FINAL DECISION

Power and Water Corporation Distribution Determination 2019 to 2024

Attachment 5 Capital expenditure

April 2019

AUSTRALIAN ENERGY REGULATOR

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Note

This attachment forms part of the AER's final 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 final decision.

The final decision includes the following attachments:

Overview

Attachment 1 – Annual revenue requirement

Attachment 2 – Regulatory asset base

Attachment 3 – Return on debt transition

Attachment 4 – Regulatory depreciation

Attachment 5 – Capital expenditure

Attachment 6 – Operating expenditure

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Attachment A – Negotiating framework

Contents

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
CCP13	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
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

Shortened form	Extended form
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
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's total revenue requirement.[1]

This attachment sets out our final 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 - Demand

5.1 Final 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.

These criteria outline 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]

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 justified that its total net capex of $338.4 million ($2018-19) for the 2019–24 regulatory control period reasonably reflects the capex criteria, taking into

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).
4 NT NER, cl. 6.12.1(3)(ii).

account the capex factors.[5] Table 5-1 outlines our final decision, as compared to Power and Water's initial and revised proposal.

Table 5-1 – Final decision on Power and Water's total forecast net capex ($2018-19, million)

	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Power and Water's initial 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
Power and Water's revised proposal	86.8	68.6	78.6	53.6	50.7	338.4
AER final decision	86.8	68.6	78.6	53.6	50.7	338.4

Source: AER analysis

Note: Net capex excludes equity raising costs, capital contributions and asset disposals. Numbers may not add up due to rounding.

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 or individual projects.

Our assessment highlighted that we are satisfied that Power and Water's revised capex drivers would form part of a total capex forecast that reasonably reflects the capex criteria.[6] In making our final decision, we considered the impact our decision will have on the safety and reliability of Power and Water's network. We consider our final decision on capex is 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 set out in appendix B of this attachment our assessment of Power and Water's individual capex drivers.

Power and Water has demonstrated that its total capex forecast forms part of an overall distribution determination that is likely to contribute to the achievement of the National Electricity Objective to the greatest degree.

Table 5-2 summarises our findings and the reasons for our draft final decision by 'capex driver' (e.g. augmentation, replacement and connections). This reflects the way we have assessed Power and Water's total capex forecast.

5 NT NER, cl.6.12.1(3)(ii).

6 NEL, ss.7(a) and 16(2).

Table 5-2 – Summary of AER reasons and findings

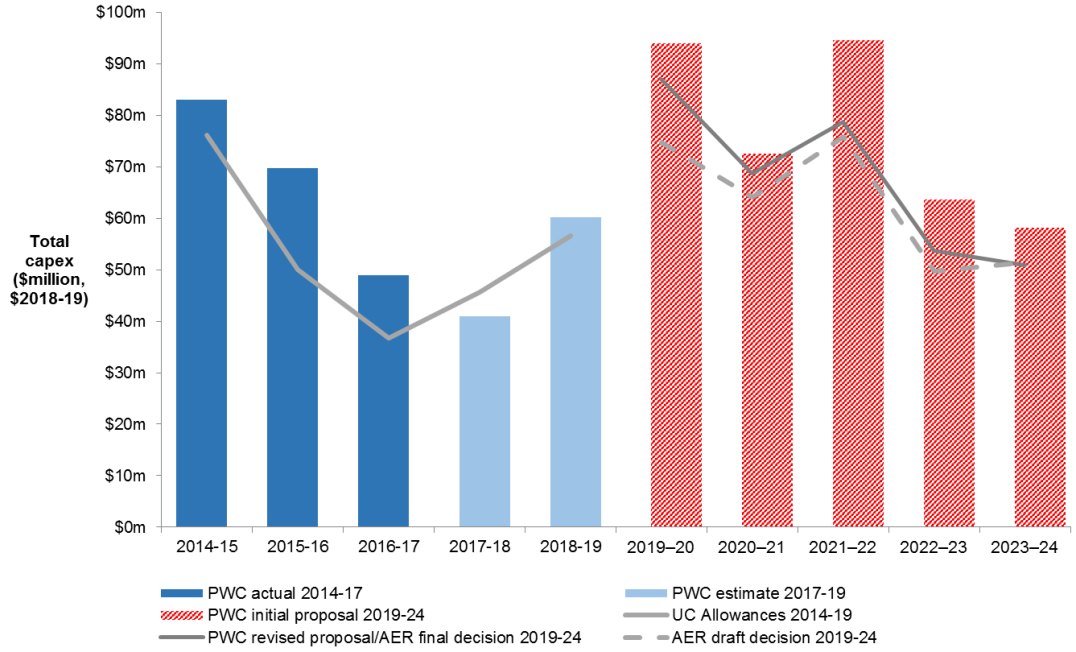
Issue	Reasons and findings
Total net capex forecast	Power and Water proposed a total capex forecast of $338.4 million ($2018–19) in its revised proposal. Power and Water has demonstrated that its revised total capex forecast reasonably reflects the capex criteria. We consider this capex forecast is sufficient for a prudent and efficient service provider in Power and Water's circumstances to maintain the safety, service quality, security and reliability of its network consistent with its current obligations.
Forecasting methodology, key assumptions and past capex performance	Power and Water's revised capex proposal demonstrated its engagement with all aspects of our draft capex decision, and acknowledged the need for ongoing improvement in its risk assessment and asset management approaches to align with industry best practice. For some capex categories, such as augex, Power and Water accepted our draft decision. In other cases, Power and Water provided further evidence to address the issues highlighted in our draft decision and justify a revised capex forecast that is higher or lower than our draft decision.
Augmentation capex (augex)	Power and Water accepted our draft decision on forecast augex, including adopting a lower cost non-network solution in place of the major Wishart augmentation project. Power and Water undertook further analysis and confirmed the viability of non-network solutions to mitigate reliability and security risks from insufficient firm capacity in the Wishart area.
Customer connections capex and capital contributions	Power and Water sought updated customer connections forecasts from AEMO, and applied updated connections unit costs, to reduce its revised forecast connections capex below our draft decision. We are satisfied that Power and Water's connection capex of $55.5 million ($2018–19) for the 2019–24 regulatory control period reasonably reflects the capex criteria. Power and Water's reduced forecast for capital contributions of $46.6 million ($2018–19) is consistent with its revised capital contributions policy.
Replacement capex (repex)	Power and Water reduced its forecast repex by 5 per cent from its initial proposal, by revising the scope of its Alice Springs poles and HV cable replacement programs, and sought to rely on new methods and additional data to justify its revised forecasts. Power and Water also proposed a replacement option for the Berrimah substation that maintains the existing capacity, in line with the reasoning set out in our draft decision.
Non-network ICT capex	Power and Water addressed the concerns outlined in our draft decision regarding the deliverability of its forecast IT capex program by reducing the proposed capex and smoothing expenditure more evenly over the forecast regulatory period. Power and Water has demonstrated its capacity to efficiently deliver the revised ICT capex program of $32.1 million ($2018–19) during the 2019–24 regulatory control period.
Non-network other capex	Power and Water largely accepted our draft decision on non-network other capex, while providing additional supporting information to justify a reduced scope of works at the 19 Mile depot.
Capitalised overheads	Power and Water updated its base year capitalised overheads costs in line with its opex forecasting methodology, applying 2017–18 costs to update the base year, resulting in a slight reduction to capitalised overheads from its initial proposal. We have accepted Power and Water's forecasts of direct capex, and therefore made no adjustment to the variable component of forecast capitalised overheads.
Real cost escalators	We accept that Power and Water's revised forecast total capex reasonably reflects the capex criteria, taking into account the capex factors. We have made no adjustment to Power and Water's forecast real labour cost escalators, as the application of updated forecasts does not materially alter the total capex forecast.
Asset Disposals	Power and Water accepted our draft decision forecast asset disposals of $0.8 million, which is in line with Power and Water's average historical level of asset disposals.

