

Final Decision

**Power and Water Corporation
Electricity Distribution
Determination 2024 to 2029
(1 July 2024 to 30 June 2029)**

**Attachment 5
Capital Expenditure**

April 2024

© Commonwealth of Australia 2024

This work is copyright. In addition to any use permitted under the *Copyright Act 1968* all material contained within this work is provided under a Creative Commons Attributions 3.0 Australia licence with the exception of:

- the Commonwealth Coat of Arms
- the ACCC and AER logos
- any illustration diagram, photograph or graphic over which the Australian Competition and Consumer Commission does not hold copyright but which may be part of or contained within this publication.

The details of the relevant licence conditions are available on the Creative Commons website as is the full legal code for the CC BY 3.0 AU licence.

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 3131
Canberra ACT 2601
Tel: 1300 585 165

AER reference: AER212492

Amendment record

| Version | Date | Pages |
|---------|---------------|-------|
| 1 | 30 April 2024 | 26 |

List of attachments

This attachment forms part of the AER's final decision on the distribution determination that will apply to Power and Water Corporation for the 2024–29 period. It should be read with all other parts of the final decision.

As a number of issues were settled at the draft decision stage or required only minor updates, we have not prepared all attachments. The final decision attachments have been numbered consistently with the equivalent attachments to our draft decision. In these circumstances, our draft decision reasons form part of this final decision.

The final decision includes the following documents:

Overview

Attachment 1 – Annual revenue requirement

Attachment 2 – Regulatory asset base

Attachment 4 – Regulatory depreciation

Attachment 5 – Capital expenditure

Attachment 6 – Operating expenditure

Attachment 7 – Corporate income tax

Attachment 13 – Classification of services

Attachment 14 – Control mechanisms

Attachment 15 – Pass through events

Attachment 16 – Alternative control services

Attachment 18 – Connection policy

Contents

- List of attachmentsiii**
- 5 Capital expenditure5**
 - 5.1 Final decision..... 7
 - 5.2 PWC’s revised proposal..... 7
 - 5.3 Reasons for final decision..... 9
- A Reasons for decision on key capex categories.....13**
 - A.1 Property.....13
 - A.2 Information and communication technology15
 - A.3 Consumer Energy Resources18
- B Contingent Projects21**
 - B.1 Assessment approach22
 - B.2 Final decision.....23
- Shortened forms.....26**

5 Capital expenditure

Capital expenditure (capex) refers to the money required to build, maintain or improve the physical assets needed to provide standard control services (SCS).¹ Generally, these assets have long lives and a distributor will recover capex from customers over several regulatory control periods. A distributor’s capex forecast contributes to the return of and return on capital building blocks that form part of its total revenue requirement.

Under the regulatory framework, a distributor must include a forecast of total capex that it considers is required to meet or manage expected demand, comply with all applicable regulatory obligations, and to maintain the safety, reliability, quality, and security of its network and contribute to achieving emissions reduction targets (the capex objectives).²

We must decide whether or not we are satisfied that this forecast reasonably reflects prudent and efficient costs and a realistic expectation of future demand and cost inputs (the capex criteria).³ We must make our decision in a manner that will, or is likely to contribute to the achievement of the National Electricity Objective (NEO).⁴

The *AER’s capital expenditure assessment outline* explains our and distributors’ obligations regarding capex under the National Electricity Law and Rules (NEL and NER) in more detail.⁵ It also describes the techniques we use to assess a distributor’s capex proposal against the capex criteria and objectives. Where relevant we must also assess capex associated with emissions reduction proposals taking into account our *Guidance on amended National Electricity Objective*.⁶

Total capex framework

We analyse and assess capex drivers, programs and projects to inform our view on a total capex forecast. However, we do not determine forecasts for individual capex drivers or determine which programs or projects a distributor should or should not undertake. This is consistent with our ex-ante incentive-based regulatory framework and is referred to as the ‘capex bucket’.

Once the ex-ante capex forecast is established, there is an incentive for distributors to provide services at the lowest possible cost, because the actual costs of providing services will determine their returns in the short term. If distributors reduce their costs, the savings are shared with consumers in future regulatory control periods. Our assessment of the ex-ante capex is consistent with the NEO, which in addition to providing for the lowest possible costs also recognises that services should be valued appropriately and adapt to changing circumstances to maintain efficiencies in the long term interest of consumers. This incentive-

¹ These are services that form the basic charge for use of the distribution system.

² NT NER, cl. 6.5.7(a).

³ NT NER, cl. 6.5.7(c).

⁴ NEL, ss. 7, 16(1)(a).

⁵ AER, *Capex assessment outline for electricity distribution determinations*, February 2020.

⁶ AER, [Guidance on amended National Electricity Objectives](#), September 2023.

based framework provides distributors with the flexibility to prioritise their capex program given their circumstances and due to changes in information and technology.

Distributors may need to undertake programs or projects that they did not anticipate during the revenue determination. Distributors also may not need to complete some of the programs or projects proposed if circumstances change, these are decisions for the distributor to make. We consider a prudent and efficient distributor would consider the changing environment throughout the regulatory control period and make decisions accordingly.

Importantly, our decision on total capex does not limit a distributor's actual spending. We set the forecast at a level where the distributor has a reasonable opportunity to recover its efficient costs.

Assessment approach

We provide guidance on our assessment approach in several documents, including the following which are of relevance to this decision:

- *AER's Expenditure Forecast Assessment Guideline*⁷
- *Regulatory Investment Test for Distribution and Transmission (RIT-D and RIT-T) Guidelines*⁸
- *AER's Asset Replacement Industry Note*⁹
- *AER's Information and Communication Technologies (ICT) Guidance Note*.¹⁰
- *AER's Guidance on amended National Electricity Objectives*¹¹

We also had regard to the guiding principles in the AER's *Better Resets Handbook – Towards consumer centric network proposals* which encourages networks to develop high quality, well-justified proposals that genuinely reflect consumers' preferences.¹²

Our final decision has been based on the information before us, which includes:

- the distributor's regulatory proposals and accompanying documents and models
- the distributor's responses to our information requests
- stakeholder comments in response to our draft decision.

⁷ AER, [Expenditure Forecast Assessment Guideline 2013](#).

⁸ AER, [RIT-T and RIT-D application guidelines \(minor amendments\) 2017](#), September 2017.

⁹ AER, [Industry practice application note for asset replacement planning](#), January 2019.

¹⁰ AER, [AER publishes guidance on non-network ICT capital expenditure assessment approach](#), November 2019.

