Draft Decision

Ausgrid Electricity Distribution Determination 2024 to 2029

(1 July 2024 to 30 June 2029)

Attachment 5
Capital Expenditure

September 2023

AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

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

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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 total forecast 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 (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, deliver efficient outcomes that benefit consumers in the long term (as required under the National Electricity Objective (NEO)).[4]

The *AER capital expenditure assessment outline* explains our and distributors' obligations 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.

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

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

2 NER, cl. 6.5.7(a).

3 NER, cl. 6.5.7(c).

4 NEL, ss. 7, 16(1)(a).

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

Distributors may need to undertake programs or projects that they did not anticipate during the reset. 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. Distributors may spend more or less than our forecast in response to unanticipated changes.

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 Guidelines*[6]
- Regulatory Investment Test for Distribution and Transmission (RIT-D and RIT-T) Guidelines[7]
- AER's *Asset Replacement Industry Note*[8]
- AER's *Information and Communication Technologies (ICT) Guidance Note*.[9]
- AER's *Distributed Energy Resources Integration Expenditure Guidance Note*.[10]
- AER's *Guidance Note on Network Resilience*.[11]

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

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

- the distributor's regulatory proposal and accompanying documents and models
- the distributor's responses to our information requests
- stakeholder comments in response to our Issues Paper.
- technical review and advice from our consultant's reports.

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6 AER, *Expenditure Forecast Assessment Guideline 2013*, August 2022.

7 AER, *RIT-T and RIT-D application guidelines (minor amendments) 2017*, September 2017.

8 AER, *Industry practice application note for asset replacement planning*, January 2019.

9 AER, *Guidance note on non-network ICT capital expenditure assessment approach*, November 2019.

10 AER, *Distributed energy resources integration expenditure guidance note*, June 2022.

11 AER, *Guidance note on network resilience*, April 2022.

12 AER, *Better Resets Handbook – Towards consumer-centric network proposals*, December 2021.

5.1 Draft decision

Our draft decision is that we are not satisfied that Ausgrid's proposed total forecast capex of $3,296.6 million ($2023–24) reasonably reflects prudent and efficient costs to maintain the safety, reliability and security of the network. Our alternative estimate of total capex is $2,736.1 million which is 17% below Ausgrid's forecast.

We encourage Ausgrid to respond to the issues we have raised in our draft decision and welcome further supporting information in its revised reviewed proposal.

Table 5.1 outlines our alternative estimate of forecast capex and compares this to Ausgrid's proposed forecast capex.

Table 5.1 AER's draft decision on Ausgrid's total net capex forecast ($ million, $2023–24)

	2024–25	2025–26	2026–27	2027–28	2028–29	Total
Ausgrid's proposal	717.7	674.1	661.6	635.4	607.9	3,296.6
AER's draft decision	628.0	555.8	548.5	516.2	487.6	2,736.1
Difference ($)	**-89.7**	**-118.3**	**-113.1**	**-119.2**	**-120.3**	**-560.5**
Difference (%)	**-12%**	**-18%**	**-17%**	**-19%**	**-20%**	**-17%**

Source: AER analysis and Ausgrid's proposal
Note: Numbers may not sum due to rounding

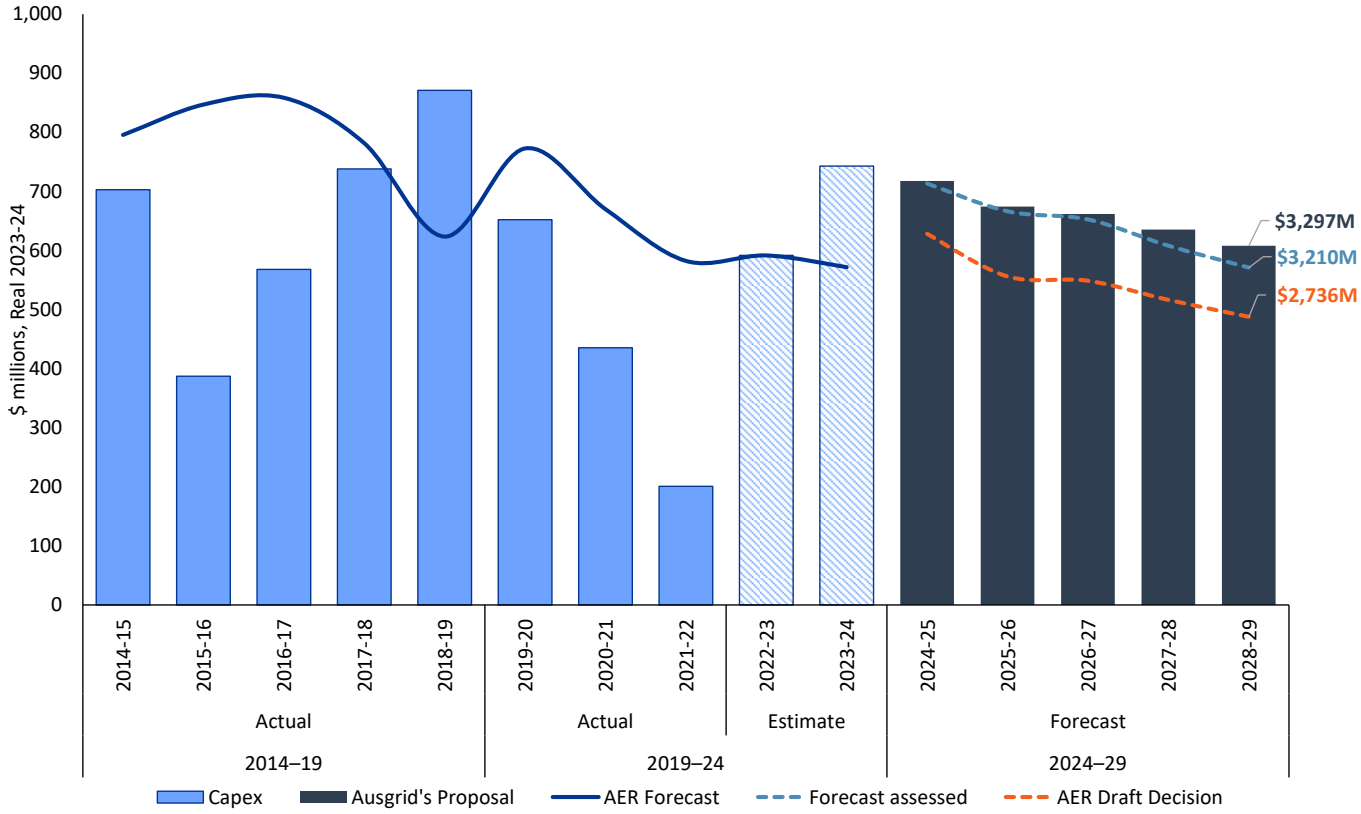
5.2 Ausgrid's proposal

Ausgrid's proposal forecasts $3,296.6 million ($2023–24) capex over the 2024–29 regulatory control period.

Figure 5.1 outlines Ausgrid's historical capex trend, its proposed forecast for the 2024–29 regulatory control period, and our draft decision. Consistent with our usual practice, the chart presents time-series of Ausgrid's net capex. We note that Ausgrid has made significant asset disposals in the 2019–24 period, which makes the comparison on a net basis between the 2024–29 period and the 2019–24 period less meaningful in this particular case.

Since submitting its proposal, Ausgrid has provided updates to its total net capex forecast. We refer to this updated forecast as "Forecast assessed" to account for Ausgrid's revised resilience capex submitted in July 2023 and revised asset disposals for fleet and property to correct an omission from the initial proposal.

Figure 5.1 Ausgrid's historical and forecast capex ($ million, $2023–24)



Source: AER analysis.
Note: Capex shown is net capex, which subtracts capital contributions (capcons) and asset disposals from gross capex. Ausgrid made significant asset disposals in the 2019–24 period, particularly in 2021–22.

As can be seen from Figure 5.1, despite a step up in its expected spend in the last two years of the current period, Ausgrid is expecting a material underspend in the 2019–24 period. The main driver of the underspend is the non-system land asset disposals, where there is a large increase in actual asset disposals compared to the forecast asset disposals in the 2019–24 period. This is not an underspend we typically see. Generally, businesses underspend on categories of capex. As capex is assessed on a net capex basis (gross capex minus asset disposals), Ausgrid's larger than expected asset disposals in the current period has a material impact on the net capex comparison.

Table 5.2 provides a breakdown of Ausgrid's capex proposal in more detail. In the forecast period, the main driver of Ausgrid's total capex forecast is repex making up 44% of the total. Ausgrid's forecast repex is 5% lower than current and estimated repex in 2019–24.

Similar to the other distribution businesses, Ausgrid has proposed investment in new and emerging areas of capex; notably, in consumer energy resources (CER), climate resilience and cybersecurity.

Table 5.2 Ausgrid's capex category forecast compared with actual/estimated capex in 2019–24 ($ million, $2023–24)

Capex category	Ausgrid's 2019–24 capex	Ausgrid's 2024–29 capex	Change from 2019–24 (%)	Proportion of total capex (%)
Repex	1,523	1,446	-5%	44%
Resilience	N/A	194	(n/a)	6%
Augex	126	138	10%	4%
Connections	81	51	-37%	2%
CER integration	4	47	1075%	1%
Operational Technology & Innovation	204	117	-43%	4%
Information & Communications Technology	282	301	7%	9%
Fleet	138	148	7%	4%
Property	174	145	-17%	4%
Capitalised overheads	743	724	-3%	22%
Total capex (excluding capcons)	**3,275**	**3,311**	**1%**	
Asset disposals	-672	-14		
Net capex	**2,603**	**3,297**	**27%**	

Source: AER analysis.

5.3 Reasons for draft decision

We reviewed Ausgrid's capex drivers, programs and projects to inform our view on a total capex forecast that reasonably reflects the capex criteria. We conducted top-down analysis such as examining trends and forecast costs compared with historical capex, and inter-relationships between cost categories. To complement this, we conducted a bottom-up analysis of Ausgrid's major programs and projects.

Our capex assessment focused primarily on the material capex categories that either represented a significant uplift in expenditure, had stakeholder interest, or are new and evolving areas such as CER and resilience. Capex that was relatively small and forecast using established modelling approaches and inputs in line with our expectations, meant that we did not need to undertake a more detailed analysis of the individual programs and projects. Our draft decision is reflective of this approach as set out below in Table 5.4.

Further, in considering the scope of our review we had regard to how Ausgrid has performed against the Better Resets Handbook expectations for capex.[13] Our assessment against each expectation is set out in Table 5.3.

[13] AER, *Better Resets Handbook – Towards Consumer Centric Network*, December 2021, pp. 19–23.

Table 5.3 Better Resets Handbook capex expectations

Capital expenditure expectations	AER Position
Top-down testing of the total capex forecast and at the category level.	Ausgrid has partly satisfied this expectation: • Ausgrid broadly satisfied us that the majority of its recurrent or business-as-usual capex performed well in trend analysis. For example, Ausgrid forecast a decline in replacement capex and its modelled repex performed well against the repex model. • From a total capex perspective (excluding capcons), Ausgrid's forecast capex is 6% above current period when accounting for the changes in accounting treatment for software as a service (shifting from capex to opex). The material underspend in net capex in the 2019–24 period (Figure 5.1) was largely due to actual asset disposals exceeding the forecast, which resulted in a material Capital Expenditure Sharing Scheme (CESS) increment. • Ausgrid forecast increases for some recurrent expenditure (for example, fleet) but reductions in in others (for example, recurrent ICT).
Evidence of prudent and efficient decision-making on key projects and programs.	Ausgrid has partly satisfied this expectation. Ausgrid has improved its modelling and forecasting for several key projects and programs in business-as-usual areas since the last review. Ausgrid generally provided supporting business cases and cost benefit models. We reviewed the new and emerging areas of expenditure (CER, resilience, cybersecurity, innovation) and found that these did not reasonably reflect the capex criteria.
Evidence of alignment with asset and risk management standards.	Ausgrid has broadly met this expectation. Ausgrid provided key asset management documents outlining the processes and approach to quantitative cost-benefit analysis. While some of its asset management documents are in line with good industry practice, we have some concerns with its key document, its Value Framework.
Genuine consumer engagement on capital expenditure proposals.	Ausgrid has broadly met this expectation. We acknowledge the significant engagement undertaken Ausgrid has undertaken with its Reset Customer Panel (RCP) and Voice of Community Panel (VoCP) in forming its regulatory proposal. The AER's Consumer Challenge Panel sub-panel 26 (CCP26) noted that overall the RCP played a strong role in pushing Ausgrid to ensure it was delivering value for customers.

Overall, we found that the majority of Ausgrid's forecast of $3,296.6 million would be required to maintain the safety, reliability and security of electricity supply of its network. Ausgrid provided sufficient information to support most of its recurrent expenditure forecasts other than its dedicated low voltage (LV) circuit reconfiguration program.

We are satisfied that our alternative forecast of total capex of $2,736.1 million is reasonable and sufficient for Ausgrid to maintain its network. This is because our alternative estimate accepts most of Ausgrid's forecast and is also in line with recurrent capex for the current period, where recurrent capex makes up the majority (80%) of total capex.

We have not accepted Ausgrid's forecast in full, reducing it by 17%, because we found insufficient information in support of its forecast especially in the new and emerging areas of expenditure of CER, resilience and cybersecurity. We note that these new expenditures have been included in most regulatory proposals for the 2024–29 period, with different reasons for

the proposed amounts. To provide guidance for future processes, we have noted information gaps and areas for improvement for forecasting and supporting information. In Ausgrid's case, we encourage it to have regard to our findings in developing its revised proposal.

For these new and emerging areas of expenditure, we acknowledge the need for investments by networks in these important areas. We observe Ausgrid has made considerable efforts in understanding the impact of these issues on its network and commend Ausgrid on its extensive customer engagement process in new and challenging areas of expenditure. We acknowledge there is uncertainty in modelling and forecasting in these areas and our assessment of Ausgrid's proposal takes account of the limitations. We welcome further analysis and engagement on these new and evolving areas.

The section below outlines findings from our top-down and bottom-up review.

Top-down perspective

Our top-down testing of Ausgrid's forecast capex informed the scope of our bottom-up review. We observe the following about Ausgrid's forecast capex at the top-down level:

- Most of Ausgrid's forecast repex is reasonable, including its modelled repex based on the outcomes of the repex model
- Ausgrid's recurrent (business-as-usual capex) capex forecast is not materially different from its current period
- Compared to the previous review, Ausgrid has improved its forecast modelling and risk assessment for recurrent (business-as-usual) capex
- However, we have concerns with its Value Framework – a framework which sets out the assumptions, inputs, metrics and parameters it applies in investment cases to support its decision-making.

We discuss these observations, in turn, below.

We note that Ausgrid performs well against the repex model with its forecast modelled repex being 36% lower than the repex model threshold. Its modelled repex is 51% of total repex. We note that our pre-lodgement engagement on repex modelling was constructive, with dialogue about preliminary outcomes of the repex model.

Further, as noted in the Better Resets Handbook expectations for capex, a comparison of the forecast with current period actuals is more meaningful for recurrent expenditure. We observe that Ausgrid's total recurrent capex forecast is not materially different from its current period. In our review, we found that most of Ausgrid's recurrent capex was reasonable, other than capex for its dedicated LV circuit reconfiguration program (repex). We note at our alternative recurrent capex forecast is not materially different from Ausgrid's.

Further, for recurrent expenditure, our review of Ausgrid's forecasting approach, risk assessment, needs analysis and other supporting information indicates that Ausgrid has improved the governance around its decision-making for recurrent capex projects, and has developed reasonable analytical tools to better understand the needs of its network. We commend Ausgrid efforts to improve on its quantitative analysis used to support its investments.

However, we have some concerns with Ausgrid's Value Framework. This is a framework which sets out the assumptions, inputs, metrics and parameters it applies in investment cases to support its decision-making. While some elements of its framework are reasonable and consistent with good industry practice, we have concerns with some assumptions and inputs that would result in an overstatement of the risk to be mitigated. For example, Ausgrid includes 'shareholder value' as a relevant input, and some risk assumptions, such as the disproportionality factor for safety, are overstated and inconsistent with our guidance on asset replacement.[14]

Given these top-down findings, we have focused our review on the prudency and efficiency of Ausgrid's increasing, new and evolving areas of capex, these being: non-recurrent ICT, innovation expenditure, resilience, cyber security and CER. We also assessed Ausgrid's dedicated LV circuit reconfiguration program given the materiality of the program ($143.5 million) and the 160% step up relative to the current period.