Source: AER analysis.

5.2 Power and Water's revised proposal

For the 2019–24 regulatory control period, Power and Water revised its total proposed forecast net capex to $338.4 from $383.0 million ($2018–19), a reduction of 12 per cent from its initial proposal. Power and Water's revised forecast of total net capex requirements for the 2019–24 regulatory control period is $35.5 million—or 12 per cent—higher than its actual and estimated capex of $302.9 million in the 2014–19 period. Relevantly, Power and Water's change in capitalisation policy for the forecast period has resulted in certain categories of non-network related expenditure being reclassified from opex to capex. The difference between current period and forecast capex should be viewed with this in mind. Figure 5-1 below shows the trend for Power and Water's historical capex compared to our draft and final decisions.

Figure 5-1 – Power and Water's historical vs forecast capex, including 2014–19 allowance and AER final 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 revised capex proposal are:

- about 32 per cent of total forecast capex is for asset replacement where Power and Water is forecasting $141.0 million for repex; this compares to its actual expenditure over the current period of $173.9 million, which is approximately 19 per cent above its forecast.
- forecast augex of $35.8 million, to meet power quality and reliability compliance obligations. This is a relatively minor component of forecast capex, consistent with forecasts of flat or declining demand across Power and Water's networks. Power and Water has confirmed the potential for non-network solutions to mitigate reliability and security risks from insufficient firm capacity in the Wishart area, consistent with our draft decision.

- forecast connections capex of $55.5 million for connection works for new and existing customers, a small reduction from the current regulatory control period. Power and Water's revised forecast applied updated AEMO connection volume forecasts and lower unit costs to reduce forecast capex for this category.
- non-network other capex of $56.1 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 $32.1 million, an increase from the current period driven by the need for compliance with NT NER requirements, and the replacement of ageing systems.
- capitalised overheads of $65.1 million, an allocation of a proportion of overheads to capex in accordance with Power and Water's cost allocation method.

5.3 Assessment approach

Our assessment approach for this final decision is the same as that set out in our draft decision on Power and Water's total forecast capex. Refer to our draft decision for further details.[7]

5.4 Reasons for final decision

We applied our assessment approach to Power and Water's forecast capex, in order to assess its prudency and efficiency. In our draft decision, we acknowledged that Power and Water had submitted a robust regulatory proposal reflecting Power and Water's understanding of its network and therefore its capex requirements. We identified areas that required improvement, mainly around Power and Water's asset management framework, risk-based cost benefit analysis and overall forecasting approach.[8]

In its revised proposal, Power and Water acknowledged the need to improve in its risk quantification methods and indicated that Power and Water's next phase of improvement lies in more sophisticated risk assessment to align with industry's best practice methods.[9] The Northern Territory Treasurer also submitted that, despite improvement in asset management and maintenance practices from the Casuarina Zone Substation incident to-date, Power and Water still has room to improve its performance to align with the community's expectations for reliability of supply.[10]

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7 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure,* September 2018, pp. 13–16.

8 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.

9 Power and Water, *Revised Capex Overview*, 29 November 2018, public, p. 25.

10 Northern Territory Treasurer, *Submission on draft decision and Power and Water's revised proposal*, 8 January 2019, public, p. 3.

Power and Water has demonstrated its genuine consideration of the issues that we raised in our draft decision. Power and Water sought to understand our concerns in greater detail and engaged with stakeholders, including us, in preparing its revised proposal. This engagement is evident in Power and Water's revised capex forecast, where for some categories, such as augex, Power and Water accepted our draft decision. In other areas, Power and Water has engaged with our concerns, undertaken further analysis and provided further evidence to justify a revised capex forecast.

The CCP13 made a similar observation and commended Power and Water on its high-quality engagement, which informed its revised proposal.[11] CCP13 also welcomed Power and Water's efforts in developing its risk and asset management practices to support its capex forecast.[12]

Based on the information before us, Power and Water has demonstrated that its 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.

Table 5-3 sets out our final decision on Power and Water's total capex forecast for the 2019–24 regulatory control period by driver category, which is consistent with Power and Water's revised proposal.