¹¹ AER, [Guidance on amended National Electricity Objectives](#), September 2023.

¹² AER, [Better Resets Handbook – Towards consumer-centric network proposals](#), December 2021.

5.1 Final decision

Overall, we are satisfied that PWC’s proposed total forecast capex of \$537.8 million (\$2023–24)¹³ reasonably reflects prudent and efficient costs to maintain the safety, reliability and security of the network. We determined an alternative estimate for capex of \$528.0 million because we did not accept \$10.2 million of PWC’s proposed single site consolidation project. Our alternative capex forecast is not materially different to PWC’s capex forecast and we are satisfied that PWC’s estimate reasonably reflects the capex criteria.

We consider this forecast will provide for a prudent and efficient service provider in PWC’s circumstances to maintain the safety, reliability and security of electricity supply of its distribution network. Table 5.1 outlines our final decision on PWC’s proposed capex.

Table 5.1 AER’s final decision on PWC’s total net capex forecast (\$ million, 2023–24)

| | 2024–25 | 2025–26 | 2026–27 | 2027–28 | 2028–29 | Total |
|----------------------------------|---------|---------|---------|---------|---------|-------|
| PWC Revised Proposal | 100.9 | 102.9 | 87.7 | 124.0 | 122.7 | 538.2 |
| AER Final Decision | 100.8 | 102.8 | 87.6 | 123.9 | 122.6 | 537.8 |
| Difference/Modelling adjustments | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.4 |

Source: AER analysis and PWC’s revised proposal.

Note: Numbers may not add up due to rounding.

Modelling adjustments relate to updates to the consumer price index (CPI), real cost escalation assumptions and PWC’s updated capex model (a total \$0.4 million reduction).

Our final decision also accepts PWC’s proposed contingent projects, which we consider are reasonably necessary to address potential system strength issues posed by the transition to renewables and the changing generation mix in the NT and to meet localised new demand associated with the development of specific commercial projects. Our decision on PWC’s revised proposal contingent projects is set out in Appendix B.

5.2 PWC’s revised proposal

PWC’s revised proposal included a revised net capex forecast of \$538.2 million which includes:¹⁴

- a revised Consumer Energy Resources (CER) forecast of \$3.7 million to better integrate CER, which reflects a substantially smaller modified program from that included in the initial proposal

¹³ Power and Water proposed \$538.2 million (\$2023–24) in its revised proposal and we have made modelling adjustments to update the consumer price index (CPI) and real cost escalation assumptions (including the exclusion of external contract labour cost escalation). This has resulted in a \$0.4 million reduction to the total capex forecast (\$537.8 million).

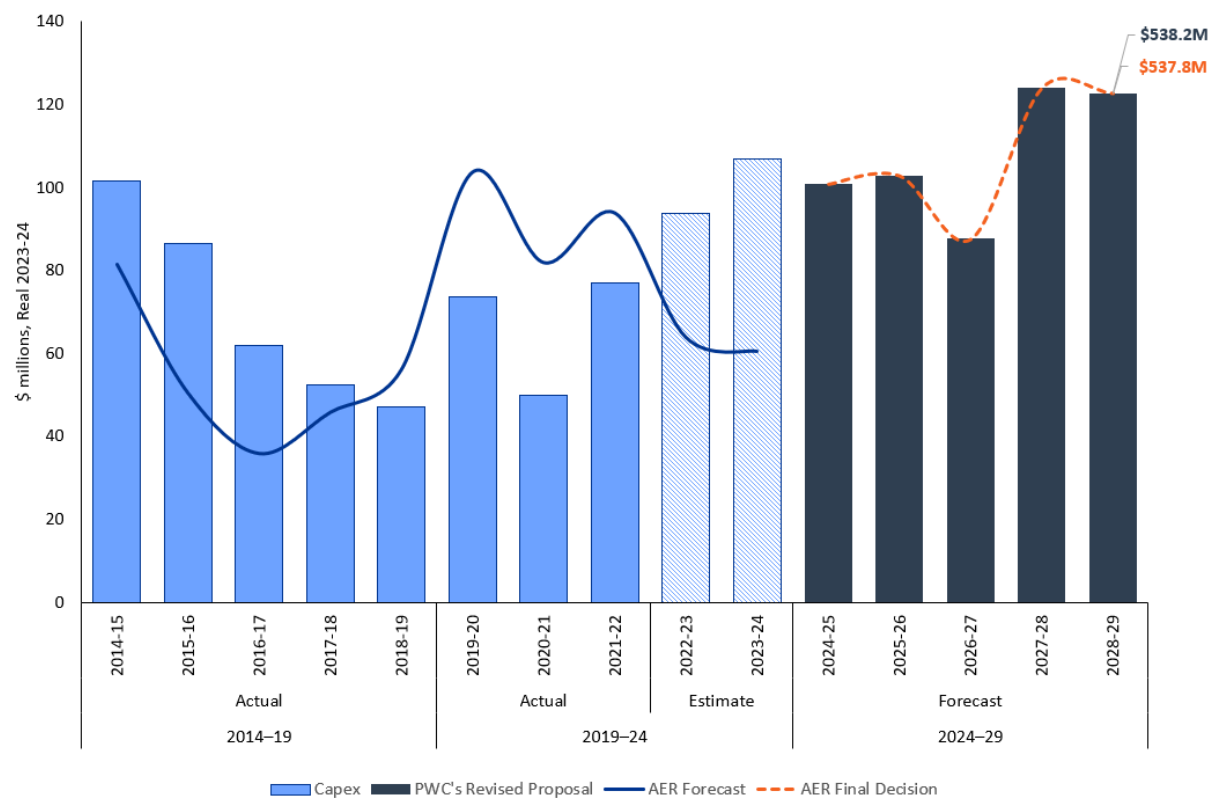
¹⁴ PWC, *Revised Revenue Proposal - Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 15.

- a revised operational technology capability uplift program of \$15.8 million (compared to \$21.6 million from the initial proposal), supported by more information on the need for and benefits of the program
- \$76.1 million for the single site consolidation project, which reflects a modified project at a lower cost compared to the initial proposal, and is supported by a robust business case
- an additional \$15.7 million in network and corporate overheads reflecting the 2022–23 actuals and the revised forecast capex.

PWC’s revised proposal did not include any capex linked to emissions reduction targets or actions under the NEO.

Figure 5.1 outlines PWC’s historical capex trend, its proposed forecast for the 2024–29 regulatory control period, and our final decision.

