrimah/Wishart load area, there will be insufficient firm capacity to meet forecast load growth beyond the time that the replacement Berrimah Zone Substation is commissioned.[55] AEMO's demand forecast shows significant growth over the 2019–24 regulatory control period for the Wishart and East Arm areas.[56]

The proposed augex project will establish a permanent Wishart zone substation by 2024 to follow the commissioning of the replacement Berrimah zone substation. Power and Water consider that the replacement Berrimah zone substation and the new Wishart zone substation will most effectively meet the growing area demand and maintain security requirements.[57]

### *AER analysis and conclusions*

We do not consider that Power and Water has demonstrated the need to construct the Wishart zone substation in the 2019–24 regulatory control period. We are therefore not satisfied that forecast capex for the Wishart zone substation reasonably reflects the efficient costs that a prudent operator would incur to meet the capex objectives. We have come to this conclusion on the basis that:

- there is uncertainty in respect to Power and Water's load growth for the Berrimah/Wishart area, particularly regarding the timing of spot loads
- as discussed in section B.4, we do not consider Power and Water's proposal to replace the Berrimah substation with a lower capacity substation to be prudent and efficient. We have provided for an alternative repex solution which maintains the existing capacity at Berrimah and is therefore likely to reduce or defer the potential need for augmentation at Wishart
- the potential for non-network and/or demand management options to defer or avoid the proposed augmentation at Wishart has not been fully considered by Power and Water
- since Power and Water submitted its regulatory proposal, Power and Water's consultant, CutlerMerz has identified a potentially viable and lower cost non-network solution to address potential constraints in the Berrimah/Wishart area in the 2019–24 regulatory control period

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54 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 64.

55 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 64.

56 AEMO*, Power and Water Corporation Maximum Demand, Energy Consumption and Connection Forecasts*, September 2017, p. 45.

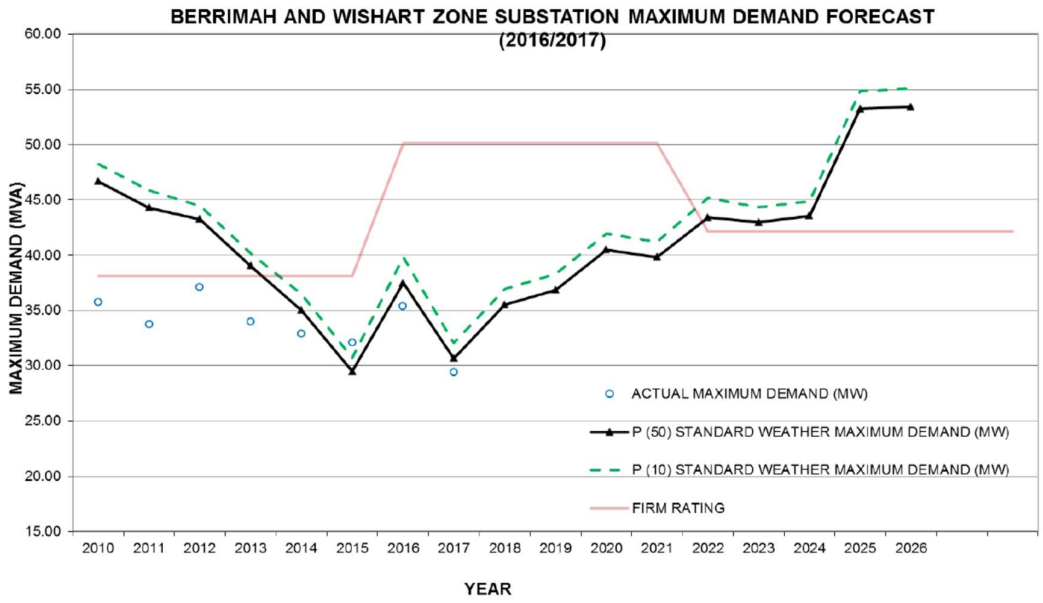
57 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 64.

- in the longer term, Power and Water should adopt a broader strategic planning approach to identify and evaluate the full suite of potential options (including non-network options) for supplying the Berrimah/Wishart area into the future.

### *Forecast demand and capacity in the Berrimah/Wishart area*

Power and Water's combined Berrimah and Wishart area maximum demand forecast and substation capacity is shown in Figure 5.4.

## Figure 5.4 Berrimah/Wishart area substation maximum demand




Source: Power and Water, *PBC - Construct Wishart Zone Substation - PUBLIC*, 23 February 2018, p. 57.

Figure 5.4 shows that actual maximum demand in the Berrimah/Wishart area has been generally declining since 2010. Power and Water is now forecasting strong load growth driven by new residential, commercial and industrial developments in the area. The firm capacity in the area increased with the installation of the NOMAD mobile substation in 2015, but is forecast to decrease in 2022 with the replacement of the existing Berrimah zone substation with a new substation of lower capacity.

As discussed in section B.4, we have provided for an alternative repex solution which maintains the existing capacity at Berrimah. We consider this is likely to reduce or defer the potential need for augmentation at Wishart. The need for augmentation at Wishart is likely to arise from 2025 at the earliest, assuming the strong load growth forecast by Power and Water over the next seven years eventuates.

We sought further information from Power and Water to support the quantum and timing of forecast block loads driving the significant increase in maximum demand out

to 2025. Power and Water provided a list of forecast block loads identified as committed for connection out to 2033, and further uncommitted loads not included in Power and Water's maximum demand forecast.[58] Power and Water did not provide information to substantiate the identified timing or magnitude of the forecast block loads. Most of these block loads relate to the sequential development in stages of larger development projects, the timing of which typically depends upon the commercial success of earlier development stages and prevailing economic conditions. The largest of these spot loads is driving the significant increase in demand of approximately 10MVA forecast for 2025, which is material to the timing of potential augmentation at Wishart. Any delay in the timing of this specific load would also delay any need for augmentation at Wishart beyond the 2019–24 regulatory control period.

In our view, despite Power and Water's description of the forecast spot loads out to 2033 as 'committed', there is considerable uncertainty around the magnitude and timing of these loads connecting to the network, particularly in the outer years. We also understand that Power and Water's demand forecasts do not take into account the potential impact of the Northern Territory Government's Road to Renewables policy which seeks to promote the use of renewables and deliver 50 per cent of the Northern Territory's energy needs by 2030.[59] This could have significant implications for the expected demand over the 2019–24 regulatory control period in the Berrimah/Wishart region, as new residential and commercial developments move to incorporate energy efficiency and distributed energy resources at the time of development.

We therefore consider that, while it is possible that some augmentation of capacity in the Berrimah Wishart area may be required over the next 5-15 years, the extent and timing of the requirement is uncertain. The justification for significant network augmentation to replace the Berrimah zone substation in the 2019–24 regulatory control period as proposed by Power and Water has not been made.

### *Consideration of non-network options*

Power and Water's preliminary business case for the Wishart zone substation project considered demand management options (options 5 and 5a) and noted the major advantage of such an option being that it:[60]

> delays the need to commit to capital expenditure to provide more firm capacity into the area, providing more time to assess the actual load growth and update demand forecasts

Power and Water concluded that demand management options were not technically or commercially viable, principally because the amount of load curtailment required was significant (13MVA based on current demand forecasts) and because Power and

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[58] Power and Water, *Response to AER information request #017, Item 24: Wishart Load Data (confidential)*, 12 June 2018.

[59] Refer https://roadmaptorenewables.nt.gov.au/.

[60] Power and Water, *PBC - Construct Wishart Zone Substation - PUBLIC*, 23 February 2018, p. 18.

Water has no experience with securing reliable load curtailment and the community is not familiar with these arrangements.[61]

We recognise that Power and Water's experience in assessing and implementing efficient demand side or non-network solutions to address network constraints is limited at this time. We sought further information from Power and Water regarding the suitability of non-network solutions for a number of proposed repex and augex projects.[62] Power and Water engaged CutlerMerz to evaluate the suitability and potential benefits of non-network options for these projects, including the Wishart zone substation project. This analysis suggests that, based on an initial assessment, a non-network solution may provide a potentially viable and lower cost investment option to defer or avoid the augmentation capex proposed for the new Wishart zone substation.[63]

Further work is needed to assess the scope, costs, risks and benefits of potential non-network options at Wishart. Nonetheless, we consider that the advice from CutlerMerz demonstrates that Power and Water's analysis of options to address the need for augmentation in the Berrimah/Wishart area would benefit from further consideration of efficient and prudent non-network options.[64] It is therefore not clear that Power and Water's options analysis for the Wishart zone substation project demonstrates that the forecast capex for Power and Water's preferred option reasonably reflects the efficient costs that a prudent operator would incur in the 2019–24 regulatory control period to meet the capex objectives.[65]

In considering options for the future supply arrangements in the Berrimah/Wishart area, we would encourage Power and Water to consider the strategic development of larger regions in its standard planning practices. We consider that strategic planning of this nature is good industry practice and provides for the efficient development and redevelopment of broader supply regions. It appears from the separate preliminary business cases for the Berrimah and Wishart projects that Power and Water's focus has been on development options for the Berrimah and Wishart substations, when consideration of options for the development of the broader supply area would also be beneficial. For example, Power and Water's options analysis could consider the option of rationalising the supply arrangement for the entire Berrimah/Wishart area by developing a single substation at the expected future load centre of the area. A single substation at the load centre may require less investment than the combined Wishart/Berrimah options proposed by Power and Water, and reduce the resultant excess capacity shown in Figure 5.5.

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61 Power and Water, *PBC - Construct Wishart Zone Substation - PUBLIC*, 23 February 2018, p. 18.

62 AER, *Information request #017 - items 43, 44 and 45*, 24 May 2018.

63 Power and Water, *Response to Power and Water AER information request #017, Items 43, 44 and 45 – Demand Management Assessments (confidential)*, 12 June 2018; and PWC, *Response to submissions received on Power and Water's 2019–24 regulatory proposal*, 17 August 2018, p. 6.

64 NT NER, cl. 6.5.7(e)(10).

65 NT NER, cl. 6.5.7(c).

## Figure 5.5 Berrimah/Wishart area load forecast and capacity with and without proposed Wishart zone substation


Source: Power and Water, *PBC - Construct Wishart Zone Substation - PUBLIC*, 23 February 2018, p. 18.

Our view on Power and Water's planning practices is similar to that expressed in the anonymous submission which noted that the construction of a new zone substation at Wishart, the augmentation of Archer Zone Substation and the replacement of the Berrimah Zone Substation appear to be closely related to each other. As noted, it is not clear that an attempt had been made to optimise a combined solution for the three substations.[66]

### *Substitute estimate*

As discussed above, Power and Water has not justified that the preferred option and proposed capex for the new Wishart zone substation reasonably reflects the capex criteria. In arriving at a substitute estimate of forecast capex required in the 2019–24 regulatory control period, we have had regard to the following:

- the sensitivity of the demand forecast to the timing and magnitude of forecast block loads suggests that a solution that delays the need to commit to significant network capex and provides more time to assess actual load growth is likely to be preferred
- our alternative option for a targeted refurbishment and replacement strategy at Berrimah is likely to maintain the existing capacity of the Berrimah substation, and

[66] Anonymous, *Submission on the Power and Water proposal*, 16 May 2018.

therefore reduce Power and Water's forecast energy at risk during the 2019–24 regulatory control period and beyond

- there is likely to be a potentially viable, lower cost non-network solution available to maintain supply in the Berrimah/Wishart area in the 2019–24 regulatory control period if required.

On balance, we have determined that our substitute estimate of forecast capex should include forecast capex of approximately $6 million to address potential augmentation requirements in the Wishart area in 2019–24. We consider, based on the initial work undertaken for Power and Water by CutlerMerz that this amount is likely to be sufficient for Power and Water to pursue an appropriately sized non-network solution to address capacity constraints which may arise in the later years of the period. We note that Power and Water has undertaken to revise its demand forecasts in its revised regulatory proposal and further consider potential options for the Berrimah/Wishart supply area which may further inform our final decision.

## Other load driven augex

In addition to the Wishart zone substation project, Power and Water proposed other minor load driven augex projects and programs which we have accepted in our substitute estimate of forecast capex for the 2019–24 regulatory control period. Our assessment of the other minor load driven projects is summarised in Table 5.7.

### Table 5.7 Other load driven augex

| Project or program | AER considerations |
|---|---|
| Overloaded feeders program | Power and Water proposed forecast capex of approximately $6.0 million to address overloaded feeders in the 2019–24 regulatory control period.[67] Power and Water's overloaded feeders program is a general program of work to address a broad range of feeder capacity and voltage issues. We are satisfied that Power and Water's forecast capex for this program, which reflects a reduction of approximately 14 per cent from the 2014–19 regulatory control period, reasonably reflects a prudent and efficient level of expenditure to address feeder constraints in the 2019–24 regulatory control period. |
| Archer zone substation augmentation | Power and Water proposed to defer installation of a third 66/11kV, 20/27 MVA transformer and a new 11kV switchboard section at Archer Zone Substation by providing for the connection and operation of a NOMAD mobile substation. Power and Water considers that the NOMAD substation will cater for the increased demand in the Palmerston area and provide a reliable supply during prolonged credible contingency events.[68]<br><br>We consider that Power and Water's proposed Archer zone substation augmentation (using a NOMAD substation) is likely to be an efficient solution to meeting the forecast demand in the Palmerston area. |

[67] Power and Water, *Attachment 13.7 - Overloaded feeders / Distribution Augmentation Program*, 16 March 2018, p. 13.

[68] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, p. 65.

## Compliance driven augex

Power and Water's proposed compliance driven augex of $14.8 million is 24 per cent of total proposed augex. As part of its annual planning process, Power and Water regularly reviews compliance with the Network Technical Code and Network Planning Criteria. Power and Water has undertaken detailed investigations of areas of non-compliance, and developed targeted augex projects and programs to mitigate the highest areas of risk on a prioritized basis, whilst ensuring it adheres to strict safety requirements whilst maintaining its service performance. Power and Water identified these projects to include low ground clearance, fault level upgrades and network security analysis.[69]

We discuss the fault level replacement program in detail below. Our assessment of the other minor compliance driven projects is summarised in Table 5.9.

### Darwin distribution substation fault level replacement program

Power and Water submitted that increasing fault levels due to the development of the network over time has resulted in fault levels now exceeding or close to exceeding the rating of a number of Magnefix MD4 switchgear installations as shown in Table 5.8.[70] Power and Water proposed a targeted program to replace 34 switchgear units.[71]

### Table 5.8 Volume of Magnefix exceeding or approaching rated fault level

| Fault Level Condition | Magnefix Installations |
|---|---|
| Exceed equipment fault level by greater than 15% | 3 |
| Exceed equipment fault level by up to 15% | 3 |
| Exceed equipment fault level by up to 10% | 3 |
| Exceed equipment fault level by up to 5% | 7 |
| At equipment fault level | 11 |
| Encroaching 5% of equipment fault level | 12 |
| Encroaching 10% of equipment fault level | 15 |
| Total | 54 |

Source: Power and Water, *BNI - Darwin Distribution Substation Fault Level Replacement Program,* March 2018, p. 3.

[69] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, p. 66.

[70] Power and Water, *BNI - Darwin Distribution Substation Fault Level Replacement Program,* March 2018, p. 3.

[71] Power and Water, *BNI - Darwin Distribution Substation Fault Level Replacement Program,* March 2018, pp. 11 and 15.

Power and Water submitted that whilst single phase fault levels have been mitigated through the installation of Neutral Earthing Resistors at most zone substations, three phase fault levels have increased with additional generation and transformation capacity. The proposed replacement program will target Magnefix switchgear, which are subject to explosive failure modes, and will replace installations where the distribution switchgear no longer meets the minimum system fault levels, targeting areas of high pedestrian traffic where risks are greatest. Power and Water submitted that whilst the risks of catastrophic equipment failure and potential injury to workers and the public are key drivers for replacing the switchgear, additional benefits include maintaining network reliability and compliance with the requirements of the Network Technical Code and Network Planning Criteria.[72]

We note that there are options to manage system fault levels other than replacing switchgear units, such as fault current limiters and network reconfiguration options. Based on the information provided by Power and Water, we consider it likely that Power and Water has implemented all possible network reconfiguration options, and that fault current limiter technology is unlikely to be economic in these circumstances. Some level of proactive replacement targeting the high risk Magnefix switchgear units is therefore likely to be justified in the 2019–24 regulatory control period.

However, Power and Water has not provided adequate evidence to demonstrate that fault levels are currently exceeded, or that fault levels will continue to rise in the Darwin CBD over the 2019–24 regulatory control period, such that the fault level will exceed equipment ratings for the 27 switchgear units where Power and Water consider this is not currently the case. We also consider that Power and Water should demonstrate the proposed augex program does not duplicate proposed repex in the substation and switchgear categories.

Table 5.8 shows that there are 27 switchgear units where fault levels are currently at or exceeding the equipment fault rating. For this draft decision, we consider that replacing these units is justified and likely to reflect prudent and efficient investment. However, we consider that there is no substantive justification for the replacement of 34 units as proposed by Power and Water. On this basis, our substitute estimate of forecast capex reflects a reduced program of 27 unit replacements to address the currently identified issues of fault level exceedance.

### Other compliance driven augex

In addition to the fault level replacement project, Power and Water proposed other minor compliance driven augex projects and programs which we have accepted in our substitute estimate of forecast capex for the 2019–24 regulatory control period. Our assessment of the other minor load driven projects is summarised in Table 5.9.

[72] Power and Water, *BNI - Darwin Distribution Substation Fault Level Replacement Program,* March 2018, pp. 6–7.