Table 5-3 – AER final decision by capex driver 2019–24 ($2018–19, million)

Category	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Augmentation	11.4	5.4	5.7	6.7	6.6	35.8
Gross Connections	10.7	11.0	11.9	10.9	11.0	55.5
Replacement	33.9	37.1	31.4	20.5	18.1	141.0
Non-Network other	20.8	5.2	19.9	5.2	5.1	56.1
Non-Network ICT	6.6	6.4	6.2	6.6	6.2	32.1
Capitalised overheads	12.7	12.9	13.0	13.2	13.3	65.1
Total gross capex	**96.2**	**78.0**	**88.2**	**63.0**	**60.3**	**385.8**
Less capital contributions	9.2	9.3	9.5	9.3	9.4	46.6
Less asset disposals	0.2	0.2	0.2	0.2	0.2	0.8
Total net capex	**86.8**	**68.6**	**78.6**	**53.6**	**50.7**	**338.4**

Source: AER analysis.

Notes: Numbers may not add up due to rounding. Net capex = gross capex less capital contributions less disposals.

[11] Consumer Challenge Panel Sub-Panel 13, *Response to Power and Water Corporation revised proposal for a revenue reset for the 2019-24 regulatory period*, 11 January 2019, Public, p. 4.

[12] Consumer Challenge Panel Sub-Panel 13, *Response to Power and Water Corporation revised proposal for a revenue reset for the 2019-24 regulatory period*, 11 January 2019, Public, p. 14.

In the context of our assessment of key expenditure drivers, we understand that in April 2019 the Northern Territory Government formally notified Power and Water of its intention to direct Power and Water to undertake a power undergrounding program in Darwin. In finalising Power and Water's 2019–24 distribution determination, we have not considered the interrelationship between the undergrounding program and any cost savings, whether capex or opex, that may be consequential to the undergrounding program. While these matters were raised with Power and Water in our draft decision,[13] as the program had not been finalised in time for the final determination, Power and Water did not have sufficient information to determine the impact on its network expenditure. In these circumstances, where material cost savings are realised through the 2019–24 regulatory control period, Power and Water may be required to submit a negative pass through application to pass these savings through to customers.

[13] AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure,* September 2018, p. 19.

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).[14]

Below we outline the assessment techniques we used to assess both Power and Water's initial and revised 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.[15] 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.[16] 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 expenditure (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

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

15 NT NER, cl. 6.5.7(e)(5).

16 NT NER, cl. 6.5.7(a)(3).

consider 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.[17] 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.

[17] This includes Power and Water Corporation.

Repex model threshold

Our 'repex model threshold' is defined by 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 scenario' and the 'lives scenario'.[18]

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 of our draft decision capex attachment.[19]

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.[20]

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

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18 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'.

19 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure,* September 2018, pp. 89–94.

20 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.

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.[21] 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.[22]

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.[23] The AEMC stated:

> "Benchmarking is a critical exercise in assessing the efficiency of an NSP".[24]

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.

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.[25] 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

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

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

23 NT NER, cl. 6.5.7(c).

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

25 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.

customer density. For more information on how we derive these measures, refer to our annual benchmarking report.[26]

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.

[26] AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2018.

B Assessment of capex drivers

This appendix outlines our detailed assessment of the categories of Power and Water's revised 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.

Power and Water has demonstrated that the proposed total capex forecast reasonably reflects the capex criteria. In this appendix, we set out further analysis in support of this view and the different assessment techniques we relied on to form this view. The structure of this appendix is:

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

B.1 Forecast augex

Augmentation expenditure (augex) 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.1.1 Power and Water's revised proposal

In its revised proposal, Power and Water accepted the AER's findings for augex but made minor adjustments to the timing of expenditure. Power and Water's revised forecast augex of $35.8 million ($2018-19) is 41 per cent lower than its initial augex proposal and in line with our draft decision augex of $35.9 million ($2018–19).[27]

Power and Water accepted our draft decision for two proposed augex projects - Wishart zone substation and the Darwin switchgear fault level replacement program.

Wishart zone substation

In its initial proposal, Power and Water proposed constructing a new zone substation at Wishart to support forecast load growth in the Wishart and East Arm (port) areas.

[27] Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 19.

In our draft decision, we found there was uncertainty in Power and Water's forecast load growth for the area, particularly in the timing of spot (large customer) loads. In this context, we considered that a solution that delayed the need to commit to significant network capex and provided more time to assess actual load growth was likely to be preferred. We concluded there was likely to be a potentially viable non-network solution available to address capacity constraints in the 2019–24 regulatory control period and defer or avoid the proposed augmentation. Our substitute estimate of forecast capex provided for an appropriately sized non-network solution, rather than constructing a new substation, reducing forecast capex for the project by 79 per cent.[28]

Power and Water accepted our decision and undertook deeper analysis of potential non-network options. Power and Water's proposed solution is to use small mobile generators to maintain reliability if a major asset fails in service. Power and Water submitted that its costing of this solution is similar to our draft decision, but has included a minor amount of opex to run the generators which has been included as a step change in its opex forecasts.[29]

Switchgear fault level replacement

In its initial proposal, Power and Water proposed replacing 34 switchgear units in Darwin where system fault levels were now exceeding or close to exceeding the rating of switchgear installations. In our draft decision, we concluded that only 27 switchgear units had fault levels that currently exceeded the equipment fault rating, such that replacement of the units would be justified in the 2019–24 regulatory control period.[30]

Power and Water reviewed our draft decision and accepted that it should replace as a priority the 27 units where the switchgear was currently at or exceeding equipment ratings. Power and Water submitted that it will continue to monitor the condition of the remaining assets to manage any associated risks.[31]

B.1.2 Final decision position

Power and Water's revised forecast augex is consistent with our draft decision on forecast augex. Power and Water has demonstrated that its revised forecast augex of $35.8 million ($2018–19) reasonably reflects the prudent and efficient costs required to achieve the capex objectives in the 2019–24 regulatory control period.

B.2 Forecast customer connections capex

Connections capex is expenditure incurred to connect new customers to the network and, where necessary, augment the shared network to ensure there is sufficient

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28 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure,* September 2018, pp. 32–38.

29 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 19.

30 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, pp. 39–40.

31 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 20.

