31 January 2023

Attachment 5.1: Proposed capital expenditure

Ausgrid's 2024-29 Regulatory Proposal

Empowering communities for a resilient, affordable and net-zero future.

Ausgrid

Contents

1. Executive summary

1.1 Our forecast is prudent, efficient and delivers our customers' priorities

The purpose of this document is to demonstrate the prudence and efficiency of our capital expenditure (**capex**) forecast for the 2024-29 Regulatory Control Period (**2024-29 period**). The information provided shows that:

- Our 2024-29 capex forecast complies with the National Electricity Rules (**NER**) and other regulatory requirements to be approved by the Australian Energy Regulator (**AER**);
- We have developed our forecasts based on extensive customer and stakeholder feedback, including from our Reset Customer Panel (**RCP**), the broader capex forecast engagement to develop our Draft Plan[1] and our Voice of the Community (**VoC**) Panel, Commercial and Industrial customer interviews, Council, Retailer and other stakeholder engagement; and
- We have made significant improvements to our capex forecasting and governance arrangements since our 2019-24 Regulatory Reset.

We are confident that our total capex reflects the prudent and efficient costs of achieving the capex objectives in the NER (see Chapter 15), and to provide safe and reliable distribution services to our customers.

This document is an attachment to our Regulatory Proposal to the AER. It should be read in conjunction with Chapter 5 of the Regulatory Proposal and other supporting documentation that are referenced where appropriate.

Note: All Software-as-a-Service (**SaaS**) implementation costs were considered as capex in the 2019-24 Regulatory Control Period but will be considered operating expenditure (**opex**) in the 2024-29 period following a recent change in accounting guidance. Our opex forecast, including SaaS related expenditure, is set out in **Attachment 6.1**: **Proposed 2024-29 Opex**.

Figure 1.1 Proof points showing that our 2024-29 capex is prudent, efficient and customer focused

Factor	Proof point
Prudent (see section 4)	Our governance practices include a rigorous review and challenge process that has resulted in an efficient capex portfolio that appropriately balances risk with the cost of investment.
Efficient (see sections 6-13)	Our 2024-29 capex forecast is 7% below our 10-year trend in investment (FY15-24) and will not lead to an increase in our real regulatory asset base (**RAB**) on a per customer basis.
Stable reliability at a lower cost (see section 3.1.2)	We are spending 5% less on network replacement in the 2024-29 period at a saving of $77m, with an expectation that we can maintain current levels of reliability at a lower cost to customers.
Rising to address new challenges (see section 7)	We are investing $194m on climate resilience based on customer concerns with extended and widespread outages during major events, access to amenities, and the disproportionate impact of climate change on customers in certain locations.

[1] Ausgrid, *Our Draft Plan for 2024-29 – for consultation (2022)*.

1.2 Our 2024-29 capex proposal is made up of continuing and increasing priorities ($real FY24)[2]

	Network			Non-network			Overheads	Total
Continuing priorities	Replacement expenditure (repex)	$1,446m	▼ 5% on 2019-24 spend	ICT (excluding 'increasing priorities')	$161m	▼17% on 2019-24 spend	Capital support ▼ 3% on 2019-24 spend	$2,930m Our continuing priorities are ▼ 8% on 2019-24 spend
	Growth	$190m	▼9% on 2019-24 spend	Property	$145m	▼ 17% on 2019-24 spend		
	Operational technology & innovation (OTI)	$117m	▼43% on 2019-24 spend	Fleet	$148m	▲7% on 2019-24 spend		
	Subtotal	$1,753m	▼ 9% on 2019-24 spend	Subtotal	$453m	▼ 10% on 2019-24 spend	$724m	
Increasing priorities	Resilience		$194m	Cyber, Enterprise Resource Planning (ERP) and CER-related ICT	$140m		Note that expenditure associated with 'increasing priorities' also attracts overheads (included in the $724m above)	$381m
	Customer energy resources (CER) enablement		$47m					
Total	Our total capex forecast is made up of our continuing priorities ($2,930m) and our increasing priorities ($381m)							$3,311m 1% higher than the 2019-24 period

[2] Trend incorporates AER guidance that SaaS implementation costs, while capex in the 2019-24, will be considered opex in the 2024-29 Regulatory Period.

Ausgrid is committed to becoming and remaining an industry leader in customer engagement. Over the past three years, we have made significant improvements in our business-as-usual (**BAU**) engagement with our customers, including by establishing our Voice of Community (**VoC**) Program. Listening and responding to what we have heard through this 'always on' VoC engagement program has helped us to become a better business and deliver better outcomes for our communities.

We have embedded the voice of the community into the heart of our business, co-designing our vision and strategy with our customers as well as engaging on our regulatory proposal. Customers have shaped our direction and priorities as well as how we will deliver on these strategic goals in the shorter term. To ensure our proposal responds to our communities' preferences and priorities, we have conducted an extensive engagement program over the past 18 months.

Our customers shaped our 2024-29 capex forecast in line with their priorities through a five phase engagement process. This engagement occurred across customer segments, with residential and small business customers engaging with us via the VoC Panel while our commercial and industrial customers and councils each had their own dedicated forums. What we heard and how we have responded is set out in **Figure 1.2.**

Figure 1.2 How customers have shaped our 2024-29 capex forecast in line with their priorities

Priority	Customer segment	What we heard (direct quotes)	How we have responded
Climate resilience	**VoC Panel**	**"Agree with investment level of $200m"** **"Pursue an efficient mix of capital and operational investment opportunities to ensure the ongoing reliable provision of electricity"**	**We are keeping within the VoC Panel's recommended investment envelope with our forecast capped at $194 million.**
	Commercial and industrial	**"Start to be proactive, think about the long term – start to rebuild more resilient"**	
	Councils	**"Nominated resilient localised community centres for people to go to"**	

Priority	Customer segment	What we heard (direct quotes)	How we have responded
Delivering net zero through Customer Energy Resources (**CER**) integration	**VoC Panel**	**"Ausgrid should introduce a proactive and targeted mixed investment plan between $100-$150 million to achieve net zero and minimise barriers for 85% impacted customers"**	**Our CER integration forecast is at the midpoint of the VoC Panel's acceptable range, at $126 million inclusive of CER related Information Communication Technology (ICT) capex and opex step changes**
	Commercial and industrial	**"Assisting the customers on their emissions reduction is going to have a greater impact on the absolute value of the greenhouse gas emission globally than emissions reductions in Ausgrid's own business"**	
	Councils	**"Would like to see more projects like solar gardens, community batteries, e.g. trial area of all electric homes"**	
Cyber	**Town Hall (all end use customers)**	**"Ausgrid should ensure the cyber protection processes are well-researched and transparent to customers and stakeholders. Invest now, to prevent a greater spend later. Prevention is better than a cure"**	**Our forecast includes $91 million (including $47 million SaaS implementation cost) to invest in the highest cyber security maturity level. In response to growing cyber security risks and in line with feedback at our Town**

Priority	Customer segment	What we heard (direct quotes)	How we have responded
	Councils	**“The above initiatives to build resilience in response to climate change and cyber security threats is strongly supported”**	**Hall meeting with all end users, we have based our cyber plans on robust, well-researched and transparent analysis.**
Innovation	**VoC Panel**	**“We want Ausgrid to move from the proposed increase in spend ($12m pa capex + $1.5m pa opex) to the higher increased spend ($16m pa capex + $2m pa opex) to achieve increased innovation”**	**We have increased our innovation forecast capex to $49 million compared to $45 million in our Draft Plan, and maintained an associated opex step change at $5 million. By moving towards, but not fully implementing, the VoC Panel’s recommended increase our innovation forecast balances the feedback we received with other competing priorities such as affordability.**
	Councils	**“Faster rollout of new technology across the network. Great to see trials of community batteries but need to keep up with the community demand for this technology”**	
Customer experience	**Town Hall (all end use customers)**	**“Need to ensure human customer service experience. If cuts need to be made this area should be reduced in funding”**	**We have not reduced our ICT program targeted at improving customer experience. This is based on feedback from the VoC Panel which told us that 82% of customers could at least ‘live with’ what we were forecasting (see section 1.4 below).**

1.3 Our proposal gives voice to our community's priorities

We brought together a VoC Panel to help us test whether our expenditure plans for the 2024-29 period met the expectations and priorities of our customers. The VoC Panel consisted of residential customers who met with Ausgrid board members, executives and senior management over the course of 10 weekend forums staged over videoconference and in person. In October 2022, an in-person town hall meeting was held. **Figure 1.3** shows that the comfort levels of a clear majority of the VoC Panel was at least 'like it' for most aspects of our capex program. A notable exception was innovation, with some members of the VoC recommending a greater level of investment.

Figure 1.3 The VOC Panel comfort levels were at least 'like it' for most aspects of our proposal

Feedback questions	Loathe it	Lament it	Live with it	Like it	Love it
How satisfied are you that Ausgrid listened to you?	0	15% ^	5%	40%	40%
How comfortable are you the draft plan looks to the future and is fair?	0	10%	14%	57%	19%
Where should Ausgrid look to find savings?	If necessary – between Cyber and IT system upgrades (SAP) – "could there be opportunities to optimise across these?"				
How comfortable are you with?					
Resilience	0	0	10%	60%	30%
Customer Experience	0	18%	38%	18%	26%
Net zero	0	0	17%	61%	22%
Cyber	0	0	12%	41%	47%
IT systems (SAP ERP)	0	0	15%	53%	32%
Innovation (NIAC)	0	20% ^	5%	50%	25%
Other (other aspects of the plan or external factors)	0	0	25%	50%	25%

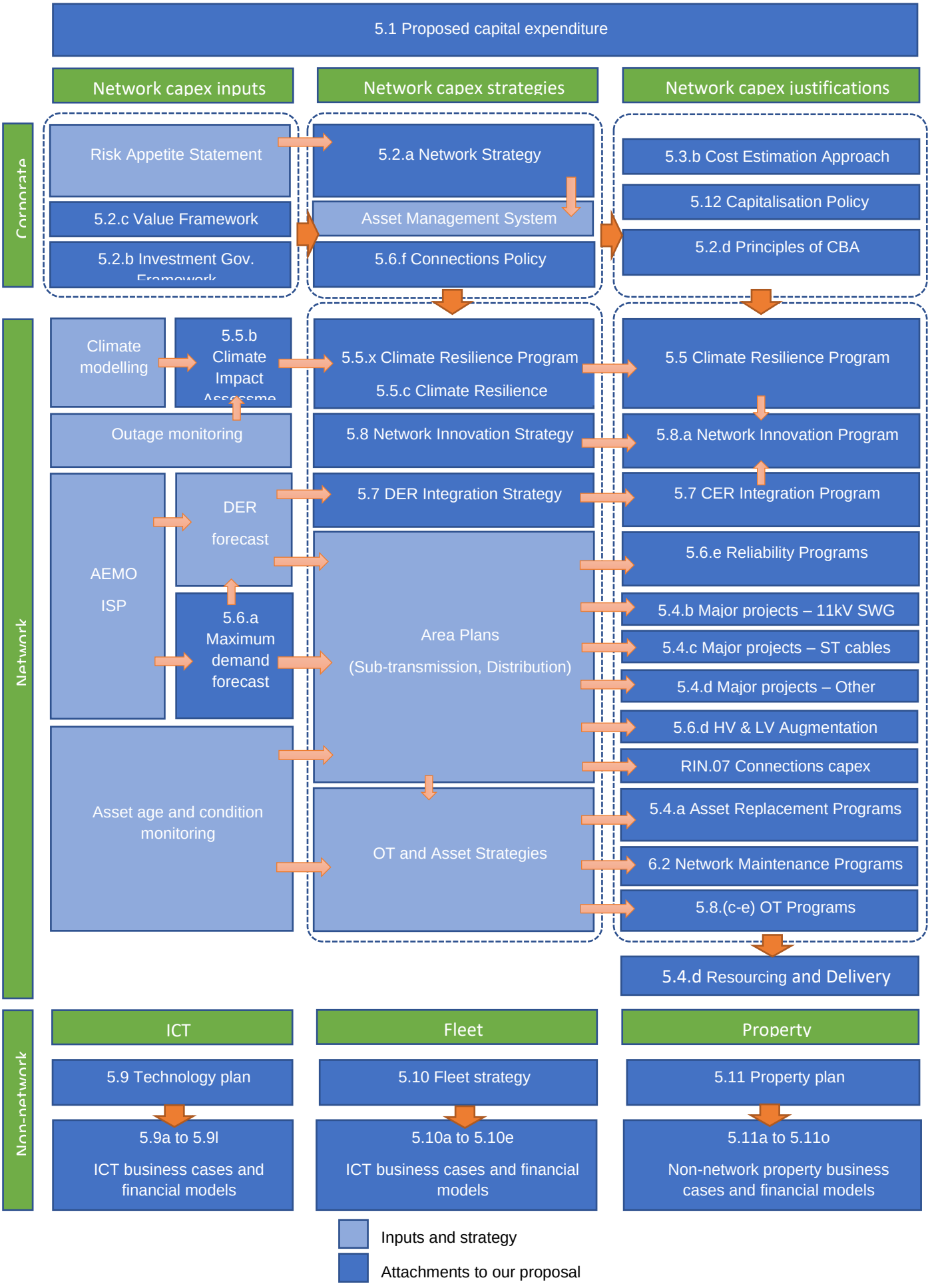
Note ^ : the 'Lament it' for 'How satisfied are you that Ausgrid listened to you' and 'Innovation (NIAC)' was primarily driven by a subset of customers prioritising significantly more investment in innovation of approximately $90m totex in the 2024-29 period compared to the $54m totex in our proposal

1.4 Our capex forecast meets the Better Reset Handbook requirements

Our alignment to the Better Reset Handbook		Further information	
Section 4.2.1.1 Top-down testing of the total capex forecast and at the category level.	✓	We have applied trend analysis comparing our 2024-29 capex forecast with our actual/estimated spend in the current and previous regulatory periods.	See **Section 3.1**
Section 4.2.1.2 Category level assessment of replacement expenditure, augmentation, connections, information and communications technology (ICT), property and fleet.	✓	We have incorporated the AER's replacement expenditure (**repex**) model into our forecasting approach. This includes analysis against the repex model threshold.	See **Section 6.3.2**
		Quantitative analysis has been presented to the RCP and AER during the pre-lodgement phase, including 'deep dive' sessions on our cost benefit analysis (**CBA**) approach for repex programs.	See **Sections 6**
		Our forecasts include top-down tests for recurrent expenditure and gives reasons if there are any material increases. Note that our 2024-29 forecast for repex and recurrent ICT capex is below our current period spend.	See **Sections 6.4** and **11.2**
		We have had in-depth conversations with the RCP and the AER about the drivers behind new capex categories. This included collaboration sessions with the RCP and technical workshops with the AER on CER and climate resilience.	See **Sections 7** and **9**
Section 4.2.2 Evidence of prudent and efficient decision making on key projects and programs.	✓	We have improved our investment governance processes based on good industry practice and also AER and EMCa feedback at our 2019-24 determination.	See **Section 2.2**
Section 4.2.3 Evidence of alignment with asset and risk management standards.	✓	Our 2024-29 capex forecast aligns to Ausgrid asset and risk management standards. These include our Board approved risk appetite, **Attachment 5.2: Network Strategy** and a refreshed investment governance and prioritisation approach.	See **Section 5.1h**
		Our CBA approach for repex projects and programs aligns to the AER's *Industry Practice Application Note: Asset Replacement Planning* (January 2019).[3]	
Section 4.2.3 Genuine customer engagement on capex proposals	✓	We have hosted over 65 customer engagement sessions on our capex program, including RCP meetings and collaboration workshops, totalling more than 100 hours of discussion. We also staged 10 VoC panel sessions totalling 60 hours of online and face-to-face engagement, and published a Draft Plan with detailed information about our 2024-29 capex forecast.	See **Attachment 3** of our Regulatory Proposal

[3] AER (2019). Industry practice application note for asset replacement planning.

1.5 How Attachment 5.1 fits in with our broader suite of capex documents



2. Key elements of our forecast

2.1 Capex forecast by driver

Our total capex forecast for the 2024-29 period is $3,311 million or $662 million per year (real FY24).[4] This is 1% higher than our current period spend[5] as shown in **Figure 2.1** which sets out our forecast by driver. The percentage split of our forecast is shown in **Figure 2.2** while **Figure 2.3** provides a brief description of each expenditure category.

Figure 2.1 Forecast capex by driver for 2024-29 period compared to 2019-24 spend ($m, real FY24)

Driver	FY25	FY26	FY27	FY28	FY29	FY25-29 period	FY20-24 period	% change
Repex	290	277	282	298	299	1446	1523	(5)%
Resilience	25	39	48	43	39	194	0	n/a
Growth	49	36	36	36	33	190	207	(9)%
CER	8	10	10	9	10	47	4	n/a
OTI	29	21	20	23	23	117	204	(43)%
ICT	74	98	59	36	34	301	282	7%
Fleet	37	36	30	23	22	148	138	7%
Non-network property	68	15	30	25	8	145	174	(17)%
Overheads	143	147	149	144	141	724	743	(3)%
Total	723	679	664	637	608	3311	3277	1.0%

Figure 2.2 Percentage share of total capex by each driver

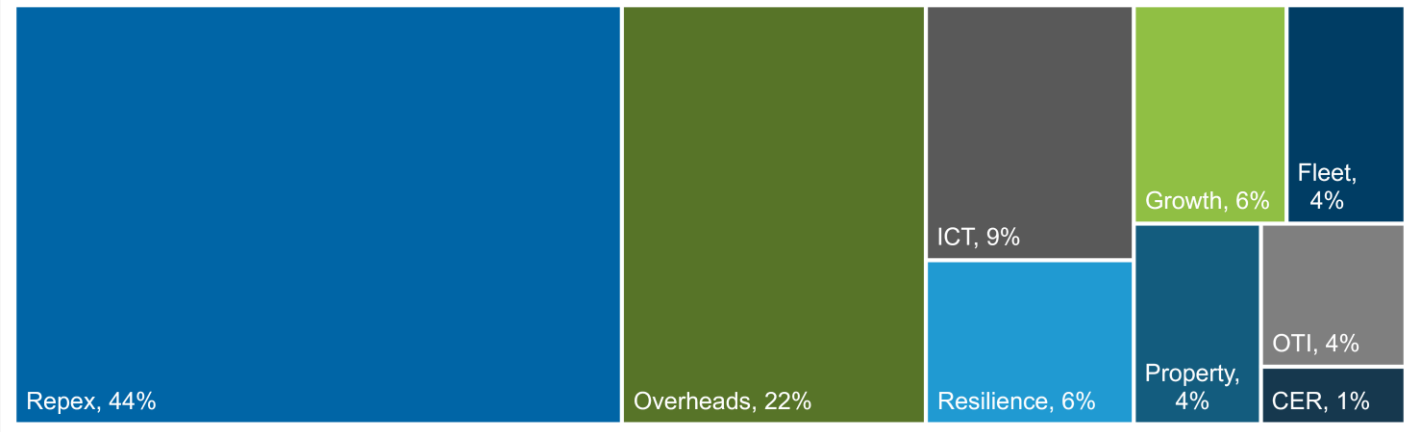


Figure 2.3 Description of the expenditure drivers making up our capex forecast

Capex driver	Description
Replacement capex (repex)	Investment in the replacement and renewal of network assets in major projects or planned, conditional and reactive programs. It represents the largest component of our

[4] All dollar numbers discussed in **Attachment 5. 1** are in real FY2024 Australian dollars, unless specified otherwise.

	capex plans. We propose to invest $1,446 million replacing network assets that pose a risk to safety and reliability.
Resilience	Building our capability to adapt, withstand and resist impacts of extreme weather events or avoid network destruction by absorbing and minimising disruptions. Resilience also includes the ability to recover from disruptive events by having the right plans and processes in place. Our resilience forecast of $194 million is a prudent, albeit cautious, level of investment. Our modelling indicates that the monetised value of the growth in our climate risk is significantly higher than our proposed level of investment.
Growth (augmentation and connection) capex	Refers to projects and programs to connect new customers and augment the network to meet peak demand forecasts, while maintaining appropriate utilisation of the network. Also includes reliability capex to manage the risk of day-to-day reliability events (which does not consider risks associated with climate driven major events typically captured via Major Event Days and considered within the new Resilience program). We propose to invest $190 million in growth related expenditure. This is $18 million (9%) lower than we expect to spend in the 2019-24 period.
CER	Providing digital tools that improve our customers' experience in connecting CER and the range of network information available to us, as well as a mix of traditional augmentation and flexible network solutions, including community batteries. We propose to invest $87 million in CER capex, including $47 million in augmentation and connections, and $20 million in ICT costs.
OTI	OTI relates to our core system operational technology requirements as well as our innovation program. We propose to invest $117 million in OTI capex. This is $87 million (43%) lower than we expect to spend in the 2019-24 period.
ICT	In our rapidly changing energy landscape, ICT is becoming the backbone for new services and innovations. Digital tools can help customers interact with us when they have a query or need information about an outage and can unlock productivity efficiencies. To keep pace with the digitalisation of our business and respond to growing cyber threats, we propose to invest $301 million in ICT. This is 7% higher than our expected spend in the 2019-24 period.
Property	Our non-network property assets include offices, depots and specialist sites located throughout Ausgrid's distribution area. Capex is required to achieve our strategic accommodation plan to mitigate the risk of safety hazards causing harm to our workforce and the general community and enable the efficient delivery of our distribution services. We propose to invest $145 million in property. This is 17% less than our spend in the current regulatory period.
Fleet	Our fleet of vehicles and mobile plant supports our operations in the field by providing safe and reliable modes of transportation and work equipment. 'Plant' assets refer to the equipment we use in the field such as elevated work platforms (**EWPs**), vehicle loading cranes, and pole installation equipment. We propose to invest $148 million in fleet equipment. This is 7% higher than our 2019-24 spend and is targeted at renewing ageing vehicles, unlocking productivity improvements and responding to changes in asset lifecycle standards determined by the Australian New Car Assessment Program (**ANCAP**).
Capitalised overheads	Our capitalised overheads capture indirect costs we incur in the delivery of our capital program. This category includes the costs associated with planning, managing and supervising the capex program and a portion of administrative/corporate support costs including safety, IT, HR and Finance functions. We propose to invest $724 million in capital support.

2.2 We have improved our capex forecasting approach

We received improvement feedback from the AER and their technical consultant EMCa at our last reset. This feedback led to us developing better tools and strengthening our governance processes to enhance our forecasting approach. **Figure 2.4** summarises these improvements and where we have elaborated on them with more detail in this document.

Figure 2.4 How we have responded to AER and EMCa feedback at our last reset

	Feedback on our 2019-24 reset	How we have responded	More detail
Risk appetite	Unclear how investment justification is linked back to defined risk appetite	Our refreshed governance process explicitly links our investments back to our board approved risk appetite	See **section 5.1**
Cost benefit analysis	Limited application of risk-based cost benefit analysis	We developed a standardised risk-based net present value (**NPV**) model that we apply across our network and non-network capex portfolio	See **section 5.2**
Need and timing	Business cases were high-level in nature and in most cases provided insufficient evidence to justify the need and timing	We have refreshed our approach to business cases to identify the need and efficient timing of our investments	See **section 6.3.2** See also **Attachment 5.4 - Principles of CBAs**
Prioritisation	Qualitative approach to prioritising capex portfolio did not represent good industry practice	We prioritise our capex portfolio based on the value to investment ratios (**VIRs**) of projects and programs. The VIRs are calculated on a common basis using our standardised NPV model.	See **section 5.2**
Top-down challenge	Limited evidence of top-down challenge from executive management	We apply a robust top-down challenge via our Investment Governance Committee (**IGC**)	

2.3 Our forecast is for standard control services

NER clause 6.5.7(b)(2) provides that our proposed forecast capex must be for expenditure that is properly allocated to standard control services in accordance with the principles and policies set out in the Cost Allocation Method (**CAM**) for the Distribution Network Service Provider. We confirm our forecast capex is for the provision of standard control services and represents expenditure that has been properly allocated to standard control services in accordance with the policies and principles set out in Ausgrid's CAM (effective 1 July 2024) as approved by the AER on 26 October 2022.