Bottom-up review

Our bottom-up review revealed a lack of information to support the prudency and efficiency of Ausgrid's forecast in the increasing, new and evolving areas of capex of capex and its dedicated LV circuit reconfiguration program. We have therefore included alternative forecasts for these parts of Ausgrid's proposal. Table 5.4 sets out our draft decision for Ausgrid by capex category.

[14] AER, *Industry practice application note for asset replacement planning*, January 2019.

Table 5.4 AER's draft decision by capex category ($million, $2023–24)

Capex category	Ausgrid's Proposal	Forecast assessed	AER's draft decision	Difference ($)	Difference (%)
Repex	1,446.0	1,446.0	1,357.8	-88.2	-6%
Resilience	193.7	170.6	26.0	-144.6	-85%
Augex	138.3	138.3	138.3	0.0	0%
Connections	51.4	51.4	51.4	0.0	0%
Operational Technology & Innovation	117.0	117.0	40.6	-76.4	-65%
Consumer energy resources integration	69.9	69.9	21.7	-48.2	-69%
Information & Communications Technology	278.4	278.4	191.3	-87.2	-31%
Fleet	147.6	147.6	147.6	0.0	0%
Property	145.1	145.1	145.1	0.0	0%
Capitalised overheads	723.6	723.6	685.5	-38.1	-5%
Total capex (excluding capcons)	**3,310.9**	**3,287.8**	**2,805.2**	**-482.6**	**-15%**
less asset disposals	-14.3	-83.3	-83.3	0.0	0%
Modelling adjustments			13.6	13.6	
Net capex	**3,296.6**	**3,204.6**	**2,735.5**	**-469.1**	**-15%**

Source: AER analysis. Totals may not sum due to rounding.
Note: Our draft decision on net capex is 17% lower than Ausgrid's initial proposal, or 15% lower than the forecast we assessed following Ausgrid's revised resilience capex in July 2023 and its updated asset disposals.

Table 5.5 summarises, and Appendix A provides further details on, our reasons for not accepting Ausgrid's forecast, by capex driver. 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 the different capex drivers to assess a regulated business' proposal as a whole and arrive at an alternative estimate for total capex where necessary. Our decision on total capex does not limit a regulated business' actual spending.

Table 5.5 Summary of our findings and reasons, by capex driver

Driver	Findings and reasons
Augex	Our draft decision includes Ausgrid's augex forecast in our alternative estimate of total capex. We reviewed Ausgrid's reliability programs and major projects. We note that most of Ausgrid's reliability programs were driven by existing and new regulatory obligations. For the majority of projects, we focused on the forecasting approach and likelihood of each project. We engaged with Ausgrid, and we are satisfied that the proposed augex reflects the level of commitment for each program likely required in the 2024–29 period. We sought information for Ausgrid's System Land Lease costs and Ausgrid noted the proposed augex reflected changes in land value to its Chullora Sub-transmission Substation

Driver	Findings and reasons
	site. We consider Ausgrid's forecasting approach is reasonable but acknowledge Ausgrid may provide an updated land valuation from the NSW Valuer General in its revised regulatory proposal. We observed that Ausgrid's augex for its HV and LV projects were 44% higher than its current period actual/estimated spend. Ausgrid cited COVID-19, storm recovery and paused live line work after a network fatality as the main drivers for its underspend on HV and LV work during the current period. Further analysis found Ausgrid's cost benefit analysis and forecasting approach for these projects to be robust and we did not identify material concerns in this case.
Connections	Our draft decision includes Ausgrid's connections forecast in our alternative estimate of total capex. Ausgrid's connections forecast is $30 million lower than the 2019–24 period, primarily driven by lower forecast customer connections. Overall, we found the information provided by Ausgrid adequately supported its proposed expenditure.
Information and communications technology (ICT)	Our draft decision does not include Ausgrid's forecast for ICT capex in the total forecast capex. We found aspects of Ausgrid's ICT forecast to be reasonable. In particular, we consider its recurrent ICT forecast to be reasonable with the forecast being more than 20% below the expected capex in the 2019–24 period. However, we have concerns with Ausgrid's non-recurrent ICT and ICT cybersecurity capex forecast. For Ausgrid's proposed replacement of its Enterprise Resource Planning platforms, EMCa's review found concerns with Ausgrid's preferred option. These concerns include: modelling bias that overstates benefits, excessive costs for the preferred option, deliverability risk, and contingency costs. We consider that Ausgrid has not demonstrated that the preferred option is prudent and efficient compared to the base case. For ICT cybersecurity, EMCa's review found that Ausgrid's forecast was overstated in terms of its risk assessment and proposed costs. We consider Ausgrid could take a risk-prioritised approach to targeting its ICT cyber security investment on practices that provide the greatest risk-reduction value. We discuss our concerns further in Appendices A.1 and A.2.
Repex	Our draft decision does not include Ausgrid's forecast for repex in the total forecast capex. We found that aspects of Ausgrid's repex forecast to be reasonable. In particular, Ausgrid's modelled repex forecast performs well against the repex model. However, we were not satisfied that its LV circuit reconfiguration program reasonably reflect the capex criteria. In particular, we found that Ausgrid did not provide sufficient evidence to support a 160% step up in expenditure for this program. We also note that it has overstated the safety risks to be mitigated, which is inconsistent with our asset replacement guidance note. These issues are discussed further in Appendix A.6.
Operational Technology and Innovation (OTI)	Our draft decision does not include Ausgrid's forecast for OTI in the total forecast capex. Our review focused on Ausgrid's proposed OT cyber security and its Network Innovation Program. Ausgrid has not satisfied us that its network innovation program and OT cyber security reflect the capex criteria. For innovation capex, we support and acknowledge innovation contributes to delivering network services efficiently. However, Ausgrid has not satisfied us that the proposed expenditure is reasonably required because it has not adequately responded to our previous concerns regarding clarity, scope and alternative funding arrangements for innovation. For OT security, we found that Ausgrid's forecast is 96% higher than the expected capex in the current period and Ausgrid's supporting information for the projects did not sufficiently link the regulatory obligations to the project scope, activities, and costs. These issues are discussed further in Appendices A.2 and A.5.
Resilience	Our draft decision does not include Ausgrid's forecast for resilience in the total forecast capex. We are cognisant that consumer engagement on the localised impacts from climate change played an important part in the development of Ausgrid's proposal. Ausgrid has continued to engage on its resilience proposal, including by submitting a business case in July 2023 and signalling its intention to undertake further cost benefit analysis on its whole-of-network expenditure in October 2023. We understand that the later timing of its updated proposal

Driver	Findings and reasons
	means that Ausgrid has not had the opportunity to respond to the information and analysis gaps we have identified for this draft decision. We therefore see our alternative forecast as a placeholder value and encourage Ausgrid respond to our feedback set out below. In coming to our draft decision, we are cognisant of Ausgrid's efforts to better understand the impact of climate effects on its network. We also appreciate Ausgrid's efforts to adhere to our guidance note on resilience. At this stage, we consider Ausgrid has not satisfied two major criteria in our guidance note: in particular, demonstrating a causal link between the impact on the Ausgrid's network and the expected increase in climate risk; and, that the preferred investment is likely to have the greatest net benefit to consumers. While we had no material concerns with Ausgrid's climate projection model, based on the information before us, we do not have confidence that its network impact model and the solutions and optimisation model are likely to result in a prudent and efficient outcome. We also have concerns with its top-down forecasting methodology. These issues are discussed further in Appendix A.3
CER integration	Our draft decision does not include Ausgrid's forecast for CER integration in the total forecast capex. Ausgrid has not satisfied us that its forecast for CER integration reflects the capex criteria. In particular, we found that Ausgrid has overestimated the benefits associated with some of its programs and that the proposed customer experience benefit is not credible. We also consider Ausgrid has overstated the curtailment and reliability benefits from its proposed augmentation expenditure. These issues are discussed further in Appendix A.4.
Fleet	Our draft decision includes Ausgrid's fleet forecast in our alternative estimate of total capex. This forecast is 6.7% higher than the expected capex in the 2019–24 period, primarily driven by increasing capex for elevated work platforms and light commercial vehicles. Considering these increasing drivers in the 2024–29 period, the fleet forecast is not materially higher than the current period. Ausgrid has committed to smoothing its current and future period fleet capex in response to concerns from its Reset Customer Panel.[15] Additionally, given the forecasted peak of the replacement cycles described in Ausgrid's proposal, we expect the 2029–34 fleet forecast to decline.
Property	Our draft decision includes Ausgrid's property forecast in our alternative estimate of total capex. This forecast is 16.9% lower than the expected property capex in the current period. Ausgrid noted this forecast is driven by the results of independent property condition reports and its accommodation strategy. The inclusion of the property disposals detailed below resulted in a reasonable net property capex forecast.
Capitalised overheads	Our draft decision does not include Ausgrid's capitalised overheads forecast in our alternative estimate of total capex. Our alternative forecast accounts for updates for data discrepancies and our alternative estimate of total direct capex. Further information can be found in Appendix A.7.
Asset disposals	Our draft decision includes Ausgrid's updated forecast for asset disposals in our alternative estimate of total capex. Ausgrid's proposal initially included $14.3 million for asset disposals for fleet and property. We identified discrepancies with the information provided and Ausgrid updated its disposal forecast to $83.3 million.[16] For fleet disposals, this involved correcting an error from $14.3 million to $35.9 million. For property, Ausgrid originally submitted zero and updated this to $47.4 million to reflect the likely timing of asset disposals in the 2019–24 period and the 2024–29 period as informed by Ausgrid's proposed affordability measure in response to stakeholder engagement.[17]

15 Ausgrid's Reset Customer Panel, *Att 3.5 Independent Report on Ausgrid 2024–29 Proposal*, January 2023, p. 78.

16 Ausgrid, *Response to information request 019 – Fleet and Property capex follow up questions,* June 2023.

17 Ausgrid, *Att 4.1 2024–29 Proposed revenue,* January 2023, pp. 6-7; and Ausgrid, *Response to information request 019 – Fleet and Property capex follow up questions,* June 2023*,* p. 8.

Driver	Findings and reasons
	Accurate and realistic forecasting of asset disposals is important because this is used to determine the forecast revenue and is used in subsequent revenue calculations for the Capital Expenditure Sharing Scheme. This ensures customers do not pay unnecessarily. We encourage Ausgrid to submit more accurate forecasts of asset disposals in future regulatory proposals.
Modelling adjustments	Our draft decision includes our standard modelling adjustments for updated inputs for inflation and labour real cost escalation. The net impact of these adjustments increases our alternative estimate by $14 million.
Ex-post review	We are required to provide a statement on whether the roll forward of the regulatory asset base (RAB) from the previous period contributes to the achievement of the capex incentive objective.[18] The capex incentive objective is to ensure that, where the RAB is subject to adjustment in accordance with the NER, only expenditure that reasonably reflects the capex criteria is included in any increase in value of the RAB.[19] We may exclude capex from being rolled into the RAB when a distributor's capex exceeds its allowance,[20] and we are satisfied that the overspend does not reasonably reflect the capital expenditure criteria.[21] We have reviewed Ausgrid's capex performance for the 2017–18 to 2021–22 regulatory years.[22] Ausgrid incurred total capex below its regulatory forecast for the ex-post review period. On this basis, the overspending requirement for an efficiency review of past capex is not satisfied.

18 NER, cl. 6.12.2(b).

19 NER, cl. 6.4A(a).

20 NER, cl. S6.2.2A(b).

21 AER, *Capital Expenditure Incentive Guideline*, November 2013, p. 17; and NER, cl. S6.2.2A(b).

22 NER, cl. S6.2.2A(a1).

A Reasons for decision on key capex categories

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

- Non-recurrent ICT (A.1)
- Cyber security (A.2)
- Resilience (A.3)
- CER integration (A.4)
- Innovation (A.5)
- LV dedicated circuit reconfiguration (A.6)
- Capitalised overheads (A.7)

A.1 Non-recurrent ICT (ERP replacement program)

A.1.1 AER's draft decision

We do not accept that Ausgrid's non-recurrent information and communications technology (ICT) capex forecast of $76 million for its replacement of the Enterprise Resource Planning (ERP) platform would form part of a total capex forecast that reasonably reflects the capex criteria. We have included $4.2 million capex for the ERP replacement in our alternative estimate of total capex, which is $72 million (95%) lower than Ausgrid's proposal.

Our draft decision includes $205 million for total ICT (recurrent and non-recurrent), which is $96 million (32%) lower than Ausgrid's proposed $301 million.[23] This amount reflects the total of our alternative estimates for the three main non-recurrent programs proposed by Ausgrid: CER-related ICT, cyber security, and the replacement of the Enterprise Resource Planning (ERP) platforms.

Our draft decision on Ausgrid's CER-related ICT and ICT cyber security are discussed in appendices 0 and A.2, respectively, while the ERP replacement is discussed in this appendix.

A.1.2 Ausgrid's proposal

Ausgrid proposed a total ICT capex forecast of $301.1 million, which is split into $109.7 million for recurrent ICT and $191.4 million for non-recurrent ICT.[24]

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[23] We assessed CER-related ICT within the "CER integration" program. As presented in Table 5.4, the total of Ausgrid's remaining ICT forecast is $278 million and our alternative estimate is $191 million for ICT (excluding CER-related ICT).

[24] Ausgrid, *Att 5.9 – Technology plan for 2024–29,* January 2023, p. 35.

Ausgrid proposed three main non-recurrent programs totalling $140 million for capex, as shown in Table A.1. We have assessed these programs in different appendices.

Table A.1 Ausgrid's proposed non-recurrent ICT programs ($ million, $2023–24)

Program	Capex	Opex	Totex	Section reference
CER-related ICT	20	3	23	Section A.4
Cyber security	44	47	91	Section A.2
Enterprise Resource Planning Program (ERP) replacement	76	73	149	Section A.1.3.1

Source: Ausgrid's proposal.
Note: The opex is due to changes in accounting standards regarding the treatment of software as a service (SaaS) implementation costs, which were previously treated as capex and are now treated as opex. The opex is assessed as a base year adjustment in Attachment 6 for operating expenditure.

Ausgrid engaged with its Reset Customer Panel on ICT including developing ICT Governance Principles. Ausgrid's customer engagement resulted in it:[25]

- adopting ICT governance principles developed through engaging with its RCP to protect customers from foreseeable cost overruns in major non-recurrent ICT projects. The RCP considers that adopting the ICT governance principles and applying the CESS also addresses its concerns with the applied 20% contingency costs.
- Excluding ERP program costs in the 2029–34 regulatory proposal which were reasonably foreseeable at the time of the initial business case.
- agreeing to sharing post implementation reviews with its Customer Consultative Committee.
- extending the depreciation schedule from 5 years to 15 years to lower the short-term bill impact.

A.1.3 Reasons for decision

We have reviewed the information Ausgrid provided in support of its non-recurrent ICT capex forecast, including the business cases and cost-benefit models. We engaged EMCa to review Ausgrid's proposed capex for its non-recurrent ICT program.[26] Where required, we have sought further information from Ausgrid through information requests.

Ausgrid's total ICT capex is 7% higher than current period. Due to changes in the accounting treatment of software as a service and cloud computing implementation costs, these are now treated as opex instead of capex as it was treated historically. When we consider the totex perspective (capex + opex), Ausgrid's proposed total ICT expenditure is $169 million (58%) higher than current period.

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25 Ausgrid's Reset Customer Panel, *Att 3.5 independent report on Ausgrid 2024–29 proposal*, January 2023, p. 21; and Ausgrid, *2024–29 Regulatory proposal*, January 23, p. 104.