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.2.1 Power and Water's revised proposal

Power and Water's revised proposal reduced gross connections capex by $7.2 million ($2018–19), relative to its initial proposal, to $55.5 million over the 2019–24 regulatory control period.[32] This is a 10 per cent decrease from our draft decision for connections capex of $61.6 million.[33]

In response to our draft decision and submissions from stakeholders, Power and Water engaged AEMO to provide revised connection forecasts reflecting the latest available data on macroeconomic drivers such as economic and population forecasts. The reduction in forecast customer connection capex reflects lower volumes of large commercial and industrial customer connections in AEMO's updated forecast.[34]

Capital contributions

The capital contribution forecast in Power and Water's initial proposal was based on a proposed customer connections policy that we considered was inconsistent with the classification of these services and required customers to pay, in full, for connection costs.[35] Our draft decision noted that Power and Water was redrafting its proposed connections policy, and included $49.0 million for capital contributions and $12.6 million in net connections capex.[36]

In response to our draft decision, Power and Water revised its customer connections policy, resulting in a reduced forecast for capital contributions of $46.6 million, and $8.9 million in net connections capex.[37] This is a 5 per cent decrease from our draft decision forecast for customer contributions.

B.2.2 Final decision position

Power and Water's revised forecast connection capex of $55.5 million ($2018–19) is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. Power and Water's forecast capex is based on updated connection volume forecasts provided by AEMO, reflecting the latest available data on underlying macroeconomic drivers.

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32 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 20.

33 AER analysis.

34 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 21.

35 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 21.

36 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 22.

37 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 22.

We are also satisfied that Power and Water's revised forecast for capital contributions of $46.6 million reflects its revised customer connections policy, which we have approved in this final decision.[38]

B.2.3 Reasons for our position

In our draft decision, we concluded that Power and Water's connections capex forecasting methodology was reasonable and likely to produce a prudent and efficient forecast of required capex in this category.[39] However, noting concerns expressed by consumers including the CCP13, and given the reliance of the forecasting methodology on forecasts of underlying macroeconomic drivers, we considered that Power and Water should ensure its revised proposal reflected the latest available forecasts in this regard.

Power and Water engaged AEMO to provide revised connection forecasts reflecting the latest available data on macroeconomic drivers such as economic and population forecasts. Power and Water also updated its connections model to incorporate the most recent connection volumes and expenditure for the 201718 year. Power and Water's updated forecast of connections capex is 10 per cent lower than its initial proposal, reflecting:[40]

- lower volumes of large commercial and industrial customer connections
- lower connection unit costs, based on 2017–18 actual data
- a reduction in gifted assets, which are a key driver of gross connections capex.

We consider that Power and Water's revised forecast of connections capex reflects updated forecasts of connection volumes and the latest available input data. On that basis, we are satisfied that Power and Water's revised forecast connections capex of $55.5 million ($2018–19) for the 2019–24 regulatory control period reasonably reflects the capex criteria.

In relation to Power and Water's revised customer contributions forecast, we note that Power and Water has revised its customer contributions policy to include the "incremental revenue less incremental cost test" when determining connection charges. We have approved Power and Water's revised customer contributions policy in this final decision.[41] Power and Water's revised capital contributions forecast reflects its revised contributions policy, whereby new customers only pay the incremental costs of their connection, with the remaining costs funded by existing customers through the net connections capex forecast.

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38 AER, *Power and Water Corporation Distribution Determination 2019 to 2024 - Overview*, 30 April 2019.

39 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p. 5-43.

40 Power and Water, *Revised Capex Overview*, 29 November 2018, p. 28.

41 AER, *Power and Water Corporation Distribution Determination 2019 to 2024 - Overview*, 30 April 2019.

B.3 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;[42]
- 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.3.1 Power and Water's revised proposal

Power and Water's revised repex forecast is $141.0 million ($2018–19, excluding overheads), which is 9 per cent above our draft decision repex substitute estimate of $129.0 million, but 5 per cent below its initial forecast of $148.6 million ($2018–19).

In our draft decision, we utilised the repex model as a guide to target our bottom-up review for Power and Water's modelled repex.[43] This led us to identify that Power and Water had not justified the total expenditure for three of its replacement programs - its Alice Springs' poles program, the Berrimah Zone substation replacement project and the Darwin Northern Suburbs HV Cable replacement program.

Power and Water's revised proposal demonstrates its genuine consideration of the issues that we have raised in our draft decision.[44] Power and Water acknowledged that there was room to improve in its risk quantification methods in order to align with industry's best practice. For the purpose of the revised proposal, Power and Water

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[42] 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.

[43] For more detailed information on our repex modelling approach. See AER, *Power and Water Corporation 2019-24 - Draft decision - Attachment 5 - Capital Expenditure,* September 2018, pp. 89–92.

[44] AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p. 57.

noted that it did not have sufficient time to integrate these practices into its business. However, it sought to understand our concerns and identify new methods and data that resulted in some adjustments to its repex forecast. The CCP13 commended Power and Water on its efforts to further develop its risk and asset management practices in support of its capex forecast.[45]

As a result of further analysis and in response to our draft decision, Power and Water adjusted down its poles and cables program, by 20 per cent and 15 per cent respectively. For the Berrimah replacement project, Power and Water has not made any substantial reductions to its forecast for this project from the initial proposal.[46] However, consistent with the reasoning in our draft decision, Power and Water has acknowledged that maintaining, rather than reducing, the capacity at Berrimah is the most efficient option and will assist in reducing the risk associated with the deferral of the Wishart substation.[47]

B.3.2 Final decision position

Power and Water has demonstrated that its revised repex forecast of $141.0 million ($2018–19, excluding overheads) is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria.

Despite some concerns with the Power and Water's underlying statistical modelling and input costs, we have assessed that any reductions to the overall capex would be immaterial. However, to guide future reviews we have noted the concerns that we have identified with Power and Water's programs in section B.3.3 of this final decision.

B.3.3 Reasons for our position

We have applied several assessment techniques to assess Power and Water's revised forecast of repex against the capex criteria. In this final decision, we have had regard to a number of factors, being:

- trend analysis of Power and Water's past and forecast expenditure;
- consideration of bottom-up and top-down methodologies, such as business cases and top-down challenges or constraints;
- advice from technical and engineering experts (where applicable); and
- stakeholder submissions.