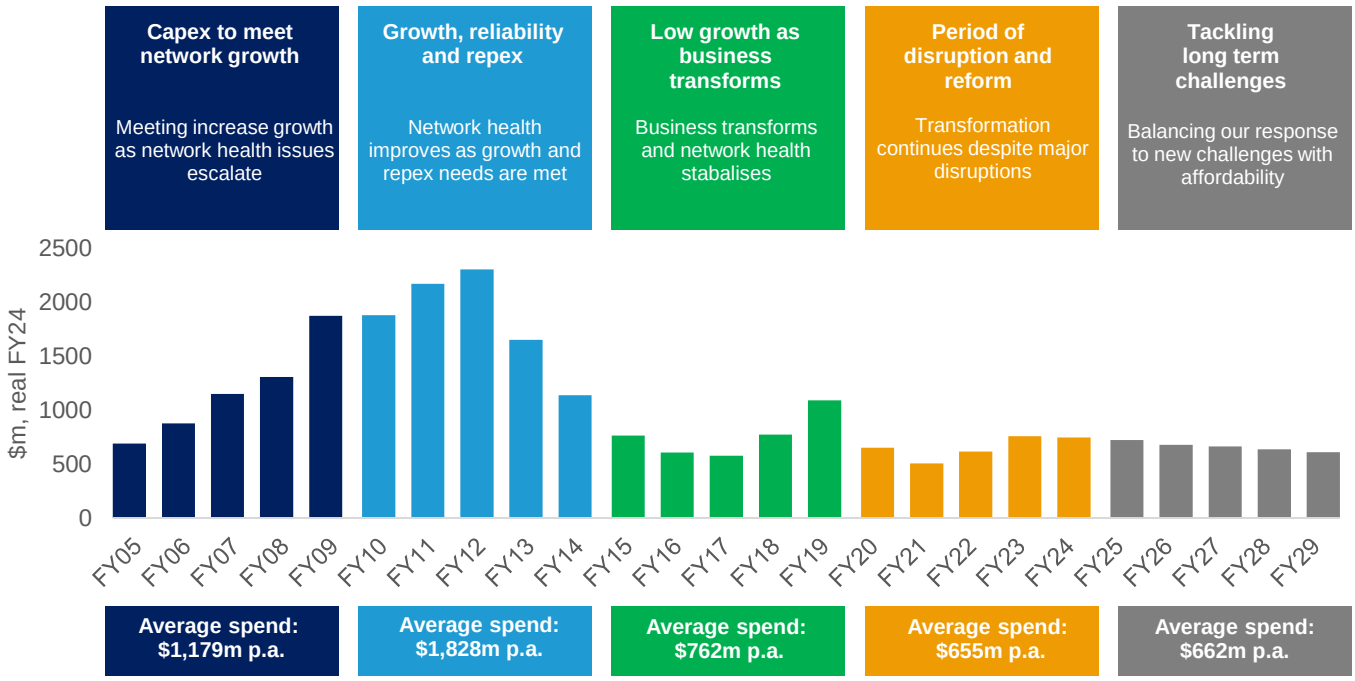
3. Top-down metrics

3.1 Using trend analysis to test our capex forecast

We agree with the Better Reset Handbook that '[c]omparing a network business's total capital expenditure forecast against actual spend over the current regulatory period can be a reasonable starting point for a top-down test'.[6]

Our total 2024-29 capex forecast of $3,311 million is 1% higher than our current period spend. It is also 40% below our 20 year long-term trend (FY05 to FY24) and 7% below our 10 year trend (FY15 to FY24). Our total capex back to FY05, with high level commentary about the key challenges during different stages in our investment cycle, is set out in **Figure 3.1**.

Figure 3.1 We will keep our capex levels consistent with recent period spend ($m, real FY24)



Customer perspective

Our customers will pay 7% less compared to our longer-term capex trend, dating back to FY15, and will get more from their investment as we take action to build climate resilience and enable a net zero future through our CER integration program.

3.1.1 Comparing our forecast to the capex trend from other networks

We have sought to contextualise our 2024-29 forecast by having regard to the capex trend from other networks. This includes the top-down assessment of Jemena's (electricity) 2021-26 regulatory proposal where the AER stated:

> *we place weight on Jemena's forecast being a moderate 9 per cent increase relative to its current spend… [and] 2 per cent higher than its longer term trend, going back to the start of the 2011-15 regulatory control period.*[7]

6 AER, *Better Reset Handbook* (December 2021), p. 20.

7 AER, *Jemena Draft Decision 2021-26* (September 2020), p 34; AER, *Jemena Draft Decision 2021-26 Attachment 5: Capital expenditure*, p 9.

We consider the trend in our 2024-29 capex forecast to be equivalent to Jemena's proposal which the AER ultimately accepted. Period-to-period, our forecast increase in capex is more moderate (1%[8] versus 9% for Jemena). We are also putting forward a lower capex forecast over a 10-year horizon (7% decrease versus a 2% increase for Jemena).

This comparative assessment against an industry peer provides favourable contextualisation of our 2024-29 trend in capex. At the same time, we acknowledge the importance of the AER's role in assessing our forecast on its merits. There are also several reasons a distributor may be forecasting higher or lower expenditure relative to their peers, such as differences in their investment cycles.

Customer perspective

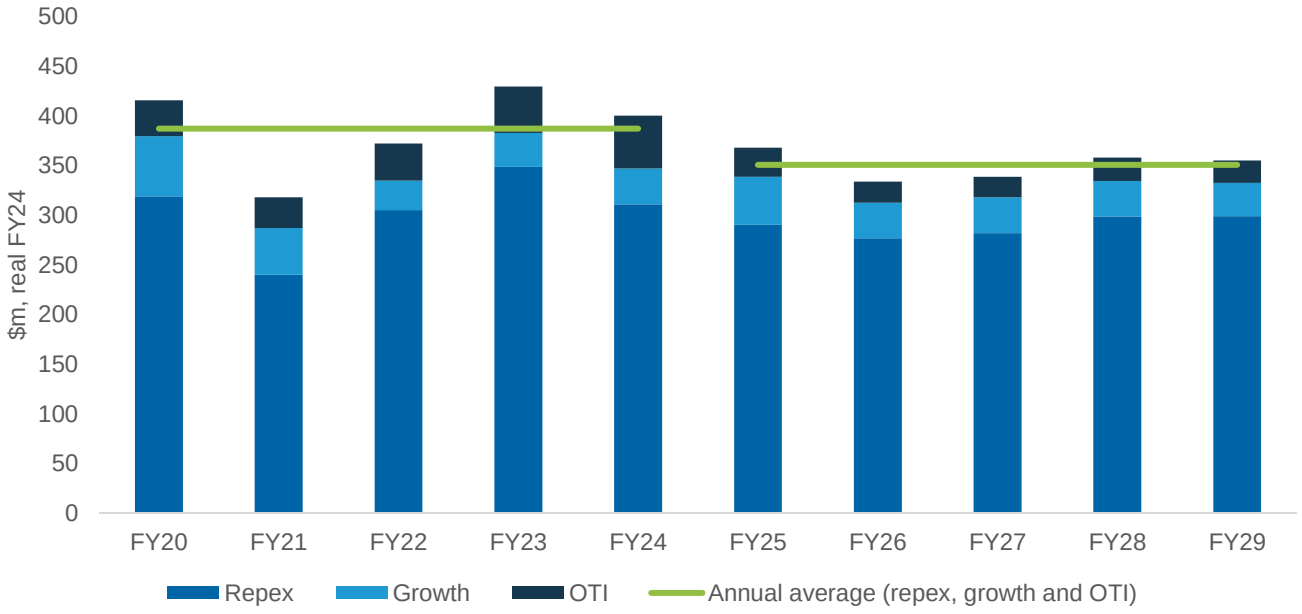
Our customers can be confident, based on a top-down assessment, that we are putting forward a reasonable forecast to maintain existing service levels and respond to increasing priorities such as climate resilience, net zero and cyber threats.

3.1.2 Keeping reliability steady within our existing repex and growth capex envelope

The Better Reset Handbook includes top-down testing based on reliability. It states that the AER 'would question whether a step up in forecast capex is required if network performance metrics like SAIDI show that [a network business] is able to maintain its network well on its efficient revealed spending levels'.[9] Changing investment levels to address reliability also relates to how much risk we take on as a business and on the behalf of our customers.

We are investing less in the 2024-29 period to keep average levels of reliability steady in normal operating conditions. Our forecast repex ($1446m), growth ($190m) and OTI ($117m) capex totals $1753 million. This is 9% less than the $1935 million we expect to spend in the 2019-24 period, as shown in **Figure 3.2**. We have isolated our repex, growth and OTI related spend because they are the investments most directly related to network reliability performance under normal operating conditions.

Figure 3.2 Actual and forecast repex, growth-related and OTI capex ($m, real FY24)

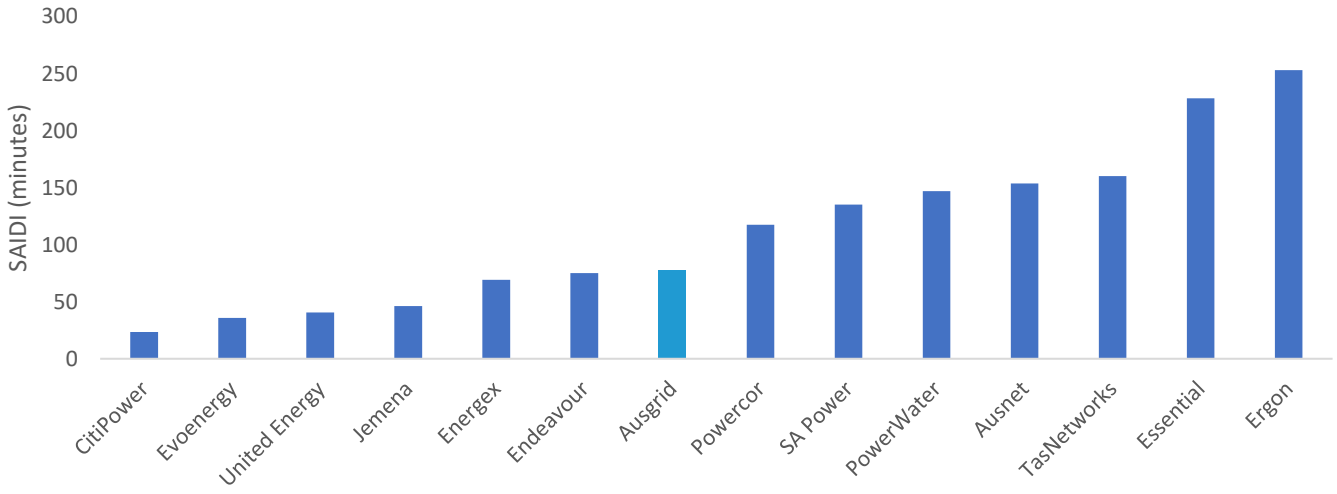


Our forecast reduction in repex, growth and OTI capex reflects the performance of our network. **Figure 3.3** shows that compared to other electricity distributors in the national electricity market (**NEM**) we perform well in terms of what a typical customer experiences in normal operating conditions (i.e. when major event days (**MEDs**) are excluded). Our forecast takes this into account by putting forward lower levels of investment, compared to the current period, for investment categories with a reliability driver. The extent of these reductions reflects the level of improved governance processes and the additional risk that a prudent business in our circumstances would be willing to bear.

[8] The 1% increase is based on FY20-22 actuals and our FY23 and FY24 estimated spend. It is important to include the FY23 and FY24 estimated data to account for our planned catch up in delivery after a FY20-22 underspend driven by several exogenous factors (COVID-19, protected industrial action, and a live work pause).

[9] AER, *Better Reset Handbook*, (December 2021), p 20.

Figure 3.3 Average SAIDI (FY17-21) with MED exclusions applied



Customer perspective

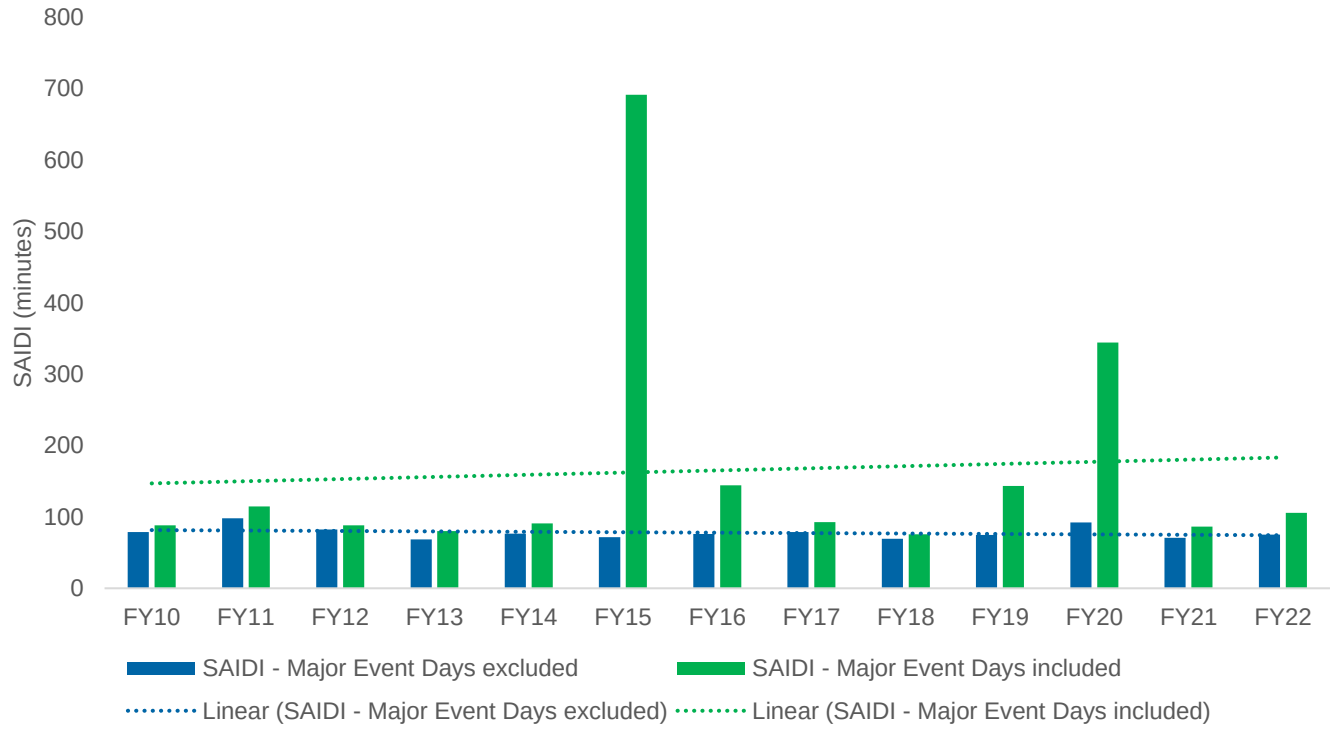
We are investing 9% less than the current regulatory period to maintain existing levels of reliability. For customers, this will mean that they will, on average, continue to receive the same level of reliability during normal operating conditions, at a lower cost.

3.1.3 Resilience investments requires a different top-down test to reliability

The top-down tests applied to reliability-focused investments are not good metrics when applied to resilience because reliability investments aim to maintain average levels of network performance in **normal** operating conditions, while resilience relates to a network's ability to absorb and recover from **extreme** events.

Therefore major events on extreme outage days (known as MEDs) should be included in a top-down test of whether resilience expenditure may be needed based on network performance. **Figure 3.4** shows a MED/non-MED gap in our network performance of up to 620 minutes in FY15 and 252 minutes in FY20. We have further investigated how we should respond to changing climatic conditions through the development of our co-designed *Climate Resilience Framework* (see **Section 7**).

Figure 3.4 SAIDI performance – with and without Major Event Days



Customer perspective

Our customers' lived experience of our network incorporates the most extreme weather days that are typically 'MED excluded' for the purposes of our reliability performance reporting. The current gap in our network performance on normal versus MED excluded days indicates there is a need to improve this lived experience by building resilience to the most extreme weather events.

3.1.4 We have tested our efficiency against benchmarks

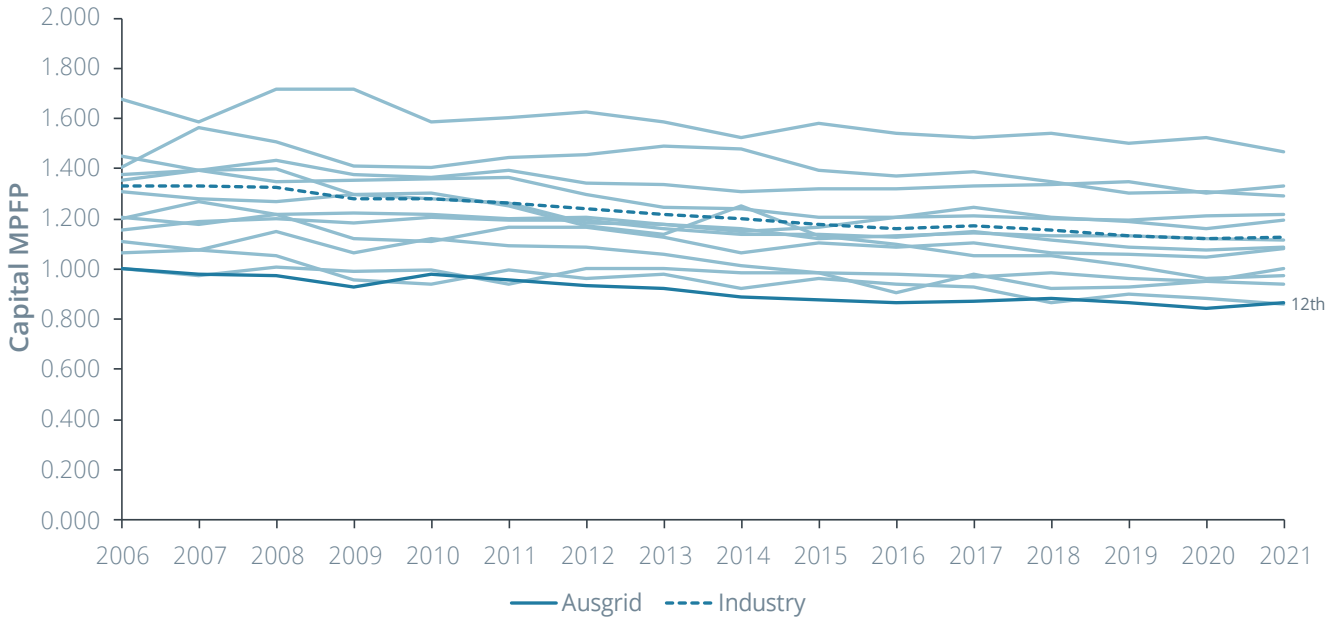
We do not perform well against the AER's published measure of capital multilateral partial factor productivity (**MPFP**). We note that there has been an overall decline in capital productivity (on this measure) across the sector over the past 15 years, which is likely because legacy capex decisions remain in the measure for an extended period.

We have been discussing capital MPFP with the RCP. We have come to the shared view that this measure is less relevant for assessing Ausgrid's relative capex efficiency because the measure is driven by historical capex required to meet previously mandated reliability standards. As a result, we cannot move up the rankings simply by spending less capex.

Demonstrating and monitoring our capex productivity remains important. The RCP noted in its report on our Draft Plan published in September 2022:

> While Ausgrid has some legitimate concerns about the methodology used by the AER, adjusting for that is unlikely to significantly improve its relative position. Capital productivity for DNSPs in NSW, Queensland and Tasmania is disadvantaged by the long tail legacy of large investment during 2005-2015 to meet various State imposed reliability standards.[10]

Figure 3.5 Capital multilateral partial factor productivity



Customer perspective

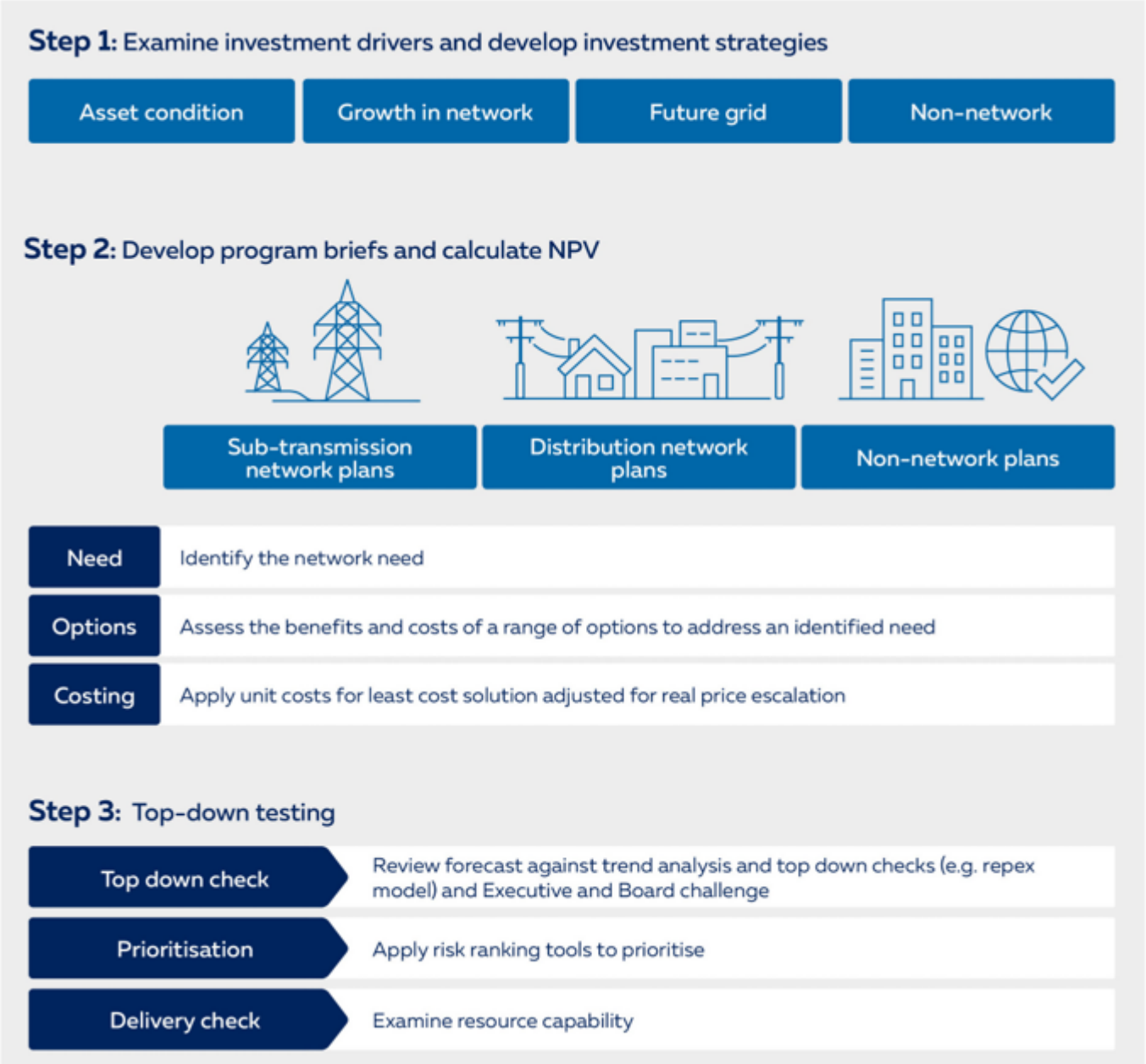
Our customers can have greater confidence in the efficiency of our capex forecast by looking at measures other than capital MPFP. This includes our trend at the total and category level as well as our performance against key AER expenditure assessment tools like the repex model. Our CBAs also provide a customer centric way of calculating whether an investment will deliver net benefits.

10 Reset Customer Panel, *Report on Ausgrid's draft plan for 2024-29* (September 2022), p. 78.

4. Capital planning and investment governance

We prepare a 10-year forecast of the capital program on an annual basis as part of our business planning process. This process is summarised in **Figure 4.1** below and has informed the development of our proposed 2024-29 capex forecast. Our capital planning and investment governance approach covers both our network and non-network expenditure programs.