26 EMCa, *Report to AER on Ausgrid's CER and ICT 2024–29*, August 2023.

Our assessment has focussed on the non-recurrent ICT programs by having regard to the expectations and good industry practices in our ICT Guidance note.[27] We found Ausgrid's approach to forecasting recurrent ICT to be reasonable and note that Ausgrid has forecast a decline in recurrent ICT capex. We had regard to the technical advice and expertise from EMCa in forming views on the prudency and efficiency of Ausgrid's forecast by considering the business cases, cost benefit analysis and options analysis. However, Ausgrid has not satisfied us that the proposed non-recurrent program for the ERP replacement is prudent and efficient. We discuss our assessment of ERP replacement program below. We discuss the interrelated opex in Attachment 6 for operating expenditure.

A.1.3.1 Enterprise resource planning replacement program

Ausgrid has not satisfied us that the $76 million forecast capex for the ERP replacement program would form part of a total capex forecast that reasonably reflects the capex criteria. Overall, we do not consider that Ausgrid has adequately justified its preferred option against the feasible option of option 1. We have included the capex for option 1 in our alternative estimate of total capex. We have also amended the corresponding base year adjustment as discussed in Attachment 6 for opex.

The primary investment driver for Ausgrid's ERP replacement is that these platforms will become obsolete due to a lack of vendor support beyond 2027. Ausgrid's ERP replacement project proposes to replace and upgrade three core systems:

- Enterprise Asset Management (EAM)
- Enterprise Resource Planning (ERP)
- Meter Data Management and Billing (MDM/B).

Ausgrid considered four options in the business case for the ERP replacement project:

- Do nothing
- Option 1: Base Case – technical upgrade of its ERP system ($19.8 million totex)
- Option 2 (preferred): Enhance – consolidate and simplify and add capabilities ($183.9 million totex)
- Option 3: New – Migrate applications to new software vendor ($138.2 million totex)

EMCa's review indicates that Ausgrid has sufficiently identified the need to invest, and it is reasonable for the ERP, EAM, and MDM/B systems to be replaced in the 2024–29 period.[28] Ausgrid considers option 2 is justified largely due to benefits associated with consolidating several legacy applications. However, EMCa advised there are several concerns with the proposed option 2:[29]

- Cost — Option 2 is the most expensive of the options considered and considerably higher than the option 1 base case, largely due to the consolidation of several

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27 AER, *Guidance note on non-network ICT capital expenditure assessment approach*, November 2019.

28 EMCa, *Report to AER on Ausgrid's DER and ICT 2024–29,* August 2023, pp. 46–47.

29 EMCa, *Report to AER on Ausgrid's DER and ICT 2024–29,* August 2023, pp. 50–52, 56–58.

applications. The base case is a viable option that satisfactorily mitigates the identified risks and has the lowest net present cost.

- Deliverability — The proposed upgrade and consolidation is a complex undertaking, and Ausgrid's implementation roadmap and documentation indicates the program won't be delivered by FY27 (when the vendor support ceases) and there is a risk of delay beyond FY29. EMCa was not convinced by Ausgrid's assessment of the delivery risk mitigation actions resulting in a 'low' residual risk. Comparatively, the option 1 base case represents a low deliverability risk due to the narrower implementation window and fewer interdependencies.
- Modelling bias — Some assumptions around costs and benefits in the cost-benefit modelling bias the calculated net present value. Firstly, Ausgrid assumes the costs are for 15 years with no ongoing costs beyond 2038 beyond, while the duration of benefits lasts for 50 years. This ignores any refresh or replacement costs that would be required to continue providing the benefits over the 50 years. Secondly, there is also an assumed Efficiency Benefit Sharing Scheme (EBSS) benefit carried over constantly from years 11 to 50 in the analysis, effectively attributing a 50 year opex benefit to the project, even though the life of the ICT investment is much less. Considering these issues, EMCa took a resourced-based economic analysis approach and adjusted the analysis period to align with the expected asset life of 15 years for these investments. This analysis indicates that the net present value for option 2 is significantly negative ($46 million) compared to the base case option 1.

Ausgrid also applied a 20–40% contingency cost in each option, which is not consistent with our expenditure forecast assessment Guideline.[30] EMCa found that Ausgrid's cost estimation methodology is otherwise reasonable.[31]

For the above reasons, we have included the capex for option 1 (less the 20% contingency) as we consider this more reasonably reflects the capex criteria than option 2. Option 1 provides sufficient expenditure for Ausgrid to undertake the technical upgrade of the ERP system.

Ausgrid's revised proposed should consider the above feedback and the feedback included in EMCa's report, which may involve revising the cost-benefit analysis and options analysis to arrive at a project scope and cost estimate that more reasonably reflects the capex criteria.

A.2 Cyber security

A.2.1 AER's draft decision

We do not accept that Ausgrid's cyber security capex forecast of $83 million would form part of a total capex forecast that reasonably reflects the capex criteria. We have included $37.5 million for cyber security capex in our alternative estimate of total capex, which is $45.5 million (55%) lower than Ausgrid's proposal. Our alternative estimate comprises $25 million

30 AER, *Expenditure forecast assessment Guideline explanatory note*, November 2013, p. 43.

31 EMCa, *Report to AER on Ausgrid's DER and ICT 2024–29,* August 2023, p. 53.

for information and communications technology (ICT) cyber security and $12.5 million for operational technology (OT) cyber security. The proposed capex for cyber security is interrelated with Ausgrid's opex proposal. Attachment 6 for operating expenditure provides further information on our assessment of Ausgrid's proposed base year adjustment for SaaS opex and the opex step change.

A.2.2 Ausgrid's proposal

Ausgrid proposed $91 million totex ($44 million capex and $47 million SaaS opex) for ICT cyber security and $39 million capex for OT cyber security. Ausgrid proposed this expenditure in order to comply with regulatory obligations under legislation and licence conditions.[32] Under the Australian Energy Sector Cyber Security Framework (AESCSF), Ausgrid proposed to invest in the capabilities required to achieve the highest level of maturity, called Security Profile level 3 (SP-3).

Ausgrid engaged with its customers on its proposed cyber security investment, and considered the following customer preferences:[33]

- Reducing cyber risks that could result in large-scale unplanned outages.
- Providing ongoing protection of network and customer data.
- Supporting the adoption of more distributed energy resources (CER) safely and securely.
- Delivering net economic benefits to customers.

Below we provide an overview of the proposed investments in ICT and OT.

ICT cyber security capex

Ausgrid proposed three options, aiming to achieve different cyber security maturity levels with the 282 practices in the AESCSF:

- Option 1: Maintain the current minimum compliance with the 88 practices relating to SP-1 ($34.1 million totex)
- Option 2: enhance cyber security maturity level by implementing a further 112 practices relating to SP-2 ($84.8 million totex)
- Option 3 (preferred): target highest cyber security level SP-3 by implementing all 282 practices ($111.7 million totex).

Ausgrid provided a business case, cost-benefit model, and qualitative and quantitative risk assessment.

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32 Relevant legislation conditions include: *Security of Critical Infrastructure Act 2018* (Cth); *Security Legislation Amendment (Critical Infrastructure) Act 2021* (Cth); *Security Legislation Amendment (Critical Infrastructure Protection) Act 2022* (Cth); Privacy Legislation Amendment (Enforcement and Other Measures) Bill 2022 (Cth), and the *Electricity Supply Act 1995* (NSW). Relevant licence conditions include conditions 9, 10, and 11 of Ausgrid's licence under the *Electricity Supply Act 1995* (NSW).

33 Ausgrid, *Att 5.1 Proposed capital expenditure 2024–29,* January 2023, p. 64.

OT cyber security capex

Ausgrid proposed two programs for OT cyber security:

- Control system core refresh program ($13.4 million), comprising five projects. Ausgrid undertook a program level options analysis ranging from extending asset life and reactive replacement to accelerated proactive replacement.
- Operational technology security program ($26.0 million), comprising 20 projects. Ausgrid undertook a program level options analysis ranging from maintenance of existing protections in line with SP-1 to uplifting its capability towards SP-3.

A.2.3 Reasons for decision

We recognise the importance of cyber security investment in supporting a reliable and secure electricity network. We also recognise the criticality of Ausgrid's network. Our draft decision has carefully balanced the increasing threat landscape and uncertainty with our assessment against the expenditure criteria so that customers pay no more than necessary for a reliable and secure electricity network.

We consider our draft decision arrives at a more reasonable estimate, noting our draft decision is a large increase (34%) on totex compared to Ausgrid's historical cyber security expenditure. This amount will enable Ausgrid to target cyber security practices with the highest risk reduction value.

Our draft decision has factored in the compliance obligations in legislation and licence conditions. SP-1 is the legislative obligation for distribution businesses if the AESCSF Framework Core is used.[34] Where distribution businesses propose to exceed the compliance obligations, prudency and efficiency must be demonstrated with a net economic benefit, with reasonable and justified assumptions, and considering a reasonable range of options to address the identified need.

We have had regard to the increasing threat landscape, Ausgrid's criticality and its expected progress towards cyber security maturity levels in our review and we have considered technical advice from EMCa in forming our draft decision.

We make the following observations regarding Ausgrid's cyber security expenditure:

- Ausgrid's proposed expenditure is significantly higher than its expected spend in the current period. On a totex basis, Ausgrid proposes to spend an additional $89.0 million (or 144%) more than current period. Our draft decision on Ausgrid's cyber security totex is 34% higher than current period expenditure.
- Ausgrid's submission has improved since the last review by providing cost-benefit models with some options analysis.
- We found that Ausgrid has not clearly linked the identified need for investment with the proposed projects and there is not a regulatory requirement to fully implement SP-3. The proposed investment is in response to Ausgrid's self-assessment under the AESCSF,

[34] EMCa, *Report to AER on Ausgrid's ICT cyber security 2024–29*, August 2023, p. 9.

and its risk assessment and risk appetite, rather than changes to obligations requiring full implementation of SP-3.

- There is limited information on the associated scope of works and underlying costs required to satisfy the requirements in the NER.
- We consider Ausgrid could consider a more reasonable range of options other than fully implementing SP-3 and instead should consider a risk-prioritised approach. In the absence of specific obligations to fully implement SP-3, we consider a risk-prioritised approach targeting the highest value practices and anti-patterns more reasonably reflects the capex criteria than full implementation of all practices.

We engaged EMCa to advise on the prudency and efficiency of Ausgrid's proposed cyber security expenditure. EMCa's review considered:

- Compliance obligations under the legislation and licence conditions.[35]
- Ausgrid's criticality assessment and self-assessment of capability and maturity under the AESCSF framework
- The gap between Ausgrid's self-assessed current maturity level and the proposed forecast maturity level
- Ausgrid's risk assessment and risk appetite
- Ausgrid's proposed investments, the identified need, and the options analysis considering a reasonable range of options.

We provide more specific assessment of the proposed capex for ICT and OT below.

ICT cyber security capex

Ausgrid proposed $91 million totex for ICT cyber security. This comprises $44 million for capex and $47 million for SaaS opex. This is 118% higher than the expected $41.7 million ICT capex in the 2019–24 period.

We summarise EMCa's advice below:

Ausgrid's overarching cyber security strategy and the evolving threat landscape[36]

- Ausgrid has appropriately identified the worsening threat landscape and increasing attack surface.
- Ausgrid has already made (and is projected to make in the remainder of the current period) significant progress towards fully implementing the practices and anti-patterns for Security Profile 2 (SP-2).

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35 Relevant legislation conditions include: *Security of Critical Infrastructure Act 2018* (Cth); *Security Legislation Amendment (Critical Infrastructure) Act 2021* (Cth); *Security Legislation Amendment (Critical Infrastructure Protection) Act 2022* (Cth); Privacy Legislation Amendment (Enforcement and Other Measures) Bill 2022 (Cth), and the *Electricity Supply Act 1995* (NSW). Relevant licence conditions include conditions 9, 10, and 11 of Ausgrid's licence under the *Electricity Supply Act 1995* (NSW).

36 EMCa, *Report to AER on Ausgrid's ICT cyber security 2024–29*, August 2023, pp. 20, 26, 28, 30

- Ausgrid's cyber-related objective is to "enhance its cyber security controls to prevent and/or detect malicious or unintentional security incidents" and Ausgrid intends to "mitigate the risk prudently and efficiently". EMCa consider this is reasonable.
- Ausgrid has self-assessed its criticality as 'high' and selected SP-3 as its target security profile by the end of the 2024–29 period. EMCa notes that Australian Energy Market Operator (AEMO) indicates the AESCSF is intended to provide guidance but is not a regulatory obligation. Therefore, in the absence of a specific regulatory obligation to achieve SP-3, the prudency and efficiency needs to be demonstrated with a net economic benefit.

Qualitative and quantitative risk assessment[37]

- From Ausgrid's qualitative risk assessment, Ausgrid appears to have overstated the overall likelihood (or probability) across seven key risks from the residual risk of the three options considered. Ausgrid has characterised many of the event likelihoods as 'Almost certain' without intervention where it is more reasonable to assume 'Likely' given the existing controls and progress towards SP-2. EMCa advises that "it is not reasonable to conclude that it is likely that there will be (on average) five successful attacks (i.e. 'almost certain') through the causes denoted… during the next [regulatory control period]."
- From Ausgrid's quantitative risk assessment, Ausgrid appears to have overstated the likelihood of cyber events. The values Ausgrid provided are hard-coded and the derivations have not been explained. Across the eight consequence types identified by Ausgrid, EMCa notes that some of the quantified likelihoods are of the correct order of magnitude, while others are 100 times higher than what EMCa considers reasonable.
- Ausgrid's quantification of the consequences of some of the events appears to be excessive, due to not including any moderating factors to account for mitigation actions and other interventions that would be taken to reduce the severity of the event. EMCa requested further information on the derivation of the consequence values and, based on this information, EMCa considers that a 30–50% reduction factor should be applied to four consequence values[38] to more realistically and reasonably account for mitigating factors to reduce the consequence severity.

Forecasting approach and options considered[39]

- Ausgrid provided a detailed bottom-up build of the cost estimates for the cyber security program but there was insufficient justification for the proposed cost estimates. EMCa has therefore relied on its own experience and benchmarking of other network service providers to test the reasonableness of Ausgrid's forecast.
- Ausgrid considered three options to address the increasing risk, although it did not compare these options against a counterfactual 'base case' as is typical in cost-benefit analysis. Overall, EMCa agrees with Ausgrid's conclusion that options 1 and 2 are not

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37 EMCa, *Report to AER on Ausgrid's ICT cyber security 2024–29*, August 2023, pp. 22, 23, 24–25.

38 Four consequence values are: unplanned outage costs, lost staff productivity, cost of manual control, and cost of interrupting Ausgrid's planned maintenance.

39 EMCa, *Report to AER on Ausgrid's ICT cyber security 2024–29*, August 2023, pp. 27–31.

the prudent choices, although Ausgrid's case for fully implementing SP-3 under its preferred option 3 is not compelling. Rather, EMCa advises that, in the absence of a regulatory obligation to completely achieve SP-3, a risk-prioritised approach would be more reasonable to address specific practices and anti-patterns within SP-3 that provide the most value and risk reduction.

We agree with EMCa that Ausgrid has not established that it has a regulatory obligation to achieve its target state of fully implementing SP-3.[40] Therefore, in the absence of a specific regulatory obligation to achieve SP-3, the prudency and efficiency of Ausgrid's proposed risk reduction must be demonstrated with a positive net economic benefit. EMCa analysed this by using two approaches involving a re-evaluation of the risk-costs estimated by Ausgrid and a benchmarking approach to test the efficient costs. Overall, EMCa advises that Ausgrid's proposal is unreasonably high and that a maximum of approximately $70 million totex would more reasonably reflect prudent and efficient costs. We summarise these approaches below.

The first approach involved a re-evaluation of the risk-costs Ausgrid estimated by including more reasonable estimates of the avoided risk-cost by adjusting the input assumptions, as described in the risk assessment above. Ausgrid's estimate of the avoided risk cost over five years is $307 million.[41] The 'avoided risk cost' is the benefit of avoiding a successful cyber attack and therefore represents the maximum net present cost for the investment to deliver a net economic benefit. EMCa's revised estimate of this risk cost is $48–72 million over five years. This suggests that a cyber security program for Ausgrid of less than approximately $70 million would reasonably reflect prudent and efficient costs.

The second approach involved undertaking a benchmarking exercise by comparing several of the other cyber security investments from network service providers that EMCa has recently assessed and provided advice for the AER.[42] EMCa assessed four estimation approaches from Ausgrid and its peers ranging from $67–74 million resulting in an average of $70 million +/-20% (or $55–85 million).