When weighing up all the above techniques, we have concluded that despite some minor concerns with Power and Water's bottom up forecasting approach, on-balance, Power and Water has responded to the concerns that we raised in the draft decision. It

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45 Consumer Challenge Panel Sub-Panel 13, *Response to Power and Water Corporation revised proposal for a revenue reset for the 2019-24 regulatory period*, 11 January 2019, Public, p. 14.

46 The only minor reduction relate to an adjustment to labour cost escalation.

47 Power and Water, *Revised Capex Overview, 29 November 2018* - Public, p. 28.

has justified that its revised repex forecast is prudent and efficient and would form part of a total forecast capex that reasonably reflect the capex criteria.

Below we detail our assessment for each of the three programs that we have raised concerns with in the draft decision and our assessment of the supporting documentation. Consistent with other previous decisions, to assist in our review of the prudency and efficiency of a business's forecast capex, we undertook a careful review of the reasonableness of programs and projects proposed over the regulatory control period. However, we acknowledge that it is a business' decision as to whether it undertakes a particular project or program over the regulatory control period. The 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. Power and Water may need to undertake programs or projects that it did not anticipate during the distribution determination process. It 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.

Alice Springs Pole program

Our draft decision did not accept the forecast 48 per cent step-up in pole repex. Our analysis identified that Power and Water's bottom-up analysis overstated the apparent risk as it did not account for joint probabilities of risk and consequence. In its revised proposal, Power and Water reduced its forecast for the program by 20 per cent, after consultation with its Customer Advisory Council (CAC).

The revised pole forecast is based on further analysis, which statistically modelled failures, using Weibull parameters and actual historical failures. In its revised analysis and in response to our draft decision, Power and Water included the consideration of population density as an input variable, to take into account the joint probability of the likelihood of a failure and its potential consequence.[48]

While we have a number of remaining concerns with the modelling, particularly regarding the derived Weibull parameters,[49] and the assumed input costs, which point to a need to further develop Power and Water's work practices, on balance we consider any further adjustments to the revised program to be immaterial in the context of the overall capex program.

In coming to our position, we have given consideration to the three submissions that we have received in support of the revised Alice Springs pole program. The Northern Territory Treasurer noted community concerns about the corroded poles in Alice Springs. The Treasurer reiterated community concerns that public safety is of paramount importance and that the potential consequences of pole failing should not

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[48] Power and Water, *Revised Capex Overview, 29 November 2018* - Public, pp. 41–42.

[49] Power and Water, *Alice Springs poles quantitative analysis*, 29 November, Public.

be undervalued.[50] In addition, the Electricity Trades Union provided a submission in support of the program, as it addresses the emerging safety risks associated with the corroded poles.[51] Similarly, the NT WorkSafe submitted its general support for the modified risk assessment approach, which incorporates population density.[52]

Berrimah substation replacement project

In its initial proposal, Power and Water did not justify that its preferred greenfields replacement option for this project was prudent and efficient.[53] We acknowledged that some capex was required for this substation, however, we determined that the engineering solution to replace Berrimah with a smaller capacity substation, which contributed to the need for augmentation in Wishart, was not justified. Our draft decision included a substitute estimate, which was based on a brownfields targeted replacement of particular assets,[54] while maintaining the capacity at Berrimah. This had flow-on effects for Power and Water's proposed augex - it assisted in deferring the need for a new Wishart zone substation and subsequently reduced Power and Water's proposed augex.[55]

In its revised proposal and consistent with the logic of our draft decision, Power and Water has acknowledged that maintaining, rather than reducing, the capacity at Berrimah is the most efficient option and will assist in reducing the risk associated with the deferral of the Wishart substation. Power and Water maintained that a revised greenfields solution is more preferable to a brownfields targeted program and noted that the additional cost to maintain capacity is minimal.[56] The ETU, in its submission on Power and Water's revised proposal, noted its support for the greenfields solution as it would provide a safe working environment for field staff.[57]

In support of its revised proposal, Power and Water provided further whole of life-cycle cost benefit analysis to justify its revised solution, which included the following:

- a comparison of the opex associated with the brownfield versus the greenfield options. The analysis demonstrates that, based on actual observed data, the

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50 Northern Territory Treasurer, *Submission on draft decision and Power and Water's revised proposal*, 8 January 2019, public, p. 3.

51 Electricity Trades Union, *Power and Water Corporation - Revised Regulatory Proposal 2019-24*, p. 1.

52 NT WorkSafe, Submission on Power and Water's revised proposal, 9 January 2019, public, p. 1.

53 The greenfield solution encompasses replacement the existing Berrimah zone substation with a lower capacity substation located directly adjacent to the existing substation. See AER *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p. 59.

54 Our estimate was based on the Power and Water's submitted condition assessment reports. It included an Asset health rating, which considered 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.

55 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p.32-37.

56 Power and Water, *Revised Capex Overview - 29 November 2018 - Public*, p. 29.

57 Electricity Trades Union, *Power and Water Corporation - Revised Regulatory Proposal 2019-24*, p. 2.

maintenance costs are lower in the case of a greenfields solution when compared to the brownfields solution[58]

- further justification of the additional assets in the existing Berrimah Zone substation that would require refurbishment under a brownfields option, which were inadvertently removed in our draft decision, and would increase the costs of a brownfields option.