Figure 4.1 Our capital planning process



4.1 Explaining our approach to investment governance

Our three step approach to investment governance is outlined in **Sections 4.1.1** to **4.1.3** below.

4.1.1 Step 1: Examining investment drivers and develop investment strategies

Our starting point involves examining key investment drivers and developing investment strategies. Our aim is to consider all relevant information and evidence on an investment need and then to develop strategies that meet the identified risks. The main factors we consider are outlined in **Figure 4.2**.

Figure 4.2 Key factors and drivers of our investment

When developing investment strategies, we undertake a detailed review of internal information concerning the state of the network and risks that it faces. This information is then used to determine the directional needs of our network and non-network investment programs, in order to maintain existing service levels.

Alongside this process we undertake a broad review of customer preferences and external drivers. For example, in recent years the frequency and severity of extreme weather events, linked to climate change, has increased. In engaging with this driver, we are developing a targeted investment strategy to mitigate network risk and deliver the greatest long-term value at least cost and in alignment with the requirements of the National Electricity Objective (**NEO**).

Customer perspective

Our assessment of multiple investment drivers and the development of investment strategies gives us the information and evidence to promote the long-term interests of customers in terms of price, quality, security and reliability of supply

4.1.2 Step 2: Develop program briefs and calculate NPV

We maintain an Investment Governance Framework (**IGF**) to provide clear guidance and accountability for the development and approval of investments. The framework applies to all investment funding requests and supports the selection of investments that deliver value for customers and provides the basis for making investment decisions in a transparent, consistent and efficient manner.

Our Investment Evaluation Procedure (**IEP**) supports the IGF to provide guidance on the following three elements in relation to the development, submission, review and approval of investment proposals:

1. **Calculate NPV** – includes the calculation of cash and probabilistic non-cash costs and benefits to evaluate the impact of an investment from a market perspective.
2. **Prepare the business case document** – we maintain a standardised business case template which must be used for all investment proposals above $2.5 million; and

3. **Submission requirements** – certain requirements that must be adhered to when submitting investment proposals to the relevant governance committee.

A key element of our approach to investment evaluation includes the use of a standardised NPV model, which is used to calculate and evaluate the net costs and benefits associated with an investment proposal.

At our last reset, EMCa observed 'only limited application of risk analysis and limited information on Ausgrid's application of predictive modelling'.[11] Since then, we have reviewed our framework for prioritising capex projects and sought feedback and advice on how to strengthen our prioritisation framework to better reflect customer value. As part of this process, we took steps to enhance our approach to cost-benefit analysis for capex projects.

This resulted in the development of our standardised NPV model which generates a consistent approach to calculating the benefits and costs of potential projects and programs. By moving to a standardised model, we have sought to improve the robustness of our internal modelling, reduce the scope or potential for error, and ensure a consistent approach to quantifying the benefits of our projects across our capex portfolio.

Customer perspective

Our customers will get value for money from the investments we make. Our standardised NPV model is an important tool to achieving this outcome by helping us to identify the least cost options to maintaining existing service levels for customers while building resilience, responding to technological change and keeping the community safe.

4.1.3 Step 3: Top-down testing

The final step in our process of developing our capex forecasts is a top-down test of our forecast capex.

Our IGC is charged with this task which involves assessing the recent trend in expenditure and compiling a prioritised portfolio of investment. In line with our commitment to continuous improvement, we are continually refining our approach. This includes an IGC assessment of our forecast against our board approved risk appetite (see **section 5.1** below). The movements in our capex forecast since the first iteration was presented to the IGC in April 2022 is set out in **Figure 4.4** on the next page.

Customer perspective

The 'top-down' testing of our capex forecast has put in place prudent governance processes to make sure our customers do not pay more than is necessary for the safe, reliable and resilient provision of network services.

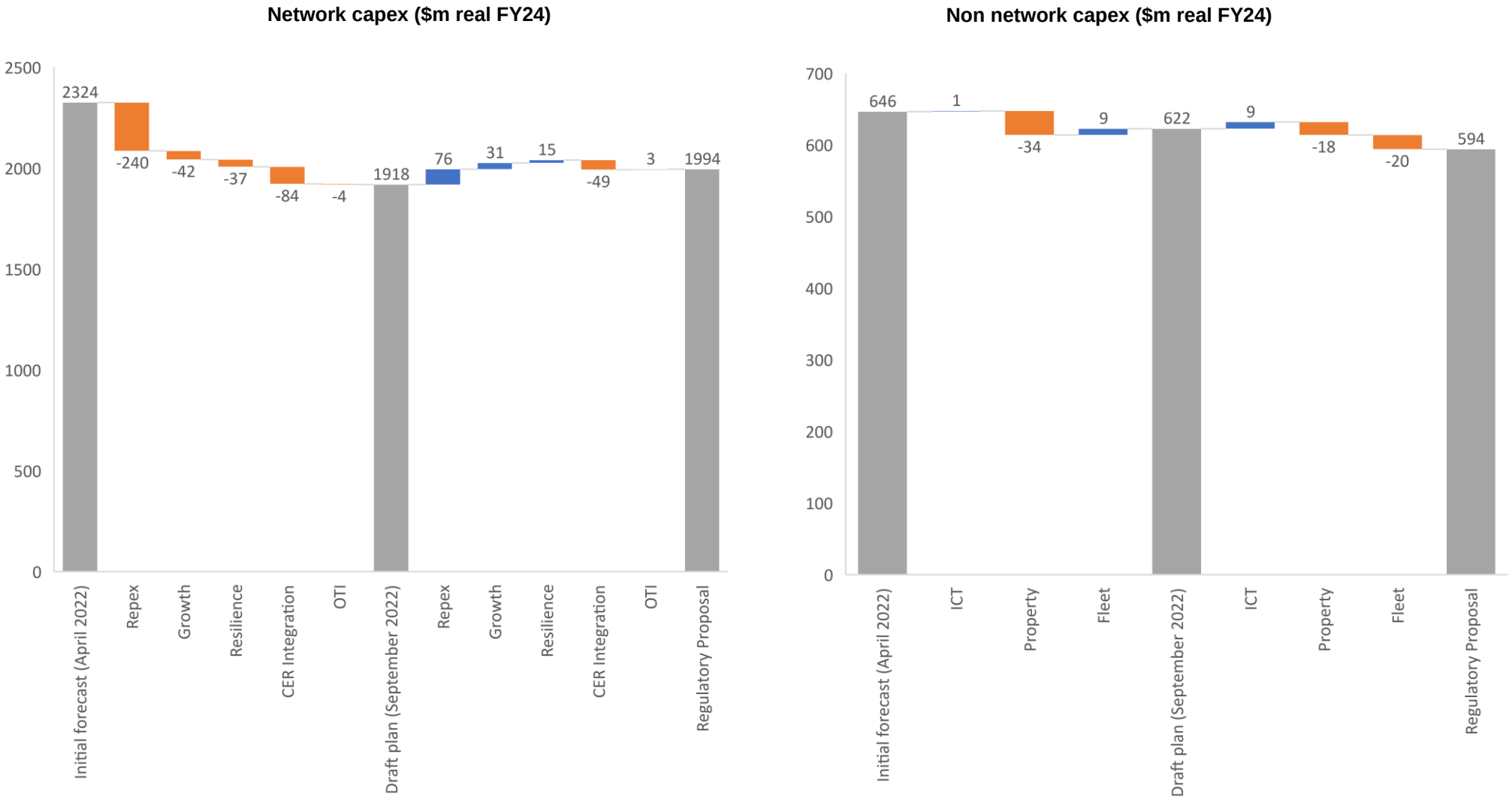
4.2 Further supporting material

Figure 4.3 Supporting documents and models – Index

Att #	Document name
5.2.a	Network strategy
5.2.b	Investment governance framework
5.2.c	Customer value framework
5.2.d	Principles of cost benefit analysis

[11] EMCa, *Review of Ausgrid's capex proposal 2019-24* (August 2018), paragraph 9.

Figure 4.4 Changes in our 2024-29 capex forecast since it was presented to the IGC in April 2022



5. Risk and delivery

5.1 Our forecast aligns to our board approved risk appetite statement

We have reflected on how we best align our expenditure forecasts to our board-approved risk appetite statement (**RAS**). The AER engaged EMCa to review our capex forecast at our 2019-24 submission, with EMCa concluding:

> *Ausgrid's descriptions in its [regulatory proposal] and associated documents do not appear to be based on or to explicitly take account of Ausgrid's stated corporate objectives, or to reflect a defined risk appetite.*[12]

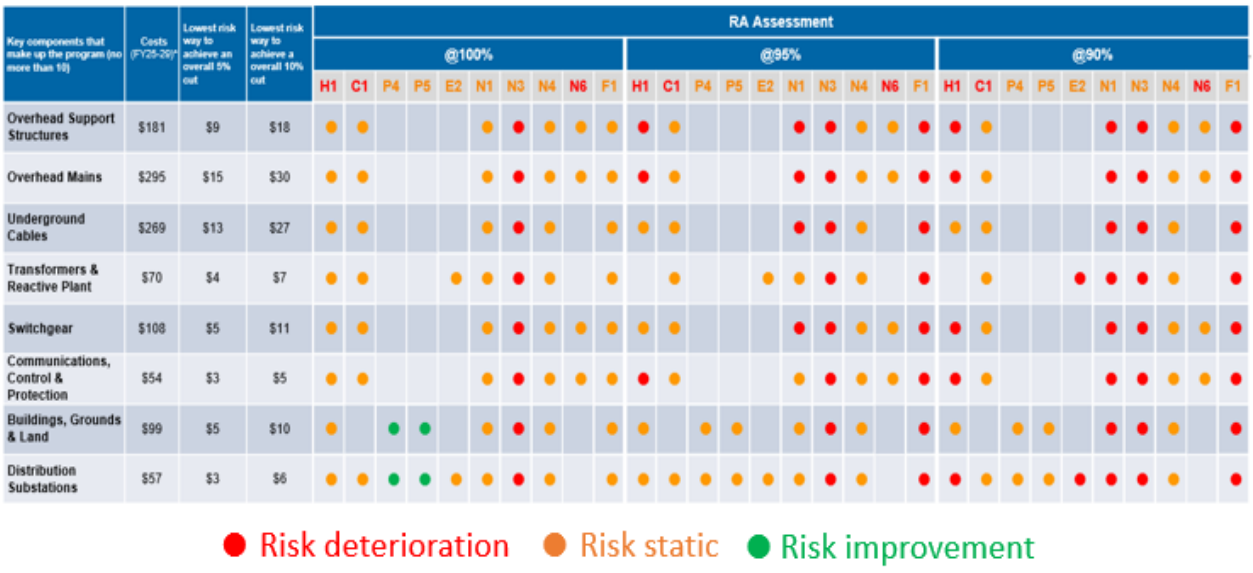
In the development of our 2024-29 capex forecast, our IGC tested whether lower levels of investment could still meet our corporate objectives and stay within the boundaries of our RAS. This involved:

- **Base case analysis:** an assessment of our 2024-29 forecast against the RAS requirements; and
- **Counterfactual analysis:** an assessment of options for minimising risk growth ('lowest risk ways') while implementing a reduction in investment of 5% or 10%.

We have 12 risk themes in our RAS. For some of these themes, our 2024-29 forecast is approaching the boundaries of our board approved risk appetite. This meant that when a 5% reduction in investment was applied, the additional risk resulted in a breach of the RAS. A 10% reduction, for these themes, resulted in a larger breach.

The IGC considered this analysis for each expenditure category. **Figure 5.1** sets out an example snapshot of our approach for repex. It shows, for example, that the risk themes H1 (Health and Safety) and C2 (Sustained and widespread outages) are at the boundaries of our risk appetite in the base case, and that applying a 5% or 10% cut to our forecast would result in a breach of our risk appetite for these themes.[13] The risk theme 'N3' relates to the timely delivery of our capital and maintenance program to promote future network sustainability. It is 'at risk' under our current repex forecast because the level of investment is insufficient to keep the average age of our assets stable, potentially triggering a risk in future regulatory periods as these ageing assets begin to present higher failure rates.

Figure 5.1 How our IGC tested alignment with key risk themes in our RAS (repex example)



12 EMCa, *Review of Ausgrid's capex proposal 2019-24* (August 2018), paragraph 10.

13 Our RAS provides more information about these and other risk themes

5.2 Delivery

We have developed a Resourcing and Delivery Strategy (**Delivery Strategy**) to ensure the efficient delivery of our works program consisting of network capex and maintenance activities.

Our Delivery Strategy demonstrates that Ausgrid has the necessary capability and resources available to deliver the proposed work plan, and in a manner which mitigates the risk of resourcing constraints and cost overruns.

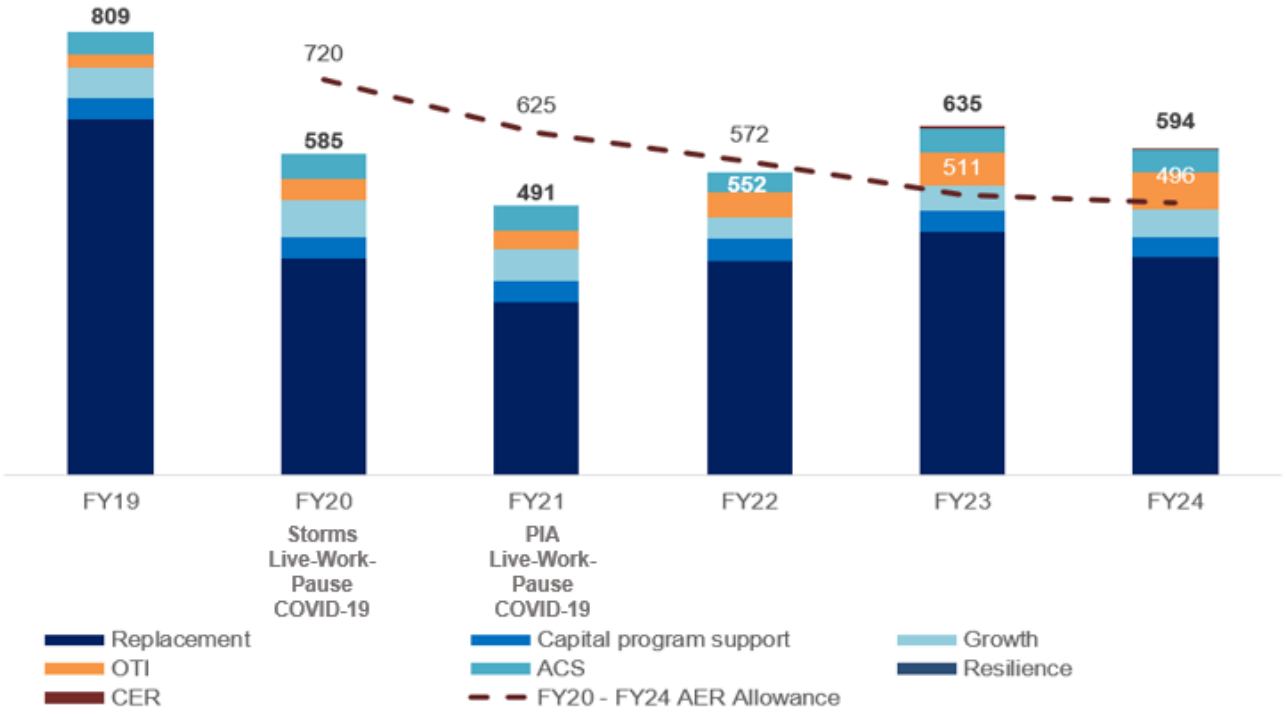
5.2.1 Our delivery so far this regulatory period has faced unique challenges

We under-delivered on our work plan in FY20 and FY21, as well as in FY22 (although to a lesser extent). This under-delivery can be attributed to unique challenges that arose during the FY20-22 period, including:

- Natural disasters which delayed works across the network. Severe storms and bushfires in FY20 contributed to delivery delays of the capex program while staff responded to emergency requirements.
- Following the death of one of Ausgrid's employees in FY20, the business paused all live work on our network. The resulting review on live work practices lasted for 9 months prior to works recommencing and contributed to a significant backlog of network defects. Our delivery was also slower after live work recommenced due to additional controls we introduced to ensure live work could be performed safely and in line with our board risk appetite.
- During 2021 Ausgrid staff engaged in several months of Protected Industrial Action (**PIA**) in relation to the enterprise agreement negotiations. Union-driven work stoppages over a 16-week period disrupted work plans and had a significant impact on Ausgrid's ability to deliver the workplan.
- The COVID-19 pandemic, like most businesses, led to considerable disruptions. It slowed our delivery by impacting our resourcing, restricting our network access, and adding supply chain constraints.

Our delivery performance in recent years is set out in **Figure 5.2**. It shows that the interruptions due to a pause on live work, PIA, COVID-19 and natural disaster events has contributed to lower levels of delivery in the years when these exogenous factors were present (FY20 and FY21). Importantly, our delivery in more stable conditions has been strong (FY19) and in line with our allowance (FY22). This demonstrates our capability to deliver in normal operating circumstances.

Figure 5.2 Delivery on our work plan has faced unique challenges outside of management control



5.2.2 Key inputs to our delivery and resourcing strategy for 2024-29

We are continually making improvements to our delivery and resourcing capabilities. In line with this, we are in the process of implementing several strategies including:

- Increasing and optimising our internal workforce via key recruitment initiatives such as the apprentice and graduate programs;
- Delivering our transformation program, which will result in productivity benefits, with additional planned initiatives ensuring this momentum is maintained, through less downtime and more "time on tools" for our workforce;
- Outsource work where we have identified that it is the most cost efficient option to do so; and
- Working with our contractors to meet our needs by way of three key frameworks on performance, assurance and commercial outcomes. These frameworks identify key leading and lagging measures for all contractors to foster a relationship of continuous improvement. In addition, new contract trials are underway that enable increased collaboration with our contractors and drives better commercial outcomes for Ausgrid's customers.

Transformation Program

Key learnings from the unique challenges of FY20-22 have been analysed and assessed by Ausgrid's Transformation Program. Our Transformation Program implements enhanced capability that enables Ausgrid to embed continual improvement into business operations.

Key initiatives have been identified and implemented by Ausgrid's Transformation Program. These initiatives enhance our capability to deliver the work plan through digital platforms and process optimisation across three key areas:

1. Organisational agility;
2. Seamless workforce operations, and
3. Advanced asset management.

Resourcing Strategy

Ausgrid's resourcing strategy ensures that the right resources are adequately trained and available at the right times to deliver our work plan. We have strategies in place to maintain the internal resources we need to keep pace with our capex program. This includes resource optimisation, transformation initiatives and the outsourcing of works where it is identified to deliver improved affordability outcomes for customers.

Internal processes and governance

Ausgrid's resourcing and delivery strategies sit within our internal Asset Management System (**AMS**) and our investment governance framework. Refer **section 4 – Capital planning and investment governance**.

5.3 Our cost estimation approach leads to effective management and application of unit rates

We use the most up to date cost estimations when planning our capex program. This allows us to make the most informed network investment decisions with respect to:

- Prudent and efficient network investment; and
- The net benefits to customers from planned projects and programs of work.
- A network that meets the needs of the customer now and into the future.

Part of our governance processes include regular reviews of outturn costs (unit cost) against our estimates. A full description of our approach is set out in **Attachment 5.3.b – Cost estimation approach**.

5.4 Further supporting material

Figure 5.3 Supporting documents and models – Index

Att #	Document name
5.3.a	Resourcing and delivery strategy for 2024-29 period
5.3.b	Cost estimation approach

6. Replacement

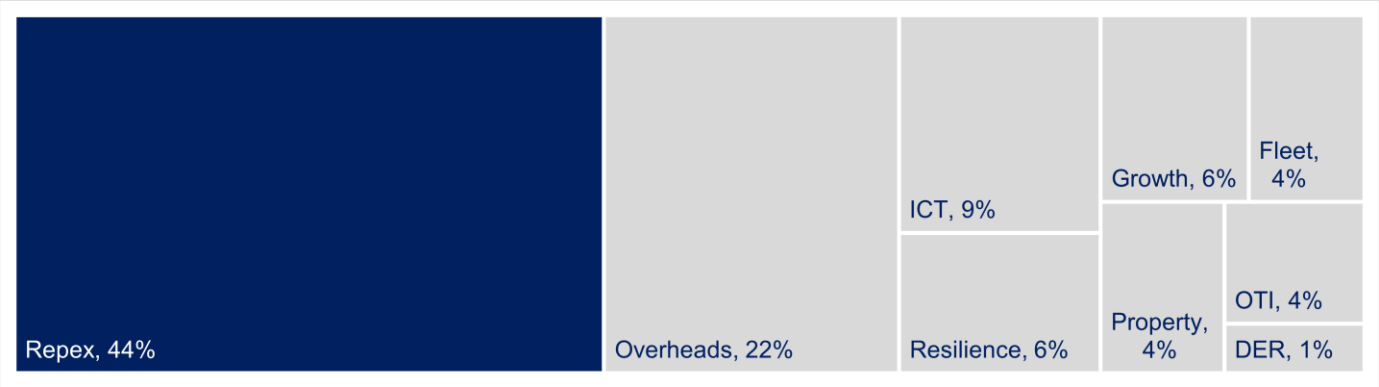
6.1 Overview

The Ausgrid network has a large population of existing assets that deteriorate as the network ages. Without appropriate management, these assets will fail and expose customers to poor network performance and unacceptable risks. To address these issues, we have ongoing replacement expenditure (**repex**) that includes:

- The replacement of individual assets under the replacement program; and
- The replacement of multiple assets under larger major projects.

Our repex programs and major projects forecast for 2024-29 is $1,446 million. This is the largest component of our capital expenditure forecast, representing 44% of our total capex program, as shown in **Figure 6.1.**

Figure 6.1 Forecast repex as a percentage of total capex



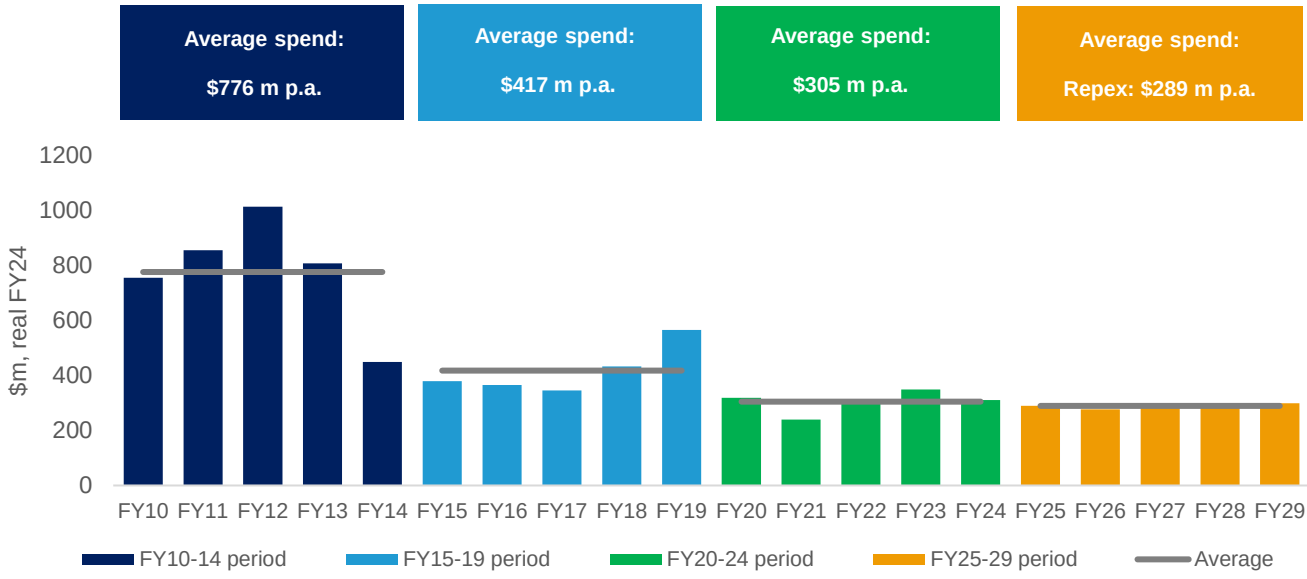
A breakdown of repex is shown in **Figure 6.2**. The forecast is broken down by asset class except for major projects, which is a combination of replacement needs across multiple asset classes, packaged into a single cost-effective solution. The bulk of major project investments for the 2024-29 regulatory period are sub-transmission cable replacements and major substation switchboard replacements. These assets are therefore not considered within the scope of programs under the relevant asset classes. Details on the major projects can be found within the **Attachment 5.4.b Major Projects – 11kV Switchgear replacement**, **Attachment 5.4.c Major projects – Sub-transmission cable replacement** and **Attachment 5.4.d Major projects – Other Replacement**.