We consider that there is a degree of conservatism in the benchmarking approach because EMCa's approach has used the businesses cost estimates as proposed (rather than what EMCa has assessed as the prudent and efficient amounts and generated an alternative estimate for). Therefore, it could be argued that the likely benchmark cost is lower than $70 million for Ausgrid.[43]

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40 AEMO, *Australian Energy Sector Cyber Security Framework – Framework Overview – 2022 Program*, 2022, p. 3. AEMO indicates that the criticality assessment tool should be treated as guidance only and is not an indication an entity has obligations under or is compliant with the applicable Commonwealth legislation.

41 EMCa noted that it identified a calculation error in Ausgrid's estimate of the risk cost over five years, which is $243 million after correction. EMCa, *Report to AER on Ausgrid's ICT cyber security 2024–29,* August 2023, p. 26.

42 The benchmarking analysis compared the proposed costs for differing maturity levels and Security Profile gaps. EMCa defined SP levels 'Plus' to refer to where the businesses progress was less than 50% beyond the previous level, and 'Minus' to represent more than 50% than full implementation of the SP practices. The four methodologies compared Ausgrid's costs against peers for: SP-2 Minus to SP-3; SP-1 to SP-2 Plus; SP-1 Plus to SP-3; and SP-1 Plus to SP-3.

43 EMCa, *Report to AER on Ausgrid's ICT cyber security 2024–29,* August 2023, p. 37.

EMCa also observed that Ausgrid's cost estimates for each of its three proposed options are excessive when compared to other network service providers' costs for the same or similar maturity uplifts.[44]

Combining the two approaches suggests that $70 million totex at most for Ausgrid would more reasonably reflect the capex criteria. Our alternative estimate for capex includes $25 million, and the remaining $35 million is included in opex, which is discussed in Attachment 6 – opex. We consider this amount will enable Ausgrid to continue improving its cyber security maturity and take a risk-prioritised approach to targeting SP-3 practices that provide the greatest risk-reduction value.

Stakeholder engagement and submissions

Ausgrid's RCP commented that:[45]

- Ausgrid should be commended for the cost-benefit analysis setting out the consequences and benefits of cyber security maturity and practices in terms of manual network control, internal staff productivity and planned maintenance.
- It is not clear that targeting SP-3 is necessary to comply with regulatory obligations and licence conditions. Like EMCa, the RCP also highlighted that AEMO has indicated the self-assessment under the AESCSF is for guidance only and not a regulatory obligation. We note that SP-1 is the strict compliance obligation.
- The RCP is confident that the cyber security proposal had the support of customers through engagement with the VoCP and Town Hall,[46] noting that the AER will examine the cyber forecast closely and reach its own decision on prudency and efficiency, as the RCP makes no observation as to whether the opex or capex proposed is prudent and efficient.

VoCP supported Ausgrid to move to a higher security maturity level to target SP-3 (highest level) in the 2024–29 period. The CCP26 noted that Ausgrid's proposal responded to the VoCP's Recommendation 6 for increasing expenditure on cyber to $106 million totex (Ausgrid submitted $111.6 million totex).[47]

The Public Interest Advocacy Centre's submission questioned the extent to which consumers can have meaningful preferences on cybersecurity under the existing framework given that cyber security requirements are likely to be mandated but submitted that further discussion is warranted to explore the sharing of risks between networks and customers.[48]

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44 EMCa *Report to AER on Ausgrid's ICT cyber security 2024–29*, August 2023, pp. 36–37.

45 Ausgrid's Reset Customer Panel, *Att 3.5 Independent Report on Ausgrid 2024–29 Proposal*, January 2023, pp. 22, 53–54, 89, 146.

46 Town Hall participants provided feedback on a number of controllable costs (including cyber) identified in Ausgrid's Draft Plan in 2022.

47 CCP26, *Submission on AER's Issues Paper for Ausgrid's 2024–29 distribution determinations*, May 2023, p. 3.

48 Public Interest Advocacy Centre, *Submission on AER's Issues Paper for 2024–29 NSW distribution determinations*, June 2023, pp. 16–17.

OT cyber security capex

Our draft decision includes $12.5 million for OT cyber security capex, which is $26.5 million (68%) lower than Ausgrid's forecast of $39 million. Our draft decision is in line with historical expenditure as we do not consider Ausgrid has provided sufficient information to demonstrate expenditure beyond this level is justified to satisfy the capex criteria. Our alternative estimate is based on program level historical actual capex for the control system core refresh and OT security programs.

Ausgrid proposed the identified need for the two programs was compliance with obligations under legislation and licence conditions. In the projects we reviewed, the project descriptions provided by Ausgrid have not clearly linked the proposed projects to its legal obligations and therefore have not satisfied the capex criteria. In many projects, it was not clear what identified need was, as there appeared to be drivers other than the proposed compliance with cyber security obligations.

In forming our draft decision, we considered whether replacement was a potential alternative driver, rather than being primarily driven by compliance with cyber security obligations. Given some projects and some elements within projects appeared to be related to replacement, we considered that an amount aligned with historical expenditure more reasonably reflected the capex criteria because Ausgrid had not clearly linked the planned activities to the compliance obligations.

We issued an information request to understand the scope of work including current state, need for investment and planned activities to address the need as used to estimate the costs of a sample of projects.[49]

We have not accepted the proposed $39 million for the two programs for the reasons set out below. We consider Ausgrid should address the following information gaps if it is to resubmit these programs in the revised proposal:

- Significant increase from historical without justification — Ausgrid proposed $39 million capex for OT cyber security, which is 96% higher than the expected capex of $19.9 million in the 2019–24 period. Ausgrid has not acknowledged or explained the significant increase. Ausgrid should provide evidence to demonstrate prudency and efficiency of the proposed forecast such as justifying why there should be an increase to historical replacement levels, the quantum of that increase, the efficiency of preferred options, and any analysis on optimal timing.
- Unclear link to regulatory obligations to demonstrate prudency — While Ausgrid has referred generally to its compliance obligations in legislation and licence conditions, it has not provided sufficient supporting information to clearly link the underlying compliance driver to the specific projects proposed and therefore has not satisfied the capex criteria. Ausgrid should clarify the fundamental need for each project and clearly link the need to the relevant regulatory obligations to demonstrate prudency. The information should relate the projects, and their associated scope, activities and costs, to the identified cyber security gaps. From the information provided, the underlying driver of

[49] Ausgrid, *Response to information request 053,* July 2023.

several of the projects does not appear to be cyber security compliance or remediating non-compliance.

A.3 Resilience

A.3.1 AER's draft decision

We do not accept that Ausgrid's climate resilience forecast of $170.6 million would form part of a total capex forecast that reasonably reflects the capex criteria. We have included $25.7 million for resilience in our alternative estimate of total capex, which is $144.9 million (85%) lower than Ausgrid's proposal.

A.3.2 Ausgrid's proposal

Ausgrid's climate resilience proposal is aimed at mitigating the projected increase in climate-related risk (particularly windstorms) in supply interruptions to customers.

Ausgrid proposed total climate resilience expenditure of $202 million ($194 million in capex, $8 million in opex) in its January regulatory proposal.[50] In its regulatory proposal, Ausgrid stated its intention to continue stakeholder engagement together with the RCP post-lodgement, and consequently it may provide an update to its climate resilience forecast in a July submission.[51]

Ausgrid submitted a revised climate resilience proposal on 14 July, changing its total climate resilience expenditure to $176.5 million ($170.6 million in capex and $5.9 million in opex), and submitted additional and new information in support of its proposal.[52]

Table A.2 sets out the components of Ausgrid's climate resilience proposal.

Table A.2 Ausgrid's climate resilience proposal

Project/program	Capex	Opex	Total expenditure
Local network solutions	125.1	0.0	125.1
Community non-network solutions	0.2	3.5	3.7
Total Local Government Area expenditure	125.3	3.5	128.8
Whole-of-network expenditure	45.3	2.4	47.7
Total climate resilience program	**170.6**	**5.9**	**176.5**

Source: AER analysis and Ausgrid's revised climate resilience business case.
Note: Totals may not sum due to rounding.

50 Ausgrid, *Attachment 5.5 – Climate resilience program*, 31 January 2023, p. 5.

51 Ausgrid, *2024–29 Regulatory Proposal,* 31 January 2023, p. 80.

52 Ausgrid, *Climate Resilience Business Case*, 14 July 2023, p. 50.

Top-down forecast

Ausgrid submits that it has aligned its resilience investment program with its customers' priorities by:[53]

> Capping investment at $202 million totex ($194 million capex and $8 million opex) in the 2024–29 period, based on the different options presented to the Voice of the Community Panel and their views on bill impacts.

Ausgrid submits that early modelling indicates that a proactive spend of around $40 million per annum could be justified based on its historical experiences in recent years (East coast storms in 2015 and 2020). Ausgrid also notes that it ran several workshops with the VoCP to assess the level of resilience investment, and that the VoCP considered $40 million per annum over the 2024–29 period would be prudent.[54] Further, the VoCP had indicated a preference for an approximate 40:60 opex to capex investment split, where the split is assessed in terms of bill impact to customers.[55]

Since submission of its regulatory proposal in January, Ausgrid's engagement with its customers in individual Local Government Areas (LGAs) and VoCP has been about their investment preferences within the $202 capped expenditure amount. This engagement also resulted in Ausgrid reducing its total climate resilience proposal to $176.5 million.

Forecasting LGA expenditure - $128.8 million

Ausgrid took a pilot approach by selecting 3 'priority' LGAs for its resilience investments, with the intention for further investments in future resets.[56] In consultation with the VoCP, Lake Macquarie, Port Stephens and Central Coast were chosen for a number of reasons including being ranked as high risk in terms socio-economic disadvantage, and difficulties in recovering from extreme weather events.

The total LGA expenditure (network and non-network) across the 3 LGAs are split in the following way: Lake Macquarie ($40.4 million), Port Stephens ($19.7 million) and Central Coast ($68.7 million).[57] Ausgrid submits that the allocation of expenditure amounts to each priority LGA was based on a range of criteria including the VoCP preferences, local demographics, geography, and network characteristics.

Ausgrid submits that it co-designed with communities in the priority LGA an investment package of both network and non-network solutions.

The local network solutions ($125.1 million capex) are network-based investments to Ausgrid's 11 kV network in the priority LGAs to reduce unserved energy and the cost of repairs from windstorms; in particular to reduce network faults, restore power faster after an

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53 Ausgrid, *2024–29 Regulatory Proposal,* 31 January 2023, p. 76.

54 Ausgrid, *2024–29 Regulatory Proposal,* 31 January 2023, p. 32.

55 Ausgrid, *2024–29 Regulatory Proposal,* 31 January 2023, p. 32.

56 Ausgrid, *Climate Resilience Business Case*, 14 July 2023, p. 3.

57 Ausgrid, *Climate Resilience Business Case*, 14 July 2023, p. 50.

outage and reduce damage to network assets. The local network solutions considered were network segmentation, undergrounding and covered conductors.

The range of network solutions used in that engagement are derived from three related models. In summary, the outputs from a climate projection model (Risk Frontier's model) are fed into a network risk/network impact model (KPMG's model). The network risk model forecasts the total risk cost from projected climate change. Outputs from the network risk model are fed into the solutions and optimisation model (Ausgrid's model) to identify network solutions to address outages from windstorms.

For its community non-network solutions ($3.5 million opex and $0.2 million capex), Ausgrid submits that its opex based non-network solutions are new activities that are not captured in base year opex or the rate of change factors. It has therefore proposed these non-network solutions as part of an opex step change.

Forecasting whole-of-network expenditure - $47.7 million

Ausgrid's whole-of-network expenditure is new expenditure in its climate resilience proposal, which was not included in the January regulatory proposal. Ausgrid's whole-of-network expenditure appears to relate to totex with wider benefits beyond the three priority LGAs. Ausgrid engaged with stakeholders in each of the priority LGAs and VoCP on its whole-of-network expenditure proposal.

Ausgrid submits that 14 solutions were discussed with the VoCP who prioritised 6 solutions as these were voted 'most important' by the VoCP. Ausgrid's supporting documentation states that the budget for its whole-of-network expenditure was 'an iterative process that was undertaken in parallel to the Community engagement and solution development activities'.[58]

Ausgrid also indicates that further supporting information will be provided about its whole-of-network proposal after the release of the draft decision:[59]

> With the proposed [whole-of-network] investment packages now finalised, Ausgrid will undertake detailed scoping and modelling for each of the nominated solutions, including a quantitative assessment of benefits to confirm indicative cost benefit analysis prior to revised proposal submission in October.

A.3.3 Reasons for decision

We acknowledge the continual need for investments by networks to better manage extreme weather events and the projected increase in climate related risk.

We are cognisant that consumer engagement on the localised impacts from climate change played an important part in the development of Ausgrid's proposal. Ausgrid's proposal has evolved since its engagement on the regulatory proposal resulting in a revised proposal submitted in mid-July. As noted by Ausgrid, further cost benefit on its whole-of-network expenditure is expected in October. We appreciate that the later timing of its updated

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58 Ausgrid, *Climate Resilience Business Case*, 14 July 2023, p. 37.

59 Ausgrid, *Climate Resilience Business Case*, 14 July 2023, p. 44.

proposal means that Ausgrid has not had the opportunity to respond to the information and analysis gaps we have identified for this draft decision. We therefore see our alternative forecast as a placeholder value and encourage Ausgrid respond to our feedback set out below.

In coming to our draft decision, we are cognisant of Ausgrid's efforts to better understand the impact of climate effects on its network. It has taken the lead on a very challenging and difficult topic, investing in a number of models and engaging extensively with its customers about their preferences. We also appreciate Ausgrid's efforts to adhere to our guidance note on resilience.

There is a great deal of uncertainty in modelling and forecasting climate change risk and our assessment of proposals takes account of the limitations and challenges in forecasting climate related expenditure.

Below we set out our assessment against our resilience guidance note, Ausgrid's top-down forecast, Ausgrid's bottom-up forecast, and how we have derived our alternative forecast.

Assessment against our resilience guidance note

In assessing the prudency and efficiency of Ausgrid's climate resilience program, we have had regard to the extent that its proposal satisfies relevant criteria in our guidance note on network resilience. In that note, we set out our expectations of the type of evidence businesses should provide to demonstrate that its resilience-related proposal is prudent and efficient; these being:

- *Identified need*; that there is a causal relationship between the proposed resilience expenditure and the expected increase in the extreme weather event;
- *Testing of the preferred option*; that the proposed expenditure is required to maintain service levels and is based on the option that likely achieves the greatest net benefit of the feasible options considered; and
- *Genuine consumer engagement*; that consumers have been fully informed of different resilience expenditure options, including the implications stemming from these options, and that they are supportive of the proposed expenditure.

We also had regard to EMCa's advice in its technical review of Ausgrid's proposed capex for its climate resilience program.[60]

Overall, at this stage, we consider Ausgrid has not satisfied two major criteria in our guidance note; in particular, demonstrating a causal link between the impact on the Ausgrid's network and the expected increase in climate risk, and that the preferred investment is likely to have the greatest net benefit to consumers. In this regard, while we had no material concerns with Ausgrid's climate projection model, based on the information before us, we do not have confidence that its network impact model and the solutions and optimisation model is likely to result in a prudent and efficient outcome. We also have concerns with its top-down forecasting methodology.

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60 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023.

More generally, we are aware that the electricity industry's understanding of the impact of climate change on electricity networks is still at a learning stage. In such an uncertain environment where resilience is a new and challenging topic, we consider it important to be clear about the type of evidence expected to support resilience-related proposals. This will ensure that that investments are in the long term interests of consumers including the efficient allocation of risk from extreme weather events.

We provide a summary of our assessment against the criteria in the network resilience guidance note below. We then set out our findings on Ausgrid's top-down and bottom-up forecast, concluding with a description of our alternative forecast.

Identified need

We consider that Ausgrid has not addressed this criterion.

We do not consider that Ausgrid's top-down forecasting approach demonstrates a casual linkage between the network impact from a projected expected increase in climate risk.

We also found that for the largest component of its climate resilience proposal, the local network solutions program representing more than 70% of its proposal, Ausgrid was not able to demonstrate a need for this investment. Ausgrid did not provide sufficient evidence to support its premise that its network will be materially impacted from windstorms. We therefore consider that Ausgrid has not demonstrated a causal linkage between an increased risk from an extreme weather event and its impact on the Ausgrid network.