Figure 5.1 PWC’s historical and forecast capex (\$ million, \$2023–24)



Source: AER analysis.

Our draft decision forecast capex was \$432.8 million compared to PWC’s forecast of \$568.0 million.¹⁵ We accepted PWC’s business as usual capex forecasts, including augmentation, replacement, connections, and fleet expenditure. We also accepted PWC’s forecast capex on cyber security, subject to PWC providing further information to substantiate the \$11.4

¹⁵ AER, *Draft Decision Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 2.

million we approved as a placeholder. Our \$135.2 million forecast capex reduction substantially relates to the following 3 projects:

- the single site consolidation (\$84.3 million)
- operational technology capability uplift (\$21.6 million)
- CER integration (\$12.1 million).

The remaining \$17.3 million of capex adjustments relate to modelling adjustments to account for inflation, real cost escalation assumptions, and updates to 2022–23 capitalised overheads (i.e., replacing estimated expenditure with actual).¹⁶

PWC acknowledged that some items of non-network expenditure and CER-related investments were not fully formulated at the time of its initial regulatory proposal.¹⁷ PWC responded to our draft decision by:

- scaling back its forecast capex for the projects we did not accept in our draft decision, including a 72% reduction in CER, a 13% reduction in property and a 9.4% reduction in ICT compared to its initial proposal. The forecast capex of \$76.1 million for the single site consolidation project also reflects a modified project at a lower cost compared to the initial proposal of \$89.8 million.
- providing further information to justify the projects we did not accept in our draft decision. This included business cases demonstrating a positive economic return for the single site consolidation project and the operational technology capability uplift component of ICT.

We consider PWC’s revised proposal has provided adequate supporting information for the capex projects we did not accept in our draft decision.

Our positions on PWC’s single site consolidation project, operational technology capability uplift and CER integration are discussed further below.

5.3 Reasons for final decision

We undertook a top-down and bottom-up review of PWC’s capex proposal. Based on the information provided to us by PWC, overall, we are satisfied that PWC’s proposed total capex forecast is prudent and efficient. Although we did not accept \$10.2 million of PWC’s proposed single site consolidation project, our alternative capex forecast is not materially different to PWC’s capex forecast. For these reasons, we are satisfied PWC’s estimate reasonably reflects the capex criteria.

The key capex aspects of PWC’s proposal that we did not accept in the draft decision were the single site consolidation project, the operational technology capability uplift component of ICT, and CER integration. In the case of the single site consolidation and operational technology capability uplift projects, PWC did not provide adequate supporting information for these initial proposals, and our draft decision did not include a capex forecast, but we

¹⁶ PWC, *Revised Revenue Proposal - Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 14.

¹⁷ PWC, *Revised Revenue Proposal - Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 15.

expected PWC to resubmit a revised capex forecast for these categories. Our draft decision accepted the other capex components of PWC’s initial proposal.

Having considered all the issues, we have identified an adjustment to PWC’s revised forecast for the single site consolidation project capex. We consider general contingency cost allowances for this building project of \$10.2 million are too broad and should not be included in projects of this nature.

However, the overall impact is small, resulting in a 1.9% difference compared to PWC’s revised proposal. For this reason, we consider that PWC’s revised proposal total capex forecast is not materially different to our alternative estimate.

Table 5.2 sets out our final capex decision for PWC by capex category.

Table 5.1 AER’s final capex decision by capex category (\$million, \$2022–23)

| Capex Category | PWC revised proposal and AER final decision |
|--|---|
| Augmentation | 33.0 |
| Replacement | 175.5 |
| Connections | 7.0 |
| Property | 92.8 |
| ICT | 64.0 |
| Fleet | 13.9 |
| CER | 3.7 |
| Non-network capex – other | 8.6 |
| Capitalised overheads | 146.6 |
| Gross Total | 545.1 |
| Less Customer contribution connections | 6.1 |
| Less Disposals | 0.8 |
| Modelling adjustments | -0.4 |
| Net Total | 537.8 |

Source: PWC’s capex model and AER analysis.

Note: Numbers may not sum due to rounding. Modelling adjustments relate to updates to the consumer price index (CPI) and real cost escalation assumptions (including the exclusion of external contract labour cost escalation).

Table 5.3 summarises our views on each of the capex categories, whether they are prudent and efficient, reflect the capex criteria, and the reasons for this. A number of capex categories were considered and accepted in our draft decision and are reflected in this table (noting these should be read in conjunction with our draft decision). Further detail and reasons on the remaining capex categories – property, ICT and CER (each of which we considered in response to PWC’s revised proposal) are contained in Appendices A.1 to A.3.

Our findings on each capex driver are part of our broader analysis and should not be considered in isolation. We do not approve an amount of forecast expenditure for each individual capex driver or project/program. However, we use our findings on each capex driver to assess a regulated business’ proposal as a whole and arrive at a substitute estimate

for total capex where necessary. Our decision on total capex does not limit a regulated business’ actual spending.

Table 5.3 Summary of findings and reasons, by capex category

| Issue | Findings and reasons |
|---|--|
| Replacement | We have included PWC’s replacement expenditure of \$175.5 million in the total forecast capex. This was considered and accepted in our draft decision. ¹⁸ |
| Augmentation | We have included PWC’s augmentation expenditure of \$33.0 million in the total forecast capex. This was considered and accepted in our draft decision. ¹⁹ |
| Connections | We have included PWC’s connections forecast of \$7.0 million in the total forecast capex. This was considered and accepted in our draft decision. ²⁰ |
| Property | <p>We have included PWC’s proposed property forecast of \$92.8 million in the total forecast capex.</p> <p>Although we consider the general contingency cost allowances included in the capital cost estimate for the single site consolidation project are not sufficiently specific, the impact of removing these contingencies from PWC’s forecast total capex is not material (\$10.2 million or 1.9% of PWC’s capex forecast). The removal of the contingencies for the single site consolidation project is our only amendment to PWC’s proposed total capex program.</p> <p>Our reasons for this are set out in Appendix A.1.</p> |
| ICT | <p>We have included PWC’s proposed ICT forecast of \$64.0 million in the total forecast capex.</p> <p>We consider PWC’s revised proposal demonstrates its proposed operational technology capability uplift project is prudent. We also consider that PWC has provided further information to justify that its proposed cyber security capex is efficient.</p> <p>Our reasons for this are set out in Appendix A.2.</p> |
| Other Non-network capex, including Fleet and Spares | We have included PWC’s non-network capex forecast of \$22.5 million in the total forecast capex. This was considered and accepted in our draft decision. ²¹ |
| CER | <p>We have included PWC’s CER forecast of \$3.7 million in the total forecast capex.</p> <p>PWC’s revised business case demonstrates significant benefits and is consistent with the scaled, staged, preparatory approach proposed by other networks which we consider prudent.</p> <p>Our reasons for this are set out in Appendix A.3.</p> |

¹⁸ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 8.