Figure 6.2 Proposed repex for the 2024 – 29 period ($m, real FY24)

	FY25	FY26	FY27	FY28	FY29	FY25-29 (forecast)	FY20-24 (expected)	% change
Overhead Support Structures	38	39	39	39	39	194	235	(18%)
Overhead Mains	61	61	63	63	63	312	241	30%
Underground Cables	58	58	58	57	56	286	290	(1%)
Transformers & Reactive Plant	21	21	19	19	19	99	93	6%
Switchgear	29	25	25	25	24	128	115	12%
Communications & Protection	15	13	14	14	13	69	79	(12%)
Buildings, Grounds & Land	21	21	21	21	21	106	113	(6%)
Major Projects	44	39	42	60	63	251	357	(28%)
Total Replacement	**290**	**277**	**282**	**298**	**299**	**1,446**	**1,523**	**(5%)**

Figure 6.3 shows our historical and forecast replacement investment year-on-year and as an average over recent regulatory control periods. Our replacement expenditure trend analysis highlights a 5% reduction in forecast expenditure relative to our expected spend in the current period. Our replacement expenditure is supported by robust bottom-up and top-down assessment, providing a forecast that is expected to deliver consistent safety and reliability outcomes for customers over the medium term while recognising customer concerns about affordability.

Figure 6.3 Repex trend over a 20-year horizon ($m, real FY24)



The rigour we have applied is indicative of a prudent, efficient and customer centric forecast. The lower level of spend relative to our historical expenditure reinforces this conclusion. Our use of multiple forecasting techniques also demonstrates that we have taken steps to respond to AER feedback at our 2019-24 regulatory reset[14].

Customer perspective

Our customers' concerns about affordability will be met by a forecast repex that is 5% lower than our expected 2019-24 spend and 15% below our 2019-24 allowance. For customers, our forecast reduction in replacement capex means that they will be paying less to fund our core set of replacement needs.

Figure 6.4 Our recent achievements and how they will benefit customers in the 2024-29 period

	What we achieved in 2019-24	Benefits to customers in 2024-29
Evidence based	Evidence based decision making	Our forecast considers a range of inputs and does not solely rely on CBA outputs
Cost benefit analysis	Significantly improved CBA modelling	Our advanced repex CBA tools include greater levels of asset risk segmentation, supporting an effective, prioritised bottom-up forecast
Top-down evaluation	We have applied top-down evaluation to support the efficiency of our forecast	We have adopted multiple evaluation methods including the AER REPEX model to apply a top-down evaluation to our repex forecast
Innovation	We established a Network Innovation Advisory Committee (**NIAC**), including customer representatives, to drive investment of innovation on our network	Continued investment in innovation through the NIAC allows us to test solutions to improve customer benefits and keep downward pressure on risk

[14] AER, *Draft decision: Ausgrid 2019-24 determination*, November 2018, p. 19 (Attachment 5)

6.2 Evidence based decision making

Although we have made significant progress in our use of advanced analytics to support optimal asset replacement timing, we have not solely relied on CBA for our repex forecast. Where our CBA supports a step change in replacement relative to historical expenditure levels, we have considered this against historical investment levels, asset performance and associated asset risks before adopting the CBA outcomes. For example, for poles our CBA supports a step change in expenditure during the 2024-29 period in-line with the increasing asset age profile and low historical replacement rates. In contrast, pole failure rates (excluding weather impacted failures), remain low, supporting our exiting asset management approach. In this case, the 2024-29 forecast for overhead support structures, including poles, is more in-line with historical investment levels.

Where it is not practicable to apply CBA, we have used historical trend to inform our forecast. Our approach considers the impact of recent investment in an asset class when assessing whether the past is a good indicator of our future requirements. For example, if an asset class contains a population of poor performing assets, we have reviewed the remaining population before applying historical expenditure levels. This combination of approaches has led to a forecast that is lower than historical expenditure levels.

6.3 Multiple forecasting methods applied

Figure 6.5 summarises the forecast methodology considered and selected in determining our replacement forecast. The 2024-29 forecast relies on a combination of cost benefit analysis and historical trend. The option to maintain risk, the AER's repex model and age-based assessment were used to validate the reasonableness of the forecast. As we continue to mature our modelling over the 2024-29 period, we anticipate a higher proportion of our forecast will transition to CBA-based rather than historical trend.

Figure 6.5 Forecast method applied to each asset class

	CBA	Maintain Risk	Historical Trend	Repex Model	Age-based Assessment
Overhead Support Structures	●	○	○	○	○
Overhead Mains	◐	○	◐	○	○
Underground Cables	○	○	●	○	○
Transformers & Reactive Plant	◐	○	◐	○	○
Switchgear	◐	○	◐	○	○
Communications & Protection	◐	○	◐	○	○
Buildings, Grounds & Land	↻	↻	●	○	↻
Major Projects	●	n/a	○	○	n/a

● = selected forecast method
◐ = combined forecast method selected
○ = considered forecast method
↻ = under development

6.4 Significantly improved our CBA modelling

Determining the optimal timing to replace network assets is a complex task. Replacing assets too early results in customers bearing costs earlier than necessary. Waiting too long to replace assets can result in increased asset failures, exposing customers to loss of supply, safety impacts and damage to property and the environment.

Our historical levels of repex will lead to an increase in the age of our assets during the 2024-29 regulatory period. While asset age is not a direct representation of asset risk, it does provide a reasonable approximation for asset condition and therefore the risk of asset failure. Taking an age-based approach to replacement will result in a large increase in repex to maintain the average age of our assets. This level of step change was not supported by our current asset failure rates and does not align to customer priority for affordability.

To address the potential risk from the increasing network age we have sought to improve our CBA approach by:

- Developing advanced modelling techniques to better predict failure of individual assets,
- Advanced analytics from the University of Melbourne to better represent and segregate fire consequences,
- Increased use of historical performance data to support future predictions, and
- Increasing the coverage of our CBA to a larger proportion of repex

In doing so, we had regard to the AER's *Industry Practice Note: Asset Replacement Planning*[15]. The advancements in our modelling provide a greater level of asset coverage and at a greater level of detail. This uplift minimises uncertainty in risk and the potential for early life replacements.

As outlined in **Figure 6.6**, our CBA approach now covers most of our repex. Our expansion in CBA coverage is a material improvement on our 2019-24 proposal, which was triggered by AER feedback at that determination. For more detail on our CBA approach refer to **Attachment 5.4.e CBA Approach for replacement programs** and **Attachment 5.4.f CBA Approach for major projects**.

Figure 6.6 Percentage coverage of CBAs for replacement activities

Replacement Type	Maturity
Major Projects	**100%** of our major projects subject to CBA
Programs	**85%** of replacement programs subject to CBA
Total Replacement	Approximately **90%** of all replacement investment subject to CBA

Customer perspective

The significant improvements to the accuracy of our CBA modelling reduces the risk of early asset replacement, reducing the cost to customers, while still achieving the desired performance.

6.5 Top-down evaluation

As noted under **Section 6.3**, we have applied multiple top-down evaluation methods to test the prudency and efficiency of our forecast utilising:

1. Historical trend (as shown in **Figure 6.3**);
2. Age-based assessment (replacement rate required to maintain average asset age);
3. Maintaining risk (replacement rate required to maintain current asset risk levels using our CBA model);
4. AER repex model

Due to the different risks across businesses and focus areas from one regulatory period to the next, we consider these top-down evaluation methods to be most valuable at the aggregate repex level, rather than at an asset class level. In each case, our forecast was in-line with or lower than the expenditure profile supported by these top-down methods supporting the prudency and efficiency of our forecast.

The AER repex model is one of the key methods used to undertake a top-down evaluation. One advantage it has over the other methods is that it applies benchmarking across peers in the NEM and is the preferred method used by the AER. The following section provides greater detail on the approach and outputs from the repex model.

[15] AER, *Industry practice application note - Asset replacement planning* (25 January 2019).

6.5.1 AER repex model

The repex model uses the following key inputs to derive a replacement expenditure forecast:

1. Asset age profile;
2. Calibrated asset lives (historical replacement volume); and
3. Historical replacement cost.

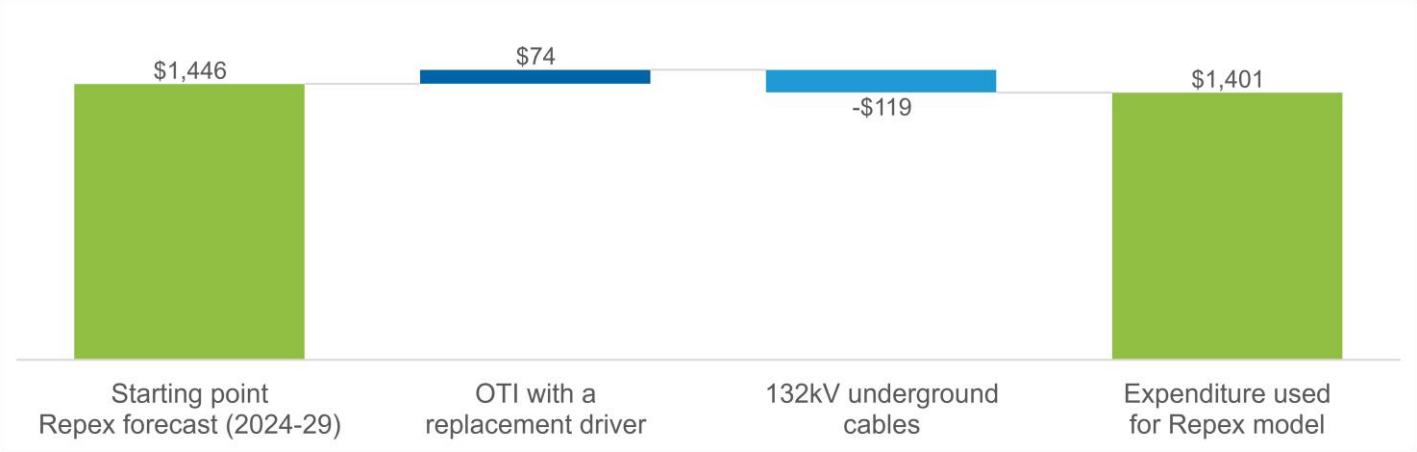
The calibrated asset lives are determined from historical replacement volumes. The overlay of the calibrated asset lives over the asset age profile is used to determine the forecast replacement volume. This data is sourced every year by the AER from all NEM peers, so that analysis and benchmarking can be undertaken across multiple years.

Consistent with previous regulatory periods, we have some additional inclusions and exclusions of expenditure in-line with our 2019-24 determination and pre-lodgement engagement with the AER. This resulted in the:

- **Inclusion in the repex model:** a component of our OTI forecast ($74 million) which involves the replacement of existing equipment, and
- **Exclusion from the repex model:** the replacement of 132kV Underground Cables ($119 million) which is a unique asset to our network which cannot be benchmarked with our peers.

Figure 6.7 shows the adjustments to our repex forecast of $1,446 million to arrive at the expenditure amount included in the repex model.

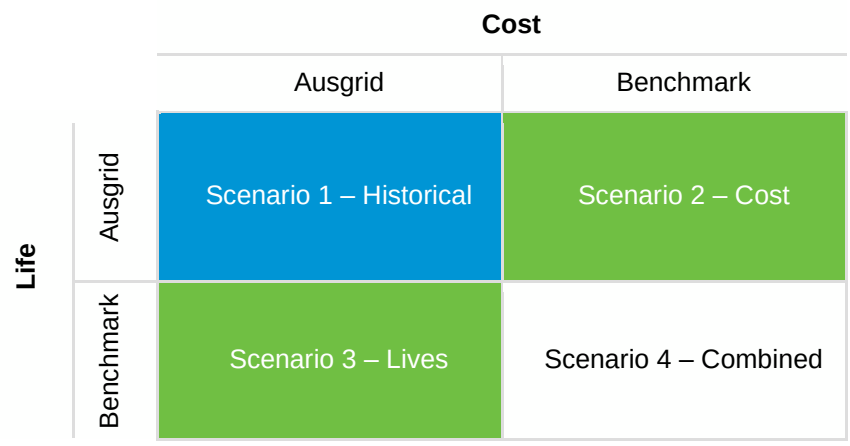
Figure 6.7 Capex included in the AER's repex model ($m FY24 Real)



Due to the different risks across businesses and changing replacement focus areas from one regulatory period to the next, we consider the repex model to be most valuable at the aggregate, rather than individual asset, level. As a result, we have utilised the tool as a helpful top-down check, rather than using it to derive our forecast.

The repex model combines forecast replacement volumes with historical replacement costs to produce an expenditure forecast. The calibrated asset lives and replacement costs are then benchmarked across our peers in the NEM. Through this benchmarking, 4 scenarios are considered (as shown in **Figure 6.8**).

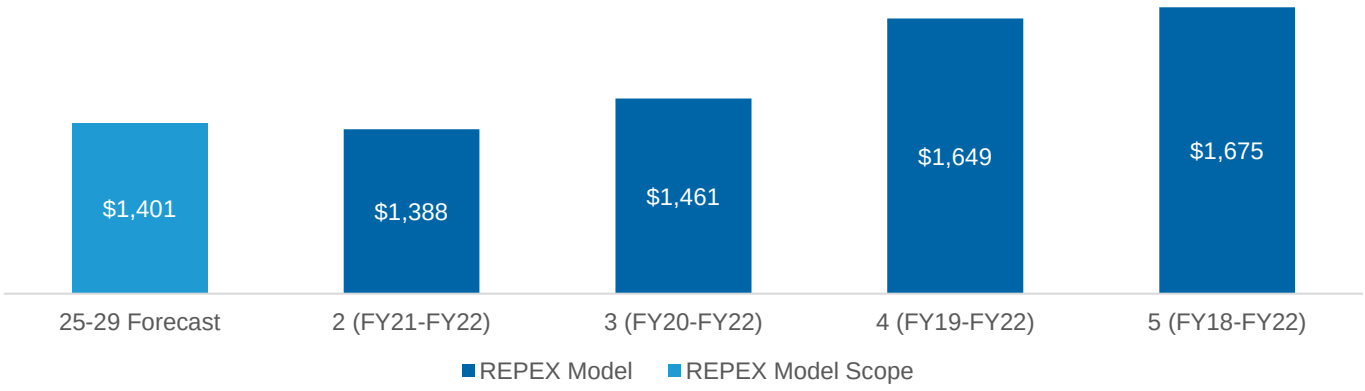
Figure 6.8 Repex model scenarios



Scenarios 2 and 3 allow for benchmarking between networks that may have higher cost longer life assets and those with lower cost shorter life assets and are therefore the more appropriate to consider. Further detail on these scenarios and their application is found in the AER's *Explanatory Note* to its review of replacement expenditure modelling assumptions[16].

Repex model outcomes will vary depending on how many historical years of data are included. If we look too far back, the expenditure may not accurately reflect the current condition of the assets, the current practices and standards used, and the current operating environment including rules and regulations. Alternatively, if too short a period is used, short-term behaviours or external factors will dominate the analysis. This has been observed recently when transient factors such as COVID-19, a live work pause and industrial action inhibited replacement activity in FY20, FY21 and FY22. While we have made strong moves to recover from recent transient factors, our repex model outcomes will continue to be impacted. This is given that the repex model relies on historical replacement volumes to inform calibrated asset lives. To balance these two areas of concern, we ran the repex model with multiple options – from two years of historical data up to five years. The analysis shows the impact from the recent delivery constraints. When reviewed over the five years, the analysis supports a more stable forecast. **Figure 6.9** shows how our 2024-29 forecast compares to the AER's repex model results. This analysis has adopted repex scenario 3, which is the likely scenario used in-line with the AER's Explanatory Note to its *Review of replacement expenditure modelling assumptions*.[17]

Figure 6.9 Comparing our forecast with the AER's repex model (scenario 3)



[16] AER, *Explanatory Note - Review of replacement expenditure modelling assumptions* (6 December 2019).
[17] AER, *Explanatory Note - Review of replacement expenditure modelling assumptions* (6 December 2019), p. 4.

These results highlight that the 2024-29 forecast is aligned to the three year repex model view despite the impacts seen during the FY20 – FY22 period. These results further support our bottom-up forecasting approach.

Customer perspective

The performance of our forecast against the repex model provides customers with additional confidence that our proposal is prudent and efficient.

6.6 Investing in innovation on our network

Our bottom-up cost benefit analysis assesses the benefits from replacing assets under a like-for-like or like-for-new option. However, we recognise that some benefits may be realised (or risks reduced) by applying innovative technologies.

$87m of OTI investment relates to replacement expenditure in new or emerging technologies to improve the long-term efficiency and / or short-term services to customers. $74m of which is captured under the repex model, as noted in **Section 6.5**. The 2024-29 forecast has been included in the AER repex model as part of the top-down evaluation of replacement expenditure. Details on OTI capital investment is captured under **Section 10** of this document.

6.7 Further supporting material

Figure 6.10 Supporting documents and models – Index

Att #	Document name
5.2.c	Customer value framework
5.3.d	Principles of cost benefit analysis
5.4.a	Asset replacement programs
5.4.b	Major projects - 11kV switchgear replacement
5.4.c	Major projects - Sub-transmission cable replacement
5.4.d	Major projects - Other replacement
5.4.e	CBA approach for replacement programs
5.4.f	CBA approach for major projects
5.4.g	Independent review of CBA modelling
5.8.a	Network innovation program
5.8.c	Control system core refresh program
5.8.d	Operational Technology security program
5.8.e	Network digitisation program

Figure 6.12 RCP meetings – Presentation index

Presentation	Date
Repex model deep dive	16 November 2021
CBA modelling of bushfires	17 February 2022
Deep dive on NPV metrics (repex and ICT focus)	24 March 2022
Repex – Comparison to repex model threshold	26 April 2022
Repex update	9 June 2022

RCP modelling workshop	11 October 2022

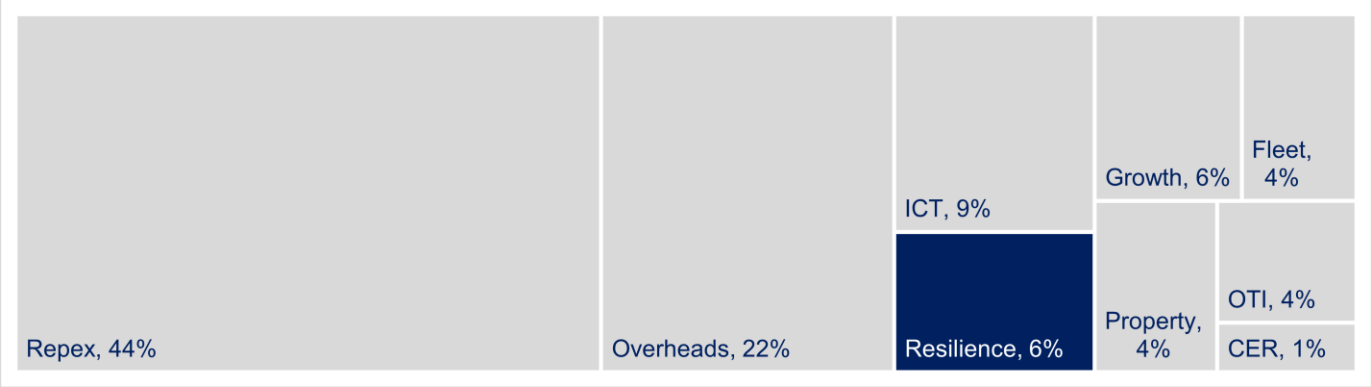
7. Climate Resilience

7.1 Overview

Climate change is causing more frequent and extreme weather events which increases the risk to our economies and societies. Ausgrid, as a critical infrastructure provider is also exposed to these kinds of events, which can cause significant loss and inconvenience to communities, especially during prolonged power outages. To meet the expectations of customers, and objectives of the NEO, Ausgrid is seeking, with communities and other resilience actors, to implement resilience related solutions.

We have put customers at the centre of the development of our resilience forecast. Our modelling indicates that investments of up to $319 million on resilience initiatives would deliver net benefits for customers. However, at this stage we are proposing to spend a lower amount ($194 million) in line with an investment cap the VOC panel recommended. Our resilience forecast, at this stage, represents 6% of our total capex program in the 2024-29 period (see **Figure 7.1**).

Figure 7.1 Forecast resilience as a percentage of total capex



Our engagement with customers on resilience has been extensive. In addition to in-depth conversations with the Voice of the Community panel, we co-designed a resilience investment framework with the RCP called *Promoting the long-term interests of consumers in a changing climate: A decision-making framework* (**Climate Resilience Framework**).

More recently, we came to the joint view with the RCP that further engagement is needed. This prompted us to develop an Implementation Plan to our Climate Resilience Framework that builds on the conversations we have been having over the past 18 months. Its key features are set out in **Figure 7.2** below.

Figure 7.2 Implementation plan for further engagement on resilience

7.2 Our resilience program is consistent with the AER Network resilience guidance note

The AER's *Network Resilience Guidance Note*[18] (**AER Resilience Note**) acknowledges that Network Service Providers (**NSPs**) play an important role in the provision of essential services to communities in the lead-up to, during, and after a natural disaster. It also takes the view that network and community resilience are related concepts and that a resilient network can assist in building community resilience. The AER Resilience Note provides guidance for NSPs in considering resilience within the regulatory framework and outlines the AER's expectation that – to support evidence that resilience funding is prudent and efficient to achieve the expenditure objectives – NSPs demonstrate, within reason, that:

1. There is a causal relationship between the proposed resilience expenditure and the expected increase in the extreme weather events;
2. 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
3. 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 address each of these in turn below.

7.2.1 There is a causal relationship between the proposed resilience expenditure and the expected increase in the extreme weather events

Our current network performance is susceptible to the impacts of extreme weather events. **Figure 7.3** shows that over the last 10 years there is a delineation in outages 'with and without' the presence of weather. This is such that:

- **No weather-related events:** our network performance is relatively stable (**dark blue** columns in **Figure 7.3**)
- **MED, MED+[19] and other weather**: our network performance varies year on year depending on the presence of a MED and other climatic events (**green**, **light blue** and **dark** columns in **Figure 7.3**).