### Table 5.9 Other compliance driven augex

| Project or program | AER considerations |
|---|---|
| Darwin transmission line uprating | Power and Water has identified some transmission line sections as not complying with statutory line clearances to ground, presenting an unacceptable safety risk. Power and Water propose to rectify the sections of transmission lines that are posing the greatest safety risk to ensure compliance with statutory line clearances. These upgrades will also have the advantage to defer future capital replacement or construction of new transmission lines and reduce system and market constraints.[73] Based on the information provided to us we consider Power and Water's proposal to rectify the sections of transmission lines that are posing the greatest safety risk to ensure compliance with statutory line clearances to ground is reasonable. The proposed capex associated with the Darwin transmission line uprating is reasonably likely to reflect prudent and efficient costs. |
| SCADA and communications Optus cable extension program | Power and Water has a commercial agreement with Optus to install fibre optic cable for use by Optus in Darwin. Power and Water use the cable network to provide protection, SCADA and operational communications requirements.[74] These assets are treated as shared assets, whereby the assets are included in Power and Water's RAB and an adjustment is made to standard control services revenue to account for the forecast unregulated revenue derived from the assets. We have reviewed Power and Water's treatment of the installation of the Optus fibre cable and are satisfied that Power and Water's treatment is consistent with our Shared Assets Guideline.[75] |
| Darwin - Hudson Creek spare 132kV transformer | Power and Water submitted that the current network design at Hudson Creek does not comply with the Network Technical Code and Network Planning Criteria.[76] Based on the information available, Power and Water has justified that the proposal to source a strategic spare transformer for this site to mitigate the risk of extended supply interruptions is a prudent and efficient solution to mitigate this risk and ensure compliance with the Network Technical Code and Network Planning Criteria. |
| Power transformer online moisture treatment | Climatic conditions experienced in the NT result in the presence of high water levels in power transformer insulating oil which reduces the serviceable life of the transformer through degradation of the insulating paper. Power and Water has proposed to install new water filtrating devices to those transformer sites that do not already have online oil filtering.[77] Based on the information available, Power and Water has adequately shown that its proposal will assist in maximising transformer asset life and is likely to reasonably reflect prudent and efficient costs. |

## Reliability and power quality driven augex

Power and Water's proposed reliability and power quality driven augex of $8.5 million is 14 per cent of total proposed augex. For this draft decision, we have made no

[73] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 67.

[74] Power and Water, *BNI - SCADA and Communications Optus Cable Extension Program,* March 2018, p. 7.

[75] AER, Shares Asset Guideline, November 2013; and Power and Water, *Response to AER information request 17 - Item 46*, 1 June 2018.

[76] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 67.

[77] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, p. 67.

specific adjustment to Power and Water's proposed reliability and power quality driven augex. In reaching this conclusion, we note that:[78]

- the purpose of Power and Water's proposed capex is to maintain average service performance across the network, consistent with the capex objectives of the NER. Power and Water does not expect that targeted improvements to poorly served customers will lead to improvements to overall network performance
- Power and Water has a regulatory obligation in the Electricity Industry Performance Code to report on and take action to improve reliability for customers experiencing poor performance
- the Utilities Commission's recently approved performance targets for rural long feeders are more onerous than those that applied in the current regulatory control period
- Power and Water submitted that its customers and other stakeholders support a program to target areas of poor performance
- the increasing uptake of solar panels has the potential to cause voltage issues in Power and Water's distribution network where the inverters are raising voltages above the steady state ranges due to long spans and voltage injection
- the program initiatives proposed by Power and Water to support its Power Quality Management Plan should assist Power and Water to meet its quality of supply regulatory requirements.

Power and Water has justified the proposed capex for this category is likely to reasonably reflect prudent and efficient costs required to achieve the capex objectives in the 2019–24 regulatory control period.

[78] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, p. 68; Power and Water, *Response to AER information request #017 - Item 26*, 8 June 2018; Power and Water, *BNI - Power Quality Compliance Program,* March 2018; and Power and Water, *BNI - Poorly Performing Feeder Improvement Program*, 22 May 2018.

## B.3 Forecast customer connections

Connections capex is expenditure incurred to connect new customers to the network and, where necessary, augment the shared network to ensure there is sufficient capacity to meet the new customer demand. The connecting customer will generally provide a capital contribution towards the cost of the new connection assets, which decreases the revenue that is recoverable from all consumers.

### B.3.1 Power and Water's proposal

Power and Water proposed forecast gross connections capex of $62.7 million ($2018-19).[79] This is a reduction of 8 per cent from actual and estimated gross connections capex in the 2014–19 regulatory control period.

Power and Water also forecast capital contributions of $62.7 million, such that it proposed to fully recover the costs of connection works from connecting customers.[80]

### B.3.2 Position

We consider that Power and Water's connections capex forecasting methodology is reasonable and likely to produce a prudent and efficient forecast of required capex in this category. We have therefore made no specific adjustment to Power and Water's forecast connection capex. However, we have applied updated forecast labour cost escalators, as discussed in the opex attachment of this draft decision, which reduce Power and Water's proposed connections capex by $1.1 million (1.8 per cent) to $61.6 million. We have therefore included this amount in our substitute estimate of total forecast capex for the 2019–24 regulatory control period. We consider that:

- Power and Water's customer connections capex forecasting methodology appears reasonable and likely to produce a realistic forecast; and
- Power and Water's forecast is consistent with the underlying expenditure trend and macroeconomic drivers of new connections activities in NT.

Given the reliance of the forecasting methodology on forecasts of underlying macroeconomic drivers, we consider that Power and Water should ensure that its revised proposal reflects the latest available forecasts in this regard.

Power and Water is currently redrafting its proposed connections policy, including adopting the standard incremental revenue less incremental cost test when determining connection charges.[81] In May 2018 Power and Water submitted a revised forecast of $49.0 million in capital contributions which we have accounted for in our estimate of total forecast net capex. We expect the Power and Water will confirm its

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79 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, p. 71.

80 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, pp. 11 and 72.

81 Power and Water, *Response to submissions received on Power and Water's 2019–24 regulatory proposal*, 17 August 2018, p. 5.

proposed customer connections policy and therefore its forecast capital contributions for the 2019–24 regulatory control period in its revised proposal.

### B.3.3 Reasons for our position

We have applied several assessment techniques to assess Power and Water's proposed connections capex and customer contributions forecasts against the capex criteria. In reaching our position, we:

- assessed trends comparing historical actual and forecast customer connections capex and customer contributions
- reviewed Power and Water's customer connections forecasting methodology, including a review of key inputs, assumptions and relevant documentation supporting Power and Water's proposal.

We sought further information and clarification from Power and Water as necessary, and also had regard to stakeholder submissions.

#### Trend analysis

Trend analysis allows us to draw general observations about how a business is performing. In addition, one capex factor that we must have regard to is the actual and expected capital expenditure during any preceding regulatory control period.[82]

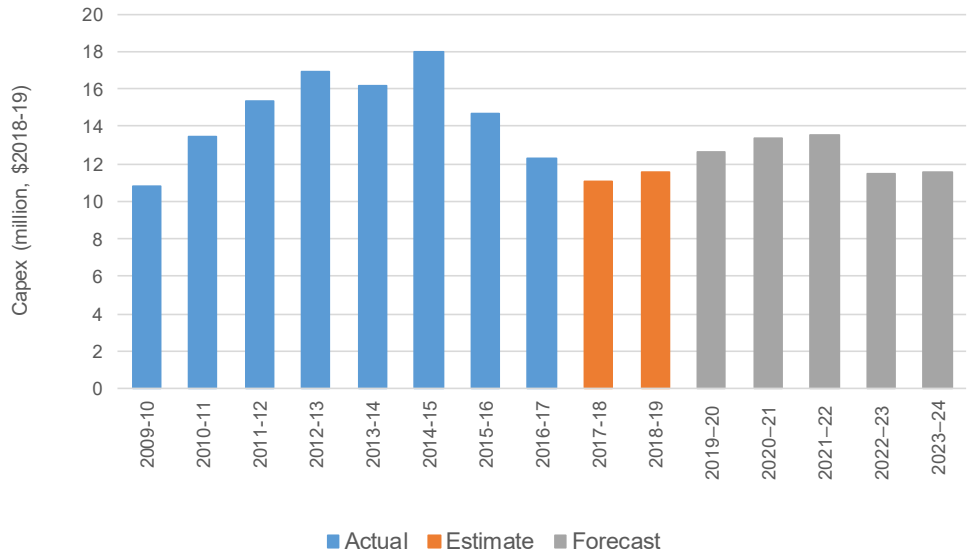
Our use of trend analysis is to gauge how Power and Water's actual connections capex and customer contributions compares to Power and Water's forecast for the 2019–24 regulatory control period. Where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast capex is likely to be efficient and prudent, and therefore contributes to a forecast of total capex that reasonably reflects the capex criteria.[83]

Figure 5.6 shows the trend in Power and Water's actual and forecast customer connections capex since 2009-10. This shows forecast gross connections capex increasing slightly in the initial years of the 2019–24 regulatory control period, then remaining at historically low levels throughout the period.

[82] NT NER, cl. 6.5.7(e)(5).

[83] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

## Figure 5.6 Power and Water connections capex 2014-15 to 2023-24 ($2018-19, million)




Source: Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 16 March 2018, pp. 11–14.

We consider that historical trend analysis supports Power and Water's customer connections capex proposal as likely to reflect a prudent and efficient level of capex for this category. Expenditure in this category is on average forecast to remain low compared to historical levels of investment.

### Forecasting methodology review

We have also considered the key drivers of Power and Water's forecast connections capex and customer contributions, including Power and Water's forecasting methodology, key assumptions and inputs.

AEMO used regression analysis to prepare a customer connections forecast for each of the three major power systems operated by Power and Water in the Northern Territory (NT).[84]

AEMO's forecast average growth rate for connections in NT was used to estimate growth for each standard control customer connection service, such as residential, residential sub-divisions, commercial and industrial, and embedded generation.[85] Power and Water used these forecast connection growth rates to forecast connections capex for each activity based connection type.

[84] Power and Water, *Maximum Demand and Customer Connections Forecasting Procedure*, 7 July 2017, p. 3.

[85] Power and Water, 12.17 - Connection Capex Forecast Model, Updated May 2018.

Power and Water calculates its connections capex forecast by first estimating the volumes of new customer connections for each customer class and then multiplying these volumes by unit rates for each connection type. We have separately assessed Power and Water's forecast volumes and unit costs as discussed below. In summary, we found that:

- Power and Water's forecast connections volumes appear reasonable and unbiased estimates of likely connection activity; and
- Power and Water's average forecast unit rates reasonably reflect a realistic expectation of cost inputs and are likely to represent efficient amounts.

**Connection volume forecasts**

Power and Water engaged AEMO to prepare forecasts for each of the three networks in NT: Darwin-Katherine; Tennant Creek; and Alice Springs.[86] AEMO developed a regression model based on the statistical relationship between the number of new connections and the underlying drivers that influence new connections.[87]

AEMO applied a consistent customer connection forecasting methodology to the three networks. The customer connection forecasts incorporated 10 years of connection numbers for residential, commercial and government (less than 750 MWh p.a.), and commercial and industrial (above 750 MWh p.a.) connection types.[88]

The process for producing the connections forecast involved estimating the number of current dwellings using the 2016 ABS population and household density, the Housing Industry Association (HIA) dwelling forecasts modified to converge smoothly with the rate of the long-term ABS population projections and calibrated for the number of electricity connections in Power and Water's regulated network.[89]

Business and industrial connections growth was calculated using economic indicators such as Gross State Product (GSP) and the large load registry that Power and Water manage for large customers in the network.[90]

Figure 5.7 shows Power and Water's historical and forecast customer connections. We compared these volumes against the forecast housing starts growth rate for NT published by the HIA. This provides an independent comparison against Power and Water's customer connections forecasts.[91]

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[86] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 55.

[87] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024*, 16 March 2018, p. 58 and Power and Water, *Maximum Demand, Energy Consumption And Connections Forecast*, September 2017, p. 24.

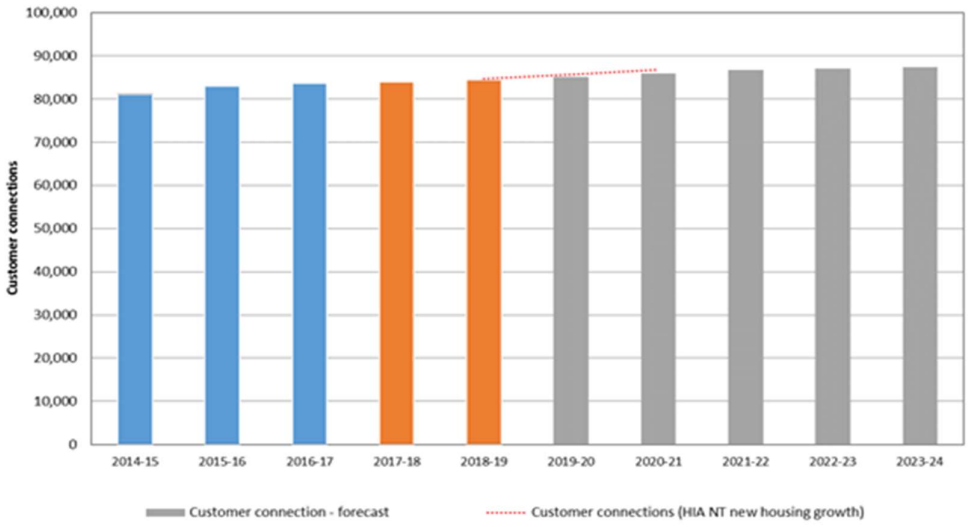
[88] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024, 16 March 2018*, p. 58.

[89] Power and Water, *Maximum Demand and Customer Connections Forecasting Procedure*, 7 July 2017, p. 10.

[90] Power and Water, *Maximum Demand and Customer Connections Forecasting Procedure*, 7 July 2017, p. 9.

[91] HIA data is a reasonably well accepted industry standard indicator of residential connection activity. HIA is a private-sector industry association comprising mainly house construction contractors, and has been used by the

## Figure 5.7 Power and Water's customer connection forecasts, 2017-18 to 2023-24




Source: Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024*, 16 March 2018, p. 57, and HIA, *State Outlook Northern Territory*, Summer Edition 2018 p. 29.

Power and Water's forecast customer connections are consistent with the HIA's independent forecast of new housing in NT. This suggests that Power and Water's forecasts are not likely to be overly inflated. We consider this provides evidence that this methodology is capable of producing a realistic and unbiased forecast of connection volumes.

Given the reliance of the forecasting methodology on forecasts of underlying macroeconomic drivers, we consider that Power and Water should ensure that its revised proposal reflects the latest available forecasts in this regard.

### Unit rates

In determining its forecast connections capex, Power and Water relied on a series of internally derived unit costs. These unit costs are broken down by connection activities based on the characteristics of the type of customer served and the capacity of the connection.[92]

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industry since 1984. See Mills, Anthony and Harris, David and Skitmore, Martin R, *The Accuracy of Housing Forecasting in Australia, Engineering Construction and Architectural*, Management 10(4), 2003, pp. 245–253. Accessed from: http://eprints.qut.edu.au/archive/00004441/

92 Power and Water, 12.17 - Connection Capex Forecast Model, 31 January 2018.

Power and Water derived a unit rate for each connection type based on a sample of historical data from 2014 to 2017. Power and Water applied the minimum value from the historical range to determine its capex forecast.[93]

We consider that Power and Water's forecast unit rates are likely to be at or close to an efficient level. The use of the lowest observed historical unit rates provides some assurance that Power and Water has not overestimated its likely outturn unit rates for connection works in the 2019–24 regulatory control period.

**Customer Contributions**

The relationship between gross connections capex and customer contributions is important as it determines from whom and when Power and Water recovers revenue associated with works required to connect new customers or alter existing connections. For works involving a customer contribution, Power and Water recovers revenue directly from the customer who initiates the work at the time the work is undertaken.

Customer contributions are impacted by the connections policy arrangements for new connections. Power and Water's initial proposal forecast cash contributions and gifted assets of $62.7 million, equalling the connections capex costs that Power and Water expected to incur in the 2019–24 period.[94] However, as discussed in attachment 17, Power and Water's proposed connection charging policy is inconsistent with the classification of connection services as standard control services. Power and Water is currently redrafting its proposed connections policy, including adopting the standard incremental revenue less incremental cost test when determining connection charges.[95] Power and Water has advised that this would result in lower cash contributions and therefore higher levels of net connections capex.[96]

Power and Water submitted a revised estimate of $49.0 million in capital contributions for the 2019–24 regulatory control period.[97] This is 7 per cent lower than actual and estimated capital contributions in the 2014–19 regulatory control period, which is consistent with the reduction in forecast connections capex. We have accounted for Power and Water's revised forecast of capital contributions in our substitute estimate of total forecast net capex. We expect the Power and Water will confirm its proposed customer connections policy and therefore its forecast capital contributions for the 2019–24 regulatory control period in its revised proposal.

## Submissions

CCP 13 expressed concerns about inconsistencies in relation to the level of economic activity, population growth and customer connections in the Darwin-Katherine and

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93 Power and Water, 12.17 - Connection Capex Forecast Model, 31 January 2018.

94 Power and Water, 07.1 - Connections Capex - Justification Document, 31 January 2018, p. 11.

95 Power and Water, *Response to submissions received on Power and Water's 2019–24 regulatory proposal*, 17 August 2018, p. 5.

96 Power and Water, Presentation to the AER, 24 May 2018.

97 Power and Water, 12.17 - Connection Capex Forecast Model, Updated May 2018.

Alice Springs network.[98] CCP 13 recommended that the AER examine the AEMO demand forecasts for Power and Water's network with particular attention to the forecasts of connection growth.[99]

An anonymous submission raised concerns in relation to the assumption that existing connections will continue their consumption and demand patterns, and that rental properties will be filled.[100]

As discussed above, we consider that AEMO's forecasting methodology for customer connections appears reasonable and likely to produce a realistic forecast. However, given the reliance of the forecasting methodology on forecasts of underlying macroeconomic drivers, and in response to the concerns raised in submissions, we requested that Power and Water advise whether it would seek updated maximum demand and customer connections forecasts from AEMO to reflect:

(a) the most recent population and GSP forecasts from NT Treasury

(b) analysis of the possible impact of increasing PV penetration driven by the "Roadmap to Renewable" target of 50 per cent renewables by 2030

(c) any other updated inputs or assumptions such as changes to block load forecasts, vacancy rates, or new significant PV/generation commitments.