¹⁹ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 8.

²⁰ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 9.

²¹ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 9.

| Issue | Findings and reasons |
|------------------------|--|
| Capitalised overheads | <p>We have included PWCs capitalised overheads forecast of \$146.6 million in the total forecast capex.</p> <p>Capitalised overheads are an allocated portion of total forecast capex, requiring a modelling adjustment based on our alternative forecast of total capex in our draft decision.²²</p> |
| Asset disposals | <p>We have included PWC's asset disposal forecast of \$0.8 million in the total forecast capex. This was considered and accepted in our draft decision.²³</p> |
| Customer contributions | <p>We have included PWC's customer contribution forecast of \$6.1 million in the total forecast capex. This was considered and accepted in our draft decision.²⁴</p> |
| Contingent projects | <p>We have accepted the two contingent projects PWC submitted in its revised proposal, together with the four PWC proposed in its initial proposal in our draft decision.</p> <p>Our reasons for this are set out in Appendix B.</p> |

²² AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 10.

²³ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 7.

²⁴ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 10.

A Reasons for decision on key capex categories

This appendix sets out our assessment of key capex categories and programs/projects within PWC’s total capex forecast and the reasons for our decision. This appendix includes:

- Property (Appendix A.1)
- Information and Communication Technology (Appendix A.2)
- Consumer Energy Resources (Appendix A.3).

A.1 Property

Property is non-network expenditure that relates to the maintenance, refurbishment and optimisation of offices, operational depots, warehouses, training and other specialist facilities used by PWC in support of its business operations.

A.1.1 AER’s final decision

We have not included all of PWC’s proposed property capex in our alternative forecast of total capex. Our alternative forecast is \$82.6 million or 11% lower than PWC’s revised property capex proposal of \$92.8 million.

A.1.2 PWC’s revised proposal

PWC proposed \$92.8 million property capex in its revised proposal in response to our draft decision of \$22.4 million (down from \$106.7 million in the initial proposal).²⁵

Our draft decision included \$22.2 million for property capex. This was \$84.5 million or 79% less than what PWC initially proposed. Our alternative estimate did not include PWC’s proposed single site consolidation project (\$89.8 million at the time) but allowed for property remediation costs and property leases, including an additional forecast amount for on-going business lease costs PWC will face in the absence of the single site consolidation.²⁶

We considered that PWC’s initial proposed single site consolidation project capex was not supported by a business case and was only at a conceptual design stage, which PWC acknowledged.

PWC’s revised proposal includes \$76.1 million capex for the single site consolidation project, which reflects a modified project at a lower cost compared to the initial proposal, and is supported by a positive business case.

A.1.3 Reasons for decision

Our assessment focused on the single site consolidation project as we accepted PWC’s proposed property remediation costs and property leases.

²⁵ PWC, *Revised Revenue Proposal - Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. xiv.

²⁶ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 11.

We sought further information from PWC through an information request and discussions on additional supporting material to justify the single site consolidation project.²⁷ Having reviewed this further information, we consider the proposed single site consolidation project costs to be reasonable, except for two contingency allowances included in the capital cost budget estimate. We consider these contingencies are too broad and should not be included in capital cost estimates. Our alternative estimate for property capex has removed \$10.2 million in contingencies from the single site consolidation project capex, which results in an alternative estimate for PWC’s property capex of \$82.6 million. This equates to 1.9% of PWC’s revised forecast total capex.

We assessed the information provided in the revised proposal and in response to our information request in relation to the single site consolidation project. PWC’s response to our information request included a detailed cost benefit analysis, capital cost estimates for the project by a local Quantity Surveyor, and current property lease costs.

PWC’s revised proposal identified:

- a number of direct benefits over the life of the new complex, including:
 - savings (in Net Present Value terms) of \$67 million in property lease costs
 - \$36 million in travel costs
 - \$10 million in general operating expenditure (e.g. electricity use and repairs and maintenance)
 - \$5 million for a land sale.
- around \$90 million of indirect internal benefits attributed to productivity gains
- indirect external benefits including avoided staff parking costs, a significant boost to the NT economy largely driven by construction activities and avoided emissions.

We consider the direct benefit assumptions of the project set out in PWC’s revised proposal are likely to be reasonable, with the avoided lease costs making up a majority of the direct project benefits. We also consider that there are likely to be some gains in productivity through enhanced staff utilisation and engagement. PWC’s modelling shows that the value of these benefits is greater than the costs of the project.

However, we consider the benefits that do not accrue to all electricity consumers, including benefits to the NT economy and avoided PWC staff carparking fees, should be excluded from the modelling. Jacana Energy also considered that NT economic benefits and PWC staff carparking fees should not be included in the assessment of the single site consolidation project.²⁸ In removing these indirect benefits, we found that the single site consolidation project remained economically positive given the high proportion of avoided lease costs.

²⁷ PWC, *Response to AER IR#027 (Confidential)*, 12 January 2024.

²⁸ Jacana Energy – *Submission on Power and Water Corporation’s revised proposal and draft decision 2024–29*, January 2024, p. 3.

In addition to reviewing the project benefits, we also reviewed the costs for the project which included gross financial expenses for project delivery, capital costs, lease termination expenses and community engagement expenses.

We consider these costs to be reasonable, except for two contingency allowances included in the capital cost budget estimate – a construction cost contingency and a design development contingency. We consider these contingencies are too broad and should not be included in capital cost estimates. We allow contingencies and project risk allowances that are specific to the project, such as risks that relate to a realistic latent condition with the site(s) and risks associated with the actions or requirements of a third party that are not under contractual arrangement with the Networks Service Provider (NSP), and hence the risk is not able to be addressed through enforcement of contract terms.²⁹ We do not consider that PWC was able to demonstrate that the two contingencies included in the capital cost estimate are sufficiently site specific.³⁰

The contingency amounts included in the capital cost estimate total \$17.1 million, on the entire project, with 59% or \$10.2 million being allocated to PWC's network business (as a standard control service cost). We have removed \$10.2 million in contingencies from the single site consolidation project capex, which results in an alternative estimate for PWC's property capex of \$82.6 million.