Figure 7.3 10-year historic climate and non-climate related network performance

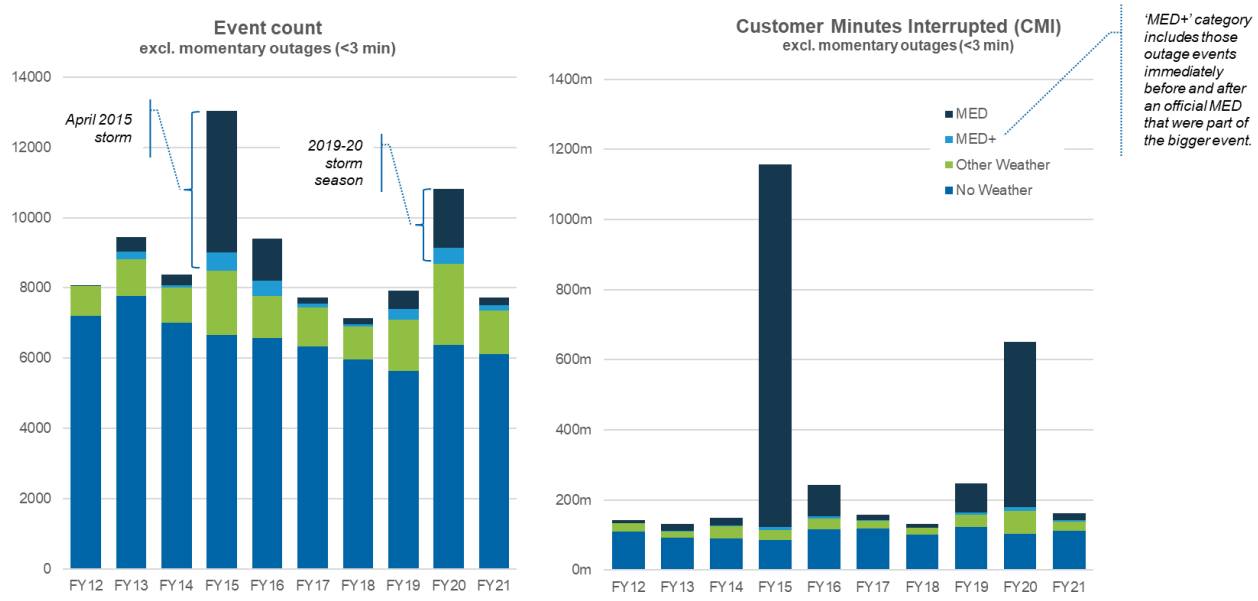
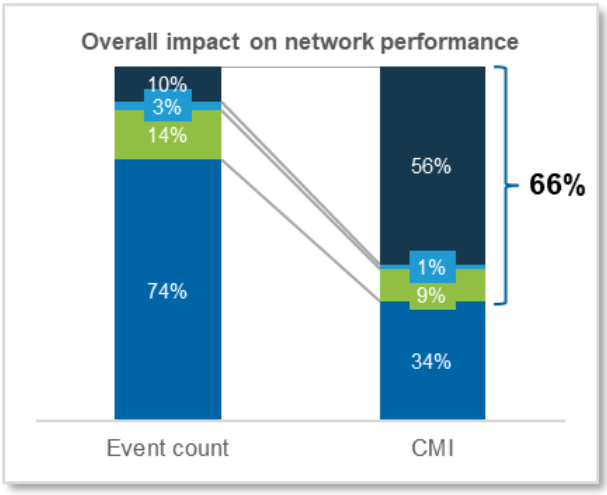


Figure 7.4 below summarises these results over the observed 10-year period (FY12-21). It shows that 27% of outages on our network are caused by climate events. While significant, this outage count understates their impact on customers. This is given that 66% of customers minutes interrupted (**CMI**) on our network relate to weather events; of

[18] AER, *Network resilience: A note on key issues* (April 2022).
[19] The 'MED+' category include outages immediately before and after a declared MED.

which, 56% relate to declared MEDs. The declared MED share is significant since the impact of these interrupted minutes on customers is excluded from traditional investment (repex and growth) considerations.

Figure 7.4 Comparison of climate and non-climate related event count and minutes interrupted



To better understand our climate risks, we commissioned climate scientists (Risk Frontiers) and modelling experts to establish a localised understanding of the climate risks faced in our network area, and how much those risks are likely to change over the coming decades. This modelling shows that we can expect a 26% increase, on average, in exposure to climate risks across our network area by 2050, and 31% by 2090.[20] From a network perspective, our impact analysis shows that by 2050, we can expect a similar (24%) increase in climate related asset failures and associated interruptions experienced by our customers. Focusing on the growth in climate risk minimises overlap with replacement expenditure, which is based on historical performance and expenditure levels relative to historical climate conditions.

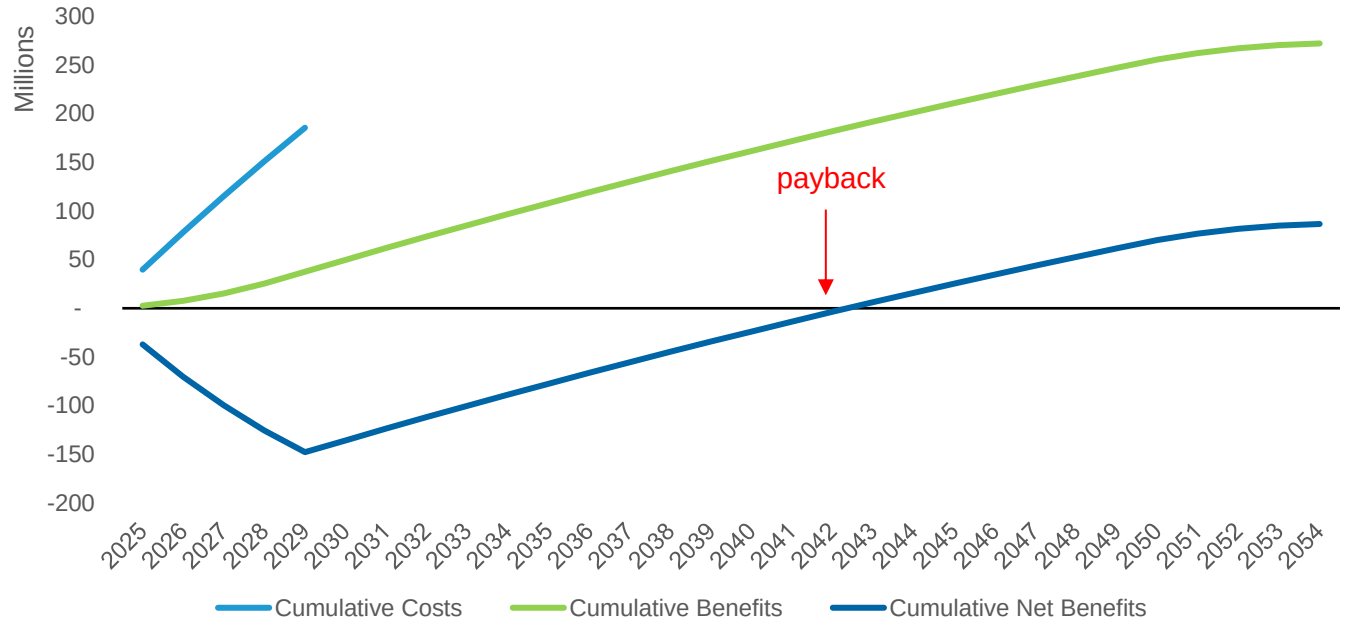
The initiatives we employ to address this growth in climate risk may include non-network solutions as well as network-based solutions such as covered conductors, aerial bundled cable, composite poles, and network segmentation initiatives. The composition of initiatives making up our resilience forecast is subject to change in response to the feedback we receive from customers through our Implementation Plan.

We have tested the required causal link between our current resilience investment envelope ($194 million) and the expected increase in extreme weather events. To do this, we modelled customer benefits over a time horizon that typically corresponds with the useful life of network assets.

A summary of this modelling is set out in **Figure 7.5** below. It shows that the customer benefits from our resilience program accumulate over time, with a payback period (benefits = costs) expected after our 2024-29 period. This reinforces the causal link between our forecast expenditure and the expected increase in extreme weather, as it shows that our planned resilience program will deliver net benefits to customers based on our understanding of our change in climate risks and the expected impacts on our network. We will revisit this analysis after we have completed our Implementation Plan.

20 Based on Representative Concentration Pathway 4.5.

Figure 7.5 Cumulative costs and benefits from resilience program ($m, real FY24)



7.2.2 The proposed expenditure is required to maintain service levels and is based on the mitigation options that achieve the greatest net benefit of the feasible options considered

The expectation that our resilience program maintains service levels and is based on the options that achieve the greatest net benefit are twin requirements which we have considered separately below.

Maintain service levels

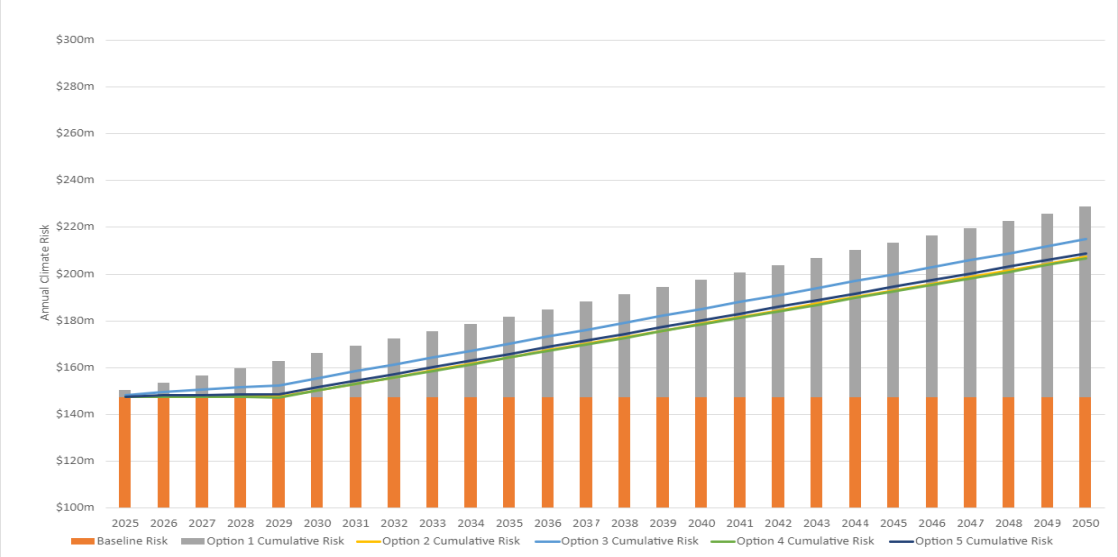
Our total 2024-29 capex program aims to maintain existing levels of service for customers. The resilience initiatives within our total program (6% of total capex) contribute to this outcome by containing the expected increase in climate-related risks that could lead to longer customer outages or safety hazards.

Our approach to calculating the expected growth in climate risk, which could lead to a degradation in existing services, involved calculating:

- Our baseline level of climate risk in FY20; and
- The change in risk in a ‘do nothing’ scenario, modelled over low, medium and high emission pathways (whereby Emissions Pathways are greenhouse gas concentration trajectories adopted by the Intergovernmental Panel on Climate Change).

Figure 7.6 sets out the growth in risk ($m) for the Emissions Pathways modelled under a ‘do nothing’ scenario. It shows that future customers would face materially higher climate risks, and ultimately poorer service levels, if we do not begin acting today to tackle the long-term challenge of climate change. This growth in climate risk, which has been monetised in **Figure 7.6** using the AER’s customer value of reliability (**VCR**), is predominately made up of estimated unserved energy i.e. longer and more frequent customer outages.

Figure 7.6 Growth in climate related risk compared to our 2020 baseline



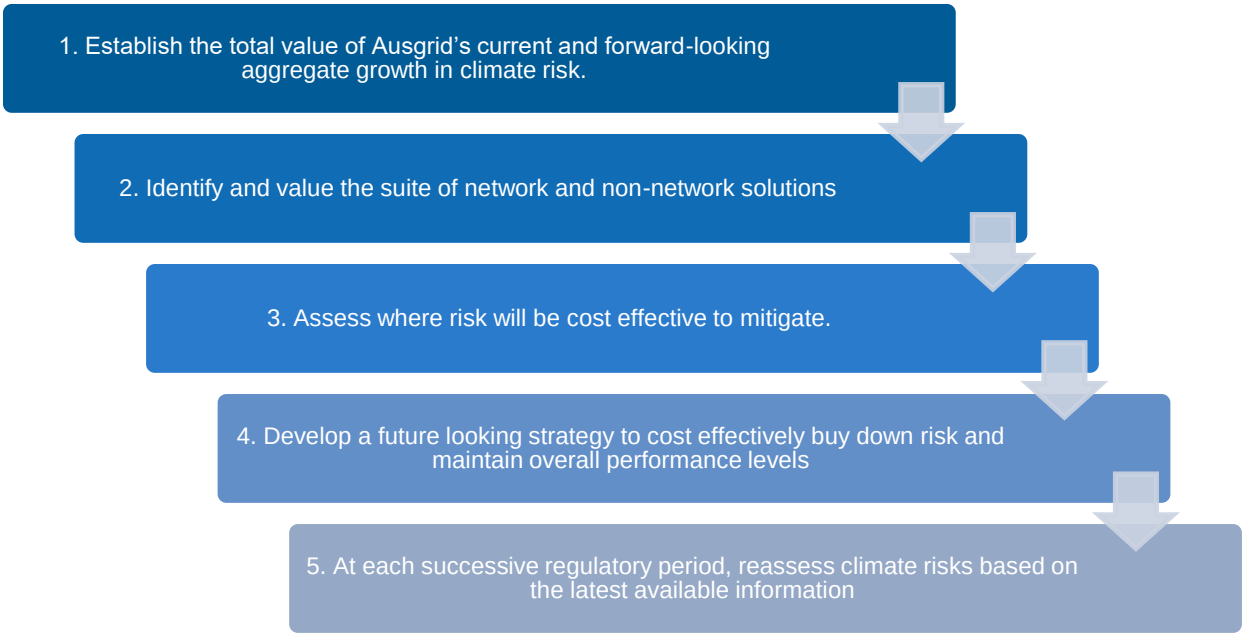
Greatest net benefit to customers

We are committed to achieving the greatest net benefit to customers, out of the feasible options considered.

To achieve this, our current plan is to prioritise the worst impacted locations on our network. **O**ur analysis has observed that the worst served LGAs experience up to three times more climate related outages than the network average, and 10 times more than those within inner Sydney. By targeting these locations, we may be able to deliver the greatest benefits for customers. The fairness of this approach, among other things, will be tested via our Implementation Plan.

Our investment decision making framework also facilitates outcomes that deliver the greatest benefit to customers. We apply a more cautious 'investment hurdle' for resilience-based initiatives compared to other investments. This cautious approach requires a minimum benefit-cost ratio (**BCR**) of 1.2. That is, the benefits from a resilience initiative must be at least 20% greater than the costs to customers, or the option will not go-ahead. Our full investment approach is summarised in **Figure 7.7**.

Figure 7.7 Our approach to developing a prudent portfolio of resilience initiatives



Our modelling of the aggregate growth in our climate risk (step 1 in **Figure 7.7** above) is $1.7 billion by 2050. To address this growth in climate risk via a smooth investment profile over multiple regulatory periods, an investment of $64 million per annum or $319 million over the 2024-29 regulatory period would be required. Our forecast of climate resilience capex of $194 million (and totex of $202 million) in the 2024-29 regulatory period is reflective of the level of investment supported by our VOC panel.

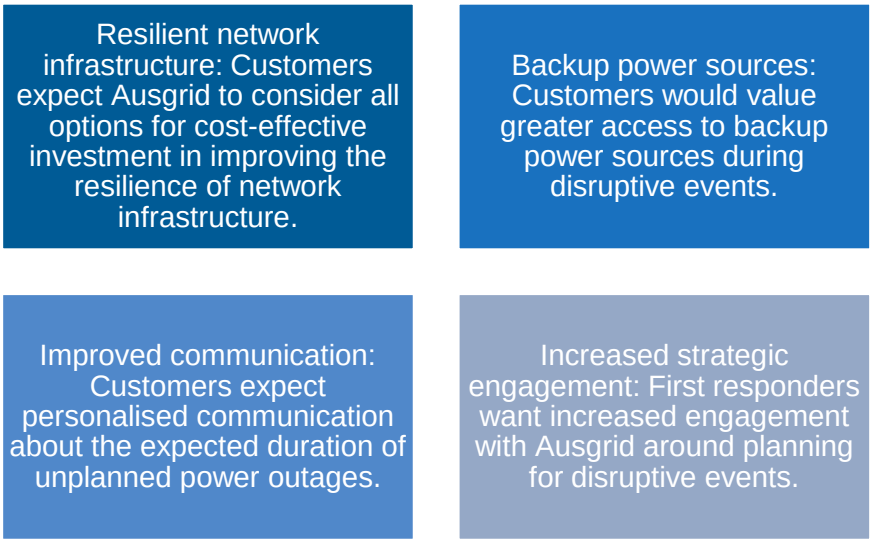
Further engagement is nonetheless required given our ambitions to take a leading role in the development of a prudent, efficient and customer centric approach to resilience investment decision making. This will be the focus of our Implementation Plan.

7.2.3 Our forecast resilience capex is supported by our customers and communities

When looking at the impacts of climate change, Ausgrid is committed to providing the best result for our customers.

We have undertaken deep and thorough engagement with our key stakeholders. We have heard from our customers, employees, shareholders, partners, and Indigenous communities, that we need to respond to a changing climate. They have told us that they want us to invest in resilient network infrastructure, be more innovative and data driven in identifying the most cost effective options, provide better backup power sources, improve communications, and build stronger strategic relationships with other resilience actors which includes co-funding.

Figure 7.9 What customers have told us so far about their priorities for building resilience



The VOC panel supported resilience related expenditure over the 2024-29 period up to a capped amount of about $200 million. Over the first half of calendar year 2023, we will be testing and refining all new resilience related expenditure via our Implementation Plan that puts our co-designed Climate Resilience Framework into action.

7.3 Further supporting material

Figure 7.10 Supporting documents and models – Index

Att #	Document name
5.5	Climate resilience program
5.5.a	Resilience implementation plan
5.5.b	Climate impact assessment
5.5.c	Climate resilience framework
5.5.d	Climate resilience CBA model
5.5.e	KPMG partner letter for climate impact assessment work

5.5.f	Risk Frontiers letter for climate impact assessment work

Figure 7.11 RCP meetings – Presentation index

Presentation	Date
Climate impact study kick off	2 September 2021
Network resilience	19 October 2021
Resilience framework	3 December 2021
Resilience engagement update	15 December 2021
Climate resilience activities	17 February 2022
Resilience submissions	28 March 2022
Co-design workshop 1 (framework)	4 May 2022
Resilience partnerships update	13 May 2022
Resilience paper	24 May 2022
Co-design workshop 2 (framework)	3 June 2022
Co-design workshop 3 (framework)	14 June 2022
Climate impact study	15 July 2022
Co-design presentation on framework	2 August 2022
Resilience framework - Road-test	6 September 2022
Resilience framework	9 September 2022
Feedback on resilience framework	21 October 2022
RCP modelling demonstration	17 November 2022
Framework consultation feedback	21 November 2022
Co-designed Framework implementation planning session 1	9 December 2022
Co-designed Framework implementation planning session 2	13 December 2022
Co-designed Implementation Planning Session 2023	22 December 2022
Co-designed Implementation Planning Workshop	10 January 2023
LGA Engagement Planning Workshop	16 January 2023
LGA Engagement Kick off	24 January 2023

8. Growth

8.1 Overview

Our forecast for growth capex totals $190 million in the 2024-29 period, comprising:

- Augmentation capex (**augex**) of $138 million, including $11 million of business as usual reliability capex; and
- Connections capex of $51 million over the regulatory period.

Augex refers to works needed on our shared network to meet increases in demand for energy and to address business as usual reliability issues affecting very localised cases of poor reliability performance. These reliability programs primarily manage the risk of day-to-day reliability events and do not consider risks associated with climate driven major events (typically captured via Major Event Days and considered within the new Resilience program). Connection capex refers to new installations to provide reliable supply to customers who want access to the shared network.

For our customers, growth capex is critical. It keeps our power supply safe, reliable and secure by enabling our network to meet its predicted load growth. Growth capex also allows new customers to connect to our grid. **Figure 8.1** shows that growth capex makes up 6% of our total forecast capex.

Figure 8.1 Forecast growth capex as a percentage of total capex

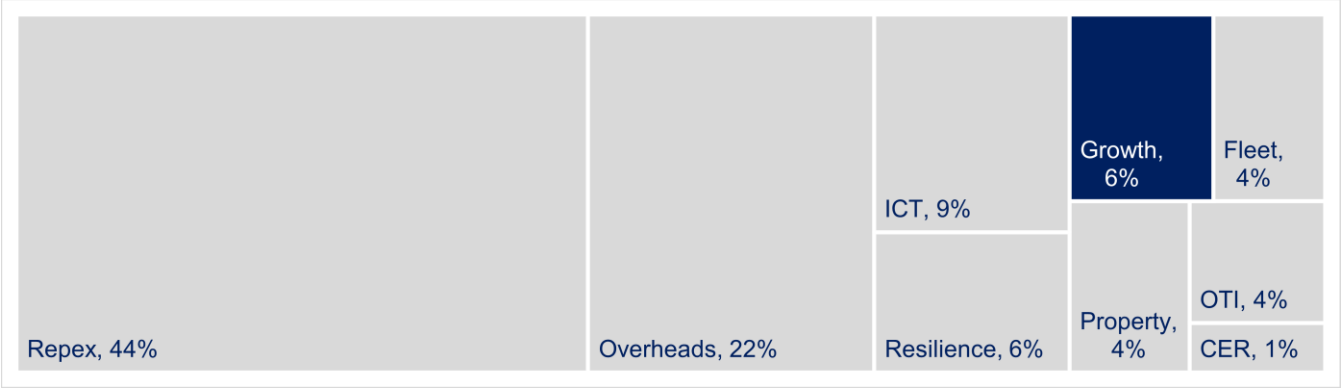


Figure 8.2 Forecast growth capex ($m, real FY24)

	FY25	FY26	FY27	FY28	FY29	FY25-29
Growth	36	26	27	26	24	**138**
Connections	13	10	9	10	9	**51**
Total	**49**	**36**	**36**	**36**	**34**	**190**

Figure 8.3 Proof points showing that our 2024-29 capex is prudent, efficient and customer focused

Factor	Proof point
Trend and affordability (see **section 8.2**)	Our growth forecast is 9% below our 2019-24 spend and 27% less than our allowance in that period. This promotes affordability for our customers at a time of rising cost of living pressures

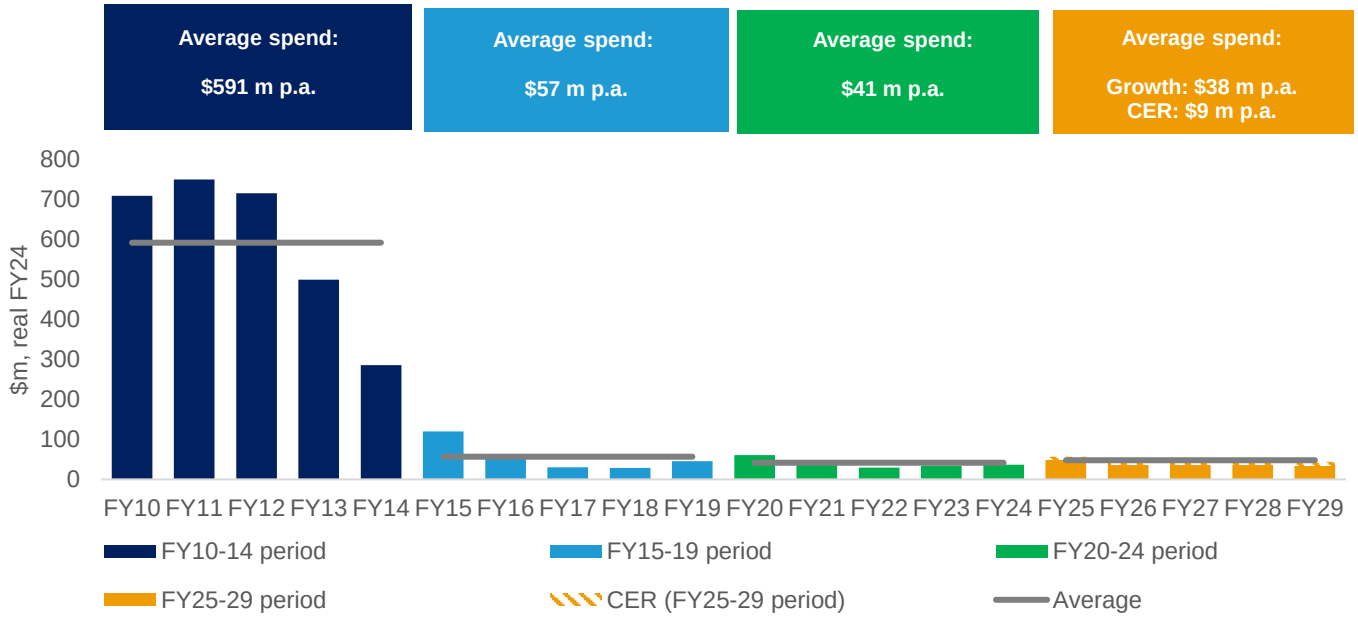
	Independent verification (see **section 8.3**)	Our demand forecast is comprehensive and has been independently verified
	Efficiently responding to spot load growth (see **section 8.3.3**)	We are efficiently responding to spot load growth in areas on our grid triggered by localised load growth

8.2 Our forecast capex is 9% less than our 2019-24 spend

Our forecast growth capex is 9% below our 2019-24 spend and 27% less than our allowance for that period.