In particular, we note that our concerns relate to the network impact model. Our main concerns are that there is a lack of evidence of projected wind intensity and that the model overstates the risk to be mitigated.

We have no material concerns with the climate projection model. We appreciate that there are uncertainties when projecting climate and consider that such modelling is new and evolving. We consider that Risk Frontier has used best endeavours to model climate changes by using a comprehensive set of information and data to undertake simulations from the 2020 baseline.

Testing of the preferred option

We consider Ausgrid has not satisfied this criterion.

For its LGA network forecast, we found that Ausgrid's solutions and optimisation model overstates the benefits (risk that can be mitigated) from the proposed investments. Its model does not take account of the probability that the windstorm damage will not occur in the specific investment network location. Further, there is a lack of information to support the effectiveness of its proposed solutions. At this stage, it appears that the effectiveness of Ausgrid's proposed solutions is overstated.

For its whole-of-network forecast, Ausgrid provides a qualitative opportunity statement that explains each project/program, a high-level breakdown of the proposed cost, and a NPV figure. However, it does not provide the supporting quantitative analysis to demonstrate that its preferred option has the greatest net benefit compared to other feasible options. We

encourage Ausgrid to include its revised proposal the quantitative cost-benefit analysis showing feasible options considered in arriving at each of the preferred investment.

Genuine consumer engagement

We consider that Ausgrid has satisfied this criterion. We appreciate the challenges to engage with consumers on the network impacts from climate change and acknowledge Ausgrid's efforts to better understand its customer's preferences for resilience-related expenditure.

As consumer preferences is a key aspect of Ausgrid's proposed climate resilience proposal, to assist us in our review of that engagement, we engaged the CCP26 to observe Ausgrid's engagement with stakeholders in the priority LGAs. We also had regard to submissions in response to our issues paper from the RCP and Public Interest Advocacy Centre (PIAC).

Overall, we consider that Ausgrid has undertaken an extensive and ambitious customer engagement process in a new area of expenditure. We commend Ausgrid for its efforts to take on that challenge. We are also cognisant that Ausgrid has led the charge in investing in different ways to engage with its stakeholders.

All submissions received noted Ausgrid's genuine desire to better understand its consumers preferences in this uncertain area of expenditure. The CCP26 submits that Ausgrid demonstrated a genuine desire to listen to its customers and empower them, its workshops were well-aided by Ausgrid staff and members of the RCP, and its engagement has been transparent.[61] PIAC also noted that Ausgrid has invested the most time and effort compared to all other NSPs in this group of resets, such as developing a joint Resilience Framework which was co-designed with its RCP.[62]

We note differing perspectives about the effectiveness of the consumer engagement process. The RCP submitted that it is satisfied that the results of the engagement program indicate customers, both those in the three LGAs subject to the trial and more broadly in Ausgrid's wider customer base from the VoCP, continue to provide strong support for Ausgrid's resilience business case.[63]

In contrast, PIAC also noted concerns about the structure of engagement with consumers. It questioned whether focussing engagement on ranking specific technical interventions is meaningful in answering more fundamental questions of community preferences for how Ausgrid should manage climate risk.[64]

The CCP26 submitted that the VoCP did not endorse the proposed LGA and whole-of-network expenditure in its totality. In particular, the CCP26 observes that no changes were

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61 CCP26, *Addendum – Ausgrid's Climate Resilience Business Case, Submission to the Australian Energy Regulator Issues paper: Ausgrid Electricity Distribution Determination 1 July 2024 to 30 June 2029*, August 2023, pp. 3-4

62 PIAC, *Submission in response to AER issues paper for NSW DNSP*, 1 June 2023, p. 13.

63 Reset Customer Panel, *Report on Ausgrid's 2024–29 resilience business case*, 14 July 2023, p. 4.

64 PIAC, *Submission in response to AER issues paper for NSW DNSP*, 1 June 2023, p. 14.

made to the LGA or whole-of-network packages in response to willingness to pay preferences.[65] The CCP26 also made a number of other observations:[66]

- There was significant over-representation of people with lived experiences of extreme weather events in the LGA engagement which affects the engagement outcome.
- the lack of the right and sufficient information to participants about the proposed resilience solutions, including details of the planned activity and the specific customer resilience outcomes associated with each solution.
- The relatively late introduction of the concept of the 'risk of paying twice', and lack of consideration of whether the proposed expenditure could be addressed through existing reliability obligations or BAU expenditure programs.
- Lack of engagement with other responsible resilience entities in the development of the proposed resilience expenditure.

Findings on Ausgrid's top-down forecast

As described in section A.3.2, Ausgrid's top-down approach was based on an investment cap ($202 million) resulting from its customer engagement. Based on the information before us, it is unclear why Ausgrid's forecasting approach would result in a prudent and efficient outcome. We observe that:

- Ausgrid's top-down forecasting method assumes a forecasted windstorm event every year.
  - No evidence has been provided to support Ausgrid's assumption of a windstorm event every year in the 2024–29 period noting that there have been two windstorm events in the last 11 years
  - This is not reflective of Ausgrid's own documentation which suggests significant uncertainty and an immaterial change in windstorm events (as discussed later)
- No evidence has been provided that total recovery costs are a reasonable proxy for its top-down forecast. Ausgrid has provided no basis for this assumption.

The CCP26 commented that:[67]

> …the CCP26 are not comfortable with Ausgrid's characterisation of this [the $202 million figure] as a 'customer-nominated cap', as just 15 people (one third of the VoCP participants) were involved in the October workshop that provided feedback on the expenditure cap.

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65 CCP26, *Addendum – Ausgrid's Climate Resilience Business Case, Submission to the Australian Energy Regulator Issues paper: Ausgrid Electricity Distribution Determination 1 July 2024 to 30 June 2029*, August 2023, p. 2.

66 CCP26, *Addendum – Ausgrid's Climate Resilience Business Case, Submission to the Australian Energy Regulator Issues paper: Ausgrid Electricity Distribution Determination 1 July 2024 to 30 June 2029*, August 2023, p. 2.

67 CCP26, *Addendum – Ausgrid's Climate Resilience Business Case, Submission to the Australian Energy Regulator Issues paper: Ausgrid Electricity Distribution Determination 1 July 2024 to 30 June 2029*, August 2023, pp. 11–12.

Given these concerns, we do not have confidence in Ausgrid's top-down forecast of $176.5 million.

Findings on Ausgrid's bottom-up forecast

As we discuss further in this section, Ausgrid's proposed forecast of $176.5 million is comprised of:

- Local network solutions across 3 LGAs ($125.1 million)
- Whole of network solutions ($47 million)
- Community non-network solutions ($3.7 million)

Local network solutions forecast - $125.1 million capex

We note that the RCP's report strongly supports the community non-network and whole-of-network solutions expenditure but for the local network solutions expenditure, the RCP specifically requests that the AER carefully review that expenditure component:[68]

> We encourage the AER to review the local network solutions to ensure as far as possible a similar degree of discipline and optimisation is brought to the resilience investments that Ausgrid brings to its repex and augex program.

In coming to our position, we had regard to the findings of our consultant, EMCa, who assessed the local network solutions component of the proposal. We agree with EMCa's assessments of Ausgrid's proposals, except where we state otherwise.

In particular, our concerns relate to both the network risk model and the solutions and optimisation model.

On KPMG's network risk model, our concerns relate to:

- Lack of evidence of the need for investment
- Overstatement of risk from windstorms

On Ausgrid's solutions and optimisation model, our concerns relate to:

- No account for the uncertainty of the investment delivering the allocated benefit
- Overstatement of benefits from proposed solutions
- Inadequate consideration of alternative risk mitigation methods
- Reliability improvement not adequately accounted for through the Service Target Performance Incentive Scheme (STPIS).

We discuss each of these issues, in turn, below.

<u>Lack of evidence of the need for investment</u>

EMCa did not find sufficient evidence that supports Ausgrid's premise that severe windstorms specifically East Coast Low (ECL) events will increase in frequency to the level

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[68] Reset Customer Panel, *Report on Ausgrid's 2024–29 resilience business case*, 14 July 2023, p. 5.

that Ausgrid has proposed, or that the KPMG modelling is sufficiently robust to predict the associated damage to the levels proposed by Ausgrid. Rather, it appears the studies referred to by Ausgrid suggest much uncertainty around the modelling of windstorms and ECLs and their impact.

EMCa found, according to KPMG's own admission, modelling of maximum windspeed did not indicate material changes over time:[69]

> Ensemble mean projections for maximum annual wind speed in 2050 under RCP4.5 show a small, non-significant increase of 3%. We attach medium level of confidence to the projection that there will not be a significant change in maximum annual windspeed. This is consistent with the ESCI (2021) report on extremes which assigned a low confidence to projections that there would be a significant trend in future windspeed extremes.

The Electricity Sector Climate Information (ESCI) review, referred to in Ausgrid's supporting documentation, concluded that east coast lows are not increasing in frequency, there has been no real trend over the years and there is a lot of uncertainty around understanding the characteristics of ECLs:[70]

> East coast lows occur on average about 22 times per year. There is large year-to-year variability in the number, with no clear trend over recent decades. Climate models project fewer east coast lows. The projections show larger reductions for higher greenhouse gas emission scenarios. However, rising sea levels are likely to increase the impact of large waves on coastal regions, and extreme rainfall is predicted to increase in intensity resulting in increased risk of flooding. There are still considerable uncertainties in scientific understanding of how some east coast low characteristics may change, including the intensity of extreme wind and wave direction.'

We also note that the other NSW distribution businesses either excluded windstorm modelling or made further adjustments due to considerable variability around modelling the impact of windstorms on the network. Endeavour Energy submits that forecast/modelling of wind events "is not at a maturity level in which confidence in its outputs can be assured"[71] and, therefore, it has not factored in wind exposure in its climate resilience proposal. Essential Energy also made corrections to the climate modelling for windspeed, adopted a straight-line projection of impacts from 2020 to 2070, to account for overstatement in 2050.[72]

Overstatement of risk from windstorms

EMCa found several aspects of KPMG's modelling that results in an overstatement of the risks to be mitigated.

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69 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023, p. 21.

70 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023, p. 21.

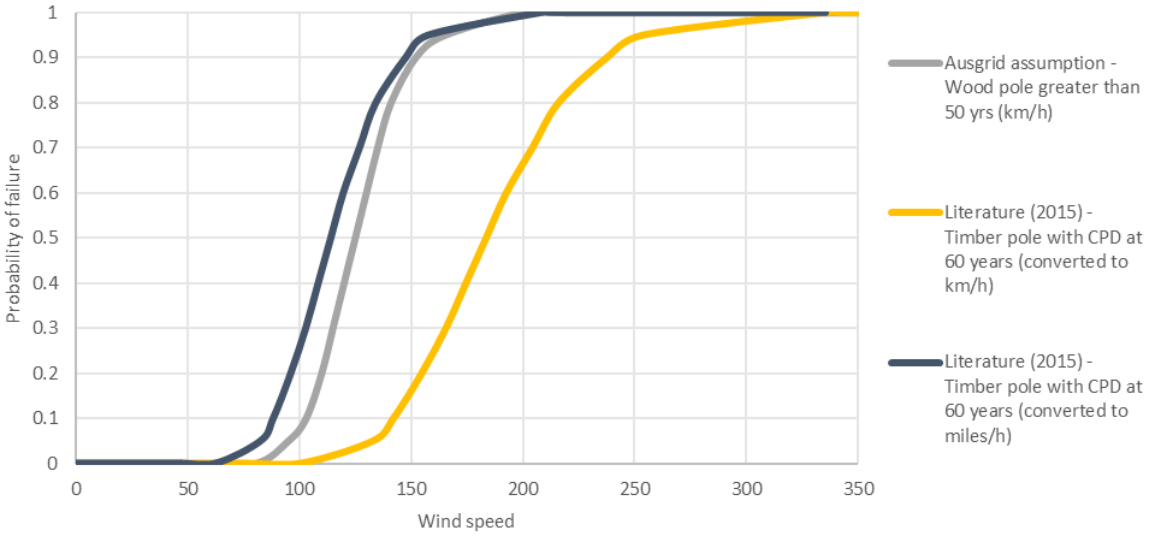
71 Endeavour Energy, *Attachment 10.34 Climate Resilience Methodology – Define and predict the risk of climate change*, November 2022, p. 12.

72 EMCa, *Report to AER on Essential Energy's climate-driven resilience 2024–29*, August 2023, p. 25.

A key concern is that Ausgrid calibrated KPMG's forecasted loss of supply by 69% to reflect historical experiences before incorporating it into its solutions and optimisation model. We agree with EMCa that this suggests the network risk model had significantly overstated the baseline (2020) risk. It raises concerns about the extent to which the model can be relied on to have assessed future increases in risk (by 2050 and 2070) that Ausgrid is seeking to mitigate.

EMCa identified a further concern about the robustness of the KPMG model where KPMG incorrectly applies a US study of pole performance in strong winds such as hurricanes to Ausgrid's circumstances. Figure A.1 sets out wind vulnerability curves – curves which depict the relationship between windspeed and the probability of failure. The black line shows the wind vulnerability curve that was sourced from a US study and the grey curve is what is applied to Ausgrid based on the US data. However, the US study applies miles/hour (and metres/second) as the unit of measurement, but KPMG has not applied the appropriate conversion when adjusting to km/hour. The yellow curve represents the correct conversion rate when adjusting to km/hour. As can be seen, KPMG has materially overstated the probability of pole failure from windstorms. For instance, KPMG's vulnerability curves suggest that at windspeeds of 150 km/hr, there is a 90% probability of pole failure (similar to the effect of a hurricane). In contrast, EMCa's corrected vulnerability curve suggests a less than 30% probability of pole failure.

Figure A.1 Wind vulnerability curves – relationship between windspeed and the probability of pole failure



Source: EMCa, *Report to AER on Ausgrid's climate-driven network resilience 2024–29*, August 2023, p. 25.

More generally, we have concerns with the applicability of a US study on pole performance associated with very strong winds such as hurricanes compared to Ausgrid's operating environment. We question whether this US study is relevant to the Australian context as engineering standards, vegetation species, vegetation densities, pole timber types, topography, and hence propensity to wind damage are all significant differences that materially impact on the relevance of this data.

KPMG's network impact model also uses a Representative Concentration Pathway (RCP) weighting of RCP4.5 (70%), RCP8.5 (15%) and RCP2.6 (15%). This compares to Endeavour Energy and Essential Energy that apply a 100% weighting to RCP 4.5. For the windstorm

related risk, the risk is similar for RCP2.6 and RCP4.5 (relatively flat) then shows an accelerated pace of change beyond 2050 for RCP4.5. For RCP8.5, there is an accelerated pace immediately beyond the baseline. We observe that including the RCP8.5 scenario adds an upward bias to the calculation of risk cost.

Given these concerns, we agree with EMCa that there is a material overstatement of risk as well as concerns with the robustness of the network impact analysis. This casts significant doubt around the validity of the outcomes coming out of the network risk model. Consequently, we have limited confidence in the prudency and efficiency of Ausgrid's proposed investments for the three LGAs, given that outputs from KPMG's model are key inputs into the investment decision. We also conclude that these findings indicate that Ausgrid's proposal is not consistent with our guidance note on climate resilience, as we do not have confidence that the preferred investment options achieve the greatest net benefit.

No account for the uncertainty of the investment delivering the allocated benefit

Ausgrid's solutions and optimisation model does not appear to account for the uncertainty of the investment delivering the allocated benefit. As damaging winds do not occur every year in every location, the benefit of an investment in a specific location will only be realised when that location is subjected to damaging winds, and as the model does not seem to account for this, the model is likely overstating the realisable benefits by a significant factor.

We asked Ausgrid as to how this was accounted for, and Ausgrid's response was that the KPMG model accounts for this probability.[73] However, we consider that it is not possible for the KPMG model to account for the probability of realising the benefit as the KPMG model does not have any information regarding the specific locations of the proposed network investments. While Ausgrid's model selects areas of higher vegetation density for investment, and hence it increases the chances that the benefits can be realised, it does not appear to account for the chances of realising the benefit.