The Consumer Challenge Panel 27 (CCP27) concluded that PWC's People's Panel participants expressed support for the single site consolidation project in principle and at a conceptual level. CCP27 noted that the participants have not had an opportunity to engage on detailed consideration of project options, costs, benefits, customer impacts or bill implications. CCP27 questioned whether it is feasible and reasonable that what is proposed in the business case can be achieved within the five year regulatory period or whether some of this proposed expenditure could be deferred, lessening the more immediate bill impact on consumers.³¹

We consider that PWC has demonstrated the need, timing and capacity to deliver the single site consolidation project, and that it would provide an overall benefit for consumers.

A.2 Information and communication technology

Information and communication technology (ICT) refers to all non-network related devices, applications and systems that support PWC's business operations. ICT expenditure is categorised broadly as either replacement of existing infrastructure for reasons due to end of life, technical obsolescence or added capability of the system with the acquisition of new assets.

²⁹ AER, *Draft Decision, AusNet Services Transmission Determination 2022 to 2027, Attachment 5 Capital expenditure*, June 2021, p. 11; AER, *Draft Decision, AusNet Services Transmission Determination 2022 to 2027, Attachment 5 Capital expenditure*, January 2022, pp. 15–19. AER, *Final Decision, ElectraNet Contingent Project - Project EnergyConnect*, May 2021, pp. 20–21.

³⁰ PWC, *Further information on single site consolidation project risk allowances*, email 12 February 2024.

³¹ CCP27, *Advice to the AER - Power and Water Corporation Electricity Distribution Revised Revenue Proposal (2024-29)*, 19 January 2024, p. 17.

A.2.1 AER’s final decision

We have included PWC’s revised proposal ICT capex of \$64.0 million in the forecast of total capex.

A.2.2 PWC’s revised proposal

PWC proposed \$64.0 million ICT capex in its revised proposal in response to our draft decision of \$48.2 million (down from \$70.7 million in the initial proposal).

Our draft decision included \$48.2 million for ICT in our alternative ICT capex estimate. Our alternative estimate did not include PWC’s proposed Operational Technology (OT) capability uplift capex but included all of PWC’s other ICT projects. Whilst our draft decision accepted PWC’s proposed \$11.5 million in cyber security capex as prudent and included this in our alternative estimate as a placeholder, we required PWC to provide additional information in its revised proposal to justify that these are efficient costs.³²

PWC scaled back its proposed advanced distribution management system (ADMS) program, focussing on the highest priority upgrades, such as the geographic information systems (GIS). PWC’s revised capex for its OT capability uplift program is \$15.8 million (compared to \$21.6 million in its initial proposal). The associated opex step change has also reduced significantly to \$3.9 million (from \$18.8 million).³³ PWC’s proposed OT capability uplift program is supported by more information on the need for and benefits of the program (including a business case and cost benefit analysis).³⁴

PWC’s revised proposal provided further information about its cyber security proposal and a business case.³⁵ PWC’s revised proposal addressed the additional information we required to demonstrate that PWC’s forecast reflected that of a prudent and efficient operator.³⁶

A.2.3 Reasons for decision

Our assessment focused on the OT capability uplift and cyber security projects as we accepted the remainder of PWC’s proposed ICT projects.

We sought further information from PWC through information requests and discussions on additional supporting material to justify the OT capability uplift and cyber security projects.³⁷ Having reviewed this information, we consider PWC has demonstrated some gaps in its existing capabilities, and that the proposed OT capability uplift capex costs to be reasonable. We also consider PWC has satisfactorily addressed our request for additional information on the reasonableness of its cyber security cost estimates and that PWC has demonstrated that its forecast ICT cyber security capex costs reflect those of a prudent and efficient operator.

³² AER, *Draft Decision Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 15.

³³ PWC, *Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 23.

³⁴ PWC, *Attachment 3.3 – OT Capability Uplift – Enablers, Data and Systems (Public) and Attachment 3.4 – Cost Benefit Analysis OT Capability Uplift (Public)*, November 2023.

³⁵ PWC, *Attachment 3.8 – Cyber security efficient costs (Public)*, November 2023.

³⁶ PWC, *Attachment 3.8 – Cyber security efficient costs (Public)*, November 2023.

³⁷ PWC, Response to AER IR#011 (28 August 2023), IR#28 (10 January 2024) and IR#35 (7 February 2024).

OT capability uplift

We have reviewed PWC’s new business case and cost benefit analysis and consider that PWC has demonstrated some gaps in its existing capabilities, and that expenditure to uplift the capability of its operational technology is needed.

In particular, we consider the existing GIS system will become unsupported during the 2024–29 regulatory control period as the vendor removes support for PWC’s current system due to its obsolescence. The maintenance of the GIS is necessary as it is essential to the provision of network services.

We considered further projects are also reasonably required, including:

- the proposed data improvement project, to improve data quality as PWC relies on largely manual based processes^{38,39}
- the document management system to assist with network switching, outage management and restoration processes.

Further, we consider the forecast project management costs associated with the OT capability uplift capex projects to be reasonable.

Based on our review of the need for and proposed benefits from the proposed GIS, data improvement project, including the document management system, we consider that the forecast investment in PWC’s ICT OT capability uplift capex is prudent.

CCP27 noted that PWC’s People’s Panel participants indicated support for PWC’s ICT proposals.⁴⁰

For the reasons outlined above, we have accepted PWC’s revised capex for its OT capability uplift capex of \$15.8 million.

Cyber security

PWC included \$11.5 million in its initial forecast capex for the 2024–29 regulatory control period for continuing its cyber security project and proposed a related \$4.4 million opex step change.

We accepted PWC’s proposed cyber security program as prudent and included its forecast capex of \$11.5 million as a placeholder in our draft decision. However, PWC did not, in its initial proposal, provide a detailed breakdown of the cost estimates for each initiative and we were unable to evaluate the efficiency of the proposed costs. Our draft decision requested additional information to demonstrate that PWC’s forecast reflected that of a prudent and efficient operator.⁴¹

³⁸ PWC, *Attachment 3.2 – OT Capability Uplift – Enablers, Data and Systems (PUBLIC)*, November 2023, p. 4.

³⁹ PWC, *Attachment 3.2 – OT Capability Uplift – Enablers, Data and Systems (PUBLIC)*, November 2023, pp. 10–11.