Figure 8.4 sets out our trend in growth capex over a 20-year horizon and shows that our spend is well below our peak levels of investment. There is also a relationship between our growth capex and CER integration capex because our CER capex enablement program (discussed in **Section 9**) will deliver more capacity to the grid, complementing our traditional growth capex needs. Due to this relationship, we have set out our growth capex and CER integration investments together in **Figure 8.4** below.

Figure 8.4 Growth capex trend over a 20-year horizon ($m, real FY24)



Customer perspective

The significant reduction in our forecast growth capex ($18 million lower compared to the 2019-24 period) will promote affordability at a time when customers are telling us they are concerned about rising cost of living pressures.

8.3 Our demand forecast is comprehensive and independently tested

Our maximum demand forecasts are produced annually for over 200 zone and sub-transmission substations. For the initial years of this forecast we employ trend analysis from weather normalised actual data, adjusted for known block loads. We then transition to system level econometric modelling for the later years, with the econometric model exclusively used from year 5 onwards. This is outlined in more detail in **Attachment 5.6: Electricity demand forecast report – January 2023**.

8.3.1 Inputs into modelling approach

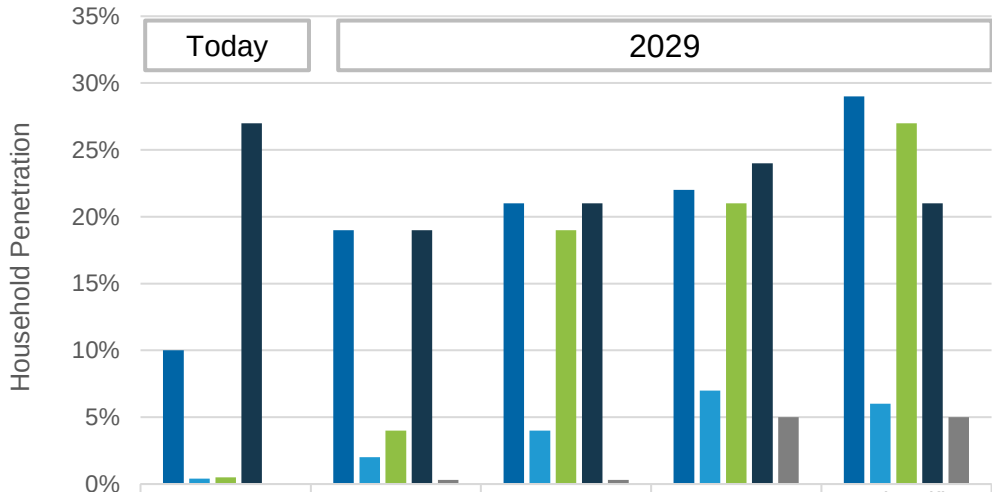
Our growth capex enables new customers to connect to our infrastructure and for our network to meet peak demand from customers. Our approach to forecasting peak demand is based on our share of the inputs and assumptions in AEMO's 2022 Integrated System Plan (**ISP**).[21] Ausgrid supplies approximately 40% of NSW peak demand and around 36-38% of energy delivered in NSW each year (based on AEMO NSW NEM region data).

AEMO's 2022 ISP includes the following scenarios:

1. **Slow Change:** Challenging economic environment with slower net zero emissions action. Slow Change would not reach the decarbonisation objectives of Australia's Emissions Reduction Plan;
2. **Progressive Change:** Delivers the decarbonisation objectives of Australia's Emissions Reduction Plan, with a progressive build-up of momentum ending with deep cuts in emissions across the economy from the 2040s;
3. **Step Change:** Moves much faster initially to fulfilling Australia's net zero policy commitments that would further help to limit global temperature rise to below 2°C compared to pre-industrial levels. Rather than building momentum as Progressive Change does, Step Change sees a consistently fast-paced transition from fossil fuel to renewable energy in the NEM; and
4. **Strong Electrification:** Consistent with strong global action on climate change and significant technological breakthroughs to achieve an even more rapid transition to net zero than Progressive Change or Step Change scenarios.

Figure 8.5 summarises the customer technology adoption assumptions for our network as applied to each of the AEMO scenarios. We have adopted the 'Step Change' scenario when developing our peak demand forecast. The 2022 ISP process identified this scenario as the most likely based on ageing generation plants, technical innovation, government policies and consumer choice.

Figure 8.5 Customer technology adoption assumptions within our network context



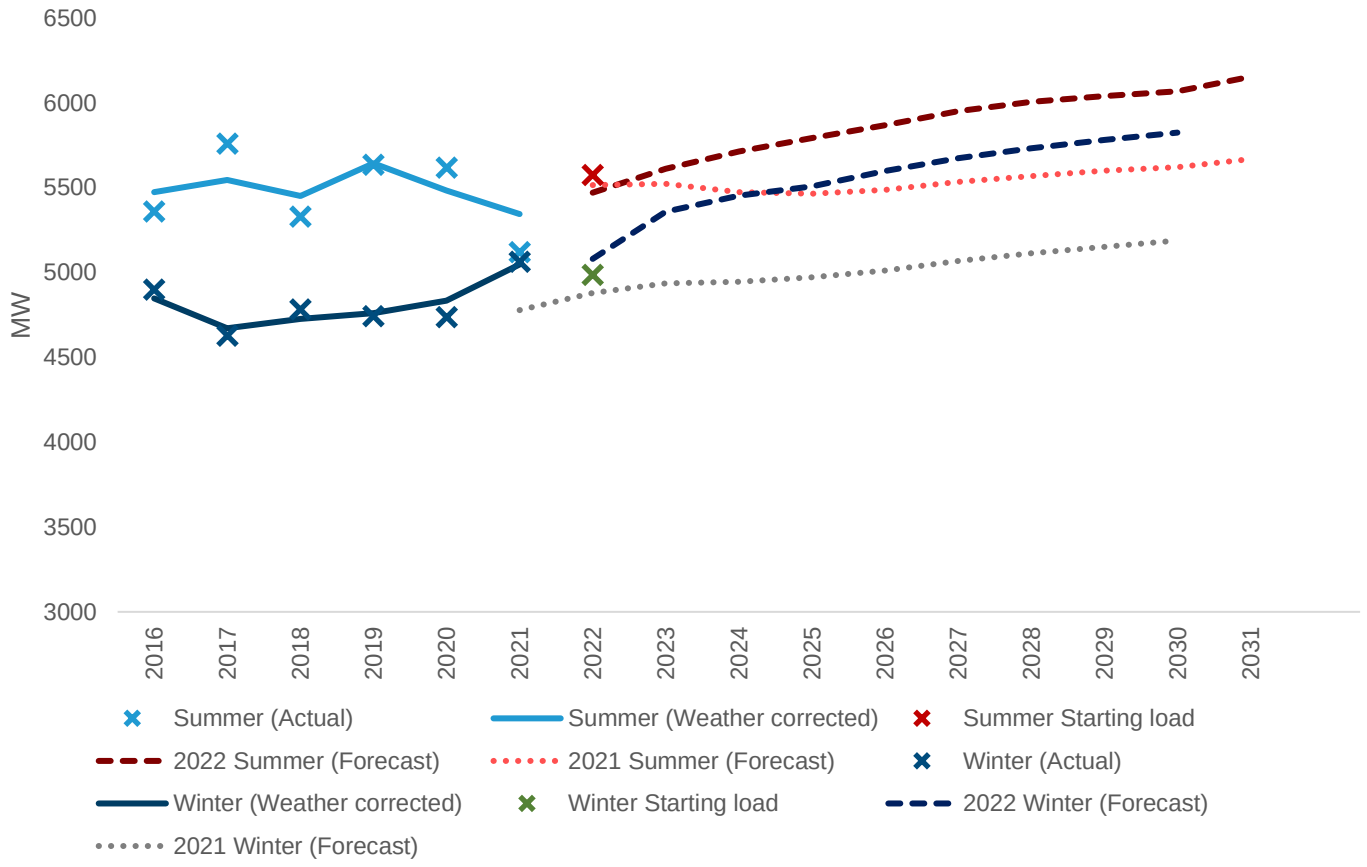
	Current	Slow	Progressive	Step	Electrification
PV	10%	19%	21%	22%	29%
Battery Storage	0.40%	2%	4%	7%	6%
EVs	0.50%	4%	19%	21%	27%
Off Peak Hot Water	27%	19%	21%	24%	21%
Electrification of Residential Gas	0	0.3%	0.3%	5%	5%

[21] AEMO (2022), *2022 Integrated System Plan (ISP)*.

8.3.2 Forecast Outcomes – Spatial Maximum Demand Forecast

Our 2022 forecast is based on the AEMO 'Step Change' scenario assumptions applied to Ausgrid's customer demographic and network. This is set out in **Figure 8.6** below. We selected the Step Change as the most likely option – in line with industry consensus.

Figure 8.6 2022 total maximum demand forecast



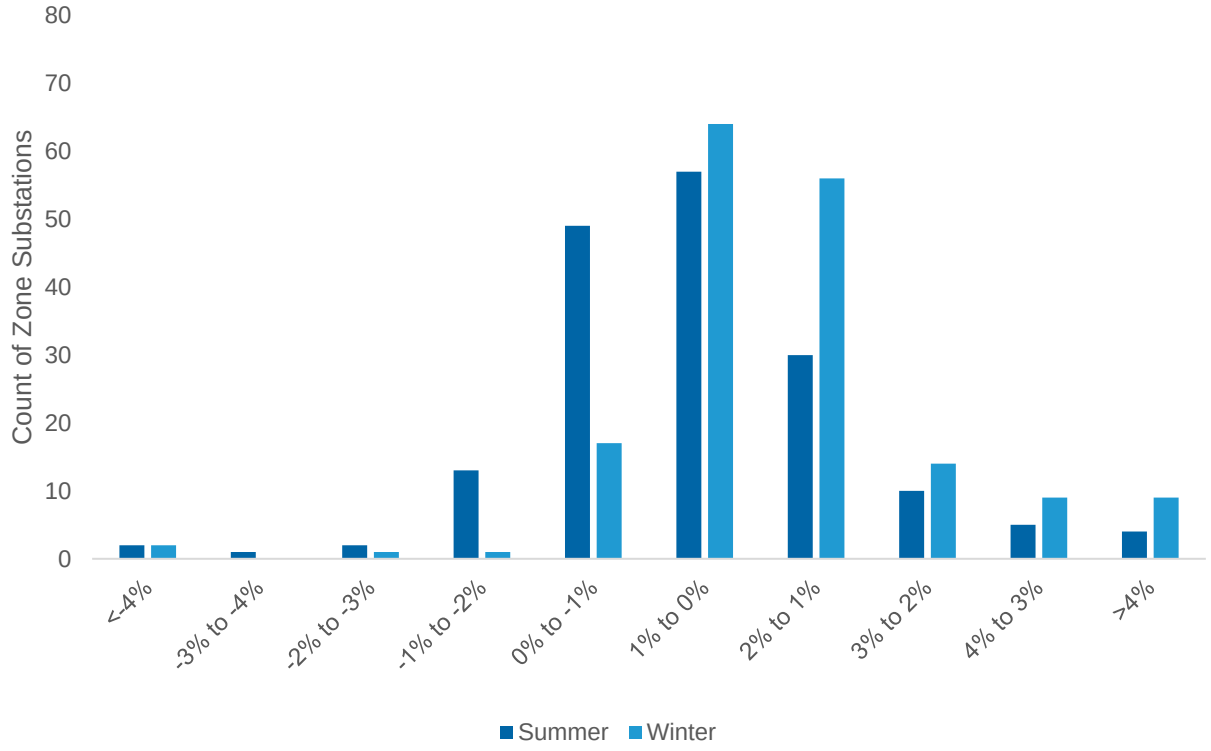
The compound annual growth rate (**CAGR**) is 1.1% per annum for summer peak demand and 1.2% per annum for winter during the 2024-29 period. FY21 forecast was 0.5% in summer and 0.8% winter for the same period. Uplift in EV uptake forecast is the major contributor to this forecast demand increase over the FY21 forecast.

8.3.3 Efficiently responding to spot load growth

Overall maximum demand provides a macro view of predicted load growth. While this view is important, constraints and/or headroom on our network will vary depending on location and specific network assets.

Figure 8.7 below shows the distribution of growth across our approximately 180 zone substations. It shows that while growth for the majority of zones falls close to the overall CAGR (1.1 to 1.2% per annum), there are a number of locations where growth is higher or lower than the average.

Figure 8.7 Growth in demand at individual zone substations on our network



8.3.4 Factors supporting the efficiency of our forecast

The management of growth on our network is becoming more challenging as large loads such as datacentres and infrastructure projects seek to connect to our network in localised areas, and transport and other parts of the economy become electrified. Our CBAs step through how we have selected the option that delivers the most economic benefits for customers (see **Attachment 5.6a to 5.6e**). Some of the factors we have taken into account to support the efficiency of our forecast are outlined below.

Factoring in the impact of CER

There is a relationship between our growth capex and CER integration capex. This is because our CER capex enablement program (discussed in **Section 9**) will deliver more capacity to the grid, complementing our traditional growth capex needs. Our capex forecast takes this into account through our agent-based modelling.

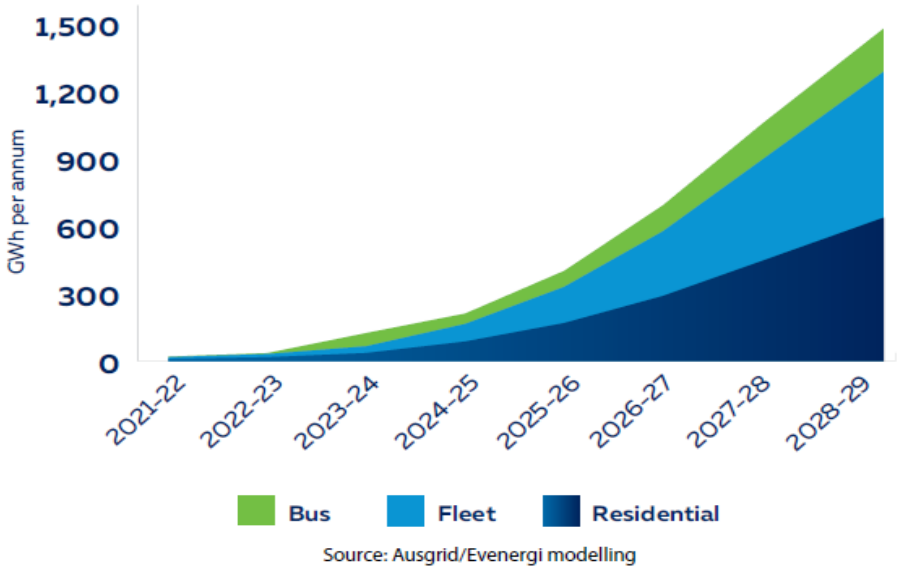
Under this approach, an agent type is assigned to each customer where variations in load are expected due to CER related adoption including rooftop solar, customer batteries, EVs, shifting off-peak hot water loads (solar soak) and electrification of residential gas. Loads which do not vary with these elements are not assigned agents but are treated as fixed loads for the purposes of this model. More information can be found in **Attachment 5.7 – CER Integration strategy**.

Managing demand through cost reflective tariffs

The Step Change scenario in AEMO's 2022 ISP forecasts that annual electricity consumption from the grid will double by 2050 as transport, heating, cooking and industrial processes are electrified.

In terms of transport, we expect to see significant growth in the number of customers owning EVs in our network area over the 2024-29 period and beyond. **Figure 8.8** below shows that we forecast that the annual energy consumption from EV charging to increase from around 20 GWh today to over 1,500 GWh by the end of the forthcoming 2024-29 period.

Figure 8.8 Forecast electric vehicle energy consumption in Ausgrid's network



Charging EVs can use a lot of electricity over a very short period. For example, we are already seeing chargers on the market with substantial capacities that could lead to significant new demand peaks on the network, including:

- Commercial chargers with up to 350 kW capacity; and
- Home smart chargers with a typical capacity of 7 kW.

The time of day when customers charge their vehicles will become increasingly important, in addition to the location where this occurs – for example, at home, at a public charging station, or in an area of the network with a lot of solar generation.

We recognise that our tariffs need to send efficient price signals about the different costs of charging EVs at different times so that EVs do not lead to a significant uplift in growth capex. We are already taking these prudent steps. Our residential demand and time of use (**TOU**) tariffs signal the higher costs of charging in the evening peak period and encourage charging overnight when network demand is low. Our proposed changes to the charging windows (see **Our Tariff Structure Statement**) for these tariffs will strengthen these signals.

Independent review

We engaged KPMG to independently review our approach to forecasting peak demand. KPMG found that our approach was robust and accounted for all major contributors to future demand. It concluded:

> *'Ausgrid's methodology for maximum demand forecasting is comprehensive. It accounts for all major contributors that significantly affect future demands. Ausgrid has a strong understanding of the driving forces for each contributor, and they regularly test their assumptions on currency and applicability.'*

8.4 Further supporting material

Figure 8.9 Supporting documents and models – Index

Att #	Document name
5.2.d	Principles of CBA
5.4.f	CBA Approach for Major Projects

5.6.a	Maximum demand forecast
5.6.b	Maximum demand forecast and DER integration model review
5.6.c	Major projects - augex and connections
5.6.d	HV & LV augmentation programs
5.6.e	Reliability programs
5.6.f	Connection policy
5.6.g	Macquarie STS Tx3 CBA model
5.6.h	HV & LV Augmentation CBA model
5.6.j	Forecast new connections – SCS customer contribution
5.6.j	Forecast new connections - SCS

Figure 8.9 RCP meetings – Presentation index

Presentation	Date
Demand forecast	3 November 2021
Program justifications – Growth	13 May 2022

9. CER Integration

9.1 Overview

Our network, ICT and innovation capex programs all include elements of customer energy resources (CER) integration. We also plan to employ opex based initiatives, innovative tariffs and dynamic connection agreements to efficiently integrate CER.

The following section of our Regulatory Proposal focuses on our planned CER integration investments that are network-based, which total $47 million in the 2024-29 period or 1% of our total capex program as outlined in **Figure 9.1**. Our CER integration program split by capex, opex and driver is set out in **Figure 9.2**. CER is a priority for our customers and our modelling, based on AEMO's Step Change scenario, forecasts an almost 90% increase in CER in our network by 2029.

Figure 9.1 Forecast CER enablement network capex as a percentage of total capex

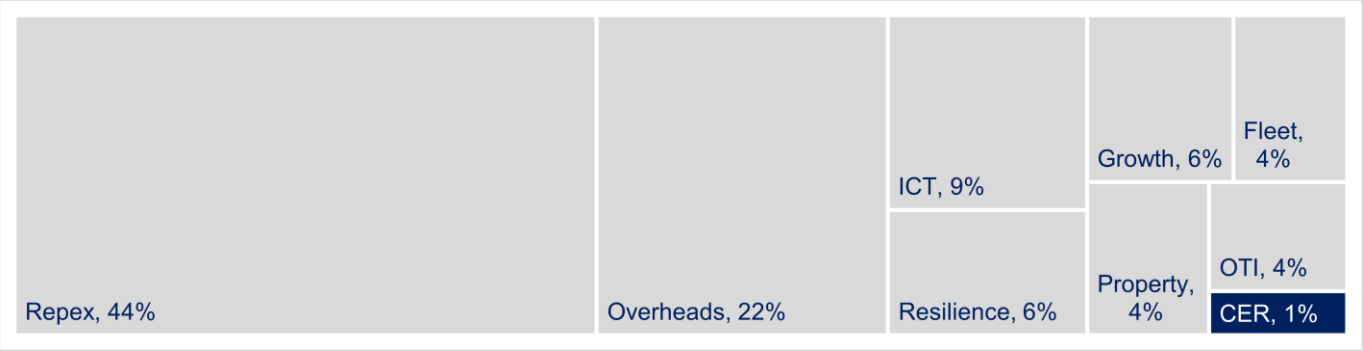


Figure 9.2 CER capex split by capex, opex and driver ($m, real FY24)

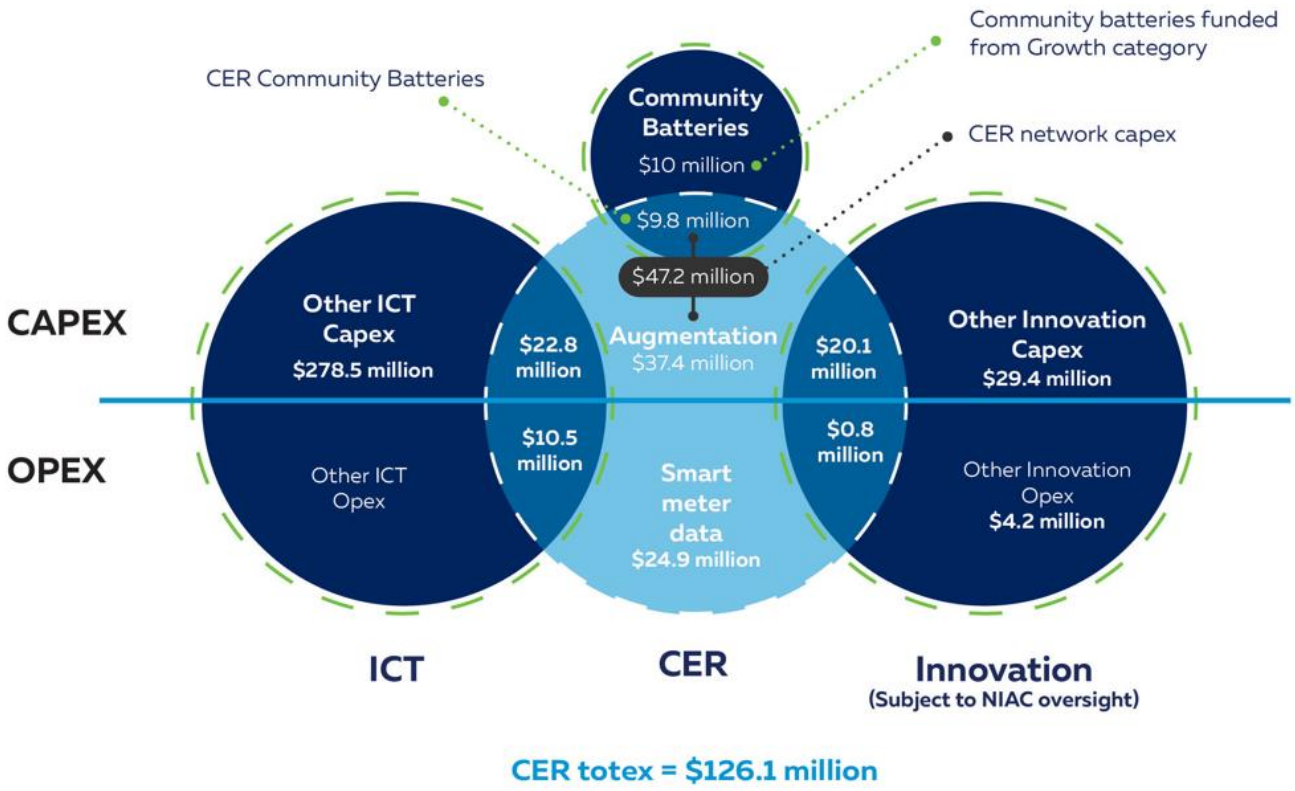
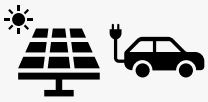


Figure 9.3 Proof points showing that our 2024-29 capex is prudent, efficient and customer focused

Factor		Proof point
	Proposed investment solves an identified need (see **section 9.2.1**)	Needs have been identified through detailed modelling that simulates distribution network performance under different CER adoption scenarios, identifying those parts of the network where constraints are most likely to emerge
	Multiple options considered (see **section 9.2.2**)	We have considered a hierarchy of non-network and network options, in addition to network-based investment solutions
	Assess cost and benefits (see **section 9.2.3**)	Our network-based CER program is the most efficient response to the identified need after compared the forecast costs against the sum of benefits under each identified value stream

9.2 Consistency with AER's Guidance Note

We have applied the AER's *CER Integration Expenditure Guidance Note* (**CER Guidance Note**)[22] to develop our CER capex forecast. This involves the following three steps.