Overstatement of benefits from proposed solutions

EMCa found that Ausgrid has overstated the level of benefits that could reasonably be achieved by the proposed solutions. Ausgrid's model assumes an 'effectiveness' of each of the proposed investment types which represents how well the investment enables the risk to be mitigated or avoided. The model appears to be sensitive to the assumed 'effectiveness' values and hence these values need to be reasonably supported.

Ausgrid's solutions and optimisation model applies three network solutions and assumes a percentage of effectiveness:

- Replace with underground cable (assumed to be 99% effective at addressing the asset loss and loss of supply consequence for all perils)
- Replace with Aerial Bundled Conductor or Covered Conductor Thick (CCT) (assumed to be 25% effective)
- Segmentation (assumed to be 100% effective).

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[73] Ausgrid, *Response to information request 048 – Resilience June onsite*, July 2023, p. 13.

Ausgrid has stated that these effectiveness percentages are based on expert opinion and have not provided any other supporting evidence. EMCa considers that Ausgrid has not provided sufficient justification to demonstrate that some of its effectiveness factors are reasonable. For example:

- Segmentation solutions typically divides the HV feeder into two parts through a sectionalising device; namely reclosers or smart switches. These solutions do not assist if the faulted section is upstream of the sectionalisation device and are unlikely to be 100% effective.[74]
- Where the effectiveness of CCT solutions has been based on historical experience, this is likely related to the most heavily vegetated or highest risk areas where these assets has been installed so far. The effectiveness is unlikely to be uniform across the network and its effectiveness would likely diminish if installed in higher volume compared to historical.[75]
- While underground solutions are very effective against windstorms, it is also about 10 to 15 times the cost of segmentation and CCT solutions. Underground conversion of existing overhead assets are typically the solution of last resort if segmentation and CCT solutions are insufficient in bringing an existing feeder's reliability above mandatory service standards.

Given the reasons above, we consider that Ausgrid's proposed solutions either have an overstatement of benefit (segmentation and CCT) or are cost prohibitive (underground).

Inadequate consideration of alternative risk mitigation methods

EMCa found that Ausgrid did not account for alternative risk mitigation methods in coming up with its preferred investment option.[76] This results in an overstatement of the risk to be mitigated and therefore the capex proposed to address that risk.

As a part of good asset management and vegetation management, NSPs have plans in place for management of vegetation and specifically its impact on electricity infrastructure to minimise interruptions to customers. We would expect that these measures are similarly deployed for, and in anticipation of, weather events. These include vegetation clearing,[77] hazard tree removal, tree planting guides as well as methods to mitigate the impact of vegetation contact on overhead lines.

EMCa asked Ausgrid to provide details of its consideration of other options to manage the risk of vegetation related risks, and while a response was not provided, we understand that Ausgrid is investigating alternative options which has yet to be incorporated into its assessment.

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74 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023, p. 32.

75 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023, p. 32.

76 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023, p. 27.

77 Including compliance to the minimum standard for the management of vegetation in the vicinity of electricity supply infrastructure in NSW

Reliability improvement not adequately accounted for through the STPIS

We agree with EMCa that Ausgrid's nominated solutions will provide ongoing reliability benefits to consumers, to outages including those incurred due to normal weather events and to third parties.[78] These benefits do not appear to have been captured by Ausgrid. We note that Essential Energy proposed STPIS adjustments for the reliability improvements benefits stemming from its resilience proposal.

EMCa recommends that the AER consider the benefits that any climate resilience expenditure allowance may have on the determination of reliability for consumers and adjustments to STPIS.[79]

Community non-network solutions - $3.5 million opex

We recognise the engagement and level of consumer support that Ausgrid has developed and implemented in relation to these proposals, which may have some community benefit. However, we have a number of concerns which are set out in full in section 6.4.3.6 of Attachment 6 – operating expenditure. In summary, these concerns are that:

- the costs proposed by Ausgrid do not meet our standard step change criteria. We do not consider these community initiatives are driven by a regulatory change or an efficient capex-opex trade off.
- this step change is immaterial in the context of Ausgrid's total forecast opex. Ausgrid is likely to be able to accommodate these costs within total forecast opex if it chooses to prioritise these activities.
- there is a lack of evidence of prudent and efficient costs. Regarding prudency, a significant proportion of the proposed expenditure is for projects which we consider to be business-as-usual activities (e.g. community liaison, safety and outage messaging, and community education). In terms of assessing the efficiency of the costs, Ausgrid has not provided information to demonstrate that these estimates reflect efficient costs, including providing detail on the build-up or basis of estimation for these costs.

Whole-of-network expenditure - $47.7 million totex

Based on the information before us, we consider the following investments to be prudent likely to be in the bounds of efficient costs:

- $3 million in capex for the Data Sharing for Multi-Agency Response. We note that Ausgrid already has existing multi-agency liaison processes and resources in place. This program seeks to expand on these existing processes and we see merit in the prudency of extending that work.
- $6 million in capex for an aspect of its Build back better program which relates to replacing wood poles with those that are bushfire resilient (composite poles). We consider it prudent to opportunistically replace some of Ausgrid's timber poles with composite poles as part of BAU condition-based replacement.

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78 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023, p. 37.

79 EMCa, *Report to AER on Ausgrid's climate-driven resilience 2024–29,* August 2023, p. 37.

For the remaining parts of the whole-of-network expenditure forecast, we consider there is lack of quantitative evidence to support the forecast, and lack of clarity around the identified need. Below we note the specific concerns about each of the projects and programs and encourage Ausgrid to respond to these in its revised proposal.

Build Back Better Program — $22.3 million capex, $0.1 million in opex

Ausgrid proposes to replace assets damaged in climate events or opportunistically through its replacement programs, with more resilient alternatives where prudent. Ausgrid is therefore proposing a change to its operational processes to make 'build back better' a mandatory consideration during emergencies.

For expenditure we have not accepted in Ausgrid's Build Back Better Program ($16.4 million), our concerns are that Ausgrid's proposal appears to place priority on building back better after a major extreme event which, by its own admission, will prolong repair times. After damaging climate events, we consider that priority should be to restore network supply to customers as quick as practical and in a safe manner. This may include temporary supply arrangements that may not meet current best practice design or construction standards because it is under an emergency recovery situation. We would typically expect a prudent and efficient operator to sequence the full replacement of assets damaged in climate events with better alternatives after emergency recovery is complete. We seek clarity from Ausgrid's revised proposal on the sequencing in the emergency recovery process and how it would support maintaining safety and outage outcomes from its change in operational practices.

We also consider that Ausgrid has not sufficiently demonstrated the benefit of an ex-ante funding arrangement in its Build Back Better Program such that it achieves the greatest net benefit compared to an ex-post funding arrangement where the scope and cost-benefit are better defined.

Fault Detection and location sensors — $11.8 million capex

This program proposes to install fault location devices such as line fault indicators with remote monitoring. Remote fault location and detection can reduce the feeder patrol time required to identify faults on the 11 kV distribution network.

We are concerned that the benefits of this program are overstated especially with a materially positive NPV of $79.4 million for a program of this size, and nature. We note that while fault finding is important, feeder patrol time typically makes up a small portion of the overall restoration time (and contribution to unserved energy). We also note that if the benefit calculation is correct, we would expect a sizable STPIS adjustment to Ausgrid's proposal which has not been proposed by Ausgrid.

Low Voltage Spreader Bars — $7.4 million in capex and $0.2 million in opex

This program proposes to install LV spreader bars along most of its bare overhead LV network of about 9000 km. Ausgrid submits that LV spreader bars are highly effective at mitigating supply interruptions caused by conductor clashing.

We do not consider there is sufficient evidence to support this level of coverage, with Ausgrid proposing a LV spreader bars penetration of 98% in bushfire areas and 80% in non-bushfire areas. Given our concerns with the network risk model and the solutions and optimisation

model, a positive NPV of $1.5 million on a $7.3 million program is unlikely to result in a positive outcome in practice.

Data Sharing Program for Multi-Agency Response — $1.0 million in opex

The opex component of this program is to "establish Intelligence Liaison for needs analysis, co-design and delivery" which seems to involve additional labour. Our concerns are that Ausgrid has not explained why the additional full-time equivalent labour resource cost for 'establishing intelligence liaison' is required on an ongoing full-time basis, and needed above its existing liaison processes and resources. In terms of assessing the efficiency of the costs, Ausgrid has not provided information to demonstrate that these costs are efficient, including explaining how these costs were estimated.

Asset Protection for Major Substations —- $0.5 million in opex

This component of the opex step change relates to targeted vegetation removal at major substations, and establishing guidelines for suitable vegetation species to replant.

We consider these to be business-as-usual activities. Ausgrid is already funded for vegetation management near its electrical infrastructure, including major substations. Ausgrid also already has publications that provide guidance to the public on suitable species to plant near electrical infrastructure. We do not consider that Ausgrid has provided information to demonstrate a need for additional resources for these two existing aspects of its vegetation management practices. This expenditure could likely be accommodated through a reprioritisation of existing vegetation management expenditure rather than a step change, if Ausgrid considers these activities to be required.

Climate Impact Assessments — $0.25 million in capex and $0.25 million in opex

Ausgrid proposes to update its climate impact assessments to reflect the latest science and modelling techniques. It submits that this would ensure that Ausgrid is using up-to-date science to make more effective geographically targeted, efficient and prudent investments to mitigate risks presented by climate change.

Given the nature of the expenditure, we do not consider this expenditure to be related to capex, and is likely opex in nature. We do not consider an opex step change is justified in relation to these costs, which appear to relate to an update to existing network planning and asset management information and processes. Ausgrid has not provided substantive information to demonstrate that this estimate reflects efficient expenditure, or that a step change is needed to accommodate a minor increase in business-as-usual costs.

Assessment and Evaluation Framework — $0.6 million in capex and $0.3 million in opex

Ausgrid proposes to evaluate program success and delivery, reporting back and engaging with local communities, and refining the program as required. Ausgrid submitted that this will assist in building trust with stakeholders.

Given the nature of the expenditure, we do not consider this expenditure to be related to capex, and is likely opex in nature. However, we do not consider an opex step change is justified in relation to these costs as program evaluation and assurance are business-as-usual activities. Ausgrid already has resources and processes in place to measure the

reliability of the network and to monitor the performance of its assets, and for stakeholder engagement. We do not consider that Ausgrid has provided evidence that supports the prudency and efficiency of this proposed expenditure, or the need for a step change to accommodate a minor increase in these business-as-usual costs.

Alternative forecast

Our draft decision on Ausgrid's climate resilience proposal is to include an alternative forecast of $25.7 million which:

- does not include any expenditure for Ausgrid's community non-network solutions.
- includes $16.7 million in capex for its local network solutions program.
- includes $9 million in capex for two projects in its whole-of-network initiative ($6 million for one aspect of its Build back better program and $3 million for its Data Sharing Program for Multi-agency Response).

Our alternative forecast for Ausgrid's local network solutions

To derive the alternative forecast, our aim was to calculate the incremental impact from wind-related climate risk. Calculating this increment would give us the maximum benefit that Ausgrid could achieve in mitigating that risk.

We derived our alternative forecast of $16.7 million by using Ausgrid's 11 years of outage data for all LGAs. This data is contained within Ausgrid's solutions and optimisation model. We filtered this data to only include outages by vegetation from wind-related events. This filtering process gave us the total value of unserved energy across the entire Ausgrid network for the past 11 years. We see this value as Ausgrid's BAU baseline.

We then calculated the incremental impact. This is where our assumptions differ from Ausgrid's. Table A.3 sets out the differences between Ausgrid and our assumptions. As can be seen from Table A.3, we consider Ausgrid has applied overly conservative assumptions. Our alternative forecast of $16.7 million is at the upper end of the range of possible estimates, reflecting the uncertainty around the forecasting of climate-related expenditure.

Table A.3 Difference in Ausgrid and AER assumptions in calculating the incremental impact from wind-related climate risk

Assumption	Ausgrid's assumptions	AER's assumptions	Explanation of differences in assumption
Climate/network risk rate of change	1%	1%	Applied Ausgrid's assumption of 1% rate of change in climate risk to 2040 and 2070 from the baseline 2020 level.
Probability of a wind event occurring in the same location per annum	100% (every year)	50% (every other year)	With 100%, Ausgrid assumes the extreme wind event occurs every year in the same investment location. We have applied the assumption of that recurrence every other year.
Probability of climate scenario occurring	100% (high confidence)	85% (high-medium confidence)	With 100%, Ausgrid assumes its projection of windstorm intensity and therefore network impact occurs with 100% certainty. This is contrary to its climate modelling where it classified these risks as 'Medium Confidence'.[80] We applied the assumption of 85% certainty.
Effectiveness of CCT	25%	25%	Applied Ausgrid's assumption, although we consider that the effectiveness is likely to diminish if installed in higher volume compared to historical.
Effectiveness of segmentation	100%	50%	With 100%, Ausgrid assumes its solution will be 100% effective in mitigating wind related risk. We have applied 50% probability, which is higher than the usual industry applied level of one third probability.
Percentage of CCT coverage	NA	20%	As our forecast is based on Ausgrid's total loss of supply associated with wind, we had to make an assumption on the level of deployment that Ausgrid's can deliver from its CCT program within a given 5-year period. Based on existing coverage, this is likely less than 10% for its targeted LGA areas. We have applied 20% as an upper end estimate.
Percentage of segmentation coverage	NA	50%	As our forecast is based on Ausgrid's total loss of supply associated with wind, we had to make an assumption on the level of deployment that Ausgrid can deliver from its segmentation program within a given 5-year period. Based on existing coverage, this is likely less than 25% for its targeted LGA areas. We have applied 50% as an upper end estimate.
Forecast period	Up to 30 years	30 years	We assume the highest value of Ausgrid's forecast period based on its CBA principles
Annual benefit multiplier to approximate the maximum justifiable capex over a 5-year period	NA	15 times	As our forecast is based on the maximum likely benefits that Ausgrid could reasonably achieve through its investments, it is assumed that the return on and return of capital is approximately 8–12% of the initial capital cost based on an assumed 40–50 years asset life and recent values of the WACC (i.e. such that investment timing is essentially as soon as practical). Depending on economic conditions, this can range between 9 to 15 times of the annual benefits to approximate the maximum justifiable capex over a 5-year period. We have applied 15 times as an upper end estimate.

Source: AER analysis.

A.4 CER integration

A.4.1 AER's draft decision

We do not accept that Ausgrid's forecast for CER integration of $69.8 million would form part of a total capex forecast that reasonably reflects the capex criteria. We have included $21.7 million for CER integration in our alternative estimate of total capex, which is $48.1 million (69%) lower than Ausgrid's proposal.

A.4.2 Ausgrid's proposal

Ausgrid proposed $69.8 million of capex for CER integration investments. It also proposed $35.4 million for opex step changes (assessed in Attachment 6 – opex) and $20.9 million of total expenditure ($20.1 million of capex and $0.8 million in opex) for CER innovation projects (assessed in section A.5).

The majority of the proposed capex is for network augmentation ($47.1 million), comprising tap changes, LV phase balancing, LV distributor and transformer upgrades ($27.4 million), static synchronous compensators ($10 million) and community batteries ($9.7 million). Other proposed capex activities related to CER integration are ICT related (totalling $22.8 million) and include connections, compliance and education activities ($11.2 million), dynamic service capabilities ($6.7 million) and network modelling ($4.7 million).

Ausgrid states that its network does not currently have sufficient hosting capacity to meet current and forecast levels of CER and its processes and systems are not yet set up to deal with this influx. It adds that supporting the transition will require fundamental changes to how it manages its network, interacts with customers and supports the stability of the end-to-end system.

Ausgrid's CER vision is to 'utilise Ausgrid's network as a platform to safely, efficiently, and equitably enable CER in a way that meets the need of customers, stakeholders and facilitates a net zero future'. Ausgrid noted that its customers recognise the overall benefits CER offers and expect them to offer a platform that facilitates the transition to a decentralised and low carbon economy that delivers on their net zero ambitions.