⁴⁰ CCP27, *Advice to the AER - Power and Water Corporation Electricity Distribution Revised Revenue Proposal (2024-29)*, 19 January 2024, p. 20.

⁴¹ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 21.

PWC’s revised proposal provided further information about its cyber security proposal and a business case.⁴² PWC’s revised proposal addressed the additional information we required to demonstrate that PWC’s forecast reflected that of a prudent and efficient operator, in particular:⁴³

- a description of the proposed actions to address each of the maturity/capability gaps it identified between its current level of cyber maturity and the level required to achieve maturity under the Australian Energy Sector Cyber Security Framework (AESCSF) framework
- linking each of the above proposed actions to the respective individual costs required to undertake these actions
- detail for the individual costs’ inputs related to each proposed action, the basis for these costs (including relevant inputs, calculations, assumptions and sources) and set out how they were estimated, such as the number of labour-days or license fee
- demonstrating the efficiency of each cost input, e.g., through market testing and detailing all assumptions or other independent expert reports.

We have reviewed PWC’s initial and revised proposals and consider PWC has:

- satisfactorily described the proposed actions to address the maturity/capability gaps required to achieve maturity under the SP-2 AESCSF framework
- satisfactorily linked the proposed actions to the respective individual costs required to undertake these actions
- provided an explanation and demonstration of initiative input costs that are reasonable and provided further supporting evidence of the costs that are being incurred, and that have been relied upon, to determine the efficient level of cyber security costs.⁴⁴

We consider PWC has satisfactorily addressed our request for additional information regarding the reasonableness of its cyber security cost estimates. Based on our review of PWC’s cyber security costs business case, we consider PWC has demonstrated that its forecast ICT cyber security capex costs reflect those of a prudent and efficient operator. We also consider that on a comparative basis, PWC’s proposed capex does not seem materially unreasonable relative to other networks’ cyber security proposals.

For these reasons, we have included PWC’s proposed \$11.4 million cyber security capex in the total capex forecast.

A.3 Consumer Energy Resources

CER integration includes solar photovoltaic systems (PV), energy storage devices, electric vehicles (EV) and other consumer appliances that are capable of responding to demand or pricing signals. Increasing CER represents a change in the way that consumers interact with electricity networks and the demands that are placed on networks.

⁴² PWC, *Attachment 3.8 – Cyber security efficient costs (Public)*, November 2023.

⁴³ PWC, *Attachment 3.8 – Cyber security efficient costs (Public)*, November 2023.

⁴⁴ PWC, *Attachment 3.8 – Cyber security efficient costs (Confidential)*, November 2023.

CER expenditure enables PWC to accommodate more rooftop solar on the network. This allows more customers to connect their rooftop solar and export more of the electricity they generate back to the grid. CER integration capex includes:

- augmenting the network to physically provide greater PV export capacity
- ICT capex to develop greater visibility of the low-voltage network and manage changes being driven by technological developments.

A.3.1 AER’s final decision

We have included PWC’s revised proposal CER capex of \$3.7 million in the forecast of total capex.

A.3.2 PWC’s revised proposal

PWC proposed \$3.7 million cyber security capex in its revised proposal in response to our draft decision of \$1.1 million (down from \$13.2 million in the initial proposal).

Our draft decision included \$1.1 million for CER integration in our alternative CER capex estimate. Our alternative estimate did not include PWC’s proposed capex to implement dynamic operating envelopes (DOE) capex but included its expenditure for installer outreach programs, which combined with ongoing compliance activities (opex) will result in improved inverter compliance and minimise reductions to its static export limits. We considered this a more prudent and efficient option for enabling higher static export limits compared to the \$27.3 million in total expenditure (\$14.1 million in opex and \$13.2 million in capex) PWC proposed to implement DOEs and undertake other CER related activities. We also sought additional information from PWC on some non-DOE related components of its proposed Future Network step change.⁴⁵

PWC has proposed significantly smaller expenditures of \$3.7 million in capex and \$4.9 million in opex. The revised program proposes a minimum level of core infrastructure to enable dynamic management of solar PV. It also proposes a base level of capability to manage immediate compliance related risks and allow PWC to better understand the hosting capacity and voltage performance of its network. PWC considers this will establish a solid foundation on which it can build greater dynamic CER management capabilities as and when required.⁴⁶

PWC consider the investment is required in all future scenarios that PWC has considered for the management of CER, and is consistent with prudent and efficient CER management options undertaken in other jurisdictions.⁴⁷ PWC provided additional information on the impact of the increasing number and capacity of customer assets on the performance and operation of the network, options considered and revised forecast expenditures.⁴⁸

⁴⁵ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, pp. 24–27.

⁴⁶ PWC, *Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 20.

⁴⁷ PWC, *Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 20.

⁴⁸ PWC, *Attachment 3.1 DER integration (Public)*, November 2023.

A.3.3 Reasons for decision

We have assessed PWC’s revised proposal and consider PWC’s revised business case demonstrates significant benefits and is consistent with the scaled, staged, and preparatory approach proposed by other networks which we consider prudent.

PWC’s scaled back CER integration proposal also aligns with feedback from its stakeholders. CCP27 noted in its submission that PWC’s People’s Panel workshop participants strongly supported PWC’s role in facilitating access to renewable energy, while also expressing a desire for restraint on the speed of implementing new systems and costs that could increase customers’ bills.⁴⁹

Jacana Energy also supported the CER integration project included in PWC’s revised proposal. Jacana Energy considers the initiatives included in this project further enable renewable energy uptake and increase the penetration of low cost electricity back into the grid where it has been historically limited.⁵⁰

We have accepted PWC’s revised capex for its CER integration program of \$3.7 million.

⁴⁹ CCP27, *Advice to the AER - Power and Water Corporation Electricity Distribution Revised Revenue Proposal (2024-29)*, 19 January 2024, p. 17.

⁵⁰ Jacana Energy, *Submission on Power and Water Corporation’s revised proposal and draft decision 2024–29, January 2024*, p. 4.

B Contingent Projects

Contingent projects are significant network augmentation or replacement projects that are reasonably required to be undertaken in order to achieve the capex objectives. However, unlike other proposed capex projects, the need for the project within the regulatory control period and the associated costs are not sufficiently certain. Consequently, expenditure for such projects does not form a part of the total forecast capex that we approve in this determination. Such projects are linked to unique investment drivers and are triggered by defined ‘trigger events’. The occurrence of the trigger event must be probable during the relevant regulatory control period.⁵¹ The cost of the projects may ultimately be recovered from customers in the future if the trigger events are met.