Power and Water advised that it will seek updated connections forecasts from AEMO. Power and Water will also provide greater transparency in relation to how renewable energy projects (mainly large-scale PV substituting existing generation supply) are treated. AEMO will review the energy and demand forecasts, to validate inputs and assumptions. We will review Power and Water's revised regulatory proposal before making our final decision on forecast customer connections capex and capital contributions for the 2019–24 regulatory control period.

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98 CCP13, *Advice to the AER, Response to proposals from PWC for a revenue reset for the 2019–24 regulatory period*, 16 May 2018, pp. 8–9.

99 CCP13, *Advice to the AER, Response to proposals from PWC for a revenue reset for the 2019–24 regulatory period*, 16 May 2018, pp. 8–9.

100 Anonymous, *Submission on Power and Water proposal*, 16 May 2018, p. 6.

## B.4 Forecast Replacement Expenditure

Replacement capital expenditure (repex) must be set at a level that allows a distributor to meet the capex objectives. Replacement can occur for a variety of reasons, including when:

- an asset fails while in service or presents a real risk of imminent failure;
- a condition assessment of the asset determines that it is likely to fail soon (or degrade in performance, such that it does not meet its service requirement) and replacement is the most economic option;[101]
- the asset does not meet the relevant jurisdictional safety regulations, and can no longer be safely operated on the network; and
- the risk of using the asset exceeds the benefit of continuing to operate it on the network.

The majority of network assets will remain in efficient use for far longer than a single regulatory control period (many network assets have economic lives of 50 years or more). As a result, a distributor will only need to replace a portion of its network assets in each regulatory control period. Our assessment of repex seeks to establish the proportion of Power and Water's assets that will likely require replacement over the 2019–24 regulatory control period and the associated capital expenditure.

### B.4.1 Position

Power and Water has proposed a replacement expenditure (repex) of $148.6 million ($2018–19)[102], which is 18 per cent lower than the $175.5 million ($2018–19) it expects to spend over the current period.[103] In summary, Power and Water submit that this expenditure is driven by:[104]

- condition and risk - these replacement projects and programs represent 94 per cent ($139.43 million) of total forecast repex. Table 5.11 below shows the breakdown of these projects per asset group. Power and Water submitted these projects and programs are intended to address an identified condition, technical obsolescence or risk to safety and continuity of supply;
- compliance driven - these replacement projects represent approximately 4 per cent ($6.08 million) of Power and Water's total forecast repex. Power and Water

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[101] A condition assessment may relate to assessment of a single asset or a population of similar assets. High value/low volume assets are more likely to be monitored on an individual basis, while low value/high volume assets are more likely to be considered from an asset category wide perspective.

[102] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024*, 16 March 2018, p. 69.

[103] This includes estimates for 2017-2018 and 2018-2019 as currently estimated by Power and Water. See, Power and Water, *Capex Overview Document* – 31 January 2018 – PUBLIC, p. 14.

[104] Power and Water, *Capex Overview Document 2019-20 to 2023- 24*, 31 January 2018, Attachment 04.1, p. 39 CONFIDENTIAL.

submitted that these projects are intended to meet the requirements of the Network Technical Code and Network Planning Criteria; and

- reliability and quality of supply - these replacement projects represent 1.8 per cent ($2.69 million) of Power and Water's total forecast repex. Power and Water submitted that these projects are required to meet reliability and power quality obligations or technical standards, including in response to customer feedback.

Power and Water has not demonstrated that the proposed repex of $148.6 million ($2018-19 dollars, excluding overheads) is efficient and prudent, and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. We have instead included in our substitute estimate of overall total capex, an amount of $129.0 million for repex, excluding overheads. This is 13 per cent lower than Power and Water's proposal. Table 5.10 summarises Power and Water's proposal and our substitute amounts for repex.

### Table 5.10 Draft decision on Power and Water's total forecast repex ($2018-19, million)

| | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | Total |
|---|---|---|---|---|---|---|
| Regulatory proposal | $34.9 | $38.5 | $33.4 | $22 | $19.7 | $148.6 |
| AER draft decision | $28.9 | $33.6 | $30.2 | $19.4 | $17 | $129 |
| Total difference b/w the AER decision and RP | -$6 | -$4.9 | -$3.25 | -$2.6 | -$2.7 | -$19.6 |
| Percentage difference b/w AER decision and RP (%) | -17% | -13% | -10% | -12% | -$14% | -$13% |

Source: AER analysis.

Note: Numbers may not add up due to rounding.

## B.4.2 Reasons for our position

We have applied several assessment techniques to assess Power and Water's forecast of repex against the capex criteria. These techniques include:

- trend analysis of Power and Water's past expenditure;
- predictive repex modelling based on Power and Water's assets currently in commission when compared to its industry peers;
- Power and Water's performance against several network health indicators;
- consideration of bottom-up and top-down methodologies, such as business cases and top-down challenges or constraints;
- advice from technical and engineering experts (if applicable); and
- stakeholder submissions.

When weighing up all the above techniques, we have concluded that despite Power and Water's forecast repex being below its actual spend during the current period, we have decided to consider the forecast repex within the context of Power and Water's overall long term replacement trend. A consideration we have also taken into account is that Power and Water has a young network compared to its peers in the NEM, [105] which is an indicator of its repex requirements.

In coming to our position, we have been informed by the results of our predictive modelling where our modelled repex for Power and Water is $92 million, which is approximately 62 per cent of its total proposed repex.[106]

For the remainder of Power and Water's repex where we have not used predictive modelling, we have relied on several factors, including expenditure trends, asset health indicators and supporting material such as a bottom-up review to assess Power and Water's repex forecast for the 2019–24 regulatory control period. Table 5.11 shows Power and Water's forecast repex at each asset group as well as the breakdown between modelled and unmodelled repex.

### Table 5.11 Power and Water's forecast repex breakdown into asset groups

| Asset group | Forecast 2019-2024 ($million) |
|---|---|
| Poles | $22.4 |
| OH conductors | $3.92 |
| UG cables | $32.85 |
| Services lines | $0.4 |
| Transformers | $24.50 |
| Switchgear | $17.42 |
| Modelled Repex | $101.48 |
| Unmodelled Repex | $47.17 |
| Total Repex | $148.65 |

[105] This has been influenced by a number of factors in Power and Water's history which has affected the age and condition of its network to-date. Factors such as the full rebuild of the Darwin Network after Cyclone Tracey in 1975 and also the major power outages in 2008 which resulted in a change in asset management and replacement practices. See Power and Water, *Regulatory Proposal* - 16 March 2018 - Public, p. 5 and Power and Water, 2014 *Network Price Determination*, initial regulatory proposal, p. 17.

Source: AER Analysis, Power and Water, *Regulatory Determination Workbooks - Consolidated*, 22 May 2018 - Public.

### Trend analysis

Trend analysis of a distributor's past expenditure allows us to draw general observations about how a business is performing, as well as to provide a sanity check against our predictive modelling results. In addition, one capex factor that we must have regard to is the actual and expected capital expenditure during any preceding regulatory control period.[107]

For some aspects of our assessment where we have not relied on predictive modelling, we have considered historical levels of expenditure to forecast repex or to determine our substitute estimate. In particular, where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast repex is efficient and prudent, and whether we would be satisfied it forms part of a forecast capex that reasonable reflects the capex criteria.[108]

In coming to our position, we had regard to the following trends:

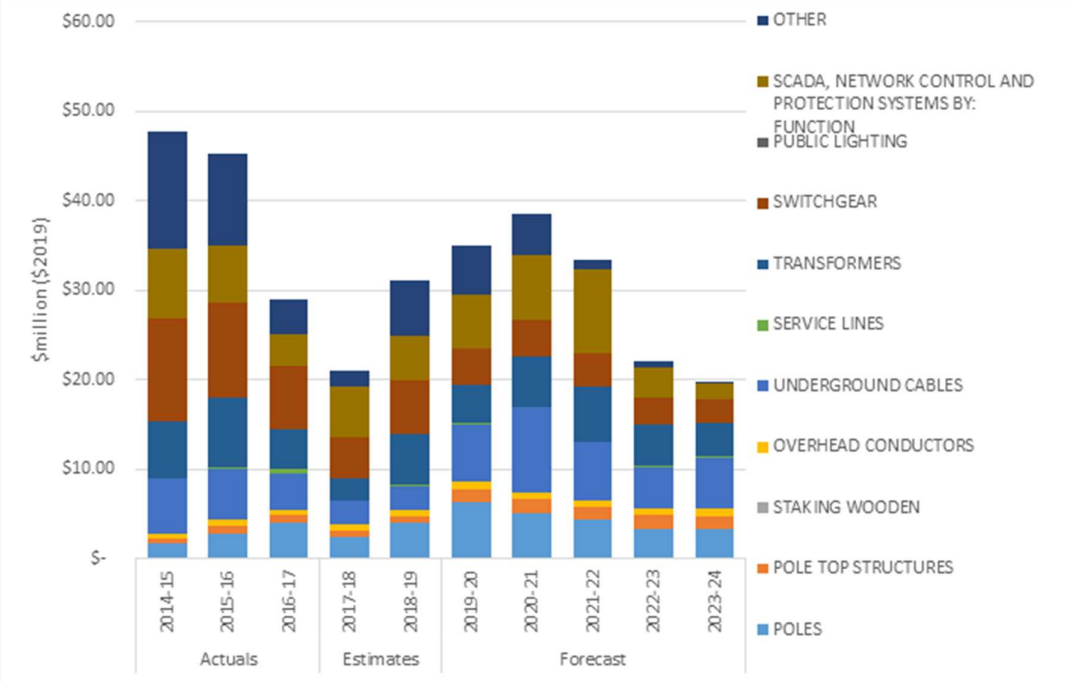
- Power and Water's proposed forecast repex for the 2019–24 regulatory control period relative to its actual spend in the current regulatory control period; and
- Power and Water's long term trend for replacement expenditure.

Figure 5.8 below shows Power and Water's historical actual repex compared to its proposed forecast repex for the 2019–24 regulatory control period, where forecast repex is approximately 14.5 per cent below actual spend. Figure 5.9 also shows Power and Water's historical trend over a 10-year period.

[107] NT NER, cl. 6.5.7(e)(5).

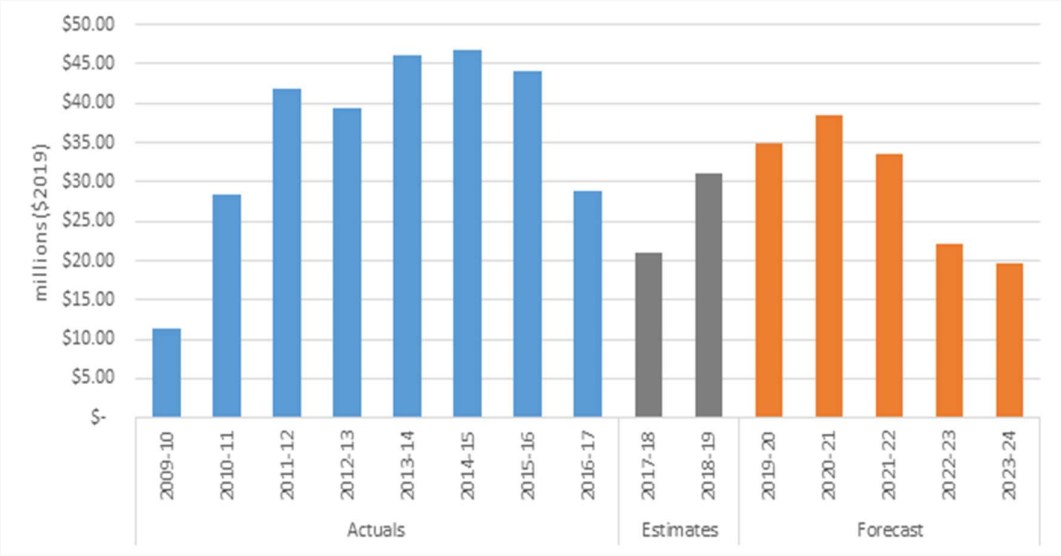
[108] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

## Figure 5.8 Comparison of historical and forecast replacement expenditure




Source: AER Analysis, Power and Water, *Category Analysis RIN Workbooks - Consolidated* - 22 May 2018 and Power and Water, *Regulatory Determination workbooks - Consolidated* - 22 May 2018.

## Figure 5.9 Long-term trend in historical expenditure




Source: AER analysis, AER Analysis, Power and Water, *Category Analysis RIN Workbooks - Consolidated* - 22 May 2018 and Power and Water, *Regulatory Determination workbooks - Consolidated* - 22 May 2018.

In viewing these trends, it is important to consider the particular circumstances Power and Water was facing in the last 10 years. The catastrophic failure at Casuarina Zone

substation in 2008 was a turning point in Power and Water's replacement practices.[109] As can be seen in Figure 5.9, there was significant repex spent after this failure resulting in an evident step up in expenditure from 2010-11 to 2015-16. At that time, Power and Water did not have the necessary information to analyse the condition of its assets or quantify the risk of its assets so it took an approach to eliminate risk by replacing assets in poor condition.[110] We have also observed a step down in replacement expenditure over the 2016-17 to 2018-19 regulatory years, likely to reflect Power and Water's move to a more condition-based replacement approach. This is evident in Power and Water's risk-based modelling for the Alice Springs pole program. Despite some concerns with the modelling that are discussed below, we acknowledge the improvement to date.

With this context in mind, it is not surprising that Power and Water's forecast repex for the 2019–24 regulatory control period is lower than its actual spend over the current period.

In assessing forecast repex, when viewing the longer term trend, our focus has been on the justification for the apparent step in repex over the forecast period. In particular, Power and Water has a relatively young fleet of assets in commission, which is a result of its abnormally high repex spend over the 2011-12 to 2014-16 period.

We have not placed weight on Power and Water's actual repex spend performance relative to its current allowance as set by the Ministerial Direction. Power and Water's overall revenue allowance as set by the Utilities Commission was reduced by around 17.5 per cent under a Ministerial Direction (with no commentary on what component of the total allowance would relate to repex).[111] This meant making meaningful comparisons between actual and allowed repex was difficult.

### Repex modelling: a top-down assessment of modelled repex

The repex model can be used to advise and inform us where to target a more detailed bottom-up review and define a substitute estimate if necessary. The model can also be used to compare a distributor against other distributors in the NEM. [112]

We recognise that it may be difficult to model some categories of repex. Sometimes expenditure cannot be forecast by the repex model due to a non-age related reason for the asset replacement (such as a change in jurisdictional safety or environmental legislation) or there may not be sufficient data on particular repex categories. We rely on other evidence to assess the prudency and efficiency of this unmodelled repex.

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[109] Parsons Brinckerhoff, *2014-2019 Network Price Determination - Review of Power and Water Corporation's regulator proposal for the 2014-2019 regulatory period*, 18 December 2013, p. 58.

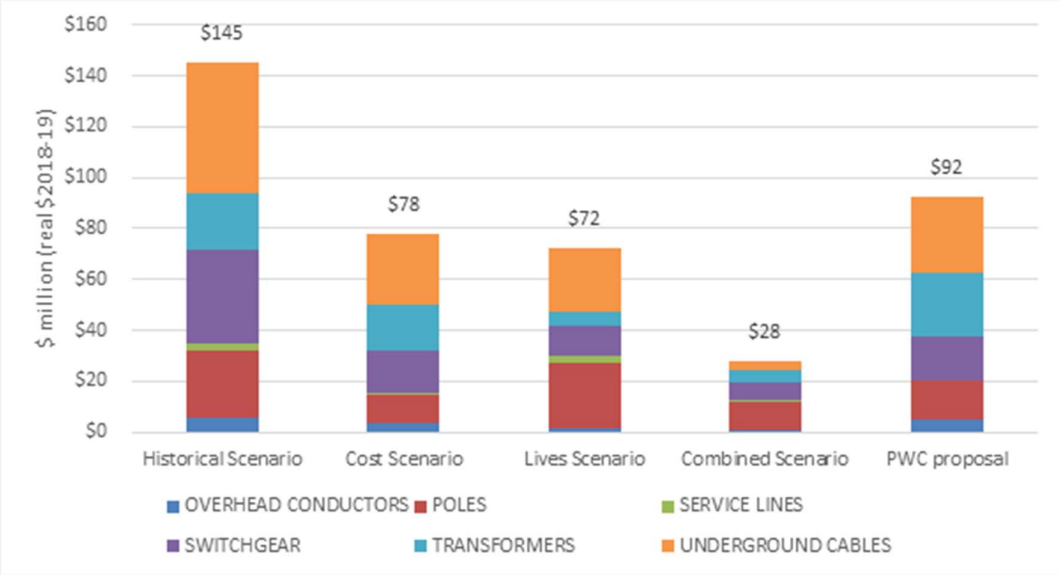
[110] Mervyn Davies Enquiry, *Final Report*, June 2011, pp. 3–4.

[111] Power and Water, Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 3.

[112] This includes Power and Water Corporation.

The results of our repex model show that Power and Water's forecast modelled repex, which is 62 per cent of total forecast repex, is 18 per cent above the threshold level of repex of $78 million. The outcomes from the scenario analysis are set out in Figure 5.10 below.

### Figure 5.10 - shows the output of the repex modelling scenario comparison




Source: AER Analysis

Note: Historical Scenario uses historical unit costs and calibrated expected replacement lives
Cost Scenario uses comparative unit costs[113] and calibrated expected replacement lives
Expected Lives Scenario uses historical unit costs and comparative expected replacement lives[114]
Combined Scenario uses comparative unit costs and comparative expected replacement lives.

As Figure 5.10 shows, Power and Water's results are being driven by differences in its forecast units and forecast replacements volumes relative to the industry median on unit costs and expected replacement lives.

Power and Water's result is driven by forecast unit rates being higher compared to the industry median for four of the six asset groups we model, namely in transformers, underground cables, OH conductors and poles. For instance, Power and Water's forecast unit rate for transformers is 36 per cent higher than the industry median value. Similarity, its forecast replacement volumes for most of these assets are also higher than the industry median; these being for OH conductors, transformers and switchgears.

### Assessment of top down and bottom up methodologies

[113] Minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM.

[114] Maximum of a distributor's calibrated replacement life and the median replacement life across the NEM.