9.2.1 Identify a problem with integrating CER

The first step in the CER Guidance Note is to identify the problem which we are seeking to address.

While CER provides significant benefits to customers, it can present technical challenges for the shared network – stemming from the original design of our network which was built for one-way energy flows rather than the mass adoption of rooftop solar and flexible loads such as batteries and electricity vehicles. The main technical challenges we face are outlined in **Figure 9.4**.

Figure 9.4 Main technical challenges arising due to CER-led transformation of our network

	Problem	Impact
Hosting capacity	Excessive voltage levels at times of peak exports from rooftop solar	Solar customers are unable to export energy back to the grid, preventing them from achieving the full benefit of their investment
Network overload	Concentrated areas of CER exports or loads, such as electricity vehicles and batteries, causing overload of the network	Loss of supply due to failure of the network

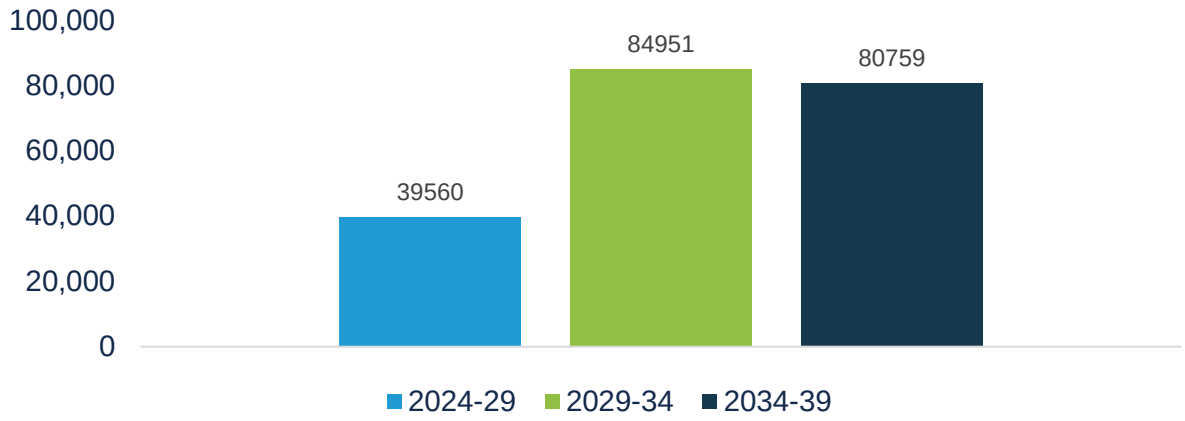
We have run extensive modelling to forecast the extent of these technical challenges. Our analysis incorporates AEMO's 2022 ISP which forecasts plausible futures for the energy industry that vary based on emission reductions, electricity demand and decentralisation of generation. AEMO considers the 'Step Change' scenario, which is described as a 'rapid consumer-led transformation of the energy sector and co-ordinated economy-wide action' to be the most likely scenario.[23]

Figure 9.5 sets out our estimated increase in customers experiencing curtailment under AEMO's step change scenario if we made no investment in CER integration. It shows an increase of 39,560 customers by the end of the

[22] AER (2022), *Assessing distributed energy resources integration expenditure guidance note*.
[23] AEMO (2022), *2022 Integrated System Plan (ISP)*, p 31.

2024-29 period under this ‘do nothing’ scenario. The growth shown in the 2024-34 and 2023-39 periods are incremental increases in the number of customers experiencing curtailment.

Figure 9.5 Estimated increase in customers experiencing a form of curtailment under AEMO’s step change scenario



Our CER integration program (see **attachment 5.7**) digs deeper into the technical challenges presented by the CER-led transformation of our network – including network voltage analysis and CER penetration forecasts over the medium to long term. We also explain how we will manage CER integration through other strategies besides investment, such as innovative tariffs and dynamic operating envelopes (**DOEs**) that allow customers to dial (up and down) their use of our network depending on whether we have the available capacity at the time.

9.2.2 Identify potential solution(s)

We have considered a range of potential solutions to respond to the challenges and opportunities that CER presents for our network and customers. These are set out in **Figure 9.6**.

Figure 9.6 Hierarchy of potential responses to CER challenges

9.2.3 Assess cost and benefits

We have applied economic modelling techniques to quantify the costs and benefits associated with a range of options for integrating CER on our network. **Figure 9.7** provides an overview of our key approaches to quantifying CER benefits, focusing on areas relevant to our network-based CER solutions.

Figure 9.7 Approach to quantification of CER benefits

Benefits Area	Approach to quantification
Customer export curtailment value (CECV)	We have adopted the AER's calculated CECV which is a modelling input that places a value on the economic cost from the curtailment of rooftop solar exports
VCR	The AER's calculated VCR has been used to value the benefit of alleviating unserved energy from the load impact of electric vehicles
Deferred investment	Our modelling has assessed the opportunity to defer investment through alleviating CER curtailment through other means

Figure 9.8 summarises the CER integration investment options we considered, together with their costs over the 2024-29 period and respective NPV outcomes. It shows the total costs across all capex streams (network, ICT and innovation) along with the associated opex. We have selected Option 3 (proactive investment) because it will deliver the highest net benefits. In this way, it is the most efficient response to the technical challenges we face in integrating CER into our network.

Figure 9.8 CER integration investment options

Option	Description	Total Cost 2024-29	NPV
Option 1: Base case	• Address CER with our current capabilities and static network settings • Most investment is through traditional network augmentation	**50.3**	**-2.9**
Option 2: Preparatory investment	• Improved network visibility to manage complex power flows through better understanding of the network and optimising network investment • Digital tools that improve the experience of connecting CER and available network information • Customer education resources to improve customer literacy about technology, services and benefits • Primarily traditional network augmentation where economically justified	**125.0**	**48.8**
Option 3: Proactive investment	• Providing incentives to customers through innovative connection and pricing options to use their energy in ways that puts less pressure on the grid • Improved network visibility to manage complex power flows through better understanding of the network and optimising network investment • Customer education resources to improve customer literacy about technology, services and benefits • Deploying a mix of traditional augmentation and flexible network solutions. This includes distribution substation tap changes, phase balancing, distributor augmentation, STATCOMs and community batteries	**126.1**	**169.4**

9.3 Further supporting material

Figure 9.9 Supporting documents and models – Index

Att #	Document name
5.7	CER integration program

Figure 9.10 RCP meetings – Presentation index

Presentation	Date
Baseline assumptions for CER investment	4-Nov-21
CER network scenarios, modelling, case studies and assumptions	10-Feb-22
Opportunities for collaboration and the incorporation of environmental benefits	10-Feb-22
ICT deep dive – Including CER related expenditure	21-Apr-22
CER workstream updated	5-May-22
Draft CER integration strategy	2-Jun-22
Initial CER forecast and overview of business case	30-Jun-22
CER strategy	7-Jul-22
CER integration impacts across other program areas and tradeoffs	20-Jul-22
Connection policy – CER integration	2-Aug-22

10. Operational Technology & Innovation (OTI)

10.1 Overview

Our capex forecast for the Operational Technology and Innovation (**OTI**) group of programs totals $117 million in the 2024-29 period. The OTI group of programs focus on investment in replacing operational technology at end-of-life and investing in new or emerging technologies that have not been proven on the distribution network in our environment. These programs contribute to multiple drivers of investment and aim to improve outcomes for customers in each of these areas. The OTI investment comprises:

- Augmentation capex (**augex**) of $23 million;
- Replacement capex (**repex**) of $87 million; and
- Non-network IT capex of $7 million.

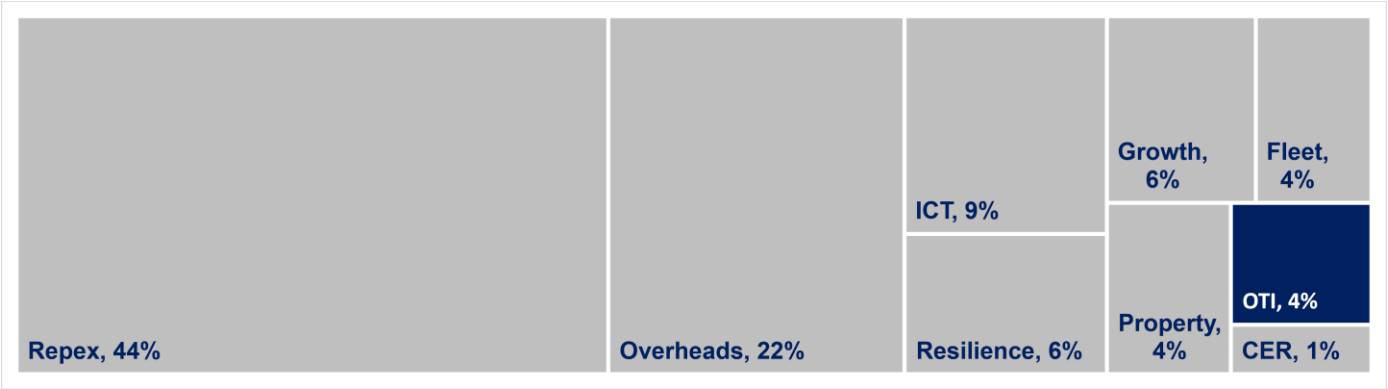
Augmentation capex within the OTI programs refers to innovative trials and pilots of new technology on our shared network needed to meet increases in CER and new ways of operating and managing the electricity network by leveraging the new energy capabilities of CER to improve outcomes for customers.

Replacement capex refers to the use of new or emerging technologies to improve the long-term efficiency or short-term services to customers to provide a reliable and resilient supply to customers. We will leverage modern technologies to replace assets where this can be achieved in better ways than traditional methods have previously allowed.

Non-network IT capex refers to the enhancement of our Digital Twin that is an integral part of representing network data in a three-dimensional model and providing advanced spatial analytics. These enhancements will provide greater information for network planning, Accredited Service Provider (**ASP**) designs and other third parties improving the decision making for managing customer connections and the shared network.

For our customers, continued evolution and transformation of the way we operate and manage the network is a key focus. It keeps our services in line with customer expectation and embeds long term benefits for customers. **Figure 10.1** shows that OTI capex makes up 4% of our total forecast capex.

Figure 10.1 Forecast OTI capex as a percentage of total capex



We will continue to invest in both proven and emerging technologies in our industry that can accelerate the transition towards a smarter grid, where there is high level of certainty in achieving benefits for customers.

Investments in operational technology (**OT**) remain focused on maintaining a modern, secure and supportable foundation to Ausgrid's monitoring and control system, while the innovation and digitisation program components of OTI continue to drive the introduction of value adding assets and related services.

These programs incorporate lessons learnt from the development and delivery of our existing OTI program, such as an increase in stakeholder and community input in the early stages of project development, including advance planning to forecast and secure scarce and specialist skills. This approach will minimise delivery bottlenecks and reduce concurrent activity where common skills are required.

Figure 10.2 Proof points showing that our 2024-29 capex is prudent, efficient and customer focused

Factor	Proof point
Voice of the Community support	The energy sector in Australia is shifting and – through discussions with customers – we have recognised the need to continue to innovate and support modern technologies. The use of these different approaches and technologies will deliver improved services while reducing the longer-term dependence on traditional methods to manage and transform an aging electricity network
Proven technologies utilised in industry	We have chosen only technologies that have been proven in other utilities or adjacent industries and have very low risk of not meeting expectations. We believe that following early adopters provides the best outcomes for our customers by investing to minimise future regrets and maximise the potential options to transform the grid to meet ongoing customer requirements
Meeting the needs of our regulatory and stakeholders' objectives	As technology adoption continues to increase – businesses, homes and utilities will become smarter, provide greater functionality and improve quality of life. However, the connectedness of devices and changing geopolitical landscape brings with it a need to better manage network security and provide confidence for customers that vulnerabilities in the critical infrastructure that supplies services will not be exploited while the technology deployed continues to serve customers Our investment programs will prudently deliver on our stakeholder and regulatory objectives to achieve these objectives whilst minimising disruption
Positive outcomes from quantitative CBA	Detailed CBA has been conducted on each of the proposed projects within each program. Each project has a positive customer outcome and has been tested for sensitivity to key inputs to provide confidence in delivering the best and improved outcomes for customers

10.1 Our forecast OTI capex is 43% below trend

Expenditure proposed for the 2024-29 period is lower than the current regulatory allowance and current forecast. This is in large part due to significant investments made in the current and past periods on assets that have a 10-20 year life and do not require the same level of investment in the 2024-29 period to sustain their functionality and leverage for ongoing benefit realisation.

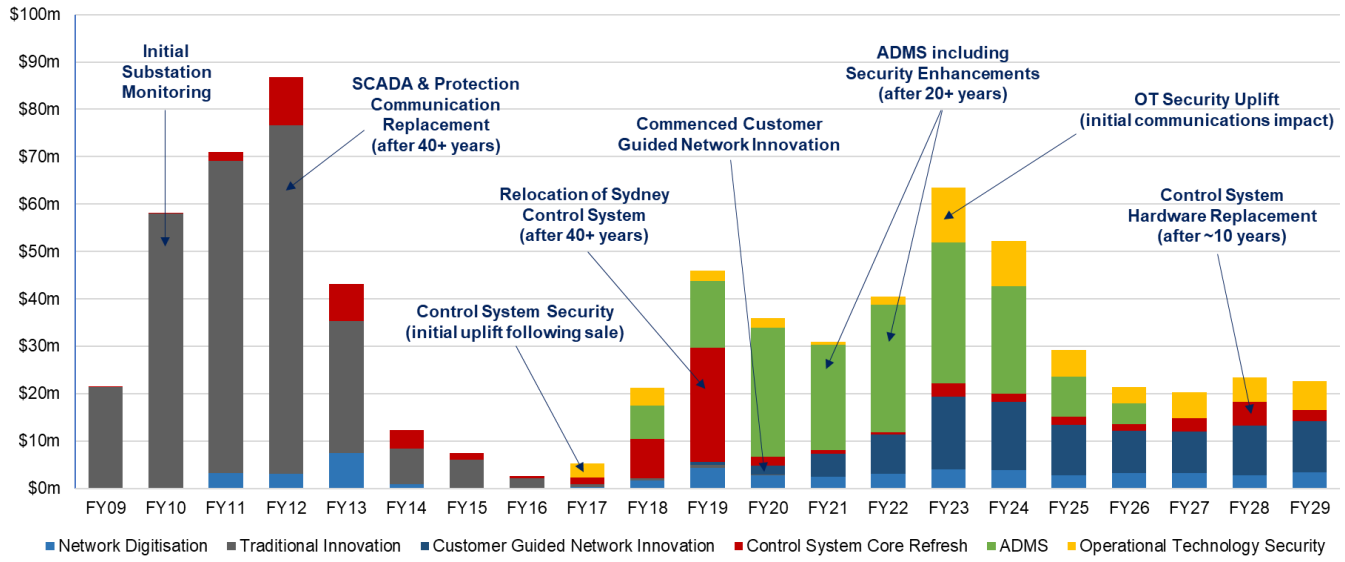
The Advanced Distribution Management System (**ADMS**) is a key investment in the 2019-24 period that will provide a modern platform at the heart of the operational technology environment. It will enable integration to platforms for CER management and will lower long-term costs for customers. This system will not require wholesale replacement in the

2024-29 period and has a lower level of investment required to sustain the system, while other technologies will be deployed to leverage the inherent functionality of the ADMS and enable a transition towards a modern electricity utility.

The remaining proposed OTI investments are relatively stable in terms of expenditure requirements and have been adjusted to reflect the underlying works required during the 2024-29 period to sustainably maximise customer outcomes by deferring investments that have marginal benefits in favour of those with the greatest benefits.

Investment in OT is cyclical, with assets generally having much shorter lives than traditional network assets. During heightened periods of energy sector transformation, a greater focus on OTI helps to support industry transformation without a larger investment on traditional solutions that limit the realisation of benefits. **Figure 10.3** demonstrates the changes over a 20-year period along with key drivers for investment during this time.

Figure 10.3 OTI capex trend including key historical investments ($m, real FY24)



10.2 Our customers support our innovation program

Our customers recognise that innovation is essential for our business to adapt and sustainably provide electricity to the communities we serve. When consulting on our Draft Plan at the VOC workshops, customers indicated a preference for more expenditure on innovation, even though this program will contribute to forecast increases in customer bills in the short term.

In increasing our proposed expenditure for this program, we have balanced the desires of customers to substantially increase expenditure with the need to maintain a program that is practically deliverable, with a high probability of returning positive customer benefits in the short and longer term.

Figure 10.4 summarises how we have responded to feedback received in relation to our innovation expenditure proposed in our Draft Plan.

Figure 10.4 How we have responded to feedback on our Draft Plan

	Draft plan	Regulatory proposal	Difference	Reason for change
Customers believe we should be investing more in innovation	$45.0m (capex) $5.0m (opex)	$49.5m (capex) $5.0m (opex)	+$4.5m	Customers have shown particular support for our current innovative community battery trial to enable a sustainable grid for customers in an environment with net zero ambitions and the need to manage increasing CER. $9.8 million is included within the CER capex for a larger community battery pilot, that

				will be managed through NIAC arrangements alongside other innovation expenditure. Modelling adjustments and CPI increases have also resulted in a minor increase to the program that aligns with customer feedback for a greater focus on innovation.

10.3 Further supporting material

Figure 10.5 Supporting documents and models – index

Att #	Document name
5.8.a	Network Innovation program overview and justification
5.8.b	Network Innovation program mid-term review
5.8.c	Control system core refresh program
5.8.d	Operation technology program
5.8.e	Network digitisation program
5.8.f	Network innovation CBA model
5.8.g	Network digitisation CBA model
5.8.h	Feedback on network innovation program
5.3.a	Asset replacement programs

Figure 10.6 RCP meetings – Presentation index

Presentation	Date
ADMS update (including relationship to ongoing innovation)	14 April 2022
OTI program update	13 May 2022
10-year OTI capex view	21 October 2022
NIAC meetings (includes a subset of RCP representatives)	1 June 2021
	1 September 2021
	30 November 2021
	15 March 2022
	16 June 2022
	14 September 2022
	1 December 2022
Innovation program development deep dive with NIAC/RCP representatives	11 July 2022
Innovation program modelling approach with NIAC/RCP representatives	19 October 2022
Deep dive on OTI programs with RCP representatives	28-29 July 2022

11. Information Communications Technology (ICT)

11.1 Overview

We envision a future where customers can flexibly respond to dynamic tariffs using smart devices, can choose from a range of innovative technologies connected to the grid, and have access to new services, like community batteries, which help facilitate a net zero future while keeping bills low. ICT is the key enabler of this future.

Our ICT capex program, $301 million, makes up 9% of our capex forecast, as set out in **Figure 11.1**. This excludes SaaS implementation costs which are currently recognised as capex, but due to accounting treatment changes will shift to opex in the 2024-29 regulatory period.

About 40% of our ICT capex program is made up of a BAU component. The other roughly 60% consists of three large projects relating to cyber security, the replacement of our ERP and CER related ICT. This is shown in **Figure 11.2** below. For completeness, the SaaS opex component of each project is shown.

Figure 11.1 Forecast ICT capex as a percentage of total capex

Figure 11.2 Forecast ICT capex and SaaS implementation opex ($m, real FY24)

	Category	FY25	FY26	FY27	FY28	FY29	Total
BAU ICT component							
GIS	Capex	1	7	6	-	-	14
	SaaS opex	-	-	-	-	-	-
Data & Analytics	Capex	10	11	6	2	1	30
	SaaS opex	-	-	-	-	-	-
ICT & Infrastructure Management	Capex	13	18	13	9	13	65
	SaaS opex	1	1	1	0	1	5
Minor Projects	Capex	10	10	6	8	7	41
	SaaS opex	5	3	4	3	4	18
Customer Information Systems	Capex	3	3	2	2	2	11
	SaaS opex	3	3	2	2	2	11
Subtotal	Capex	36	49	33	20	23	161
	SaaS opex	9	7	7	5	6	34
	Totex	45	55	40	25	29	195
Cyber, ERP and CER component							

Cyber Security	Capex	9	9	9	8	9	44
	SaaS opex	10	9	9	10	9	47
ERP	Capex	21	33	15	6	1	76
	SaaS opex	21	32	15	5	0	73
CER related ICT	Capex	7	7	2	2	1	20
	SaaS opex	0	1	0	1	1	3
Subtotal	Capex	**38**	**50**	**26**	**16**	**11**	**140**
	SaaS opex	**31**	**42**	**24**	**16**	**9**	**123**
	Totex	**69**	**92**	**50**	**32**	**20**	**263**
Total	Capex	74	98	59	36	34	301
	SaaS opex	40	49	31	21	16	157
	Totex	115	147	90	57	49	458

Figure 11.3 below sets out the long-term trend in the BAU component of our ICT program. It shows that, inclusive of SaaS implementation costs, this part of our forecast is reflective of our historical spend over a 20-year time horizon and trending lower towards the later years of the 2024-29 period. Our 2024-29 BAU ICT capex is only 18% below our estimated 2019-24 BAU ICT capex.

Figures 11.4 to **Figure 11.6** provide the same analysis for our cyber security, ERP and CER-related ICT projects. The spend profile in these areas reflects the growing integration of digital technologies into all areas of our business, resulting in fundamental changes in how we operate our network and deliver value for our customers. It also reflects the emergence of completely new types of services, such as the use of digital tools to integrate up to 620,000 new CER into our network by FY29.