Our draft decision accepted the following contingent projects, totalling \$296 million:⁵²

- Shared transmission works to transport generation from a Renewable Energy Hub in Darwin-Katherine (\$120.8 million)
- Holtze-Kowandi land development (\$60.8 million)
- Middle Arm commercial development (\$69.1 million)
- Wishart commercial development (\$45.6 million).

We did not accept PWC’s proposed ‘Unlocking existing large scale renewable generation in Darwin-Katherine (\$45.7 million) project’. We considered that PWC had not demonstrated a sufficient need for the contingent project, and we were unable to approve it under the NT NER.⁵³

PWC’s revised proposal maintains that the proposed contingent project we did not approve in the draft decision is still required and has provided further information to better articulate and justify the need for the project.⁵⁴

PWC stated that its initial proposal was based on the premise that the proposed investment to ‘unlock’ the full capacity of renewables connected to the Darwin Katherine Transmission Line (DKTL) would also address future system strength issues likely to arise across the network in the near term. PWC submitted that recent studies indicate addressing the system strength issues on the DKTL would not provide an adequate solution to maintain security of supply in the broader Darwin area. PWC considers that additional synchronous condensers or other network solutions at further locations would also be required. PWC concluded that the originally proposed Unlocking existing large scale renewables on the DKTL contingent project would not address system security issues in the Darwin area and that additional investment will be required.⁵⁵

⁵¹ NT NER, cl. 6.6A.1(c)(5).

⁵² AER, *Draft decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, pp. 28–33.

⁵³ AER, *Draft decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, p. 33.

⁵⁴ PWC, *Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 29.

⁵⁵ PWC, *Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 29.

PWC also reported that Territory Generation plans to start retiring the four gas-fired generators at Channel Island from 2026 and to retire one unit by the end of 2024.⁵⁶ PWC considers this will increase the pace of change in the NT's generation mix and the likelihood and urgency of investing in system strength. Given these developments, and to better articulate the need for the proposed contingent project (in response to our draft decision), PWC has separated the original project into two discrete components:⁵⁷

- Unlocking large scale renewables on the DKTL (\$50 million).
Consistent with the initial proposal, PWC considers investment is required to enable large scale solar to increase export from facilities connected to the DKTL without compromising system security.
- Managing network voltage and system strength with an increasing proportion of inverter-based generation (\$100 million).
As synchronous generation leaves the power system and the proportion of inverter-based generation increases, PWC considers investment is required to maintain adequate system strength and regulate voltage across the Darwin region. This will likely include additional synchronous condensers and/or battery storage systems.

PWC reported that in its recent engagement with customers that customers understood that there are network challenges that need to be resolved to enable dispatch of large scale renewables in the Darwin and Katherine regions. PWC also reported that customer representatives supported investment to unlock renewable energy from existing solar farms to customers, and considered that renewable energy should enable electricity to be supplied at a cheaper cost, as well as providing environmental benefits.⁵⁸

B.1 Assessment approach

We reviewed PWC's revised proposal two contingent projects against the assessment criteria in the NER.⁵⁹

PWC's revised revenue proposal included a description of the contingent projects, proposed trigger events, project requirement, proposed capex and demonstration of rules compliance.⁶⁰ For the revised proposal contingent projects submitted by PWC, we were concerned that the triggers are either too broad, not specifically clear and lacked sufficient detail, including network specific locations, or required further justification.

We sought additional information in respect to the 2 proposed contingent projects. In addition to the information provided by PWC in its response to our information requests, including updated trigger events for each of the proposed contingent projects, we raised further

⁵⁶ PWC, *Attachment 4.1: Contingent projects – Revised Regulatory Proposal (Public)*, November 2023, p. 2.

⁵⁷ PWC, *Attachment 0.1 – Revised Regulatory Proposal*, November 2023, p. 29.

⁵⁸ PWC, *Attachment 0.1 – Revised Regulatory Proposal*, November 2023, pp. 29–30.

⁵⁹ NT NER, cl. 6.6A.1.

⁶⁰ PWC, *Attachment 4.1: Contingent projects – Revised Regulatory Proposal (Public)*, November 2023.

questions on PWC’s proposed contingent projects in discussions during meetings with PWC prior to the release of our final decision.⁶¹

We also considered whether the proposed trigger events for each project are appropriate. This includes having regard to the requirements in the NT NER for the trigger event.⁶²

B.2 Final decision

We consider PWC’s revised proposal contingent projects are reasonably necessary to address potential system strength issues posed by the transition to renewables and the changing generation mix in the NT, and to meet localised new demand associated with the development of specific commercial projects.

We consider PWC has justified the need for these contingent projects but had concerns with the specificity of the triggers as required under the NT NER, and have worked with PWC to develop more specific trigger events for each of the two projects. We also consider the two proposed contingent projects satisfy the remaining criteria under clause 6.6A.1(b) of the NT NER to be accepted as a contingent project for the 2024–29 regulatory period.

Jacana Energy supports the proposed contingent project to unlock large scale renewables as it will enable the dispatch of the facilities currently connected to the DKTL and will assist in more efficient and streamlined investment in infrastructure that connects renewables. Jacana Energy is also supportive of the proposed contingent project for managing network voltage and system strength with an increasing proportion of inverter-based generation. Jacana Energy encourages PWC to work with retailers to value demand side initiatives that may also assist in managing network issues associated with high small-scale renewable penetration, at lower cost.⁶³

Table B.1 lists PWC’s revised proposal contingent projects trigger events and our final decision trigger events for the 2 revised contingent projects. Table B.1 in our draft decision lists PWC’s contingent projects and trigger events for the four contingent projects we accepted in our draft decision.⁶⁴ The final decision contingent projects for 2024–29 are listed in the constituent decisions set out in Appendix B of the overview.

Table B.1 PWC’s revised proposal contingent projects and AER final decision

| Project | Revised proposal trigger event | PWC updated amended trigger event |
|---|--|--|
| Unlocking large scale renewables on the DKTL (\$50 million) | 1. Confirmation by NTESMO of a projected shortfall in system strength on the DKTL, or in the Katherine region. | 1. Confirmation by the Northern Territory Electricity System and Market Operator (NTESMO) that a shortfall in inertia, system strength and/or voltage support services is forecast to occur at the |

⁶¹ PWC, *Response to AER IR#033 (Confidential)*, 25 January 2024.

⁶² NT NER, cl. 6.6A.1(c)(1).