We reviewed several business cases to assess the bottom up and top down methodologies Power and Water applies to forecast repex for the 2019–24 regulatory control period.

Power and Water uses a number of approaches to forecast repex depending on the asset.[115] This includes:

- for large projects the scope and cost depends on planning criteria and regulatory obligations;
- for some repex the forecast is based on a build-up of volumes and unit costs;
- where it is not feasible to forecast based on volumes and cost due to, for instance, accuracy of volumes, the forecast was based on historical expenditure; and
- benchmarking capex based on results from Nuttall Consulting who applied the AER's repex model.

We observe that, overall, Power and Water has submitted a forecast repex proposal with supporting material that reflects a reasonable understanding of the specific needs of its business. Its supporting documentation and modelling demonstrate a broad understanding of some of the principles around cost benefit analysis. It would also appear that Power and Water's businesses practices are developing over time and we encourage steps towards improvements in its forecasting approach, asset management practices and risk management in future resets. We are also encouraged by Power and Water's clear commitment to embed these improvements as evident from our discussions with Power and Water throughout the review process.

However, in this draft decision, we have identified a number of issues with Power and Water's methodologies, being:

- an overestimation of replacement volumes in its bottom-up forecasts for a sample of projects that we have assessed.[116] This is as a consequence of an overly conservative and risk-averse approach.[117] This is evident in Power and Water's risk management guideline, where Power and Water assumes the most credible worst case consequence outcome of events;[118]
- a subjective approach to risk assessment, which does not account for joint probability which is inconsistent with good industry practice;[119] and
- a degree of subjectiveness where there is in-built conservatism attached to its project costing forecasts. As an example, we have observed the inclusion of

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[115] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, 31 January 2018, p. 41 CONFIDENTIAL.

[116] Alice Springs Pole replacement program and Darwin Northern Suburbs XLPE program. See Power and Water, *Alice Springs Corroded Poles* - Public, 16 March 2018 and Power and Water, *Darwin Northern suburbs High Voltage cable replacement program* - public, 16 March 2018.

[117] Power and Water, *Information request response IR032 Question 3*, 18 July 2018.

[118] Power and Water, *Risk Management Foundation Document - Risk Management Guidelines*, p. 10.

[119] As an example, the probability that two mutually exclusive events occur at the same time.

'contingency risk' across some of its major program/projects to take account of cost and scope uncertainty.

On the final point above, consistent with our previous determinations, we are of the view that there is likely to be a forecasting risk, if a specific contingency is not defined.[120] The estimated cost of projects and programs can increase or decrease such that at overall capex portfolio levels, there may be no material change to the ex-ante forecast capex. In this regard, we consider a capex forecast that includes a 'contingency risk' is not prudent and efficient.

### Nuttall Consulting top-down review

Power and Water commissioned Nuttall Consulting to benchmark its repex forecast.[121] From the outcome of these scenarios, Nuttall Consulting concluded that Power and Water's forecast modelled repex of $100 million would be below the AER's alternative estimate which was estimated to be $127.9 million.[122]

Nuttall Consulting compared Power and Water's forecast against three studies: applying historical costs (and historical replacement volumes, which subsequently estimated expected asset lives), applying forecast unit costs (and forecast replacement volumes, which subsequently estimated forecast expected asset lives) and then applying what Nuttall Consulting refer to as 'the AER's benchmark unit costs' (and historical replacement volumes, which subsequently estimated expected asset lives).[123] Nuttall Consulting's AER unit costs were derived from the AER's previous determinations for Victorian and Tasmanian distributors. [124]

We have reviewed Nuttall Consulting's report and associated supporting documentation. Nuttall Consulting acknowledges that the repex modelling outcomes and conclusions assume that the AER will produce estimates using a similar approach to that applied in previous decisions.

We consider the analysis and underlying assumptions to be sound. The differences between our modelled threshold alternative of $78 million versus Nuttall Consulting's forecast of $127.9 million is due to a number of reasons:

- our use of the most up to date industry data; and
- a more comprehensive comparative analysis using RIN data from all 14 NEM businesses, reflecting refinements to our modelling approach.

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[120] Power and Water noted that the contingency cost is the difference between the base case and the expected cost of a given project (P50 cost estimate). We have inquired about the contingency and Power and Water provided us with further information requested further on its Risk and Contingency Cost Estimates (RACE). Power and Water noted that its RACE costs relate to specific contingencies: Power and Water, Information request response #017 (AER Item 19), 12 June 2018, Public.

[121] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018 - Public, p. 69.

[122] Nuttall Consulting calculated a potential AER substitute estimate based on past decisions. See Power and Water, Nuttall Consulting - *Repex Report* - 31 January 2018 - Public, p. 4.

[123] Power and Water, *Nuttall Consulting - Repex Report* - 31 January 2018 - Public, p. 7.

[124] Power and Water, *Nuttall Consulting - Repex Report* - 31 January 2018 - Public, p. 7.

Nuttall Consulting's observations indicate a more thorough assessment of the forecast repex associated with particular asset groups is needed. We also identified these same asset groups as areas for further assessment, being:

- transformer unit costs (33kV to 66kV) has increased 7 fold between historical and forecast periods; and
- in aggregate, Power and Water's replacement lives for its assets appear to be shorter than the AER's benchmark replacement lives. This is particularly the case for 11 kV underground cables and 66-132 kV poles.

### Assessment of Power and Water's bottom-up business cases

We also undertook a bottom-up assessment of a sample of Power and Water's business cases. In determining the areas for us to scrutinise, we were informed by a number of factors including whether the repex forecast for asset groups, such as the forecast for expenditure on poles, is materially above the repex model threshold, trend analysis, as well as the materiality of each asset group as part of total repex.

We have focused largely on business cases where transformers, poles and underground cables feature as a material component of the repex forecast. [125]

Below we set out reasons as to why we were not satisfied with Power and Water's forecast repex for particular programs.

#### *Berrimah Zone Substation replacement*

The most significant proposed transformer expenditure is within the Berrimah Zone Substation replacement program. Based on the information before us, Power and Water has not justified that its repex forecast for this program is prudent and efficient.[126] Instead, we consider our alternative forecast is prudent and efficient.

Power and Water is proposing to replace the Berrimah Zone Substation with two 20/27MVA transformers, and a 66/11kV zone substation located directly adjacent to the existing substation. In coming to our position we have had regard to:

- analysis from CutlerMerz, Power and Water's consultant, where a worst-case scenario in its quantitative analysis is applied which brings forward the need for the forecast repex. For instance, Power and Water assumes that the condition of the two transformers are identical, [127] despite the transformers having different asset health ratings in its own condition assessment report;[128]

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[125] The three asset groups make up approximately 79 per cent of the modelled repex.

[126] Power and Water, *Replace Berrimah Zone Substation* - Public.

[127] Power and Water, *Response to Information request #005 - Power Networks Transformer DP methodology* - Public, 13 April 2018.

[128] Asset health rating considers age, operating performance, reports and failures and are categorised in Power and Water's own Condition assessment report. Power and Water, *Condition Assessment Report - Berrimah Zone Substation*, Public, p. 8.

- insufficient evidence to support replacing the Berrimah substation in the next regulatory control period. While we acknowledge that some degree of capex is required for this substation, based on the information before us, Power and Water has not adequately shown that a greenfields replacement with a smaller capacity substation is efficient and prudent. It would also appear that Power and Water's proposed replacement option for this substation (reducing the capacity at Berrimah) is designed to allow for augmentation of the network at Wishart to meet sufficient firm capacity. The interrelationship between the two projects was also flagged in a public submission.[129] Our assessment of forecast capex for the Wishart Substation development is discussed in the augex section.
- Our substitute forecast is based on a review of the assets' condition report for Berrimah. We assess that it would be prudent and efficient to refurbish a number of assets identified in the Condition Assessment Report (CAR) and target replacement based on condition. We also consider it reasonable to invest in a spare transformer, given the non-standard sized transformers in the zone substation. However, Power and Water has not justified that developing a new adjacent substation, and the associated civil works is required over the next regulatory control period. In coming to this position, we have had regard to Power and Water's assessment of the substation's building and civils works which indicate that there are no significant issues.[130] The approach we took in coming up with the substitute estimate is in Appendix F.

### *Alice Springs corroded Poles program*

Power and Water has not adequately shown that the proposed repex for its targeted Alice Springs corroded poles program is prudent and efficient.

Figure 5.11 shows the actual and forecast spend on poles overtime. As can be seen, Power and Water are proposing a 48 per cent increase in pole expenditure relative to the current period spend.

Power and Water notes that its poles expenditure has increased from previous years due to the inclusion of a program to address the elevated safety risk associated with below ground corrosion of the steel distribution poles in the corrosive soils' environment in and around the Alice Springs area.

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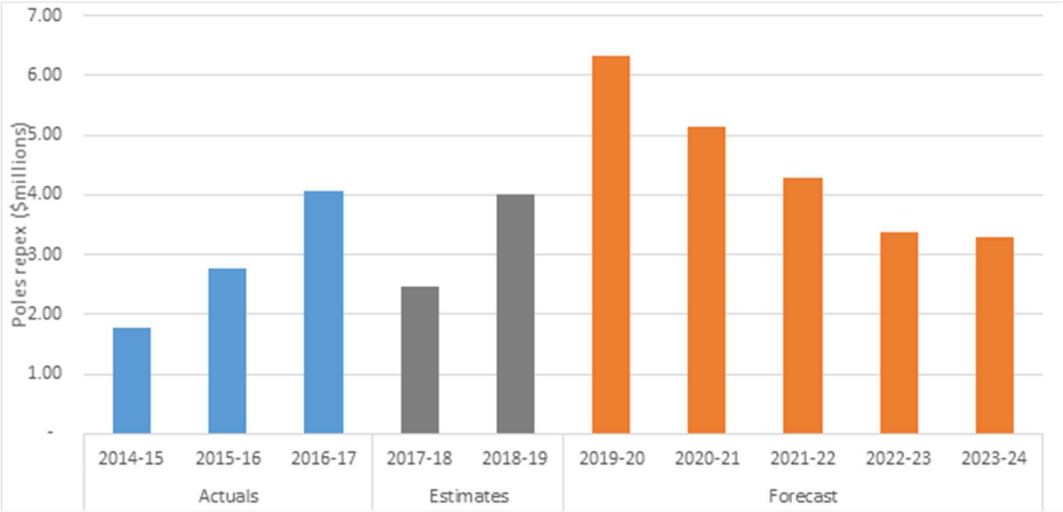
[129] Anonymous, *Submission on the Power and Water proposal*, 16 May 2018, p. 7.

[130] Power and Water, *Condition Assessment Report - Berrimah Zone Substation*, Public, p. 7.

**Figure 5.11: shows the historical and forecast poles repex**




Source: AER Analysis, Power and Water, *Category Analysis RIN Workbooks - Consolidated* - 22 May 2018 and Power and Water, *Regulatory Determination workbooks - Consolidated* - 22 May 2018.

Based on the information before us, our position is that replacing some of the Alice Springs corroded poles is necessary. Power and Water noted that below ground inspections have found a high rate of corrosion.[131] We requested further information on the underlying modelling and Power and Water has provided its risk based forecast model.[132] In coming to our position, we observe that its supporting quantitative analysis overstates risk, as it does not account for joint probabilities for risk or consequence.[133] Therefore, the cost benefit analysis which incorporates the overstated risk is not likely to represent the most efficient outcome.

Our alterative estimate includes expenditure for only the highest risk poles to be replaced over the 2019–24 regulatory control period. We consider that this amount is prudent and efficient and consistent with its historical spend on poles.

### *Darwin Northern Suburbs HV Cable replacement*

Power and Water has not justified that the proposed repex for a targeted proactive replacement of HV and LV cables at specific locations in Darwin, is prudent and efficient. We have included in our substitute estimate an amount, which we are satisfied is prudent and efficient.

The Darwin Northern Suburbs HV Cable replacement is the largest component of the underground cables' expenditure forecast, making up around 64 per cent of this asset

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131 Power and Water - *PBC - Alice Springs Corroded Poles* - Public - 16 March 2018.

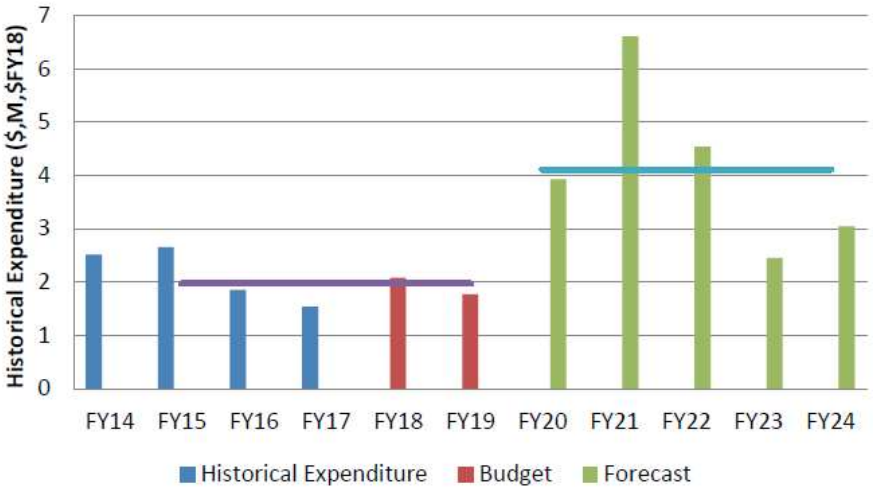
132 Power and Water, *Information Request 017 - Item 40 - Risk Based Forecast Model - ASC Poles* - 29 May 2018 - Confidential.

133 For example, it does not account for the low probability of mutually exclusive events occurring at the same time.

group. It is a targeted replacement program of HV and LV cables at specific locations, with a focus on replacing about 44 kilometres of HV XLPE cables in the northern suburbs of Darwin over the 2019–24 regulatory control period.

Power and Water's forecast repex for this program is double the expenditure from actual current spend. Figure 5.12 shows repex proposed for the forecast period relative to current period spend and allowance.

### Figure 5.12: shows the historical and forecast XLPE underground cables replacement expenditure ($2017-18, million)




Source: Power and Water, *BNI - Darwin Northern Suburbs High Voltage Cable Replacement Program*, p. 14.

The information before us, including the cable replacement model[134], cable test data and the business case[135], indicates that replacement of these cables is prudent (as these directly impact the cable fault Customer Minutes Lost). However, we assess that the forecast replacement volumes are overstated and do not represent efficient expenditure. In particular, we note that Power and Water proposes to replace some of those underground cables over the regulatory control period without conclusive evidence that these cables have failed an earthing test and without considering the cost of consequence.[136] Our substitute estimate allows Power and Water to replace 31 km of the cables that have failed the earthing test, particularly ones that have a large impact on Customer Minutes Lost.

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134 Power and Water, *IR017 Item 41, NMP1 - Replacement Model* - 20180529 - Public.

135 Power and Water, *BNI - Darwin Northern Suburbs High Voltage Cable Replacement Program* – Public.

136 We requested further information in information request #32, Power and Water revised its XLPE cable modelling, however, on further investigation we have identified that, on multiple occasions, and the cable test results are not consistent with the modelling. See Power and Water, *IR032 Q2 - XLPE Replacement Data* - 20180719 - confidential.

We note that this program and its associated proposed repex may be affected by the implementation of the undergrounding project that was announced by the NT government in April 2018. We also understand that other programs that may be affected include the Lake Bennett Conductor Clearance rectification project, and Darwin Coastal Pole Top Corrosion Replacement Program. Should implementing this undergrounding project impact Power and Water's proposed capex in the forecast period, we expect Power and Water would address this as part of its revised regulatory proposal, the impact of which we will assess on the basis of the information available to us at that time.

### Unmodelled repex

For the unmodelled repex, where we have not used predictive modelling, we have relied on several factors, including expenditure trends and supporting material such as a bottom-up review to assess Power and Water's repex forecast for the 2019–24 regulatory control period. Based on the information before us, Power and Water has demonstrated that the unmodelled component of repex is efficient and prudent.

We accept Power and Water's proposed repex of $12.5 million for various SCADA and communications replacements. The most significant item in this expenditure is associated with the Energy Management System (EMS). An anonymous submission has flagged whether the costs of the upgrade should be shared amongst users of the system.[137] In response to an information request, Power and Water noted that System Control, a ring-fenced entity, utilises the EMS to perform its system operator functions in addition to network operator functions on behalf of Power Networks.[138] Power and Water has a service level agreement with System Control which includes provisions to have a cost recovery mechanisms for shared assets.

While we accept that the EMS expenditure is prudent as it is required to operate the network, we consider that as a shared asset, a mechanism should exist to allow each party to pay its share of the system usage, as consistent with clause 6.57(e)(9) of the NT NER. We have included the proposed EMS expenditure in our substitute total capex estimate, however, we invite Power and Water to consider the inclusion of a revenue adjustment mechanism to allocate the efficient shared costs between the two parties.

### Network health indicators

Network health measures provide useful information about the overall condition of a regulated businesses' assets currently in commission. When assessing a distributor's proposed repex over the regulatory control period, we will have regard to various network health measures to determine for instance whether a step up in forecast repex is required when a distributor has performed consistently well overtime on these health measures.

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[137] Anonymous, *Submission on the Power and Water proposal*, 16 May 2018, p. 7.

[138] Power and Water, *Information request response #034 - Energy Management System Upgrade*, Public, p. 2.