Currently, 10% of Ausgrid's customers have solar PV. Ausgrid forecasts that this figure will increase to 20% by 2029, based on forecasts in AEMO's 2022 Integrated System Plan (Step Change scenario). This is lower than most other distribution networks, since 38% of Ausgrid's customers live in apartment blocks with limited access to useable rooftop space to accommodate solar PV.[81]

A.4.3 Reasons for decision

We assessed Ausgrid's "CER integration program" business case, supporting documents and responses to our information requests.[82] EMCa also reviewed the prudency and

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80 Ausgrid, *Attachment 5.5.b – Climate impact assessment,* January 2023, p. 7 (Table A: Projected risk increase to climate perils on Ausgrid's network (medium emissions scenario).

81 Ausgrid, *Attachment 5.7 – CER integration program*, January 2023, p. 7.

82 This included "Ausgrid – Attachment 5.7 – CER integration program" and "HoustonKemp – 5.7.A.2 – Economic benefits of DSO investments – Public".

efficiency of the proposed expenditure, with a focus on whether Ausgrid sufficiently demonstrated the need for network investment to accommodate forecast levels of CER.[83]

We assessed the proposed CER integration expenditure against our guidance note and the customer export curtailment value (CECV) methodology. Our guidance note outlines the types of benefits that may be realised and how DNSPs should quantify them.[84] Relatedly, we apply the CECV methodology to derive CECVs, which we expect DNSPs to use when estimating wholesale electricity market benefits associated with their proposed investments.[85]

Our assessment focused on:

- Hosting capacity analysis. DNSPs should study the networks' ability to accommodate more CER connections without experiencing voltage or thermal violations. The output of this analysis is a forecast of export curtailment.
- Options analysis. The preferred investment option should be a credible option which maximises the net economic benefits, relative to a "BAU" base case scenario.
- Benefit quantification. DNSPs should quantify credible types of benefits and use appropriate input assumptions to quantify benefits.

Hosting capacity analysis

Ausgrid noted that the purpose of its hosting capacity model is to derive the probable maxima and minima network conditions. To do this, it reviewed historical data to identify the three times of the year when the zone substation experienced its annual maximum load, minimum load, and minimum daytime load, noting that at these times connections in the zone experience their lowest and highest voltages. It then undertook simulations every five years (in 2024, 2029, 2034 and 2039) based on assumed load and technology uptake.

Curtailment starts to occur when the connection voltage rises past a threshold and the proportion of energy curtailed increases with the voltage, as specified in AS4777. Estimates of energy lost to curtailment in the intervening years were obtained by interpolation. Ausgrid does not propose to impose static export limits, and so all forecast curtailment is voltage related.

In its analysis, Ausgrid set the voltage threshold for calculating curtailment of solar PV export due to overvoltage at 250V. Ausgrid noted that the 250V limit on the mains is equivalent to modelling a 253V limit at the inverter or switchboard. EMCa considered that 253V is still a conservative trigger (given volt-var and volt-watt settings for inverters installed under AS 4777.2:2020), which has the effect of overestimating the extent of curtailment.[86]

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83 EMCa, *Report to AER on Ausgrid's DER and ICT 2024–29,* August 2023.

84 AER, *DER integration expenditure guidance note*, June 2022.

85 AER, *Customer export curtailment value methodology*, June 2022.

86 Inverters compliant with AS 4777.2:20 will trip as follows:
(1) 240V: volt var settings initiate, with q requirement for the inverter to absorb VARs at 258V
(2) 253V: volt-watt response initiate and ramp down output (kW) with increasing voltages through to 265V
(3) 258V: trip if the 258V is sustained on average for 10 minutes
(4) 260V: trip if 260V is sustained for more than 1 second
(5) 265V or more: instantaneous trip.

Options analysis

Ausgrid compared its proposed "proactive investment" option ($105.2 million of total expenditure in 2024–29) against a base case scenario ($49.8 million of total expenditure) and a "preparatory investment" option ($104.2 million of total expenditure).

The base case scenario excludes expenditure (primarily opex) related to network visibility and modelling but includes a small level of expenditure associated with connections, compliance and education. The three investment options considered by Ausgrid involve significant levels of augmentation. The base case scenario includes $47.3 million of augmentation expenditure and the preparatory investment option includes $60.6 million of augmentation expenditure. As we discuss in the following section, we do not consider that these levels of augmentation expenditure are justified due to overstated benefits.

EMCa noted that there is significant uncertainty about the medium to long term utilisation of the low voltage network given the potential for energy self-sufficiency via energy storage. Therefore, it suggested that investing in traditional network assets with technical lives of over 40 years should be avoided or deferred where practicable.

Ausgrid also proposed to undertake a range of activities associated with connections, compliance and education. These include improving customer connection processes, enabling dynamic connection agreements, compliance monitoring and customer education initiatives. Improved inverter compliance will allow Ausgrid to accommodate more solar PV connections in the future without introducing static export limits (or alternatively, it may introduce higher static export limits than would otherwise be the case). The Australian Energy Market Commission (AEMC) recently reviewed compliance with, and enforcement of, CER technical standards in the NER, and recommended several actions to improve inverter compliance.[87] We support these actions, including DNSPs introducing commissioning sheets for CER devices, and suggest that Ausgrid consider such actions to improve inverter compliance.

EMCa suggested that the proposed upgrade to connections processes is somewhat excessive based on the forecast numbers of new connections, and a staged investment at a lower cost is likely to still realise the forecast benefits.

Benefit quantification

Ausgrid quantified a significant number of benefits it claims its proposed investment program will deliver. Some benefits are attributed to multiple elements of the investment program. In this section we discuss each benefit, its materiality and reasonableness.

"Market efficiency"

"Market efficiency" benefits represent some of the total claimed benefits. Ausgrid engaged HoustonKemp to quantify the economic benefits of distribution system operator investments (dynamic service capabilities), including dynamic operating envelopes and dynamic pricing. It noted that variability in wholesale market prices provides aggregators an opportunity to arbitrage the price difference. For example, aggregators can charge their virtual power plant (VPP) when wholesale electricity prices are low and discharge when wholesale electricity

87 AEMC, Review into consumer energy resources technical standards - Final report, September 2023.

prices are high. The price difference provides aggregators with a financial incentive to actively participate in the wholesale market. Their approach to quantifying these "market efficiency" benefits involves estimating the change in the timing and quantity of both charging and discharging of VPPs (or electric vehicles), valued at the wholesale market prices in the respective 30-minute time periods.

We recognise that investments which enable VPP participation will allow customers to get more value out of their CER investments, and the orchestration of CER will play an important role as the electricity market transitions away from centralised electricity generation. However, we consider it important that benefits are valued appropriately and suggest that market efficiency benefits should be quantified using differences in CECVs rather than wholesale electricity prices. This reflects our previously stated position that wholesale electricity prices incorporate other costs (generator ramping, bidding strategy effects etc.) which are additional to dispatch costs and do not represent economic benefits. Ausgrid's approach also quantifies direct compensation to VPP participants rather than the benefits to all customers. The market efficiency benefit that is accounted from CECVs captures the short run marginal cost of generation rather than the market price.

Reliability

Reliability benefits represent some of the total claimed benefits. Ausgrid used forecasts of unserved energy and the AER's values of customer reliability to measure total potential benefits associated with improving reliability. Ausgrid forecast that, absent the proposed investment, electric vehicle charging will lead to LV distributor capacity constraints and greater levels of unserved energy. These benefits are the primary justification for network augmentation, including in the alternative preparatory investment option.

EMCa was critical of Ausgrid's approach to quantifying reliability benefits. It noted that Ausgrid has applied the value of customer reliability (VCR) to assumed avoidance of being unable to fully serve electric vehicle charging loads 'on demand'. This represents a misapplication of VCR and a considerable overstatement of this assumed benefit. It added that EV charging is one of the easier loads to time-shift, which is why it is recognised as an ideal candidate for (orchestrated) control. An inability to supply an EV charger load at a particular time will for the most part have a negligible cost to a consumer (and may even be unnoticed) provided the charging load can be supplied at a deferred time prior to when the consumer requires the EV to be charged to its desired level. EMCa concluded that this is better recognised as 'deferred supply' of energy than as 'unserved' energy, and it would expect the per-kWh cost of such deferment to be considerably less than the VCR.[88]

Avoided curtailment and emissions

Avoided curtailment and emissions benefits represent some of the total claimed benefits. Ausgrid combined these potential benefits in its analysis (with avoided curtailment representing around two thirds of these benefits and avoided emissions the remaining third). It used annualised CECVs to value voltage related curtailment and emissions were valued at

88 EMCa, *Report to AER on Ausgrid's DER and ICT 2024–29,* August 2023.

$30 per tonne of CO2 avoided, which Ausgrid claimed is aligned with industry standards.[89] These benefits are partly attributed to a number of the proposed investments, including augmentation (for each potential investment option).

We consider that Ausgrid has overstated the value of avoided curtailment by applying annualised CECVs. As noted above, Ausgrid's hosting capacity analysis involved reviewing historical data to identify the three times of the year when the zone substation experienced its annual maximum load, minimum load, and minimum daytime load, noting that at these times connections in the zone experience their lowest and highest voltages. It would be prudent for Ausgrid to align these periods with the appropriate CECVs, which vary every half hour over a 20-year forecast period.[90]

The inclusion of an emissions reduction objective into the National Electricity Objective applies to the 2024–29 resets. The Commonwealth Government is currently leading work on developing a value of emissions reduction. This means that distribution network service providers may propose environmental benefits and quantify the emission reductions by applying a value (in accordance with any guidance by Government). Our guidance on the amended national energy objectives (published in September 2023) sets out our expectations of cost benefit analysis and consumer engagement by service providers, which we will consider in reaching our final determination.

Other benefits

Other benefits represent some of the total claimed benefits, and include avoided opex, deferred capex and customer experience. Avoided opex represents productivity or an opex saving by reducing the need and time taken to manage and monitor CER-driven customer complaints, customer connections and compliance with dynamic connections. Deferred capex represents the benefit of not having to invest in the network to support CER integration (based on the cost of network investments that would be justified instead of the proposed investment). Customer experience represents the productivity gained through greater access to information and reduced waiting times for new CER connections.

We consider these benefits are largely credible and are estimated reasonably, with the exception of customer experience benefits, which are positive externalities to society rather than benefits within the electricity system.

Alternative forecast

Based on our assessment of Ausgrid's hosting capacity analysis, options analysis and benefit quantification, we consider our alternative forecast of $21.7 million is appropriate to facilitate CER integration in Ausgrid's network. Our alternative forecast consists of:

- $9.0 million of the proposed $11.2 million for connections, compliance and education activities. We believe that this alternative forecast will be able to deliver the activities while meeting service expectations.

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89 The emissions intensity was published in the National Greenhouse and Energy Reporting (Measurement) Determination 2008 by the Clean Energy Regulator.

90 The AER published updated CECVs in June 2023.

- $8.0 million of the proposed $47.1 million for augmentation. This estimate is based on Ausgrid's traditional augmentation expenditure for activities such as distributor upgrades and tap changes. We consider this is a prudent amount for "business as usual" activities.
- $4.7 million for network modelling uplift and multi-horizon forecasting (as proposed). This expenditure is likely needed to support investments in network visibility (opex) and managing two-way power flows.

Our alternative forecast has excluded the proposed $6.7 million of expenditure for dynamic service capabilities (as well as the proposed opex). We consider that Ausgrid has overstated the value of "market efficiency" benefits, as its approach to quantifying benefits is based on forecast differences in wholesale electricity prices.

If Ausgrid's analysis is updated to include our recently published CECVs, the benefits will likely outweigh the proposed costs. However, we are unable to replicate Ausgrid's analysis with a high level of certainty, and so we encourage Ausgrid to update its analysis in its revised proposal.

A.5 Innovation

A.5.1 AER's draft decision

We do not accept that Ausgrid's forecast of $49.5 million for its network innovation program would form part of a total capex forecast that reasonably reflects the capex criteria. We have not included Ausgrid's forecast capex for its network innovation program in our alternative estimate of total capex. At this stage, Ausgrid has not provided sufficient information to support the prudency and efficiency of the program.

A.5.2 Ausgrid's proposal

Ausgrid proposed $49.5 million capex and a $5 million opex step change for its network innovation program. We discuss our assessment of the opex step change in Attachment 6 for operating expenditure.

Ausgrid has proposed its investment across three workstreams:

- Supporting and enabling CER
- Building safe and intelligent networks
- Improving community energy resilience.

Ausgrid provided supporting documentation including reports from the Network Innovation Advisory Committee (NIAC), and cost benefit analysis for the following options:

- Option 1 – Do nothing.
- Option 2 – full network innovation program undertaking all identified projects, with a split of 60% trials and 40% pilots.
- Option 3 (preferred) – optimised network innovation program undertaking approximately 60% of identified projects, with a split of 70% trials and 30% pilots.
- Option 4 – Maximised breadth of network innovation program undertaking approximately 70% of identified projects, with a split of 80% trials and 20% pilots.

Ausgrid's proposal notes:[91]

> A key learning from Ausgrid's current innovation program has been that the pace of development in the electricity sector, and associated technologies, is accelerating. This requires a flexible and adaptable program, one that is able to pivot as challenges emerge and new solutions are required to address those challenges.
>
> Our response to this has been to develop the FY25-29 innovation program as an evolving portfolio of projects, rather than a list of specific projects to be delivered over a 5-year period.

A.5.3 Reasons for decision

We support the need and objective of innovation proposals, and we acknowledge this as part of enabling dynamic efficiency as part of the efficiency objectives in the NEO.

We determine a forecast for providing for standard control services that prudently and efficiently achieves the capex objectives:

- to meet or manage expected demand
- to comply with regulatory obligations or requirements
- to maintain the safety, quality, reliability, and security of supply of the network.

These objectives focus on the service level outcomes that the network provides to consumers. Like all projects, we consider that innovation investments should clearly link to these objectives. From the information provided by Ausgrid, Ausgrid has not demonstrated the prudency and efficiency of the proposed innovation program to achieve these objectives. We also do not consider Ausgrid has adequately addressed our concerns raised previously in the 2019 review.

This section sets out stakeholder submissions, how Ausgrid's forecast compares with historical expenditure, our previous feedback to Ausgrid, and further guidance on supporting innovation.

Stakeholder submissions

Ausgrid cited strong customer support for the network innovation program from its RCP, the VoCP, and the independent NIAC members:

- The VoCP wanted Ausgrid to increase the proposed spend on innovation.[92]
- The independent NIAC members expressed strong support for network innovation program, subject to exclusion from the CESS and the EBSS.[93]
- The RCP observed that "The engagement with customers around Ausgrid's proposed $54.5m innovation program ($5m opex step change and $49.5m capex) has revealed a level of tension between customers' clear willingness to fund innovation programs,

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91 Ausgrid, *Att 5.8.a Network innovation program,* January 2023*,* p. 16.

92 Ausgrid, *2024–29 Regulatory Proposal,* January 2023, p. 98.

93 Independent NIAC members, *Attachment 5.8.h feedback on innovation program*, January 2023, p. 1.

> Ausgrid's capability to deliver against that ambition and the AER's approach to this relatively new program." Overall, the RCP supported Ausgrid's proposed level of investment and shared the view with the NIAC that the innovation program should be excluded from the CESS and EBSS.[94]

PIAC submitted on the NSW distribution businesses that innovation initiatives should be explored through the regulatory framework, as it would also allow for transparency of how the funding would benefit consumers:[95]

> While we can see the merit in investigating and trialling emerging technologies and network solutions, we question the extent to which activities falling under the broad umbrella of 'innovation' are already funded through regulatory allowances or other incentive mechanisms. Our concern with discrete innovation funding is not just limited to Endeavour's [or Ausgrid's] proposal and is grounded in an understanding that innovation should be seen as a response or 'tool' rather than an output, that is desirable in its own right.
>
> Innovative responses to problems or issues tend to result from a need to overcome resource or circumstantial constraints, rather than the provision of extra resources earmarked for 'innovation'. It is critical that innovation programs are transparent about how proposed funding is to be used, what issues are being investigated, what purpose innovation needs to serve (for instance, to derive benefits for non-solar customers from network batteries), and how consumers are intended to benefit from said innovation.

Comparison with current period

Based on available actuals until December 2022, Ausgrid has spent $14.8 million out of its $50.9 million capex forecast for network innovation in the current period ($2023–24). Ausgrid expects to spend $39.2 million in the 2019–24 period, which is $10.3 million or 26% lower than forecast. Therefore, Ausgrid's proposed $54.5 million totex ($49.5 million capex, $5.0 million opex) in the 2024–29 period is $15.3 million or 39% higher than its expected spend in the current period.