⁶³ Jacana Energy, *Submission on Power and Water Corporation’s revised proposal and draft decision 2024–29*, January 2024, p. 4.

⁶⁴ AER, *Draft Decision, Power and Water Corporation – Electricity Distribution Determination 2024 to 2029, Attachment 5 Capital Expenditure*, September 2023, pp. 28–31.

| Project | Revised proposal trigger event | PWC updated amended trigger event |
|--|---|--|
| | <p>2. The AER is satisfied that Power and Water has successfully completed a RIT-T that:</p> <ul style="list-style-type: none"> a. Identifies a need to relieve limitations that would otherwise have constrained the dispatch of generation connected to the DKTL. b. Identifies a preferred option consistent with the RIT-T guidelines that maximises the net economic benefit to all those who produce, consume and transport electricity. <p>3. Power and Water Board provides a commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the NER.</p> | <p>Katherine Zone Substation node where any one or more of the following criteria are breached:</p> <ul style="list-style-type: none"> ○ A projected shortfall in inertia which, following a credible contingency event, will result in network frequency that is outside the thresholds set out in clause 2.2 of the Network Technical Code, or ○ Power frequency voltage levels criteria (Network Technical Code clause 2.3) is not met, resulting in voltage levels outside of the thresholds set out in clause 2.3 of the Network Technical Code, or ○ A projected shortfall in system strength, as measured by a negative Available Fault Level calculated as the actual Synchronous Three Phase Fault Level minus the required Synchronous Three Phase Fault Level, and resulting in an adverse system strength impact as defined in the System Strength Impact Assessment Guideline and Clause 16 of the Network Technical Code. <p>2. The AER is satisfied that Power and Water has successfully completed a RIT-T that:</p> <ul style="list-style-type: none"> a. Identifies a need to relieve limitations that would otherwise have constrained the dispatch of generation connected to the DKTL. b. Identifies a preferred option consistent with the RIT-T guidelines that maximises the net economic benefit to all those who produce, consume and transport electricity. <p>3. Power and Water Board provides a commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the NER.</p> |
| <p>Managing network voltage and system strength with an increasing proportion of inverter-based generation (\$100 million)</p> | <p>1. One or more of the following occurring:</p> <ul style="list-style-type: none"> a. Confirmation by NTESMO of a projected shortfall in system strength and/or voltage support services in the Darwin region; and/or b. A regulatory obligation or requirement within the meaning of section 2D of the National Electricity Law, such as a Ministerial Direction under the Government Owned Corporations Act 2001 (NT), or some other legislative or regulatory measure implemented by the Northern Territory Government, that requires the Power and Water Corporation to provide ESS including voltage, network support and/or voltage support services. | <p>1. One or more of the following occurring:</p> <p>a) Confirmation by NTESMO that a shortfall in inertia, system strength and/or voltage support services is forecast to occur on any of the following network nodes on the Darwin sub transmission network:</p> <ul style="list-style-type: none"> • 132kV Channel Island • 132kV and 66kV Hudson Creek • 66kV Berrimah • 66kV Woolner • 66kV Darwin • 66kV Palmerston • 66kV Strangways |

| Project | Revised proposal trigger event | PWC updated amended trigger event |
|---------|---|--|
| | <p>2. The AER is satisfied that Power and Water has successfully completed a RIT-T that:</p> <ul style="list-style-type: none"> a. Identifies the need consistent with the RIT-T guidelines to manage the issues caused by a shortfall in ESS, or direction by the Northern Territory Government. b. Identifies a preferred option consistent with the RIT-T guidelines that maximises the net economic benefit to all those who produce, consume and transport electricity and/or implements a reliability corrective action. <p>3. Power and Water Board provides a commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the NER.</p> | <p>where any one or more of the following criteria are breached:</p> <ul style="list-style-type: none"> • A projected shortfall in inertia which, following a credible contingency event, will result in network frequency that is outside the thresholds set out in clause 2.2 of the Network Technical Code, or • Power frequency voltage levels criteria (Network Technical Code clause 2.3) is not met, resulting in voltage levels outside of the thresholds set out in clause 2.3 of the Network Technical Code, or • A projected shortfall in system strength, as measured by a negative Available Fault Level calculated as the actual Synchronous Three Phase Fault Level minus the required Synchronous Three Phase Fault Level, and resulting in an adverse system strength impact as defined in the System Strength Impact Assessment Guideline and Clause 16 of the Network Technical Code. <p>b) A regulatory obligation or requirement within the meaning of section 2D of the National Electricity Law, such as a Ministerial Direction under the Government Owned Corporations Act 2001 (NT), or some other legislative or regulatory measure implemented by the Northern Territory Government, that requires the Power and Water Corporation to provide essential system services (ESS) including voltage, network support and/or voltage support services.</p> <p>2. The AER is satisfied that Power and Water has successfully completed a RIT-T that:</p> <ul style="list-style-type: none"> a. Identifies the need consistent with the RIT-T guidelines to manage the issues caused by a shortfall in ESS, or direction by the Northern Territory Government. b. Identifies a preferred option consistent with the RIT-T guidelines that maximises the net economic benefit to all those who produce, consume and transport electricity and/or implements a reliability corrective action. <p>3. Power and Water Board provides a commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the NER.</p> |

Shortened forms

| Term | Definition |
|---------------------|--|
| ADMS | advanced distribution management system |
| AEMO | Australian Energy Market Operator |
| AER | Australian Energy Regulatory |
| AESCSF | Australian Energy Sector Cyber Security Framework |
| capex | capital expenditure |
| CCP27 | Consumer Challenge Panel, sub-panel 27 |
| CESS | capital expenditure sharing scheme |
| CER | Consumer Energy Resources |
| DKTL | Darwin Katherine Transmission Line |
| DNSP or distributor | Distribution Network Service Provider |
| DOE | Dynamic operating envelope |
| ESS | Essential System Services |
| EV | electric vehicle |
| GIS | Geographic Information System |
| ICT | information and communication technologies |
| NEL | National Electricity Laws |
| NEM | National Electricity Market |
| NEO | National Electricity Objectives |
| NER or NT NER | National Electricity Rules As in force in the Northern Territory |
| NSP | Network Service Provider |
| NTESMO | Northern Territory Electricity System and Market Operator |
| opex | operating expenditure |
| OT | operational technology |
| PV | photovoltaic system |
| RAB | regulated asset base |
| repex | replacement expenditure |
| RIT-T | regulatory investment test for transmission |
| SCS | standard control service |