In assessing Power and Water's network health, we have reviewed:

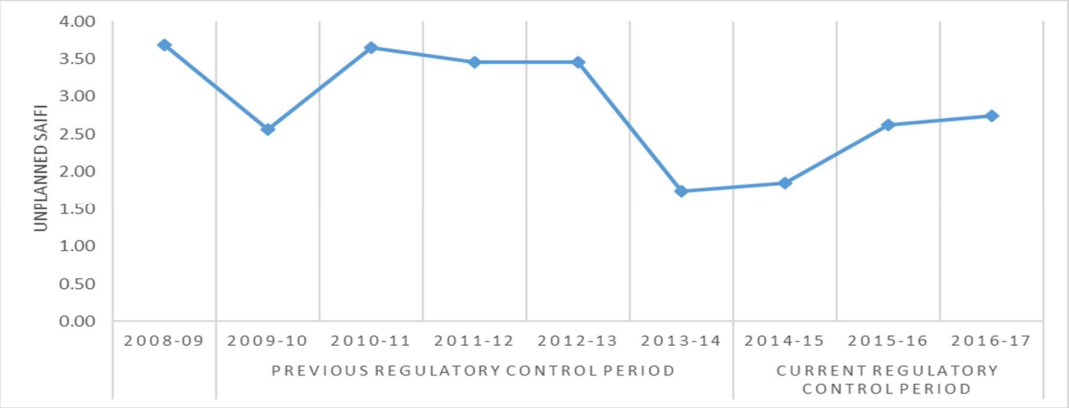
- measures of reliability on Power and Water's network
- the age profile of assets in Power and Water's` network, and where possible, relative to comparable networks. Asset age is a reasonable proxy for asset condition which affects asset the repex requirements of the network
- utilisation of the Power and Water's network (where spare capacity should be correlated to asset condition). This is to provide an indication as to whether Power and Water's assets are likely to deteriorate more or less than would be expected given the age of its assets.

Overall, we observe a decreasing trend in Power and Water's SAIFI overtime indicating that Power and Water is improving the reliability of its network. We also observed that when compared to other distributors, Power and Water's network assets are on average younger in age, suggesting that age replacement needs are ordinarily lower than other distributors.

### *Trends in reliability (SAIFI)*

The figure below shows Power and Water's SAIFI over time. SAIFI is a measure of the frequency of interruptions.[139] The overall trend may reflect improvements Power and Water has undertaken to date on its asset management practices. We note that the Utilities Commission has set targets for Power and Water to improve its service levels for its rural long feeders, which is likely to result in more overall improvements in SAIFI.[140]

**Figure 5.13 - Power and Water whole of network unplanned SAIFI**




Source: AER analysis. See Power and Water, *Economic Benchmarking Regulatory Information Notice* - 3.6 Quality of service.

[139] The SAIFI measure used is the one that excludes major event days and excluded events. See Power and Water, *Economic Benchmarking Regulatory Information Notice* - 3.6 Quality of service.

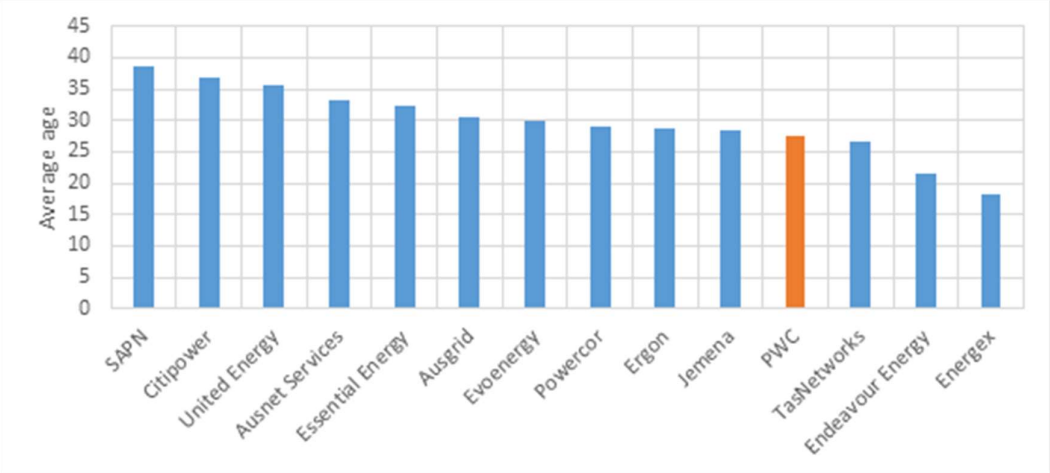
[140] Power and Water, *IR017 Item 25 - updated PWC13.32 - BNI - All Regions - Poorly performing feeder improvement program - Public*, p. 5.

### *Average Asset Age*

We considered the average age of all Power and Water's assets compared to other NEM businesses.

Figure 5.14 below shows that compared to other distributors in the NEM, Power and Water has a relatively young network. Power and Water is the 4th youngest network among the other distributors. It has an average asset age which is below the industry average.

**Figure 5.14 Electricity distributor network average asset age**




Source: AER analysis, Power and Water, *Category Analysis RIN Workbooks* - 5.2 Asset Age Profile, 22 May 2018.

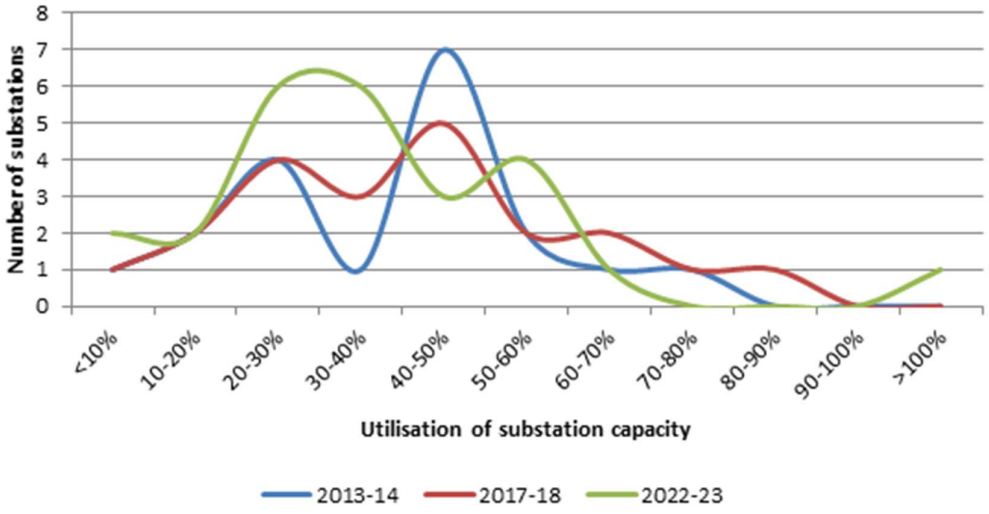
### *Asset Utilisation*

We consider that the degree of asset utilisation can have an impact on the condition of certain network assets. We note that the relationship between asset utilisation and condition can vary across the asset types. The relationship between asset utilisation and condition is not necessarily a linear one and the condition of an asset may be difficult to determine. As such early-life asset failures may be due to utilisation, or a combination of factors.

As can be seen from Figure 5.15, we note that Power and Water has a slightly more even spread of asset utilisation rates for zone substations in 2017-18 than it did in 2013-14. This spread has seen an increase in the number of zone substations with utilisation rates greater than 60 per cent. However, the majority of its zone substations have utilisations below that level. We, therefore, expect that a large number of Power and Water's zone substation are in a reasonable condition.

In viewing this graph, it is important to note the particular planning criteria for Power and Water. Power and Water follows deterministic planning standards, which explains the low utilisation of its zone substations.

**Figure 5.15 Power and Water zone substation utilisation 2013-14, and 2017-8 actual, and 2022-23 forecast**




Source: AER analysis, Power and Water, *Regulatory Determination Workbooks - Consolidated* - 22 May 2018.

Note: The utilisation rate is the ratio of maximum demand and the normal cyclic rating of each substation for the specified years.[141] Forecast utilisation in this figure is based on forecast weather corrected 50% POE maximum demand at each substation and existing capacity without additional augmentation over 2019–24.

## B.5 Forecast non-network other capex

Non-network other capex includes fleet, buildings and property, tools and equipment and other minor capex.

### B.5.1 Power and Water's proposal

Power and Water's proposed forecast non-network other capex of $69.4 million ($2018-19) is driven by:[142]

- the capitalisation of fleet and property leases, including both the remaining value of ongoing leases as at 1 July 2019 and new leases forecast to be entered into in the 2019–24 regulatory control period. These lease payments were previously recognised as opex in the 2014–19 regulatory control period[143]

[141] Normal cyclic rating is the maximum peak loading based on a given daily load that a substation can supply each day of its life under normal conditions resulting in a normal rate of wear.

[142] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, pp. 84–85.

[143] Power and Water, *Response to Power and Water AER information request #025, Capitalised leases*, 13 July 2018.

- a project to upgrade the facilities and access road at the 19 Mile depot at a cost of approximately $6.5 million[144]
- business as usual capex for minor property works, tools and equipment, furniture, fittings and other minor capital items.[145]

The significant increase in forecast non-network other capex from the 2014–19 regulatory control period relates to the capitalisation of fleet and property lease costs. Power and Water leases its vehicle fleet and some of its property assets, with lease costs historically treated as opex by accounting for lease payments in the year in which they were incurred. From 1 July 2019, Power and Water will capitalise its fleet and property leases in accordance with changes to Australian Accounting Standard *AASB 16 Leases*. The effect of the changes is that, from 1 July 2019, the full amount (over its term) of a lease must be capitalised up-front when it is first entered into, or is renewed. From 1 July 2019, Power and Water's existing and new leases will therefore be reflected on its balance sheet, recognising both an asset for the right to use the leased asset and an obligation to make lease payments over the lease term. The remaining value of existing fleet and property leases will be capitalised in 2019-20, and new leases capitalised as they are entered into.[146]

### B.5.2 Position

Our draft decision includes $54.8 million ($2018-19) in forecast non-network other capex for the 2019–24 regulatory control period. This is $14.7 million lower than Power and Water's proposed non-network other capex. We are satisfied that our substitute estimate, which corrects errors in Power and Water's approach to estimating capitalised lease costs and excludes the 19 Mile property project, reasonably reflects the capex criteria.

Table 5.12 summarises Power and Water's proposal and our substitute amount for non-network other capex.

**Table 5.12 Draft decision on Power and Water's total forecast non-network other capex ($2018-19, million)**

| | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | Total |
|---|---|---|---|---|---|---|
| Power and Water proposal | 27.9 | 5.6 | 25.0 | 5.7 | 5.3 | 69.4 |
| AER draft decision | 19.5 | 5.2 | 19.9 | 5.2 | 5.0 | 54.8 |
| Total adjustment | -8.4 | -0.4 | -5.0 | -0.5 | -0.3 | -14.7 |

Source: AER analysis.

Note: Numbers may not add up due to rounding.

[144] Power and Water, *BNI - Upgrade 19 mile depot,* March 2018, p. 10.

[145] Power and Water, *BNI - Minor capex program,* March 2018, p. 6.

[146] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, p. 84.

We have accepted Power and Water's proposal to capitalise its fleet and property leases in accordance with changes to Australian Accounting Standard AASB 16 (Leases) effective from 1 July 2019. However, we have not accepted Power and Water's estimate of forecast capex for these leases as it reflected the sum of expected future lease costs rather than the present value of these costs as required by AASB 16. This error, which Power and Water has acknowledged, had the effect of overstating forecast capex for fleet and property leases. We have also excluded forecast capex for the 19 Mile Depot and access road upgrade project from our substitute estimate of forecast capex as, based on the information available, Power and Water has not justified the need and timing of this investment in the 2019–24 regulatory control period.

### B.5.3 Reasons for our position

This section sets out our findings in relation to proposed non-network other capex.

We have reviewed Power and Water's historical expenditure and forecasting methodologies to assess whether the forecast non-network other capex is likely to meet the capex criteria, objectives and factors set out in the NT NER.[147] For specific projects and programs, we have assessed whether Power and Water has justified that:

- the project or program is reasonably required to achieve the capex objectives;[148] and if so
- the preferred option is likely to reasonably reflect the capex criteria.[149]

We have also had regard to submissions received form interested stakeholders. Table 5.13 provides a summary of submissions received in respect to Power and Water's proposed non-network other capex.

**Table 5.13 Submissions responding to Power and Water's proposed non-network other capex**

| Submission | Comments |
|---|---|
| Consumer Challenge Panel 13 | Noted that the change in Power and Water's capitalisation policy has resulted in an increase in its proposed capex.[150] |
| Anonymous | Stated that the accounting standard relating to leases provides that, as of 1 July 2019, certain leases of duration greater than 12 months should be recognised as an asset. Acknowledged that this provision means that expenditure associated with these leases is properly (in accounting terms) capital expenditure rather than operating expenditure as it has been previously. Stated that this will increase the revenue stream for Power and Water by an amount equal to the return on investment of those leases (and |

147 NT NER 6.5.7.

148 NT NER 6.5.7(a).

149 NT NER 6.5.7(c).

150 Consumer Challenge Panel subpanel 13, *Issues Paper – Power & Water Corporation (Power and Water) electricity network revenue proposal 2019–24*, 16 May 2018, pp. 33–34.

| | |
|---|---|
| | some borrowing costs). Submitted that in the case of the existing leases, this seems to be a windfall gain for Power and Water. Proposed that the incremental revenue resulting from this change to accounting standards be treated so that customers do not see an increased revenue as a consequence of a regulatory change rather than an increase in service.[151]<br><br>Noted that for both the capex associated with the vehicle fleet and property that there is a large expenditure in the first year of the period associated with the capitalisation of leases.[152] |

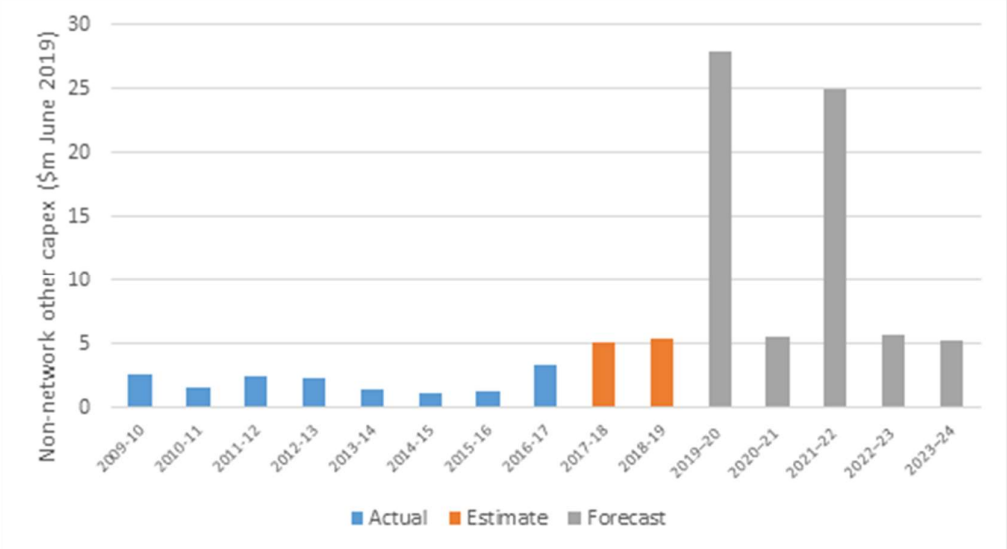
We have considered these submissions as part of our assessment of the proposed non-network other capex detailed below.

### Category analysis

We have assessed Power and Water's forecast expenditure in each category of non-network other capex. This category analysis has been used to inform our view of whether forecast non-network other capex is reasonable relative to historical rates of expenditure in each category, and to identify trends in the different category forecasts which may warrant further review.[153]

Figure 5.16 shows Power and Water's actual/estimated non-network other capex since 2009-10 and its forecast non-network other capex for the 2019–24 regulatory control period. This shows significant spikes in expenditure for the 2019-20 and 2021-22 regulatory years, and expenditure approximately in line with recent historical levels for the other forecast years of the 2019–24 regulatory control period.

**Figure 5.16 Power and Water historical and forecast non-network other capex ($2018-19, million)**




[151] Anonymous, *Submission on Power and Water's regulatory proposal*, 16 May 2018.

[152] Anonymous, *Submission on Power and Water's regulatory proposal*, 16 May 2018.

[153] NT NER, 6A.6.7(e)(5).

Source: Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, pp. 14 and 86.

Whilst trend analysis is generally a useful aid in reviewing non-network other capex forecasts because of the recurrent nature of expenditure in this category, the impact of the change in Australian Accounting Standard *AASB 16 Leases* from 1 July 2019 has significantly diluted the relevance of such analysis for the two largest categories, fleet and buildings and property, in non-network other capex. We consider that trend analysis remains an important tool for assessing the other two categories, tools and equipment and minor capex, in our review of non-network other capex.

Our conclusions are summarised below.

### *Fleet capex*

Power and Water proposed $27.7 million for fleet capex for the 2019–24 regulatory control period, an average of $5.5 million per year.[154] More than half of Power and Water's forecast fleet capex is allocated to the 2019-20 regulatory year. This forecast is not comparable to fleet capex in the current regulatory control period due to the change in capitalisation approach for vehicle lease costs in the 2019–24 regulatory control period. Power and Water identified its current fleet lease costs (operating expenditure) to be approximately $3.6 million per annum ($2017-18).[155]

Power and Water's proposed fleet capex, which it has historically leased and treated as opex, reflects the change in capitalisation approach from 1 July 2019 in accordance with changes to the Australian Accounting Standard *AASB 16 Leases*. Power and Water submitted that the effect of the changes is that from 1 July 2019, the full amount (over its term) of a lease must be capitalised up-front when it is first entered into, or is renewed.[156] For each new or replacement lease entered into, the whole lease cost is recognised as capex as the present value of future lease payments.[157] Power and Water's forecast fleet capex therefore reflects:[158]

- the remaining value of existing leases as at 1 July 2019, capitalised in 2019-20
- the value of leases to be renewed in the 2019–24 regulatory control period in accordance with vehicle replacement schedules.

Power and Water's fleet capex forecast is based on the following assumptions:[159]

- fleet numbers will remain stable over the 2019–24 regulatory control period and commensurate with the size of the works program and level of services that Power and Water must provide

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154 Power and Water, *Response to AER information request #025*, 13 July 2018, p. 2.
155 Power and Water, *BNI - Vehicle fleet program,* March 2018, p. 8.
156 Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 75.
157 Power and Water, *BNI - Vehicle fleet program,* March 2018, p. 4.
158 Power and Water, *Lease treatment explanation*, 18 March 2018, p. 2.
159 Power and Water, *BNI - Vehicle fleet program,* March 2018.