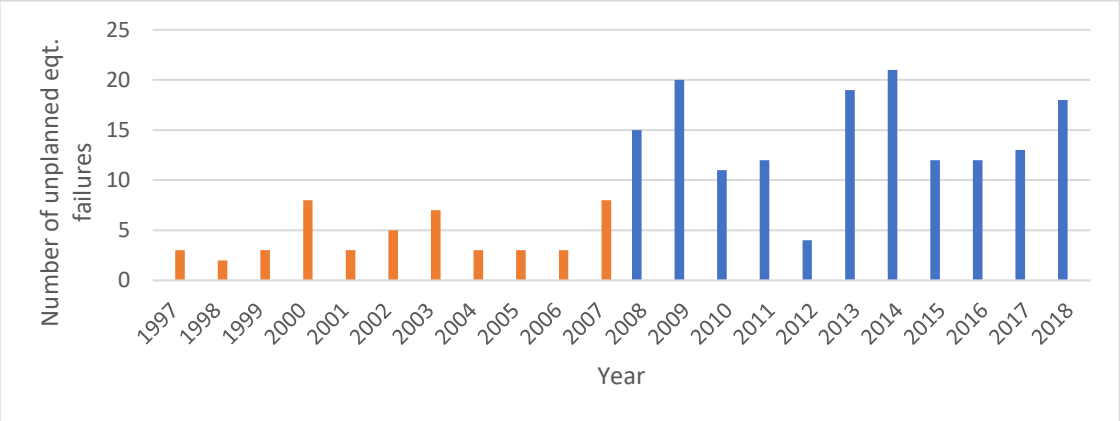
Based on the additional information provided, Power and Water has demonstrated that its revised greenfields option, which maintains the capacity at Berrimah zone substation, reasonably reflects the efficient costs that a prudent operator would incur in the 2019–24 regulatory control period.

Darwin Northern Suburbs HV Cable replacement

In our draft decision, we identified a number of concerns with Power and Water's initial forecast for its Northern Suburbs cable replacement program, which was a step up from historical expenditure.[59] In our draft decision, we noted our concerns and arrived at a substitute estimate that was based on Power and Water's own cable model.

In its revised proposal, Power and Water reduced its forecast capex for this program by 15 per cent from its initial proposal. As supporting justification and based on recent test results, Power and Water undertook regression analysis for these cables, to forecast the underground cable deterioration rate. While we acknowledge that the analysis is an improvement from the initial proposal, we have some concern regarding the historical input data that is used in the model, which may overstate the deterioration rate of these cables.[60] Figure 5-2Figure 5-1 below shows the historical failures for the HV underground cables.

Figure 5-2 – Power and Water's historical number of unplanned failure of HV cables



Source: Power and Water, *Darwin Suburbs cables replacement quantitative analysis - 29 November 2018 - Public. Xlsx*

[58] Power and Water, *Response to IR#43 - Capex and non-network expenditure* - 16 January 2019 - Public, p. 4.

[59] AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p. 62.

[60] Power and Water, *Darwin Suburbs cables replacement quantitative analysis - 29 November 2018 - Public.xlsx*

Power and Water has used the growth of failure rates over the 1997-2018 period as an input to calculate the expected deterioration rate over the forecast period. The figure below shows a marked increase in faults in 2008. Power and Water acknowledges itself that it is not clear whether the significant increase in faults in 2008 is due to a deterioration in the cables or improved data collection regime,[61] but has noted, in response to an information request, that there has been a number of changes in data collection over the years. Power and Water noted there was a move from a manual process to an internally developed geospatial system in 2008.[62]

While the impact of this is considered in the model, we are of the view that, incorporating the marked increase in failure rate, without conclusive evidence of its root cause is likely to overstate the deterioration rate and hence, overstate the expenditure required for this program. However, on this occasion, we consider any adjustment to the modelling and subsequent reductions to Power and Water's repex, in the context of the overall capex forecast, would be immaterial. Therefore, we have not made any adjustment to Power and Water's forecast repex for its underground cable program.

As noted in our draft decision, it appears that Power and Water's businesses practices are developing over time and we encourage ongoing steps towards improvements in its data collection, forecasting approach, asset management practices and risk management in future resets.

B.4 Forecast non-network other capex

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

B.4.1 Power and Water's revised proposal

In its revised proposal, Power and Water reduced its forecast of non-network other capex to $56.1 million ($2018–19), a reduction of 19 per cent from its initial proposal but slightly above the substitute estimate in our draft decision.

Our draft decision included forecast non-network other capex of $54.8 million ($2018–19). In our draft decision, we corrected errors in Power and Water's approach to estimating capitalised property and fleet lease costs, and excluded costs associated with the 19 Mile Depot redevelopment project.[63]

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61 Power and Water, *Revised Capex Overview - 29 November 2018 - Public*, p. 29.

62 Power and Water, *Response to IR#43 - Capex and non-network expenditure - 16 January 2019 - Public*, pp. 9-10.

63 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p. 67.

Property and fleet leases

Power and Water accepted our draft decision to reduce forecast property and fleet lease capex by 14 per cent.[64] We found that Power and Water initial fleet and property lease capex forecasts were overstated as they reflected the sum of expected future lease payments, rather than the present value of these payments in accordance with changes to the *Australian Accounting Standard AASB 16 Leases*.[65] Power and Water accepted our findings on the calculation of lease costs and reduced its forecast fleet and property lease capex to $46.0 million ($2018–19) to reflect the lower amount for property and fleet leases.[66]

Upgrade 19 Mile Depot and access road

We did not accept Power and Water's initial proposal to redevelop its 19 Mile Depot. Power and Water's revised forecast capex for the 19 Mile Depot is 79 per cent lower than its initial proposal.[67]

Power and Water's initial proposal set out its strategy to re-locate its crews at its leased East Arm Depot to the existing site at 19 Mile Depot which it owns. Power and Water considered this had the advantages of reducing its lease costs on depots while also keeping its field crews close to the rural areas of Darwin. The proposed capex on the site was to upgrade facilities for additional staff and to upgrade access to the site.[68]

In our draft decision, we considered it was unclear if the project would proceed given the absence of a Power and Water Board or management endorsed depot strategy. We found that a report prepared by one of Power and Water's consultants did not support the need for significant access upgrade works. We also found that Power and Water had not provided dilapidation reports or similar documentation to demonstrate the existing facilities at the 19 Mile Depot site are in poor condition and/or are not fit-for-purpose and require refurbishment.[69]

In its revised proposal, Power and Water accepted our view that relocating staff to its 19 Mile Depot may be a longer-term aspiration and that further analysis is required before proceeding. Power and Water advised that the crews who were located at its East Arm Depot have since been relocated to the Ben Hammond Depot. Power and Water acknowledged that the information it submitted did not provide clear evidence of the existing site condition or the need to upgrade site access.[70]

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64 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 30.

65 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p. 71.

66 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 30.

67 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 29.

68 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 29.

69 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, pp. 73–76.

70 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 29.