We note that this comparison is substantially higher when comparing against Ausgrid's pro-rated actual costs in the current period. On this basis, this proposed innovation capex is $24.9 million (100%) higher than current period not including the proposed $5 million opex step change.

Ausgrid and the NIAC have undertaken a mid-term review of the network innovation program, which involved refining the governance framework, undertaking project reviews, and revising the innovation principles. We observe there is lots of movement and reprioritisation on the 2019–24 program. Some of the most significant differences in current project delivery are:[96]

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94 Ausgrid's Reset Customer Panel, *Attachment 3.5 Independent Report on Ausgrid 2024–29 Proposal,* January 2023, pp. 47–48, 126.

95 PIAC, *Submission is response to the AER issues paper for NSW DNSPs*, June 2023, p. 11.

96 Ausgrid and NIAC, *Attachment 5.8.b network innovation program mid-term review*, January 2023, p. 8.

- Community battery trials and the DSO program have increased in allocated funds from forecast, due to reprioritisation away from these projects:
  - HV Microgrid ($0.4 million out of $17 million currently spent)
  - Network Insights ($3.7 million out of $10.5 million currently spent)
  - self-healing networks (abandoned due to failed testing)
  - dynamic load control (on track and under budget of $0.6 million)
  - EV charging programs (preliminary scoping).
- The NIAC has noted that $4.8 million has been reallocated to resilience programs from the underspent programs in Microgrids, Dynamic load control and self-healing networks.

Our previous decision on Ausgrid's 2019–24 network innovation program

Ausgrid proposed its network innovation program in the 2019–24 review. Our final decision stated that we did not consider that Ausgrid had sufficiently justified the program and we highlighted the following concerns:[97]

- Insufficient information in support of individual projects — Ausgrid provided updated cost-benefit analysis for each project and an independent review of the program by GHD Consulting, but there was insufficient detail in the business cases and cost break downs.
- Insufficient evidence of how the proposed benefits were accounted for in the overall proposal.
- Alternative funding arrangements were not considered — Ausgrid provided no evidence that it had considered alternative funding arrangements for these projects (for example, incentive schemes, allowance mechanisms, and government grants).
- Lack of 'innovation' — we noted that a number of the programs (for example, portable off-grid supply units, self-healing networks) were not innovations but deployment of mature technologies and some were a continuation of Ausgrid's current work program.
- Repetition of trials conducted by others — for instance, the incremental benefit from some programs such as EV charging and Micro-Grid had not been demonstrated as these were already being trialled by others.
- Issues in the cost-benefit analysis — for example, we considered several assumptions were not reasonable and were not supported by evidence or analysis, there were misaligned costs and benefits, and there were overstated program benefits.
- We also stated that if Ausgrid decides to undertake this program in the forthcoming period, it is our expectation that Ausgrid documents closely the benefits arising from this expenditure. We expect detailed post implementation reviews and regular performance reporting for all projects to demonstrate the prudency and efficiency of these projects.

We acknowledge Ausgrid has made some progress, particularly with the NIAC governance arrangements, which are a positive step to managing innovation within Ausgrid and involving independent membership with customer and technical representatives. Ausgrid has also

97 AER, *Final decision for Ausgrid 2019–24 – Attachment 5 – Capital expenditure*, April 2019, pp. 50–52.

provided qualitative post-implementation reviews and NIAC's mid-term review of several projects from the 2019–24 period, which indicated.[98]

- The NIAC undertook post-implementation reviews for three projects: River Communities Microgrid, Statcom trial phase 1, and community battery program phase 1.
- Progress and reprioritisation of projects, illustrated through project dashboards.
- The innovation principles were reviewed to give more prominence to the principles for 'accelerates decarbonisation' and 'improves resilience'.

However, we continue to have similar concerns to those previously raised, which we do not consider Ausgrid has adequately addressed in its regulatory proposal so far. We are cognisant of the emerging challenges networks face and we must balance this to protect the long term interest of consumers and ensure they pay no more than necessary for regulated energy services. It remains important, even in responding to emerging and uncertain challenges, that there is sufficient information and a sound basis to justify expenditure.

At this stage, we have concerns about the clarity and scope of what is proposed to be in Ausgrid's network innovation program and why these types of programs and projects are not able to be provided for through Ausgrid existing expenditure categories, incentive schemes, and allowance mechanisms, or through alternative mechanisms such Energy Innovation Toolkit and regulatory sandboxing for trialling technologies and obtaining trial waivers, and government funding such as through Australian Renewable Energy Agency (ARENA).[99]

Guidance for the revised proposal

Below we set out some guidance for Ausgrid to consider in the revised proposal:

- Describe the type of projects and programs by providing information on the identified need, scope of works, costs, options and expected benefits. Further, clearly demonstrate why the pilot/trial is transformative rather than core improvement and efficiency that should be part of normal business operations. Currently, what Ausgrid is proposing is a fund with limited information about what that money is expected to be used for and why that amount of money is prudent and efficient.
- Clearly explain how the existing incentive schemes, allowances, government grants and regulatory sandboxing have been considered and genuinely exhausted before considering an expenditure forecast to fund the proposed innovation. This is to minimise duplication and ensure the appropriate alternative funding arrangements are utilised. This is particularly pertinent when a business is claiming material incentive payments in the 2024–29 period and could fund innovation projects with that revenue.
- Focus on a more targeted subset of projects that are clearly linked to addressing specific needs in line with the capex objectives and are likely to deliver the most value to customers. Currently, there are many (29) small projects proposed and it is not clear how Ausgrid has determined which projects are included and why. Ausgrid should consider whether any projects can be justified as traditional augmentation and

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98 Ausgrid, *Att 5.8.a Network innovation program,* January 2023; and Ausgrid's NIAC, *Att 5.8.b Network innovation program mid-term review,* January 2023.

99 Australian Government, Energy Innovation Toolkit.

integrating technology, rather than under the banner of 'innovation', which is not by itself a reason to invest.

- Demonstrate how the findings and lessons learnt from the post implementation reviews have been used to inform and refine the projects in the 2024–29 period. Further demonstrate how the quantified benefits of previous projects and future projects are incorporated into the remainder of the proposal or are likely to be incorporated in future proposals, such as through lower repex, augex or opex.
- Explain how the knowledge from the pilots and trials will be shared with industry, consumers, and the regulator. Knowledge sharing is critical to minimise duplication between network service providers. Where similar projects have been undertaken by others, Ausgrid should demonstrate how any shared lessons have been considered and used to inform the proposed pilot/trial, and what the incremental benefit of Ausgrid's pilot/trial is. Ausgrid has referred to knowledge sharing generally but there is limited evidence of how this is done in practice and the benefits of doing so.
- Whether Ausgrid is the appropriate party to undertake the proposed innovation compared to a contestable market participant and if there are any ring-fencing concerns. This is why an industry approach to innovation is important such as that facilitated through the Energy Innovation Toolkit or ARENA, so that the appropriate participants undertake the innovation and duplication is minimised.

The above is guidance and is not intended to be exhaustive or definitive. Overall, if innovation expenditure is to be included in an expenditure forecast, then Ausgrid should demonstrate it addresses the expenditure objectives, satisfies the expenditure criteria and is in the long term interest of consumers.

A.6 Dedicated LV circuit reconfiguration

A.6.1 AER's draft decision

We do not accept that Ausgrid's forecast for its dedicated LV circuit reconfiguration program of $143.5 million would form part of a total capex forecast that reasonably reflects the capex criteria. We have included $55.3 million for this program in our alternative estimate of total capex, which is $88.2 million (61%) lower than Ausgrid's proposal.

A.6.2 Ausgrid's proposal

Ausgrid proposed $143.5 million (contributing 10% of total repex) to remove 2690 km of expected redundant overhead LV conductors that are used to provide public lighting. This is $88.2 million (or 160%) higher than its current period actual and expected capex of $55.3 million (of which $41.7 million or 75% is currently an estimate).

The program funds the transfer of individual street light supply connections to the adjacent LV mains and the subsequent removal of redundant overhead dedicated LV circuits.[100]

Ausgrid submits that its program will assist in mitigating the risks associated with in service and redundant dedicated LV circuits, and also increase the utilisation of LV mains. While it is

[100] Ausgrid, *Response to information request 049c - Project Brief – Doc_11.03.73 Dedicated LV circuit Reconfiguration*, July 2023.

possible to de-energise the redundant LV conductors and remove them opportunistically over time with minimal cost to consumers, Ausgrid submits that doing so will pose a safety risk to the public. It noted that when an overhead conductor breaks due to poor condition, even in a de-energised state, it could still be re-energised if it lands on the shared LV network in the right situation.

In response to an information request, Ausgrid provided further material to support its forecast for this program for the 2024–29 period. It did not provide a business case as requested but did provide a cost benefit analysis model.

A.6.3 Reasons for decision

Based on the information before us, we consider that Ausgrid has not provided sufficient information to support the prudent and efficiency of its forecast, where the forecast is a 160% step up from current period expected spend. We consider our alternative forecast of $55.3 million as a placeholder, as this is based on the Ausgrid's expected expenditure in the current period.

We set out our concerns with Ausgrid's supporting information below and encourage Ausgrid to address these in its revised proposal:

- Lack of clarity around the primary need. Ausgrid submitted cost-benefit analysis, which indicates that the primary benefit is reliability (assets landing on the shared LV network causing outages). This is inconsistent with our discussions with Ausgrid and other documentation which suggests safety risk (assets landing on the shared LV network causing live situations) is the main driver.[101]
- The application of a disproportionality factor of 10 applied to safety in its cost benefit analysis model, which overstates the safety risk to be mitigated. This is inconsistent with our asset replacement industry practice application note and previous decisions where we have accepted up to 3 for workers and 6 for the public.
- Other examples of overstatement of risk and therefore the benefit from the program. It appears that Ausgrid's modelling assumes nearly all dedicated LV circuit conductor failures cause an outage to all 3 phases in the shared LV network. We consider that the assumption that this number of conductor breaks will cause outages on the shared LV network is not reasonable and that this outcome and the undetected safety risk are mutually exclusive (as it is improbable to have a short circuit outage and an undetected safety risk to occur at the same time). Ausgrid also did not provide evidence of calibration of this assumption to historical incidents.
- A 100% step up in forecast unit rates compared to historical rates without sufficient supporting information on its cost breakdown. We found that average implied unit rates to be $25 000 per km for 2019–20 to 2021–22, compared to implied forecast unit rates at $48 000 per km.

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101 Ausgrid, *Response to information request 049 – LV dedicated circuit capex program*, 7 July 2023, p. 3; Ausgrid, *Response to information request 049c - Project Brief – Doc_11.03.73 Dedicated LV circuit Reconfiguration*, July 2023; Ausgrid, *Att. 5.4.a - Asset replacement programs*, 31 Jan 2023 – Public, p. 26.

- Lack of credibility to its options analysis. We would expect a prudent network service provider to test different feasible options such as a 'like for like' replacement as a default counterfactual feasible option. Ausgrid appears to have dismissed other feasible and lower cost options without carrying out a quantitative cost benefit analysis. This includes a neutral bonding method which can significantly lower safety risk and is likely appropriate in certain areas of its network. Overall, this indicates a potential lack of prioritisation and flexibility, raising concerns about the prudency and efficiency of the program.
- While we have observed a similar program in another DNSP, Ausgrid's proposed program costs are orders of magnitude higher and have different financial and regulatory treatments. We seek clarity from Ausgrid on the reasons it considers these assets carry higher risk in comparison with other DNSPs' networks such that it requires proactive interventions (rather than opportunistic interventions) across its entire asset base. In addition, we seek further information on how it sets the priority of the LV conductors removed this period and next period as well as across its other safety-related programs in general.

A.7 Capitalised overheads

Overhead costs include business support costs not directly incurred in producing output, and shared costs that the business cannot directly allocate to a particular business activity or cost centre. The Australian Accounting Standards and the distributor's cost allocation methodology determine the allocation of overheads.

A.7.1 AER's draft decision

We have included $685.5 million in our alternative estimate of total capex. This is $38.0 million (5%) lower than Ausgrid's and accounts for updates for data discrepancies and our alternative estimate of total direct capex.

A.7.2 Ausgrid's proposal

Ausgrid proposed $723.5 million for capitalised overheads for the 2024–29 period. To arrive at its forecast, Ausgrid states it used "the AER's standard method" based on:

- 75% of capitalised overheads are fixed.
- 25% of capitalised overheads vary with direct capex.

The forecast for capitalised overheads is calculated by assuming that for every 4% change in direct capex, capitalised overheads change by 1%.

Ausgrid's approach was largely the same to our standard approach, with a differing number of years. Our standard approach uses the available actual capex and overheads from the current period. This is typically three years for a draft decision and four years for a final decision. In contrast, Ausgrid used the most recent five years of actual capex and overheads from 2017–18 to 2021–22.

In addition to the AER's standard method for calculating capitalised overheads, Ausgrid have applied an annual 0.5% productivity adjustment to its capitalised overheads forecast. This adjustment was done in response to stakeholder engagement with the Reset Customer Panel as an affordability measure.

A.7.3 Reasons for decision

We consider Ausgrid's approach is a suitable method to forecast capitalised overheads. We identified some data discrepancies in years 2017–18 and 2019–20 and have corrected these in our alternative estimate.

We have used Ausgrid's methodology including five years of actual expenditure and the 0.5% productivity adjustment to determine the alternative forecast for overheads. We have updated the forecast to account for:

- The data amendments to reflect latest data for years 2017–18 and 2019–20.
- Our alternative estimate on total direct capex. Our lower alternative estimate of total direct capex results in a lower forecast of capitalised overheads.

We sensitivity tested the calculated capitalised overheads outcome against using the standard three years of actuals at the draft decision stage. Ausgrid's approach using five years of actual expenditure would result in a slightly higher estimate of overheads than our approach of using three years. However, after applying Ausgrid's proposed 0.5% productivity adjustment to overheads, Ausgrid's methodology results in a lower forecast than our standard approach.

As usual, our final decision will update for changes in total direct capex and we will re-test the methodology using the available four years of current period actual expenditure. Ausgrid's proposal did not explain why it selected to use five years of actual expenditure. We encourage Ausgrid to provide further information to support its selected number of years in the revised proposal, and to test the sensitivity of this assumption.

We commend Ausgrid for introducing the 0.5% productivity adjustment to its capitalised overheads forecast in response to engagement with its RCP.

Shortened forms

Term	Definition
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulatory
AESCSF	Australian Energy Sector Cyber Security Framework
ARENA	Australian Renewable Energy Agency
AS	Australian Standard
augex	augmentation expenditure
capcons	capital contributions
capex	capital expenditure
CBA	cost benefit analysis
CCP26	Consumer Challenge Panel, sub-panel 26
CCT	covered conductor thick
CECV	customer export curtailment value
CER	consumer energy resources
CESS	capital expenditure sharing scheme
DER	Distributed Energy Resources
DNSP or distributor	Distribution Network Service Provider
EAM	Enterprise Asset Management
EBSS	efficiency benefit sharing scheme
ERP	Enterprise Resource Planning
EV	electric vehicle
HV	high voltage
ICT	information and communication technologies
kV	kilovolt
kWh	kilowatt hour
LGA	local government area
LV	low voltage
MDM/B	Meter Data Management and Billing
NEL	National Electricity Laws
NEO	National Electricity Objectives

Term	Definition
NER	National Electricity Rules
NIAC	Network Innovation Advisory Committee
NSP	Network Service Provider
opex	operating expenditure
OTI	operational technology and innovation
PIAC	Public Interest Advocacy Centre
RAB	regulated asset base
RCP	Reset Customer Panel
RCP	Representative Concentration Pathway
repex	replacement expenditure
RIT-D	Regulatory Investment Test for Distribution
RIT-T	Regulatory Investment Test for Transmission
SaaS	software as a service
SCS	standard control service
SP	security profile
STPIS	service target performance incentive scheme
totex	total expenditure
VCR	value of customer reliability
VoCP	Voice of Community Panel
VPP	virtual power plant
WACC	Weighted average cost of capital