- vehicle failure forecast volumes remain constant
- no change in vehicle lease costs in real terms for the duration of the 2019–24 regulatory control period
- a like for like vehicle replacement policy.

Power and Water has justified that these assumptions provide a reasonable basis for its fleet capex forecast in the 2019–24 regulatory control period. We also consider that Power and Water's vehicle replacement schedule for different vehicle types is similar to that of other Australian electricity network providers. We are therefore satisfied that Power and Water's proposed motor vehicle replacement program is likely to reasonably reflect Power and Water's requirements in the 2019–24 regulatory control period.

In our assessment of Power and Water's approach to capitalising fleet lease costs in the forecast period, we sought to confirm that the change in treatment of these costs from opex to capex would not, in and of itself, result in higher costs to consumers. This concern was raised in the anonymous submission we received on Power and Water's regulatory proposal.[160] We found that Power and Water's forecast lease capex reflected the sum of expected future lease payments, rather than the present value of these payments. This is inconsistent with Australian Accounting Standard AASB16 and Power and Water's own documentation for the fleet lease capex program which states that "the whole lease cost is recognised as capex as the present value of future lease payments".[161] In response to our information request, Power and Water acknowledged that its forecast capex for capitalised fleet leases reflected the sum of expected future lease payments, rather than the present value of those payments.[162] This approach has the effect of overstating forecast capex requirements, and would therefore lead to an over recovery of expected lease payments over the life of the assets. Power and Water provided updated fleet capex forecasts to reflect the present value of future vehicle lease payments, resulting in a reduction in forecast fleet capex of $2.6 million ($2017-18).[163]

We have included Power and Water's revised forecast for fleet capex in our substitute estimate of non-network other capex for the 2019–24 regulatory control period.

### *Buildings and property capex*

Power and Water's buildings and property capex forecasts comprise three components: capitalised property leases, a major project relating to the 19 Mile depot and access road upgrade, and a minor business-as-usual component.[164]

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[160] Anonymous, *Submission on Power and Water's regulatory proposal*, 16 May 2018, p. 3.
[161] Power and Water, *BNI - Vehicle fleet program,* March 2018, p. 4.
[162] Power and Water, *Response to AER information request #025*, 13 July 2018, p. 1.
[163] Power and Water, *Response to AER information request #025*, 13 July 2018, p. 2.
[164] Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, p. 84.

### *Property lease capex*

Power and Water proposed approximately $23.8 million ($2017-18) for property lease capex for the 2019–24 regulatory control period, an average of $4.8 million per year.[165] This forecast is not comparable to property capex in the current regulatory control period due to the change in capitalisation approach for property lease costs in the 2019–24 regulatory control period. Power and Water submitted that there is a corresponding step decrease in opex, consequential to the change of treatment of this expenditure from opex to capex.[166]

Similar to Power and Water's fleet lease capex proposal, Power and Water's forecast property lease capex reflects:[167]

- the remaining value of existing leases as at 1 July 2019, capitalised in 2019-20
- the value of leases to be renewed in the 2019–24 regulatory control period.

Power and Water's property lease capex forecast is based on the following assumptions:[168]

- the number of leased properties will remain relatively constant over the 2019–24 regulatory control period
- at the end of a lease period, the existing lease will be renewed on similar terms unless the property is known to be no longer required
- the lease costs will remain constant in real terms for the duration of the 2019–24 regulatory control period
- the East Arm Depot lease will not be renewed, subject to the 19 Mile depot and road access upgrade project proceeding.

We discuss the 19 Mile depot project separately below. Regarding Power and Water's other assumptions, it has demonstrated that they provide a reasonable basis for Power and Water's property capex forecast in the 2019–24 regulatory control period. We are therefore satisfied that Power and Water's proposed property leases are likely to reasonably reflect Power and Water's property requirements in the 2019–24 regulatory control period.

Similar to our assessment of Power and Water's fleet capex proposal, we sought to confirm that the change in treatment of property lease costs from opex to capex would not, in and of itself, result in higher costs to consumers. This concern was raised in the anonymous submission we received on Power and Water's regulatory proposal.[169] We found that Power and Water's forecast lease capex reflected the sum of expected

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165 Power and Water, *BNI - Property leases,* March 2018, p. 6.
166 Power and Water, *BNI - Property leases,* March 2018, p. 6.
167 Power and Water, *Lease treatment explanation*, 18 March 2018, p. 2.
168 Power and Water, *BNI - Vehicle fleet program,* March 2018.
169 Anonymous, *Submission on Power and Water's regulatory proposal*, 16 May 2018, p. 3.

future lease payments, rather than the present value of these payments. This is inconsistent with Australian Accounting Standard AASB16 and Power and Water's own documentation for the property lease capex program which states that "the whole lease cost is recognised as capex as the present value of future lease payments".[170] In response to our information request, Power and Water acknowledged that its forecast capex for capitalised property leases reflected the sum of expected future lease payments, rather than the present value of those payments.[171] This approach has the effect of overstating forecast capex requirements, and would therefore lead to an over recovery of expected lease payments. Power and Water provided updated property capex forecasts to reflect the present value of future lease payments, resulting in a reduction in forecast property capex of $4.2 million ($2017-18).[172]

We have included Power and Water's revised forecast for property lease capex in our substitute estimate of non-network other capex for the 2019–24 regulatory control period.

### *Upgrade 19 Mile Depot and access road*

Power and Water submitted that it currently has two rural depots – 19 Mile (owned) and East Arm (leased). Power and Water proposed to upgrade the 19 Mile depot at a cost of $6.5 million,[173] not renew the lease at East Arm when it expires on 31 July 2018, and consolidate both current crews at the 19 Mile depot.[174]

Power and Water submitted that as Darwin and Palmerston continue to develop into the surrounding rural area and population density increases, there is a need to consider the strategic relocation of Power Network crews to ensure ongoing service delivery excellence. Power and Water considers that the 19 Mile Depot at Coolalinga is central to Power and Water's customer base in the Palmerston and rural areas. On this basis the location of 19 Mile is considered optimal with regard to the future growth of the network.[175]

Power and Water submitted that an option to consolidate services at the 19 Mile depot would potentially allow the closure of the East Arm depot with a saving in lease costs of approximately $0.6 million per year. However, Power and Water identified the following issues at the 19 Mile site which it considers need to be rectified to facilitate the relocation strategy:[176]

- the facilities are in poor condition and require refurbishment of the warehouse, offices and ablutions to comply with building occupancy requirements. The septic

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170 Power and Water, *BNI - Property leases,* March 2018, p. 5.
171 Power and Water, *Response to AER information request #025*, 13 July 2018, p. 1.
172 Power and Water, *Response to AER information request #025*, 13 July 2018, p. 2.
173 Power and Water, *BNI - Upgrade 19 Mile depot,* March 2018, p. 2.
174 Power and Water, *Capex Overview Document 2019-20 to 2023-24*, March 2018, p. 84.
175 Power and Water, *BNI - Upgrade 19 Mile depot,* March 2018, p. 3.
176 Power and Water, *BNI - Upgrade 19 Mile depot,* March 2018, pp. 2–4.

system also does not comply with current requirements and will not support any future development

- the access road into the 19 Mile depot does not currently comply with Austroads standards. Further development at the 19 Mile depot cannot take place because the access road in its current state will not allow the safe access of rigid body vehicles that carry Elevated Work Platforms and semi-trailer vehicle body trucks to the site
- the existing warehouse is not large enough to accommodate required storage of critical spare parts to support network infrastructure
- the site does not have effective security and requires an upgrade of the existing security fencing and installation of CCTV.

We reviewed the supporting documentation provided by Power and Water in support of the 19 Mile depot project. We discussed this project with relevant Power and Water staff, and also requested further information to justify the need for the project and scope of works proposed, including:[177]

- evidence of the condition of existing facilities at the site, such as building condition or dilapidation reports
- details of Power and Water's overarching depot property strategy, setting out the rationale for the consolidation of depot facilities
- details of the proposed redeveloped facilities at the site, such as the managed floor space of office, shed and yard areas
- evidence of the road access issues at the site, including correspondence from the Department of Infrastructure, Planning and Logistics (DIPL) regarding these issues.

In response, Power and Water:

- advised that is did not have a formalised depot strategy document[178]
- provided preliminary sketches of site plan development options for the 19 Mile depot[179]
- provided a report from its consultant Cardno on the requirements for upgrading the existing site access to the Stuart Highway[180]
- advised that, contrary to its initial belief in discussions with AER staff, it had not received correspondence from DIPL regarding the issue of road access to the 19 Mile depot.[181]

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[177] AER, Information request #017 - items 36, 37 and 38, 24 May 2018.
[178] Power and Water, *Response to AER information request #17 - Item 37*, 14 June 2018.
[179] Power and Water, *Response to AER information request #17 - Item 38*, 13 June 2018.
[180] Power and Water, *Response to AER information request #17 - Item 36*, 13 June 2018.
[181] Power and Water, *Response to AER information request #17 - Item 36*, 13 June 2018.

The road access upgrade costs are a significant component of the proposed capex for the 19 Mile depot project.[182] The Cardno traffic report provided by Power and Water as evidence of the access issues at the site concluded that:[183]

- Austroad guidelines indicate the existing Stuart Highway left and right turn deceleration lanes are appropriate for the traffic volumes at the site.
- Austroads guidelines indicate that an acceleration lane for vehicles turning onto the Stuart Highway is not warranted due to the low traffic volumes and compliant sight distances
- there is no recorded crash history at the intersection, indicating that it operates safely under existing traffic conditions. The small increase in projected traffic is not considered sufficient to generate a change in the level of road safety risk
- if an acceleration lane was to be provided, there are significant cost implications due to the presence of a large diameter water pipe and drainage culverts
- the existing access arrangements are appropriate for the existing and estimated volume of traffic, subject to some surface resealing.

We do not consider that the Cardno traffic report supports Power and Water's proposal for major site access upgrade works at the 19 Mile depot site. Based on the information set out in the report, the existing site access arrangements comply with relevant design guidelines and can accommodate Power and Water's forecast increase in traffic volumes at the site should the depot consolidation strategy proceed.

Regarding the need for redevelopment of the existing 19 Mile depot facilities, Power and Water did not provide dilapidation reports or similar documentation to demonstrate that the existing facilities at the 19 Mile depot site are in poor condition and/or not fit for purpose and require refurbishment. While this may be the case, in the absence of such evidence it is difficult for us to conclude that the need for redevelopment of the existing facilities at 19 Mile has been clearly justified.

We also found the lack of an overall strategy for the future management of Power and Water's depot facilities to be concerning in the context of this investment proposal. While we consider that a depot consolidation strategy along the lines proposed by Power and Water may have benefits, in the absence of a depot strategy and implementation plan agreed to by Power and Water's Board and management it is not clear that Power and Water will necessarily undertake the 19 Mile project as proposed, or in the proposed timeframe. In this regard, we note the view expressed in the Cardno report that Power and Water's plan to consolidate depot operations at the 19 Mile facility is likely to be a medium to long term proposal, and that there is no definite decision on if or when this will occur.[184]

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[182] Power and Water, *BNI - Upgrade 19 Mile depot,* March 2018, p. 9.

[183] Cardno, *19 Mile Depot Access Upgrade, Power and Water Corporation - Traffic Report*, 16 April 2018, p. 17.

[184] Cardno, *19 Mile Depot Access Upgrade, Power and Water Corporation - Traffic Report*, 16 April 2018, pp. 7 and 17.

On the basis of the information available, Power and Water has not justified that the forecast capex for the 19 Mile depot project reasonably reflects the efficient costs that a prudent operator would incur in the 2019–24 regulatory control period. We have excluded the forecast capex for this project from our substitute estimate of forecast capex in the 2019–24 regulatory control period.

We do not consider that this draft decision in relation to the 19 Mile depot project necessarily requires that the lease at the East Arm depot be continued. Power and Water noted that "the vacation of East Arm is being driven by the need to reduce overall expenditure".[185] Power and Water has capacity at other depots to accommodate the staff and equipment based at East Arm, as it would need to do in any case in the intervening period between ending the East Arm lease and completing the proposed works at 19 Mile, a period of at least 18 months. In our view, Power and Water has not provided evidence to demonstrate that it is unable to accommodate staff from its East Arm depot at the existing 19 Mile facility and/or other facilities.

### *Tools and equipment*

Power and Water proposed $2.7 million ($2017-18) for tools and equipment capex for the 2019–24 regulatory control period, an average of $0.5 million per year. Power and Water submitted that this program is to cover the ad hoc acquisition of tools and equipment for the purpose of providing distribution services.[186] The forecast costs are based on an average of historical expenditure in this category.[187]

Given the recurrent nature of expenditure for items in this category, and Power and Water's forecasting methodology based on average historical expenditure, Power and Water's proposed tools and equipment capex is likely to reasonably reflect prudent and efficient capex requirements. We have included Power and Water's estimate of forecast tools and equipment capex in our substitute estimate of non-network other capex for the 2019–24 regulatory control period.

### *Minor capex*

Power and Water proposed $2.4 million ($2017-18) for minor capex for the 2019–24 regulatory control period, an average of $0.5 million per year. Power and Water submitted that this program is to cover the purchase of plant and equipment, furniture and fittings and minor capital items.[188] The forecast costs are based on an average of historical expenditure in this category.[189]

Because of the recurrent nature of expenditure for minor capex and that Power and Water has used historical expenditure. Power and Water has justified that proposed minor capex is consistent with that of a prudent operator and is reasonably likely to

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185 Power and Water, *BNI - Upgrade 19 Mile depot,* March 2018, p. 4.
186 Power and Water, *BNI - Tools and equipment (Capex),* March 2018, p. 2.
187 Power and Water, *BNI - Tools and equipment (Capex),* March 2018, p. 5.
188 Power and Water, *BNI - Minor Capex Program,* March 2018, p. 2.
189 Power and Water, *BNI - Minor Capex Program,* March 2018, p. 5.

reflect efficient costs. We have included $2.4 million for minor capex in our substitute estimate of non-network other capex for the 2019–24 regulatory control period.

## B.6 Forecast non-network ICT capex

Non-network ICT capex relates to expenditure on information and communications technology assets.

### B.6.1 Power and Water's proposal

Power and Water proposed ICT capex of $37.5 million ($2018-19) for the 2019–24 regulatory control period, an average of $7.5 million per year.[190] This is a 109 per cent increase from the average annual ICT expenditure of $3.4 million for the previous five years.[191]

Power and Water's ICT capex proposal includes ICT sourced directly by the Power Networks business, and the share of corporate ICT attributed, or allocated, using the CAM to the Power Networks' business that relate to distribution services.

Power and Water has proposed a number of ICT projects to deliver network services efficiently through appropriate technologies, relating to: network planning; works management; outage management; network business management; systems operations; and RIN reporting.[192] Power and Water has also proposed upgrades to its retail management system; finance management system; asset management system; and geographic information system.

Power and Water has also proposed to implement:[193]

- a new customer relationship management system to provide functionality to better manage electricity consumer expectations
- a new meter data management system to implement the system and processes required to comply with the NT-specific elements of Chapter 7A of the NT NER
- a set of business intelligence data and reporting tools to improve the reliability of enterprise data and reporting function capability for the distribution network business.

### B.6.2 Position

Power and Water has not demonstrated that its proposed non-network ICT capex of $37.5 million ($2018-19) is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. We have instead provided an alternative estimate of $25.7 million for this draft decision, which is 31 per cent below Power and Water's forecast.

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190 Power and Water, *ICT Capital Expenditure Plan*, p. 3.

191 Power and Water, *ICT Capital Expenditure Plan*, pp. 15 and 22.

192 Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024*, 16 March 2018, p. 73.

193 Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024*, 16 March 2018, p. 74.

Our substitute estimate provides for an increased ICT capex program compared to historical expenditure in this category, but at a lower level than proposed by Power and Water. We consider this will ensure that Power and Water has the capacity to efficiently deliver the forecast ICT capex in the 2019–24 regulatory control period.

### B.6.3 Reasons for our position

We have applied several assessment techniques to assess Power and Water's proposed non-network ICT capex forecast against the capex criteria. In reaching our position, we:

- assessed trends comparing historical actual and forecast non-network ICT capex
- reviewed Power and Water's ICT strategy, project management resources and capabilities, including a review of project documentation supporting Power and Water's proposal.

We sought further information and clarification from Power and Water as necessary, and also had regard to stakeholder submissions and advice on Power and Water's forecast non-network ICT capex from our internal technical experts.

**Trend analysis**

Trend analysis allows us to draw general observations about how a business is performing. In addition, one capex factor that we must have regard to is the actual and expected capital expenditure during any preceding regulatory control period.[194]

Our use of trend analysis is to gauge how Power and Water's actual non-network ICT capex compares to forecast expenditure for the 2019–24 regulatory control period. Where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast non-network ICT capex is likely to be efficient and prudent, and therefore contributes to a forecast of total capex that reasonably reflects the capex criteria.[195] The ICT category can however be characterised by lumpy, non-recurrent investments, for example when major enterprise systems require replacement within a particular regulatory control period.

Table 5.14 shows Power and Water's actual and estimated non-network ICT capex since 2011-12 and its forecast non-network other capex for the 2019–24 regulatory control period.[196] This shows the significant step increase in ICT capex proposed for the 2019–24 regulatory control period, and that Power and Water's forecast ICT capex is front loaded within the period. Power and Water has proposed to incur approximately 29 per cent of the total forecast ICT capex in the first year of the 2019–24 regulatory control period.