Power and Water submitted that there will not now be a major relocation of staff to the 19 Mile Depot during the 2019–24 regulatory control period. Power and Water's revised proposal included capex for a minor upgrade of the current facility, based on:[71]

- recent discussions with, and advice from, the Department of Infrastructure, Planning and Logistics (DIPL) indicating that a deceleration lane is required on the current site, and upgrades are needed to the intersection.[72] On this basis, Power and Water reduced its capex forecast for upgrading site access by 50 per cent; and
- advice from certification expert Hodgkison on whether the existing facility is fit for purpose.[73] The advice stated that minor works are required at the site to meet planning certification. On this basis, Power and Water reduced its capex forecast for upgrading the site by 93 per cent.

B.4.2 Final decision position

Power and Water has demonstrated that its revised non-network other capex forecast of $56.1 million ($2018-19, excluding overheads) is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria.

Power and Water accepted our draft decision on forecast fleet and property lease capex, and provided additional supporting information to justify the need for a reduced scope of works for the 19 Mile Depot upgrade project.

B.4.3 Reasons for our position

We consider that Power and Water's revised property and fleet lease capex forecasts correctly reflect the present value of its expected future lease payments in accordance with changes to the *Australian Accounting Standard AASB 16 Leases*.

We also consider that Power and Water has justified its revised capex forecast to provide for a deceleration lane and upgrades to the intersection at its 19 Mile Depot site. Power and Water has provided additional evidence on the minimum works required to ensure safe vehicle access to the site. DIPL has advised that an intersection upgrade is required for safe access to the depot as the existing deceleration lane is slightly less than the requirement for the design speed.[74]

Further, we consider that Power and Water has demonstrated the need for minor works at the 19 Mile Depot site to meet planning certification requirements. Power and

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71 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, pp. 29–30.

72 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024 - DIPL: Access issue with 19 Mile Depot PUBLIC*, 29 November 2018.

73 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024 - Hodgkison: Proposed works to the PWC 19 Mile Facility PUBLIC*, 29 November 2018.

74 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024 - DIPL: Access issue with 19 Mile Depot PUBLIC*, 29 November 2018.

Water's certification expert identified three streams of work to meet planning certification:[75]

- the warehouse contains non-compliant doors which are too narrow, and which block access
- the office building is not compliant with disability access and does not provide adequate unisex toilet and shower facilities; and
- the septic system is no longer compliant to current standards.

This is a significantly smaller scope of works than forecast in Power and Water's initial proposal, which had been based on accommodating additional staff at the 19 Mile Depot site.

On the basis of our review of Power and Water's justification for its revised non-network other capex program, we consider Power and Water has demonstrated that its proposed non-network other capex is efficient and prudent, and would form part of a total capex forecast that reasonably reflects the capex criteria.

B.5 Forecast non-network ICT capex

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

B.5.1 Power and Water's revised proposal

Power and Water has decreased forecast ICT capex by $5.4 million ($2018–19) to $32.1 million over the 2019–24 regulatory control period, a reduction of 14 per cent from its initial proposal. This is a $6.4 million or 25 per cent increase from the draft decision allowance of $25.7 million.[76]

In our draft decision, we identified concerns regarding 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, which will significantly impact on all major functions of Power and Water's business over the five years of the regulatory control period.

We were concerned that this would 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. Our draft decision provided for an increased ICT capex program compared to historical expenditure in this category, but at a lower level than proposed by Power and Water.

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[75] Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024 - Hodgkison: Proposed works to the PWC 19 Mile Facility PUBLIC*, 29 November 2018, p. 53.

[76] Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 28.

We considered this would ensure that Power and Water had the capacity to efficiently deliver the forecast ICT capex in the 2019–24 regulatory control period.[77]

Power and Water's revised proposal acknowledged these concerns by deferring projects beyond the 2019–24 regulatory control period, and flattening the profile of ICT capex across the period by prioritising and staging investments, for example by delaying upgrades to the asset management system to the later years of the 2019–24 regulatory control period.[78] While Power and Water has deferred some projects beyond the 2019–24 regulatory control period, Power and Water considers the $6.4 million increase in ICT capex from our draft decision to be integral to delivering efficiencies, meeting compliance obligations and delivering improvements in customer service outcomes.[79]

B.5.2 Final decision position

Power and Water has demonstrated that its proposed ICT capex of $32.1 million ($2018–19) for the 2019–24 regulatory control period reasonably reflects the capex criteria.

In making our decision, we expect that Power and Water will continue to conduct post implementation reviews of the ICT capex projects it undertakes in the 2019–24 regulatory control period. This will assist in ensuring that the intended outcomes and benefits of ICT capex programs and projects are achieved and more transparently demonstrated to customers and stakeholders. It is our intention to have regard to these reviews to inform our assessment of ICT capex forecasts for Power and Water's future regulatory determinations.

B.5.3 Reasons for our position

Power and Water acknowledged that its initial proposal had significant front loading of the ICT project capex in the early years of the 2019–24 regulatory control period, and that there may have been difficulty in realising the full benefits of the proposed ICT capex program.[80]

Power and Water's revised proposal responded to our concerns on deliverability by deferring ICT capex for three projects beyond the 2019–24 regulatory control period, and by flattening the profile of forecast ICT capex within the period.[81] This reduces demands on subject matter experts and IT users within the business, and is likely to improve Power and Water's ability to deliver a still large and complex portfolio of ICT investments into a resource constrained business over a short period of time.

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77 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, pp. 80–83.

78 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 28.

79 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 28.

80 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, pp. 28–29.

81 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, pp. 28–29.

CCP13 submitted that there were still gaps in identifying consumer benefits, and argued that Power and Water needed to demonstrate more specific linkages between expenditure and benefits.[82]

While Power and Water has not been able to fully quantify the savings it expects to generate from the ICT capex program, it has provided more information on its ICT project management, resources and post implementation review procedures and how it assesses whether the expected benefits of ICT investments will be realised.[83]

While we welcome the additional justification provided by Power and Water, we have some concerns, particularly in relation to Power and Water's ability to deliver ICT capex related benefits to customers that justify the investment. A program of this scale is likely to require significant changes within the business's processes and practices in order to achieve the potential benefits. In subsequent regulatory periods, we expect to see a more transparent demonstration of the benefits that these investment delivered to consumers. This could be achieved through Power and Water undertaking post implementation reviews, and quantifying reductions in opex.