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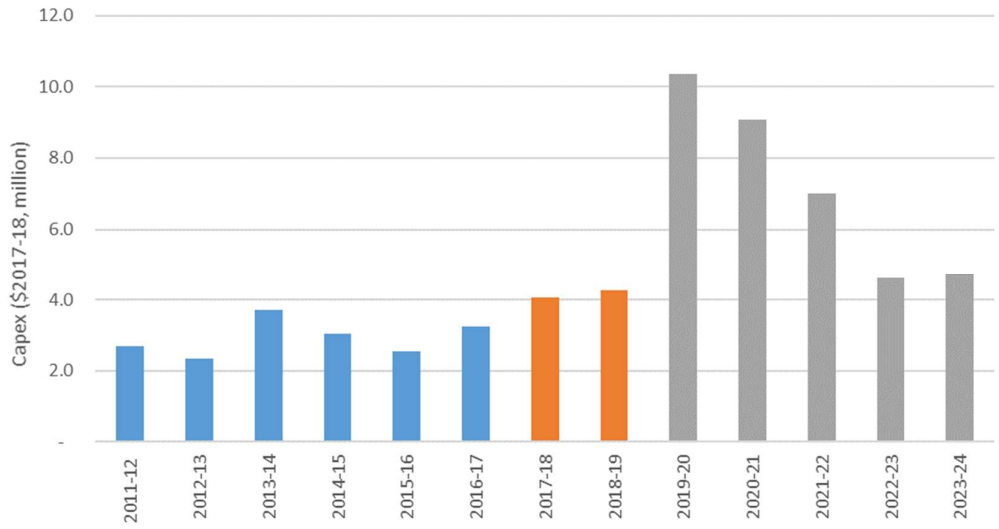
194 NER, cl. 6.5.7(e)(5).

195 AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

196 Historical ICT capex expenditure includes corporate expenditure which was not historically capitalised. It is shown here as capex to demonstrate the long term trend.

## Table 5.14 Power and Water's historical and forecast non-network ICT capex ($2017-18, million)




Source: Power and Water, *ICT Capital Expenditure Plan*, pp. 15 and 22.

We consider that the forecast step increase in non-network ICT capex in the 2019–24 regulatory control period warrants further review, with particular focus on the drivers of the historically high levels of investment forecast for the first three years of the period.

**ICT project and deliverability review**

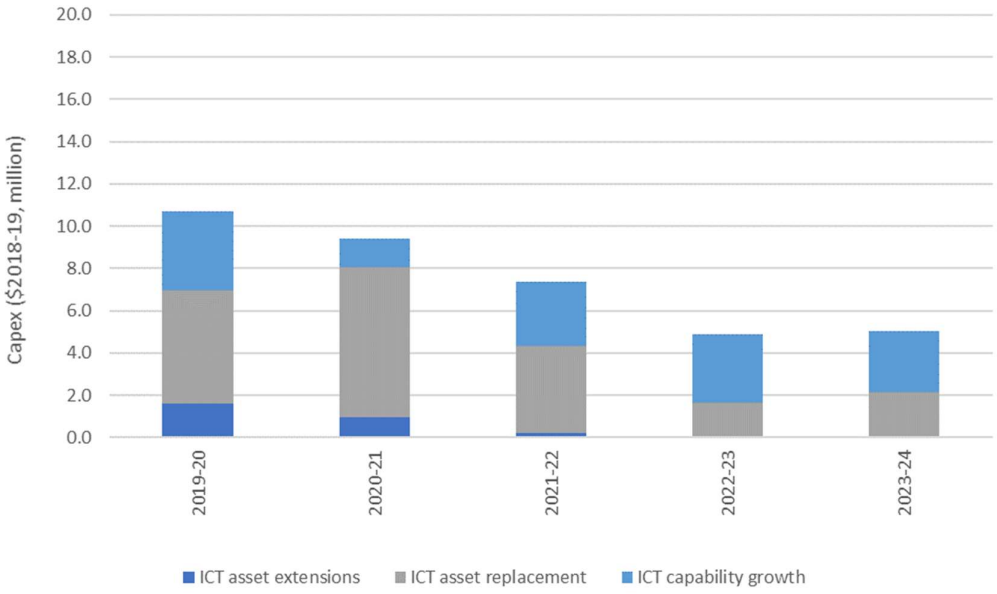
Our assessment of Power and Water's forecast non-network ICT capex has focussed on the drivers of increased costs above historical levels of expenditure in this category, and Power and Water's capability to efficiently deliver the proposed ICT capex program.

Forecast ICT capex is increasing significantly, more than double the historical level of expenditure in this category. The main drivers are to replace and upgrade ageing systems, and the need for additional system functionality to comply with NT NER requirements.

Power and Water ICT capex contains both recurrent and non-recurrent cost components. Power and Water's proposed ICT capex includes $20.4 million for ICT asset replacement capex, $14.3 million for ICT capability growth capex, and

$2.8 million for asset extension capex.[197] Table 5.15 shows the breakdown of Power and Water's forecast non-network ICT capex by driver.

### Table 5.15 Forecast non-network ICT capex 2019–24 ($2018-19, million)




Source: Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 74.

We received submissions relating to Power and Water's forecast non-network ICT capex. CCP 13 submitted that it was concerned about the significant increase in ICT capex and the lack of information on the quantified benefits provided in Power and Water's reasons for the proposed expenditure.[198]

An anonymous submission identified a number of concerns in relation to Power and Water's ICT capex, including: the short service life of ICT assets, Tier 1 IT products having a cost premium for installations and upgrades, and the lack of evidence for Tier 1 systems being more efficient than systems that are scaled more appropriately to Power and Water's business size. This submission also raised concerns in relation to: the outage management system duplicating parts of the energy management system; issues in relation to customers having to finance major corrections of programs and

[197] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024*, 16 March 2018, p. 74.

[198] CCP13, *Submission on Power and Water's regulatory proposal*, 16 May 2018, pp. 35–36.

strategies; and whether the type of customer relationship management system proposed meets the NEO.[199]

We agree with some of the concerns expressed in these submissions, particularly regarding the significant increase in ICT capex and Power and Water's ability to deliver this expanded ICT capex program into a resource constrained business in a short period of time; and the need for Power and Water to demonstrate the benefits of its proposed ICT capex, and that the scope and timing is prudent and efficient.

We sought additional information from Power and Water to support the prudency and efficiency of the proposed expenditure, and Power and Water's capacity to deliver the program as proposed. Specifically, we sought:[200]

- evidence of a cost benefit assessment, such as a NPV analysis, for major ICT projects that enhance functionality to demonstrate the benefit of these investments
- details of Power and Water's strategies to deliver a significantly expanded ICT capex program
- documentation on vendor roadmaps for major systems upgrades.

Power and Water submitted that it had not undertaken NPV analysis on benefits and costs for individual IT projects. However, Power and Water noted that it had identified ICT capability programs providing tangible (FTE reductions) and non-tangible benefits in its ICT strategy. Power and Water considered that a key difficulty in undertaking NPV analysis on capability programs is to accurately identify the value of the benefit. For example, Power and Water considered that it was difficult to estimate benefits when Power and Water's current risk framework is qualitative. Nonetheless, Power and Water recognised that we were seeking a more quantitative basis for estimating the value of IT capability projects, and advised that it was in the process of assessing whether a value for benefits can be accurately derived.[201]

We welcome Power and Water's approach in identifying opex efficiency savings arising from ICT capex investments. We encourage Power and Water to continue its efforts to define and quantify these benefits in its revised proposal, including to provide further detail on when and how it expects to realise efficiency benefits, and evidence that these efficiency benefits have been accounted for in its forecast opex proposal.

Power and Water provided some evidence that demonstrated that it has established access to suitable external specialist resources to deliver the proposed ICT program, and that it is considering additional internal project management resources.[202]

However, based on the information available, we consider that Power and Water has not sufficiently demonstrated its ability to deliver the significantly expanded ICT

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199 Anonymous, *Submission on Power and Water's regulatory proposal*, 16 May 2018, p. 11.
200 AER, *Information request #017 - Items 30, 31 and 32*, 24 May 2018.
201 Power and Water, *Response to AER information request #017 - Item 32*, 15 June 2018.
202 Power and Water, *Response to AER information request #017 - Items 30 and 31*, 14 June 2018.

program that it has proposed, efficiently and in full, within the 2019–24 regulatory control period. In particular, we are concerned that Power and Water has not demonstrated how the business itself can adapt and accommodate the extent and rate of ICT change proposed.

We expect that Power and Water's proposed upgrades to its works management, outage management, network business management, system operations, customer relationship management and meter data management systems will impact significantly on virtually all major functions of Power and Water's business over the five years of the regulatory control period. This will impose significant demands on subject matter experts and IT users within the business in terms of defining system specifications and requirements; identifying and adapting to changes in processes and ways of working; as well as testing, training and implementation of the new and upgraded systems. We therefore consider that Power and Water's ability to deliver such a large and complex portfolio of ICT investments, into a resource constrained business over such a short period, is of concern.

Therefore, for this draft decision, we consider that Power and Water has not demonstrated its capacity to efficiently deliver the full proposed ICT capex program during the 2019–24 regulatory control period, or that it would be prudent to do so. Power and Water has not justified that forecast non-network ICT capex is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria.

However, based on the material provided in Power and Water's regulatory proposal and our discussions with Power and Water staff, we consider that Power and Water does have a real need to update and upgrade many of its ICT systems. Moreover, the recent adoption of the NT NER will require additional functionality for Power and Water to comply with new regulatory obligations such as those relating to Chapter 7A.

Our substitute estimate of forecast ICT capex therefore provides for an increase in ICT capex in the forecast period, but at a reduced level that we consider to be demonstrably deliverable given Power and Water's historical expenditure in this category. Our substitute estimate of forecast ICT capex is $25.7 million ($2018-19), a reduction of $11.7 million (31 per cent) from Power and Water's proposal.

## B.7 Forecast capitalised overheads

Capitalised overheads are unallocated network and corporate support costs that have been capitalised in accordance with Power and Water's capitalisation policy. They are generally costs shared across different assets and cost centres.

### B.7.1 Power and Water's proposal

Power and Water proposed forecast capitalised overheads of $66.9 million ($2018-19) in the 2019–24 regulatory control period. Power and Water's proposal reflects a revised approach to the treatment of these corporate and network overheads, which were previously allocated to opex.

Power and Water proposed to capitalise, for regulatory purposes, the same network and corporate overhead costs that it capitalises for statutory purposes, in proportion to the ratio of direct capex to total direct costs. Power and Water submitted that its approach is consistent with its approved cost allocation method and the practice of other distributors.[203]

### B.7.2 Position

Our draft decision includes $58.4 million ($2018-19) in capitalised overheads for the 2019–24 regulatory control period. This is $8.4 million (12.6 per cent) lower than Power and Water's proposed capitalised overheads of $66.9 million. Our substitute estimate:

- corrects an error identified in Power and Water's base year estimate of capitalised overheads; and
- applies a lower rate of expected growth these costs in the 2019–24 regulatory control period.

We are satisfied that our substitute estimate would form part of a total capex forecast that reasonably reflects the capex criteria.

### B.7.3 Reasons for our position

We accept Power and Water's proposal to capitalise a portion of network and corporate overheads based on the ratio of direct capex to total direct costs. This is consistent with the approach for allocating indirect costs set out in Power and Water's cost allocation methodology, which we approved in January 2018.[204]

Power and Water submitted that there is a wide range of capitalisation approaches and outcomes across distributors in the NEM, with the amount of overheads capitalised ranging from 20-50 per cent of total overheads.[205] Power and Water's proposed

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[203] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 9.

[204] AER, *Power and Water Corporation - Cost Allocation Method*, January 2018.

[205] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 75.

capitalisation approach results in a forecast of capitalised overheads as a percentage of total overheads of approximately 24 per cent, towards the lower end of this range.[206]

As shown in Table 5.16, Power and Water's total capitalised overheads (network and corporate) are forecast to range from 12-20 per cent of total standard control capex in the 2019–24 regulatory control period. We consider this level of capitalised overheads expenditure is comparable to other distributors in the NEM, where capitalised overheads typically contribute between 10-30 per cent of total capex.

### Table 5.16 Power and Water's proposed capitalised overheads share of total forecast capex ($2018-19, million)

| | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | Total |
|---|---|---|---|---|---|---|
| Capitalised overheads | 13.0 | 13.2 | 13.4 | 13.6 | 13.7 | 66.9 |
| Total forecast capex | 106.6 | 85.8 | 108.2 | 75.2 | 69.8 | 445.6 |
| Share of total capex | 12% | 15% | 12% | 18% | 20% | 15% |

Source: Power and Water, *Capex overview document*, 16 March 2018.

CCP 13 submitted that there "is a significant level of variation across networks on the level of capitalisation of overheads. While the level of capitalisation is currently a matter at the networks discretion, CCP 13 believe that consumers need a more comprehensive and transparent understanding of these different approaches to ensure they meet the NEO. There are advantages and disadvantages of putting overheads in expenditure in opex or capex. We suggest that the AER consider undertaking a more comprehensive review of overhead capitalisation approaches to see whether there should be a guideline developed."[207]

We agree with CCP 13 that there is a range of approaches taken by service providers across the NEM to the capitalisation of overhead costs. This reflects the non-prescriptive, principles based nature of the regulatory framework (for example, the cost allocation principles), and differences in capitalisation policies, cost allocation methods and outsourcing practices across businesses. For this decision, we consider it is reasonable, and consistent with industry practice, that Power and Water align its statutory and regulatory capitalisation policies to capitalise a portion of its overhead costs, in accordance with its cost allocation methodology. More broadly, beyond the context of this decision, we will consider the need for further transparency or guidance in this area to assist both consumers and businesses.

An anonymous submission suggested that overheads are "properly opex" and that capitalising a portion of indirect costs does not provide a good incentive to minimise overhead costs. This submission suggested that capitalised overheads "be added back into the Power and Water opex forecast, which is then subject to the usual assessment

[206] Power and Water, *SCS and ACS Metering Capex Model*, 16 March 2018 (Updated June 2018).

[207] CCP13, *Submission on Power and Water's regulatory proposal*, 16 May 2018, p. 37.

of prudency and efficiency by the AER. Only then, when satisfied that the expenditure is prudent, should the capitalisation amount be added to the regulatory asset base".[208]

We agree with the anonymous submission that forecasts of capitalised overheads should be subject to prudency and efficiency review. Given the alignment between the opex and capex criteria in the NT NER, we consider this remains the case whether these costs are allocated to opex or capex.

We reviewed Power and Water's capitalised overheads forecasting methodology, including key inputs, assumptions and relevant documentation supporting Power and Water's proposal. Power and Water forecast capitalised overheads using a similar base-step-trend approach as applied to opex.[209] We consider this to be a reasonable methodology for forecasting capitalised overheads given the nature of these costs, which were previously classified as opex.

We reviewed the inputs and assumptions applied by Power and Water to determine its forecast capitalised overheads. In the course of this review, we identified that the base year capitalised overheads figure used in Power and Water's capex model to forecast capitalised overheads did not align with the corresponding reduction in opex in that year as a result of the change in capitalisation policy. Power and Water advised that the capitalised overhead amount in the capex model was accidently carried over from data sourced from an earlier draft version of its category analysis RIN templates, and was therefore incorrect.[210] This error had the effect of overstating Power and Water's forecast capitalised overheads. We have corrected this error in determining our substitute estimate of forecast capitalised overheads.

As discussed in our decision on forecast opex, we have applied a lower forecast of the rate of change used to trend forward base year costs to determine forecast opex for the 2019–24 regulatory control period. For consistency with our decision on forecast opex, we have applied this revised rate of change in determining our substitute estimate of forecast capitalised overheads.

We are satisfied, based on the information available, that our substitute estimate of forecast capitalised overheads of $58.4 million ($2018-19) would form part of a total capex forecast that reasonably reflects the capex criteria. Our substitute estimate:

- corrects an error in Power and Water's base year estimate of capitalised overheads
- applies a lower rate of change in these costs in the 2019–24 regulatory period.

Power and Water expects to update its forecasting methodology inputs to reflect actual capitalised overheads in the 2017-18 year as part of its revised proposal.[211] We will assess Power and Water's revised capitalised overheads proposal in our final decision.

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[208] Anonymous, *Submission on Power and Water's regulatory proposal*, 16 May 2018, p. 4.

[209] Power and Water, *Capex overview document*, 16 March 2018, p. 7.

[210] Power and Water, *Response to AER information request #017 - Item 48 follow up questions*, 22 June 2018, p. 1.

[211] Power and Water, *Response to AER information request #017 - Item 48 follow up questions*, 22 June 2018, p. 2.

# C Engagement and information-gathering process

## Initial revenue proposal

Power and Water lodged its revenue proposal on the 31 January 2018, which included the primary documents that relate to capex for the 2019–24 period. The initial proposal did not include any of the supporting documentation that usually accompanies a regulatory proposal. The proposal also included an unaudited response to the AER's regulatory information notice (RIN).

Prior to lodgement, Power and Water requested an extension to the submission date from the 31 January 2018 to 30 April 2018.[212] Power and Water submitted that there are additional complexities associated with the transition and the adoption of the NT NER. Power and Water added that the delay would allow it to provide for a more efficient and effective consultation process. We considered Power and Water's request and decided that the 3 months delay was not likely to provide for a more efficient and effective consultation process. However, we acknowledged that there is an additional burden placed on Power and Water due to its transition to the NT NER. As such we agreed to allow Power and Water additional time to submit its capital expenditure forecast supporting information, such as detailed business cases, asset management plans and economic modelling.[213]

Power and Water submitted the remaining supporting capex documentation as well as an audited AER regulatory information notice (RIN) on the 16 March 2018.

## Information-gathering process

During the review process, we requested further information on Power and Water's capex proposal through a number of formal requests for information.

We made seven information requests specifically related to Power and Water's capex proposal.[214] The questions aimed to test our understanding of the material provided as well as clarify capex-related issues. Power and Water responded to 100 per cent of the information requests. The majority of these questions were responded to within the agreed timeframe, with minor delays on two information requests.

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[212] Power and Water, *Letter to AER - Request for extension of time for 2019–24 regulatory proposal*, 5 December 2017.

[213] AER, *Letter to Power and Water - Request for revised submission date for 2019–24 regulatory proposal*, 15 December 2017.

[214] Each of these information requests had a series of questions.

## Engagement

We have engaged with CCP during the review process to understand and test its views on Power and Water's regulatory proposal. We have had regard to CCP's public submission, along with all the other submissions that we have received on Power and Water's capex proposal.

In terms of engagement with Power and Water, we have had a number of meetings with Power and Water throughout the review process. Overall, we acknowledge Power and Water's efforts in its engagement with us. Power and Water has put forward a high quality proposal that reflects the development of the business's practices over the years and its engagement on capex was open and transparent. This was evident in our on-site visit to Darwin in late May, which was a face-to-face discussion where we sought further detailed information on capex issues and tested our understanding of Power and Water's revenue proposal.[215]

We also offered an explanatory meeting on our repex model. Power and Water agreed to our proposed meeting. The AER repex model explanatory session occurred in late July. This included a discussion on the latest modelling refinement, which is discussed in appendix D below, and how it impacted Power and Water.[216] It was an opportunity for Power and Water to understand the underlying assumptions of the repex model and how it affected its repex proposal.

Similarly, following the NT budget and the announcement of the NT Government's undergrounding project, Power and Water reached out to engage on the impact of the undergrounding program on its capex proposal. We sought further clarification on the expected outcome, noting that there may be an impact on Power and Water's repex. Power and Water advised us that it intends to update its capex forecasts to reflect the undergrounding decision in its revised regulatory proposal.[217]

We also met with Power and Water in September to discuss our assessment of the capex proposal and to provide an indication of our position on key aspects of our draft decision.

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[215] The agenda included a range of topics, namely, the network planning framework, connections capex and contributions policy changes, augmentation, replacement and non-network capex. The outcomes of this face-to-face discussion were a list of questions. Power and Water responded to these questions as part of the IR#017.

[216] Further information on the repex modelling refinement is found in Appendix D.

[217] Power and Water, *Letter to the AER - Cabinet decision impacting Power and Water - regulatory determination, public*, 4 September 2018.

# D Repex modelling approach

This section provides a guide to our repex modelling process. It sets out:

1. relevant background information
2. the data used to run the repex model
3. the key assumptions underpinning our repex modelling approach
4. the repex model outcomes under different scenarios.

## D.1 Background to predictive modelling

In 2012, the AEMC published changes to the National Electricity and National Gas Rules.[218] Following these rule changes, the AER undertook a "Better Regulation" work program, which included publishing a series of guidelines setting out our approach to regulation under the new rules. [219]

The expenditure forecast assessment Guideline (Guideline) describes our approach, assessment techniques and information requirements for setting efficient expenditure allowances for distribution network service providers (distributors).220 It lists predictive modelling as one of the assessment techniques we may employ when assessing a distributor's repex. We first developed and used our repex model in our 2009–10 review of the Victorian electricity distributors' 2011–15 regulatory proposals and have also used it in subsequent electricity distribution decisions.

The technical underpinnings of the repex model are discussed in detail in the replacement expenditure model handbook.[221] At a basic level, the AER's repex model is a statistical tool used to conduct a top-down assessment of a distributor's replacement expenditure forecast. Discrete asset categories within six broader asset groups are analysed using the repex model. These six asset groups are poles, overhead conductors, underground cables, service lines, transformers and switchgear.

The repex model forecasts the volume of assets in each category that a distributor would be expected to replace over a 20-year period. The model analyses the age of assets already in commission and the time at which, on average, these assets would be expected to be replaced, based on historical replacement practices. A total replacement expenditure forecast is derived by multiplying the forecast replacement volumes for each asset category by an indicative unit cost.

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[218] AEMC, *Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012.

[219] See AER *Better regulation reform program* web page at http://www.aer.gov.au/Better-regulation-reform-program.

[220] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013; AER, *Expenditure Forecast Assessment Guideline for Electricity Transmission*, November 2013.

[221] AER, *Electricity network service providers: Replacement expenditure model handbook*, November 2013.

The repex model can be used to advise and inform the AER and its consultants where to target a more detailed bottom-up review, and define an alternate repex forecast if necessary. The model can also be used to benchmark a distributor against other distributors in the National Electricity Market (NEM).[222]

As detailed in the AER's repex handbook, the repex model is most suitable for asset groups and categories where there is a moderate to large asset population of relatively homogenous assets. It is less suitable for assets with small populations or those that are relatively heterogeneous. For this reason, we exclude the SCADA and other asset groups from the modelling process and do not use predictive modelling to directly assess the asset categories within these groups.

Expenditure on and replacement of pole top structures is also excluded, as it is related to expenditure on overall pole replacements and modelling may result in double counting of replacement volumes. In addition, distributors do not provide asset age profile data for pole top structures in the annual category analysis RINs, so this asset group cannot be modelled using the repex model.

## D.2 Data collection

The repex model requires the following input data:

- the age profile of network assets currently in commission
- expenditure and replacement volume data of network assets
- the mean and standard deviation of each asset's expected replacement life.

This data is derived from distributors' annual regulatory information notice (RIN) responses, and from the outcomes of the unit cost and expected replacement life benchmarking across all distribution businesses in the NEM. The RIN responses relied on are:

- annual category analysis RINs – issued to all distributors in the NEM
- reset RINs – distributors are required to submit this information with their regulatory proposal.

Category analysis RINs include historical asset data and reset RINs provide data corresponding to distributors' proposed forecast repex over the upcoming regulatory control period. In both RINs, the templates relevant to repex are sheets 2.2 and 5.2.

Our current approach of adopting a standardised approach to network asset categories provides us with a dataset suitable for comparative analysis and better equips us to assess the relative prices of capital inputs as required by the capex factors.[223]

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[222] This includes Power and Water Corporation.

[223] NT NER cl. 6.5.7(e)(7).

## D.3 Scenario analysis

In this section we set out the broad assumptions used to run a series of scenarios to test distributors' forecast modelled repex. The specific modelling assumptions applied for each distributor are outlined in each individual repex modelling workbook.

The four scenarios analysed are:

1. historical unit costs and calibrated expected replacement lives (**Historical Performance Scenario**)
2. comparative unit costs and calibrated expected replacement lives (**Cost Scenario**)
3. historical unit costs and comparative expected replacement lives (**Expected Lives' Scenario**)
4. comparative unit costs and comparative expected replacement lives (**Combined Scenario**).

Comparative unit costs are defined as the minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM. Comparative replacement lives are defined as the maximum of a distributor's calibrated expected replacement life and the median expected replacement life across the NEM.

## D.4 Calibration

The calibration process estimates the average age at replacement for each asset category using the observed historical replacement practices of a distributor. The length of the historical period analysed during this process is referred to as the 'calibration period'. The inputs required to complete the calibration process are:

- the age profile of network assets currently in commission
- historical replacement volume and expenditure data for each asset category.

The calibrated expected replacement lives as derived through the repex model differ from the replacement lives that distributors report. During the calibration process, we assume the following:

- the calibration period is a historical period where a distributor's replacement practices are largely representative of its expected future replacement needs[224]
- we do not estimate a calibrated replacement life where a distributor did not replace any assets during the calibration period, because the calibration process relies on actual historical replacement volumes to derive a mean and standard deviation
- where a calibrated replacement life is not available, we substitute the value of a similar asset category.

[224] Each DNSP's specific repex modelling workbook outlines more detailed information on the calibration period chosen.

## D.5 Comparative analysis

The Cost, Lives and Combined Scenarios rely on a comparative analysis technique that compares the performance of all distributors in the NEM. The technique analyses the two variable repex model inputs – unit costs and replacements lives. The aim of the Cost, Lives and Combined Scenarios is to test unit cost and expected replacement life inputs that are most representative of distributors across the NEM.

Previous distribution determinations where we have used the repex model have primarily focused on the Historical Performance Scenario. This scenario forecasts a distributor's expected repex and replacement volumes based on its historical unit costs and asset replacement practices (which are used to derive expected replacement lives).

Our refined comparative analysis repex modelling approach builds on this previous analysis and introduces the historical performances of other distributors in the NEM into the forecast period. The Cost Scenario analyses the level of repex a distributor could achieve if its historical unit costs are substituted with comparative unit costs. Expected Lives Scenario analyses the level of repex a distributor could achieve if its calibrated expected replacement lives are substituted with comparative expected replacement lives.

### Unit costs

The comparative analysis technique compares a distributor's historical unit costs, forecast unit costs and median unit costs across the NEM. Historical unit costs are derived from a distributor's category analysis RIN and forecast unit costs are derived from a distributor's reset RIN, which is submitted as part of its regulatory proposal.

The median unit costs across the NEM are based on each distributor's historical unit cost for each asset category. The median unit cost is used for comparative analysis purposes because this approach effectively removes any outliers, either due to unique network characteristics or data reporting anomalies.

The United Kingdom's Office of Gas and Electricity Markets (Ofgem) has a similar approach to unit costs benchmarking, where Ofgem applies a unit cost reduction where the distributor's forecast unit cost was higher than industry median[225].

The unit cost input used in the Cost and Lives' Scenario is the minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM.

[225] Ofgem, *Strategy decisions for the RIIO-ED1 electricity distribution price control - tools for cost assessment* - 4 March 2013.

### Replacement lives

For expected replacement lives, the comparative analysis technique compares a distributor's calibrated replacement lives (based on historical replacement practices) and the median expected replacement lives across the NEM. Median expected replacement lives are based on each distributor's calibrated replacement lives for each asset category. Once again, using the median value effectively accounts for any outliers.

The expected replacement life input used in the Expected Lives and Combined Scenarios is the maximum of a distributor's calibrated replacement life and the median replacement life across the NEM.

### Repex model threshold

Our repex model threshold is defined taking these results and other relevant factors into consideration. For the 2019–24 determinations, our approach is to set the repex model threshold equal to the highest result out of the Cost and Expected Lives' Scenario.[226] This approach gives consideration to the inherent interrelationship between the unit cost and expected replacement life of network assets.

For example, a distributor may have higher unit costs than other distributors for particular assets, but these assets may in turn have longer expected replacement lives. In contrast, a distributor may have lower unit costs than other distributors for particular assets, but these assets may have shorter expected replacement lives.

## D.6 Unmodelled repex

As detailed in the AER's repex handbook, the repex model is most suitable for asset groups and categories with a moderate to large asset population of relatively homogenous assets. It is less suitable for assets with small populations or those that are relatively heterogeneous. For this reason, we exclude the SCADA and other asset groups from the modelling process and do not use predictive modelling to directly assess the asset categories within these groups.

Expenditure on and replacement of pole top structures is also excluded, as it is related to expenditure on overall pole replacements and modelling may result in double counting of replacement volumes. In addition, distributors do not provide asset age profile data for pole top structures in the annual category analysis RINs, so this asset group cannot be modelled using the repex model.

[226] Our modelling approach means Historical Performance Scenario will always be higher than the Cost and Expected Lives' Scenario, and the Combined Scenario will always be lower than Cost and Expected Lives' Scenario.

# E Demand

Power and Water has utilised demand forecasts to help determine its forecast capex. We have reviewed Power and Water's demand forecast in order to determine whether or not the proposed capex reasonably reflects a realistic expectation of forecast demand. Accurate, or at least unbiased, demand forecasts are important inputs to ensuring efficient levels of investment in the network.

Maximum demand trends give a high level indication of the need for expenditure on the network to meet changes in demand. Forecasts of increasing system demand generally signal an increased network utilisation which may, once any spare capacity in the network is used up, lead to a requirement for augex. Conversely forecasts of stagnant or falling system demand will generally signal falling network utilisation, a more limited requirement for augex, and the potential for the network to be rationalised in some locations.

## E.7 Power and Water regulatory proposal

Power and Water obtained independent maximum demand forecasts from the Australian Energy Market Operator (AEMO) for the 2019–24 period, to assess constraints and inform long-term development plans for its distribution network.

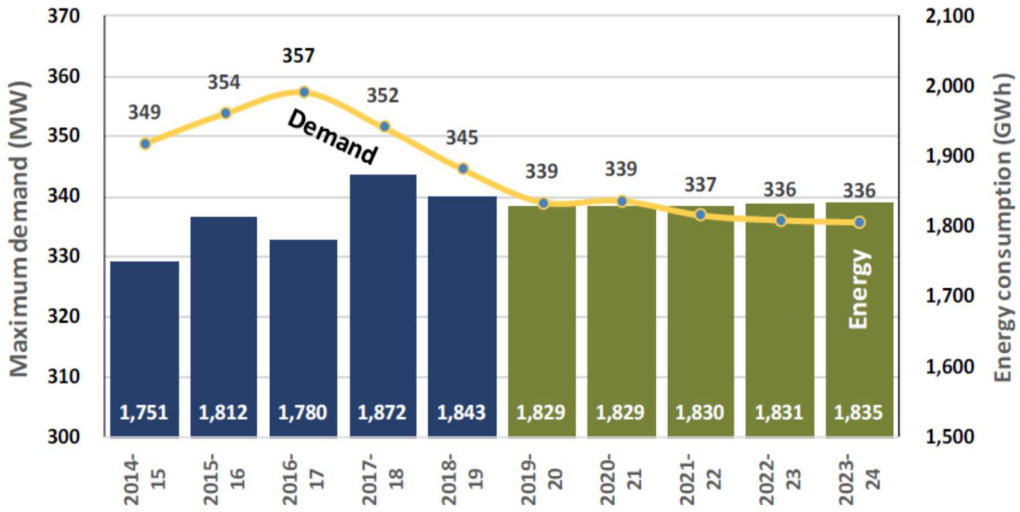
AEMO's maximum demand forecasts for the Northern Territory show a decline in maximum demand over the 2019–24 regulatory control period, both in aggregate and for each of Power and Water's network regions.[227] This is consistent with the forecast reduction in augex in the 2019–24 regulatory control period. Power and Water submitted that the key driver of load driven augex is therefore growth within localised parts of its distribution network where capacity constraints are forecast.[228]

Figure 5.17 shows system wide maximum demand declining from 2016-17, and continuing to decline over the 2019–24 regulatory control period. Energy consumption is forecast to be flat over the forecast period.

[227] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, pp. 56–60.

[228] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 69.

**Figure 5.17 Actual and Forecast Maximum Demand and Energy Consumption - Power and Water distribution network**




Source: Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, p. 56.

## E.8 Position

We consider that AEMO's demand forecasting methodology used to prepare Power and Water's forecast of system maximum demand is likely to be reasonable and unbiased. However, it is not clear that the forecasts proposed by Power and Water necessarily reflect a realistic expectation of forecast demand. We are concerned that Power and Water's forecasts:

- include forecast block loads where Power and Water has not justified the quantum and timing of the forecast load[229]
- may not fully account for the potential impact of the NT Government's 'Roadmap to Renewables' policy, improvements in energy efficiency, and increasing PV and/or energy storage penetration
- do not account for the latest available forecasts of macroeconomic driver inputs such as GSP and population forecasts.

We expect that Power and Water will update its demand forecasts (including connection forecasts) and/or provide additional information to validate key inputs and assumptions as part of its revised proposal.

[229] We discuss this point specifically in our assessment of the Wishart zone substation augex project.

## E.9 Reasons for our position

We consider that AEMO's demand forecast for Power and Water's distribution network is based on a reasonable and well established forecasting methodology. AEMO is an independent and experienced provider of demand forecasting information in the NEM.

AEMO applied the following forecasting methodologies to each of Power and Water's three networks:[230]

- Regional maximum demand: AEMO forecast regional maximum demand by season using a probabilistic methodology. It prepared forecasts based on:
    - 10 per cent Probability of Exceedance (PoE), where maximum demand is expected to be exceeded, on average, one year in ten; and
    - 50 per cent PoE, where maximum demand is expected to be exceeded, on average, one year in two.
- Zone substation maximum demand: AEMO forecast zone substation maximum demand by season using the same probabilistic methodology as for regional maximum demand.
- Energy consumption: AEMO used a weather-based regression model using daily system consumption data, correlated against weather data from weather stations close to demand centres. This was used to create a base year forecast. AEMO then grew the forecast on an annual basis, using key drivers of future changes in electricity consumption, including: residential connection growth; gross state product growth; large load variations; and rooftop PV and battery energy storage system installations.
- Customer connections: AEMO undertook regression analysis to forecast connections for the 2019–24 regulatory control period, based on 10 years of connection numbers for each connection types.

We received submissions on Power and Water's demand forecasts from CCP 13 and an anonymous submission. CCP 13 expressed concern that the demand forecasts may overstate future demand and recommended that: [231]

- we examine AEMO's demand forecasts for Power and Water's network with particular attention to the forecasts of connection growth, PV installation and energy efficiency/productivity in the Territory
- Power and Water consider commissioning an updated demand forecast from AEMO that takes account of more recent input information and explicitly takes account of the Government's commitment to 50 per cent renewables by 2030.

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[230] Power and Water, *Regulatory Proposal 1 July 2019 to 30 June 2024,* 16 March 2018, pp. 57-58; and Power and Water, *Maximum demand and customer connections forecasting procedure*, 7 July 2017.

[231] CCP13, *Submission on Power and Water's regulatory proposal*, 16 May 2018, p. 9.

The anonymous submission queried the assumption that existing connections would continue their patterns of consumption and demand given vacancy rates in rental properties would be likely to rise following completion of a major construction project in Darwin in 2017-18.[232]

We put these concerns to Power and Water.[233] Power and Water advised that it was reviewing whether there were any factors that may lead to a material change in its demand forecasts. This included reviewing the latest data on population and GSP forecasts, the NT's Roadmap to Renewable energy target of 50 per cent renewables by 2030, and any updates to inputs or assumptions.[234] Power and Water also provided a response to submissions addressing these points, in which it stated that it was in discussions with AEMO to analyse the impact of these concerns, and that the outcome of this AEMO engagement would be reflected in its revised regulatory proposal.[235]

On this basis, and based on the information available to us in making this draft decision, we have not been able to conclude that Power and Water's demand forecasts reflect a realistic expectation of forecast demand in the 2019–24 regulatory control period.[236] While we consider that AEMO's demand forecasting methodology is reasonable and likely to be unbiased, we expect that Power and Water will provide additional and updated information in its revised proposal, including revised forecasts where necessary, to validate its demand forecasts and ensure they reflect the latest available inputs and assumptions.

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232 Anonymous, *Submission on Power and Water's regulatory proposal*, 16 May 2018, p. 6.

233 AER, *Information request #020*, 15 June 2018.

234 Power and Water, *Response to AER information request #020*, 22 June 2018, p. 2.

235 Power and Water, *Response to submissions received on 2019–24 initial regulatory proposal*, 17 August 2018, p. 8.

236 NT NER, cl. 6.5.7(c)(1)(iii).

# F Berrimah cost-breakdown - Confidential appendix