For this final decision, we consider that Power and Water has adequately demonstrated its capacity to efficiently deliver the revised ICT capex program during the 2019–24 regulatory control period. We are therefore satisfied that Power and Water's forecast non-network ICT capex of $32.1 million ($2018-19) is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria.

B.6 Forecast capitalised overheads

Capitalised overheads are unallocated corporate and network 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.6.1 Power and Water's revised proposal

Power and Water has decreased forecast capitalised overheads by $1.8 million ($2018–19) to $65.1 million, a reduction of 3 per cent from its initial proposal, over the 2019–24 regulatory control period. However, this is 12 per cent higher than our draft decision of $58.4 million.[84]

B.6.2 Final decision position

Power and Water's revised capitalised overheads forecast of $65.1 million ($2018-19) for the 2019–24 regulatory control period would form part of a total capex forecast that reasonably reflects the capex criteria.

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82 Consumer Challenge Panel Sub-Panel 13, *Response to Power and Water Corporation revised proposal for a revenue reset for the 2019-24 regulatory period*, 11 January 2019, Public, p. 6.

83 Power and Water, *Post Implementation Review (PIR) Procedure*, 11 July 2018.

84 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 30.

B.6.3 Reasons for our position

Power and Water has allocated its capitalised network and corporate overheads in proportion to the ratio of direct capex to total direct costs, as set out in its cost allocation method. [85]

In our draft decision, we considered that Power and Water's level of capitalised overheads expenditure was comparable to other distributors in the NEM, where capitalised overheads typically contribute between 10-30 per cent of total capex. We also considered that Power and Water's capitalised overheads forecasting methodology, which utilised a similar base-step-trend approach as applied to opex, was a reasonable methodology for forecasting capitalised overheads given the nature of these costs.[86]

Power and Water's revised capitalised overheads forecast applied the latest 2017–18 actual costs to update the base year, in line with its approach to forecast opex. Power and Water also adjusted some of the indirect labour recoveries from opex to capex to account for an unusually low level of capex in 2017–18, which resulted in a low capex/totex ratio not reflective of historical rates or the forecast for the 2019–24 regulatory control period. The revised capitalised overheads are therefore intended to more accurately reflect historical rates and the forecast for the 2019–24 regulatory control period.[87] Overall, Power and Water's adjustments resulted in a slight reduction to capitalised overheads of $1.8 million from its initial proposal.

We considered the interaction between our decision on forecast network and corporate overheads allocated to opex and those allocated to capex. In our final decision on forecast opex, we have accepted Power and Water's proposed corporate overheads opex, while reducing forecast network overheads by 13 per cent. This is partially offset by the inclusion of transition costs to allow for the phasing in of Power and Water's proposed efficiencies to forecast corporate and network overheads over the 2019–24 regulatory control period.[88] We do not consider that any adjustment we might make to forecast capitalised overheads as a result of our final decision on corporate and network opex overheads would be material in the context of the total capex forecast.

For these reasons, we are satisfied that Power and Water's revised capitalised overheads forecast of $65.1 million ($2018–19) would form part of a total capex forecast that reasonably reflects the capex criteria.

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85 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 31.

86 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, pp. 84–86.

87 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 22.

88 AER, *Power and Water Corporation 2019–24 - Final Decision - Attachment 6 - Operating expenditure*, April 2019.

C 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.

C.1 Power and Water's revised proposal

In our draft decision, we concluded that AEMO's demand forecasting methodology used to prepare Power and Water's system maximum demand and connection volume forecasts was likely to be reasonable and unbiased, and likely to produce realistic forecasts. However, we noted concerns raised in submissions that the demand and connection volume forecasts may not reflect the latest available input assumptions and forecasts for underlying macroeconomic drivers. We therefore expected that Power and Water would 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.[89]

In response to this feedback Power and Water engaged AEMO to revise its customer connection forecasts based on the latest available information. The revised forecasts indicated an increase in customer connections for the Darwin-Katherine region, and a decline in Alice Springs and Tennant Creek.[90] Overall, the revised forecasts indicated a reduction in the number of large commercial and industrial customers, and have resulted in a reduction in Power and Water's proposed gross connections capex. AEMO's review of system demand forecasts concluded that no material change is required.[91]

CCP13 submitted that while AEMO provided an updated forecast of customer connection numbers, and reviewed peak and total demand numbers, these revised forecasts might still be optimistic. CCP13 cited a difficult budget situation faced by the NT Government and a pessimistic economic outlook held by commercial and industrial

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89 AER, *Power and Water Corporation 2019–24 - Draft Decision - Attachment 5 - Capital expenditure*, September 2018, p. 97.

90 Power and Water, *Revised regulatory proposal 1 July 2019 to 30 June 2024*, 29 November 2018, p. 21.

91 AEMO, *Forecasting Advice for the Revised Regulatory Proposal*, 2018, p. 3.

customers. However, CCP13 concluded that, even with lower demand, there may be limited scope for Power and Water to adjust its expenditure given the large fixed cost component in a small network.[92]

C.2 Final decision position

We consider Power and Water's system maximum demand forecasts and updated connections forecasts prepared by AEMO to be reasonable and likely to reflect a realistic expectation of demand. This is due to the following factors:

- AEMO is an independent and experienced provider of demand forecasting information in the NEM
- AEMO's independent 2019–24 regulatory control period demand forecast is likely to be unbiased and reflect a reasonable demand forecasting methodology
- the revised maximum demand and customer connection forecasts have been updated to reflect current inputs and assumptions
- forecast maximum demand is consistent with the recent downward trend in the NT in recent years.

We also agree with CCP13 that forecasts of maximum demand are not a significant driver of required expenditure in the 2019–24 regulatory control period.

[92] Consumer Challenge Panel Sub-Panel 13, *Response to Power and Water Corporation revised proposal for a revenue reset for the 2019-24 regulatory period*, 11 January 2019, Public, p.10.