Figure 11.3 Actual and forecast ICT capex excluding cyber, ERP replacement and CER ($m, real FY24)

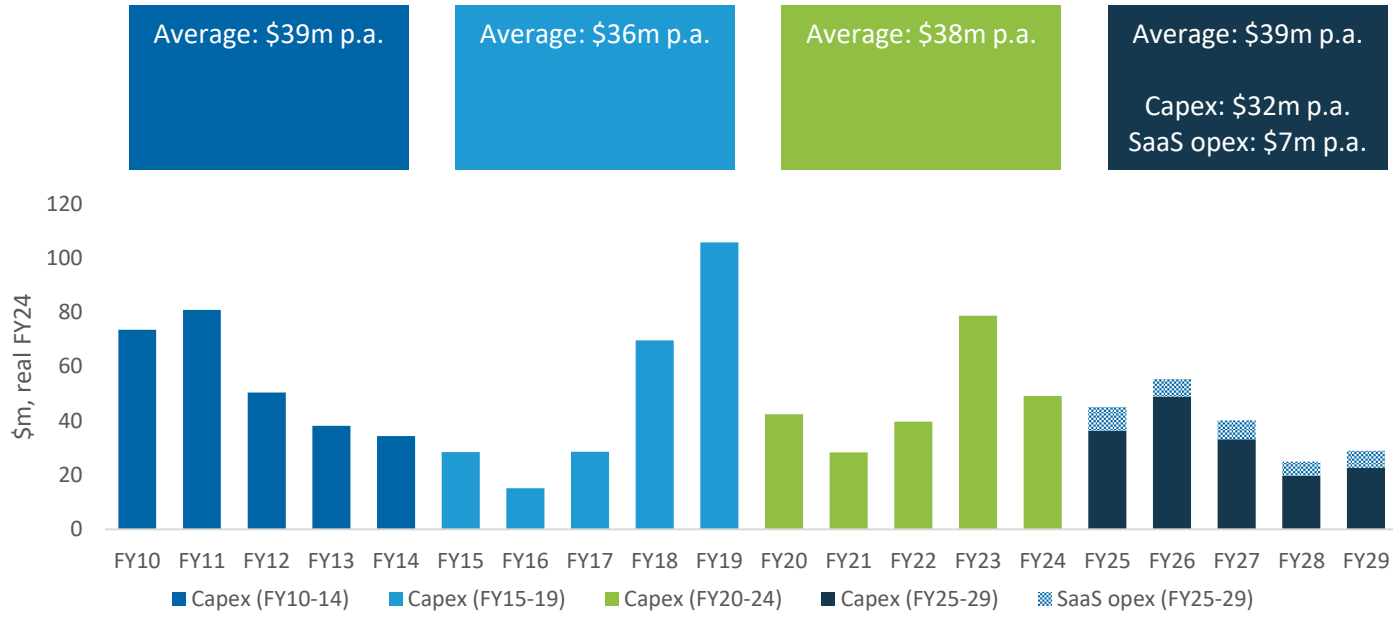


Figure 11.4 Actual and forecast cyber security capex ($m, real FY24)

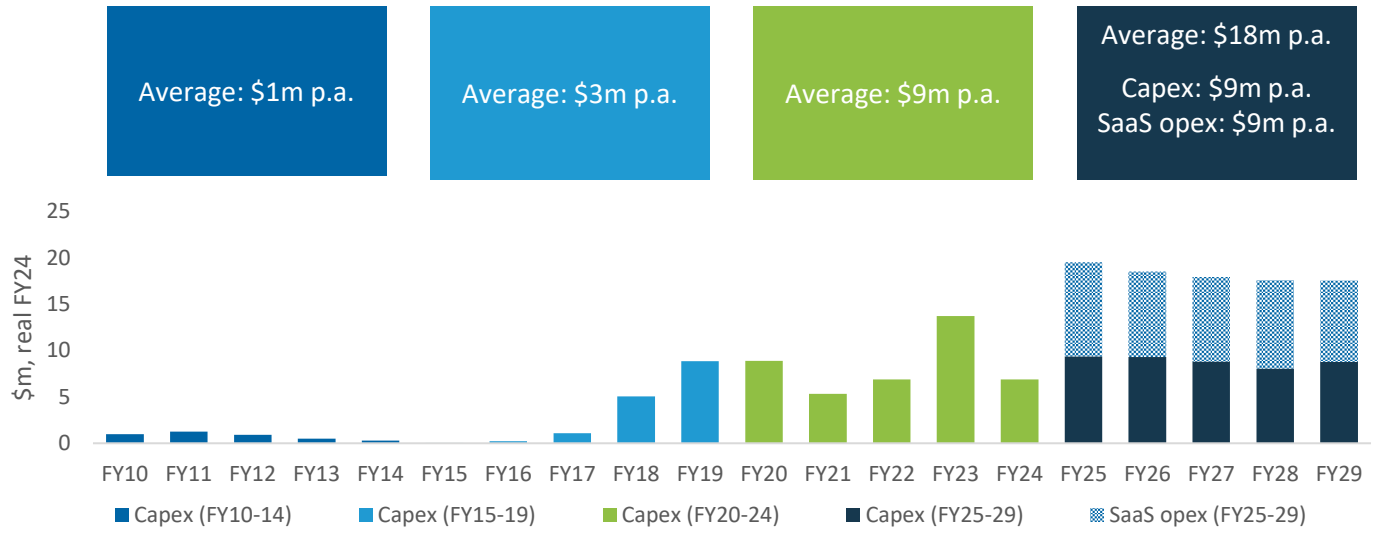


Figure 11.5 Actual and forecast ERP replacement capex ($m, real FY24)

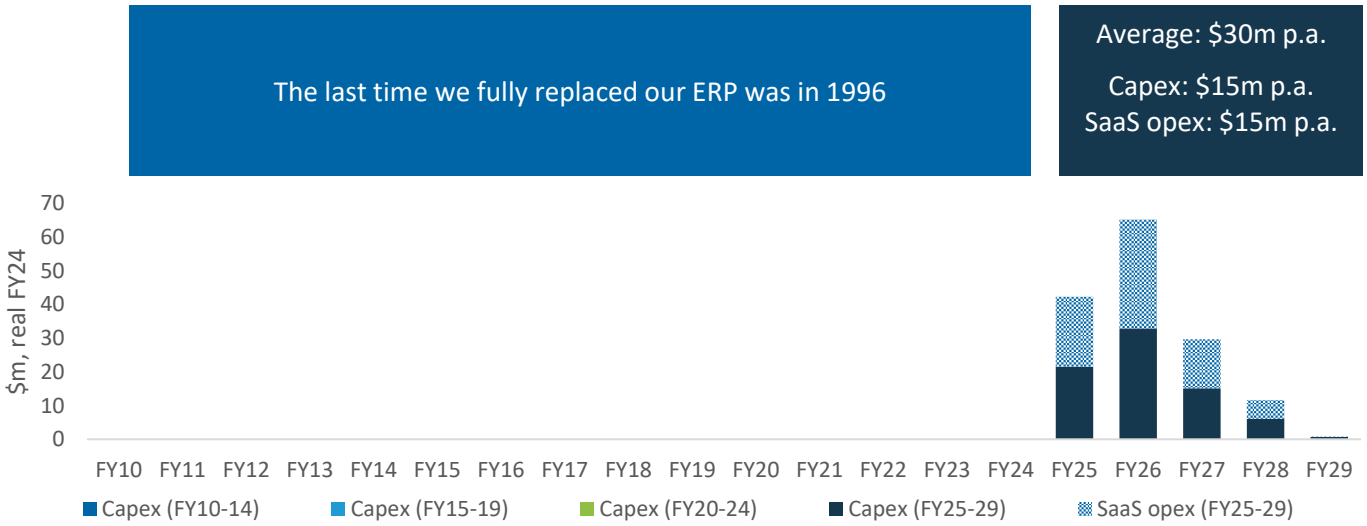


Figure 11.6 Actual and forecast CER related ICT capex ($m, real FY24)

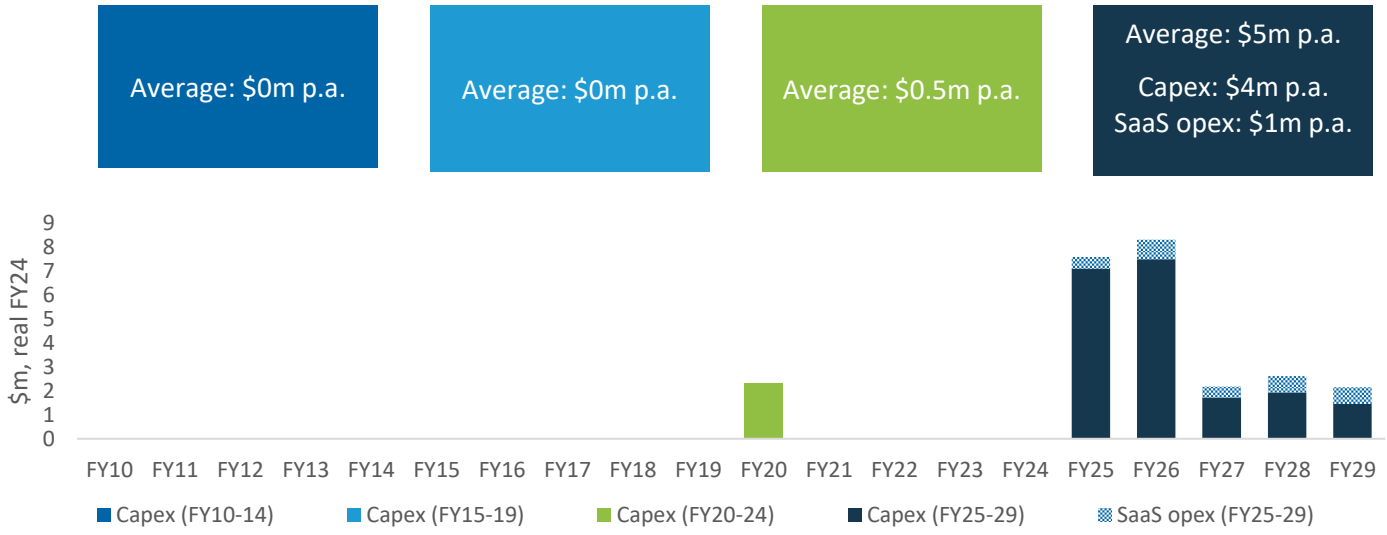


Figure 11.7 Proof points showing that our 2024-29 capex is prudent, efficient and customer focused

Factor	Proof point
Trend analysis – Recurrent capex (see **section 11.2**)	Our forecast recurrent ICT capex (with inclusion of all SaaS implementation costs) in the 2024-29 period is 26% below our 5-year trend
Benchmarking – Recurrent capex (see **section 11.3**)	Our recurrent ICT capex compares favourably to peers when benchmarked on a totex per customer basis
Cyber – Non-recurrent capex (see **section 11.4**)	Our cyber security program will allow us to respond to evolving threats and aligns to a maturity level the AER has considered prudent for other network businesses
ERP – Non-recurrent capex (see **section 11.5**)	We are replacing our ERP to deliver cost reflective prices and other innovation services our customers value

11.2 Our forecast ICT recurrent capex is 26% below trend

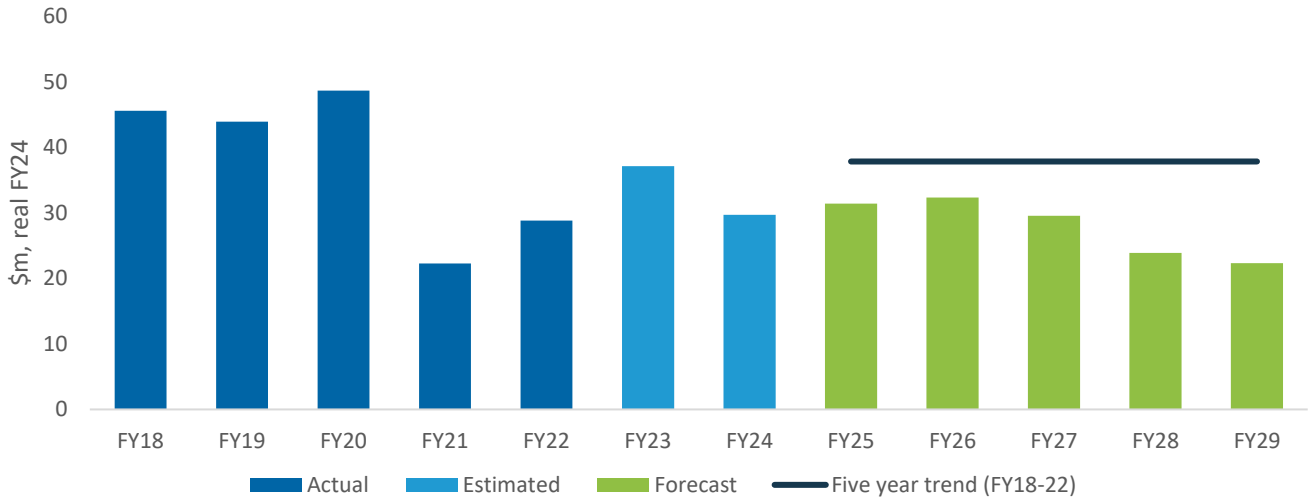
We find it helpful to breakdown our ICT forecast between a BAU stream and a large project stream (cyber, ERP and CER). At the same time, we acknowledge that the AER runs its trend analysis based on 'recurrent' capex.

The AER's *Non-network ICT capex assessment approach* guidance note (**AER's ICT Guideline**) defines recurrent ICT capex as 'expenditure that is related to maintaining existing ICT services, functionalities, capability and/or market benefits, and occurs at least every five years'.[24] We have applied this definition when undertaking trend analysis and, as per the AER's ICT Guideline, taken a 5-year average of our historical recurrent ICT capex as the reference point for testing our forecast.[25] The 5-year window allows for year-on-year variability in our investment profile.

Figure 11.8 sets out the results of our analysis. Our forecast recurrent ICT capex in the 2024-29 period is $38 million per annum. This is 26% lower than our historical average spend for this category expenditure ($28 million per annum from FY18 to FY22).

[24] AER, *Guidance note – Non-network ICT Capex assessment approach for electricity distributors*, (November 2019), p 8.
[25] AER, *Guidance note – Non-network ICT Capex assessment approach for electricity distributors*, (November 2019), p 10.

Figure 11.8 Trend analysis against a 5-year historical average ($m, real FY24)



Customer perspective

Our recurrent ICT capex is 26% lower than our historical average. For our customers, this means they will pay less next regulatory period for the same level of service associated with our recurrent ICT investments.

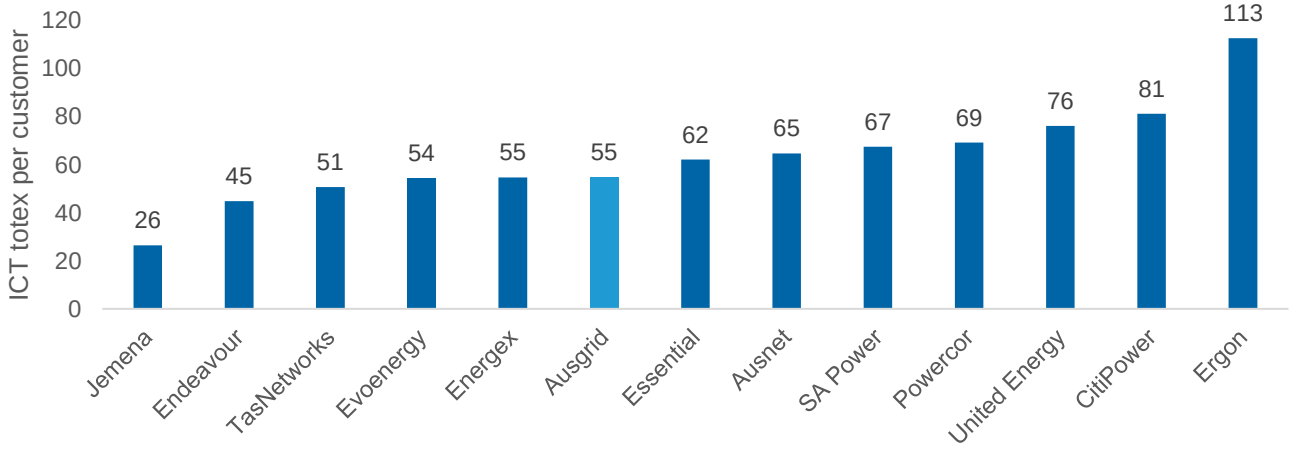
11.3 Our recurrent ICT capex benchmarks well against our peers

The AER's ICT Guideline states that the AER will have regard to benchmarking analysis of recurrent ICT capex in making its assessment of this category. In our case, the purpose of this analysis is to enable the AER to compare the performance of Ausgrid to our own past performance and the performance of other electricity distributors.

To account for the substitutability of capex and opex, the AER undertakes its benchmarking analysis at the total expenditure (**totex**) level. The AER's ICT Guideline also states that the AER will 'benchmark over customer numbers and ICT users given the strong correlation between these factors'.[26]

Figure 11.9 below sets out our ICT totex per customer. It shows that we had the 6th most efficient recurrent ICT totex per customer in FY21 (the last year of actuals for all electricity distributors). Our recurrent ICT program is also trending lower over the 2024-29 period, meaning that our benchmark efficiency is likely to improve. There is also only a small difference between our totex per customer ($55) and the performance of 4th place ($54) in the NEM.

Figure 11.9 Recurrent ICT totex per customer ($, real FY24)



26 AER, *Non-network ICT Capex assessment approach*, November 2019, p. 10

Customer perspective

Our recurrent ICT totex benchmarks well and is set to improve in performance over the 2024-29 regulatory period. These efficiencies will be passed on to our customers in full through a lower recurrent ICT totex than other distributors.

11.4 We are prudently responding to growing cyber security threats

We are proposing $91 million in cyber security capex. This is made up of $44 million in capex and $47 million in SaaS implementation costs which from the 2024-29 period will be recognised as opex.

Cyber attacks are on the rise in Australia. The recent Medibank incident saw four million customers have their personal information leaked, while the Optus breach exposed personal details of 10 million Australians.

There have also been attacks on JBS Foods which paralysed a company that employs 11,000 Australians across 47 sites and on Nine Entertainment which disrupted the network's ability to broadcast. In Australia, there is now a cyber attack reported every 8 minutes.[27]

We have a duty to our customers to protect their data and safeguard our systems from vulnerabilities to cyber attacks that in a worst case scenario, such as in the Colonial Pipeline incident in the USA, could lead to a shutdown of our network. There are also regulatory requirements under the recently amended *Security of Critical Infrastructure Act 2018* (Cth) (**SOCI Act**) which place new and enhanced obligations on Ausgrid. These include a requirement to implement and maintain a Risk Management Program that addresses a range of prescribed risks, including cyber security. The Risk Management Program must:[28]

- Identify hazards that present a material risk to the availability, integrity, reliability and confidentiality of critical infrastructure assets, or information about, or stored in, those assets;
- Mitigate risks to prevent incidents (so far as it is reasonably practicable to do so);
- Minimise the impact of realised incidents (so far as it is reasonably practicable to do so); and
- Implement effective governance and oversight procedures, including testing and evaluation, relating to security.

Our plan for the 2024-29 period is to invest in the capabilities needed to reach a maturity level known as Security Profile 3 (SP-3). It will best prepare Ausgrid and our network to implement and maintain the required Risk Management Program in the SOCI Act and minimise our exposure to cyber risks in the first place.

We note the AER's recent Draft Decision on Transgrid's transmission revenue determination for the 2023-28 period[29] states:

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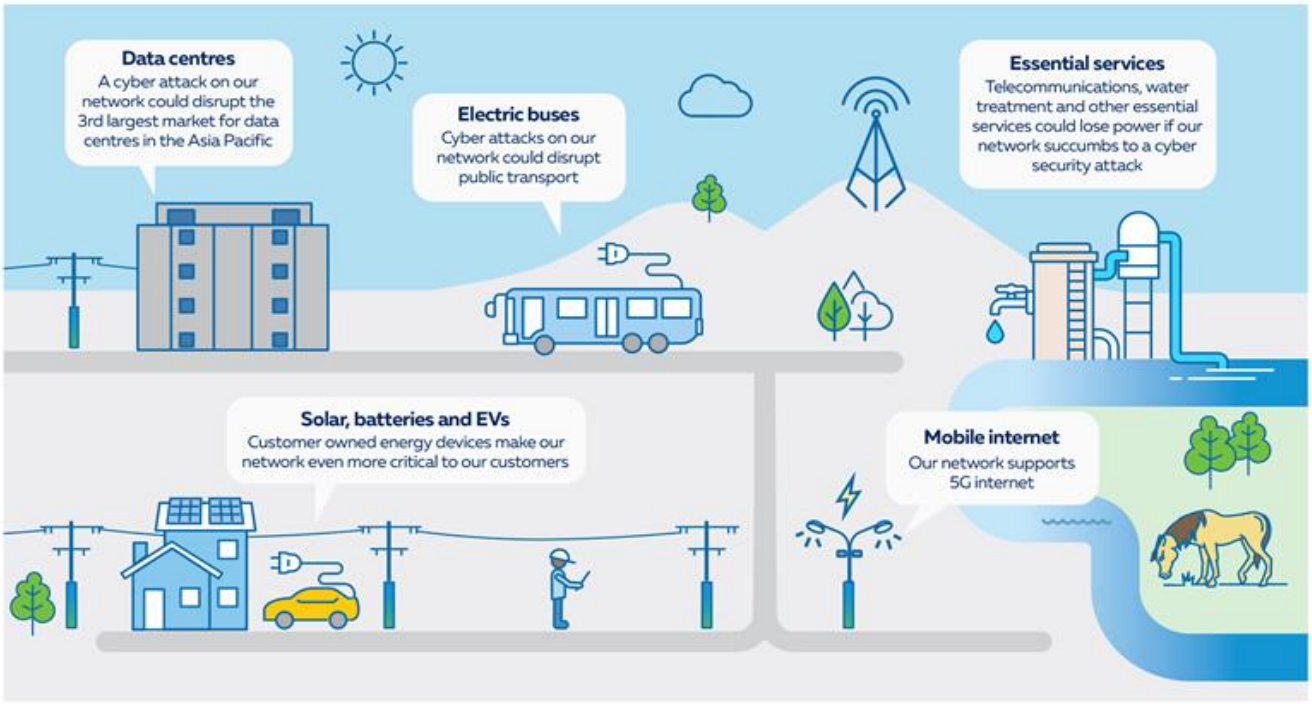
27 ASCS (November 2022), *Annual Cyber Threat Report, July 2021 to June 2022*.
28 Security of Critical Infrastructure Act 2018 (Cth), sections 30AC-30AF
29 AER (2022), *Transgrid 2023-28 – Draft Decision – Attachment 6 – Operating expenditure – September 2022*, p 22.

We agree with Transgrid and consider it prudent for Transgrid, as a transmission network service provider, to uplift its security and particularly to achieve SP–3 maturity. This is also supported by our consultant, Energy Market Consulting associates (EMCa), who provided expert advice on the assessment of this step change. EMCa considers that it is appropriate for Transgrid to achieve an AESCSF maturity indication level of SP–3 based on the combination of legislation, appropriate risk management, and the urgent request of the Australian Cyber Security Centre to adopt an enhanced cyber security posture.

It is also prudent to move to SP-3 from a customer impacts perspective. Our network powers essential services, like wastewater treatment and telecommunications infrastructure, and supplies an area recognised as the third largest market for data centres in the Asia Pacific region and the 8th largest internationally.[30] This is indicative of the compounding impacts of a cyber attack. They threaten not just the disruption of our electricity network but other critical services, as outlined in **Figure 11.10** below.

Figure 11.10 The importance of cyber security in our community



To calculate our efficient level of investment in cyber security protection, we have applied economic analysis. Our approach considered the consequences of a successful cyber-attack, the likelihood of specific events, and the risk we can 'buy down' through investment. The results of this analysis are shown in **Figure 11.11**. It shows that our target state of Security Profile 3 achieves the highest cyber security level and greatest net benefits. More information about our approach is set out in **Attachment 5.9.c – Cyber security program**.

Figure 11.11 Cyber security options analysis

Option	Description	Capex	Opex	NPV
1: Maintain current cyber security level	Maintain Security Profile 1 maturity level	13.5	20.6	(72.0)
2: Enhance cyber security level (base case)	Invest to reach Security Profile 2 maturity level by enhancing current systems	34.8	50.1	12.6

[30] Cushman & Wakefield (2022), *2022 Global Data Center Market Comparison Report*.

3: Highest cyber security protection	Undertake approximately 60% of the identified projects and customer research with the largest expected NPV	44.4	67.3	126.1

Customer perspective

Our cyber security program, by reaching Security Profile-3 (**SP-3**), will:

- Reduce cyber risks that could result in large-scale unplanned outages;
- Provide ongoing protection of network and customer data;
- Support the adoption of more distributed energy resources (CER) safely and securely connecting to our grid; and
- Deliver net economic benefits to customers as revealed through our NPV modelling.

11.5 Transforming our ERP is necessary and will deliver customer benefits

We are forecasting $76 million in capex for the replacement of our existing ERP platform in the 2024-29 period.

Our existing ERP was initially deployed in 1996 and parts of it will have been in operation for 31 years by the time of its planned replacement date in 2027. Many of our digital ambitions for customers – from cost reflective pricing, to handling customer complaints in a timely manner – depend on not only replacing the ERP but also transforming it.

We outline the reasons why our ERP transformation program is important to our business in **Figure 11.8**. These benefits range from securing technical support for our current ERP version (which expires in 2027) and unlocking efficiencies through standardised business operations. The customer benefits are more wide-ranging and are set out in **Figure 11.12** below.

Figure 11.12 Why transforming our ERP is important to our business

Figure 11.13 How transforming our ERP will benefit our customers

11.6 Further supporting material

Figure 11.14 Attachment index

Att #	Document name
5.9	Technology Plan 2024-29
5.9.a	Geographic information systems program
5.9.b	ICT model – GIS
5.9.c	ERP upgrade
5.9.d	ICT model – ERP upgrade
5.9.e	Cyber security program brief
5.9.f	ICT model – Cyber Security
5.9.g	Customer information systems program
5.9.h	ICT model – Customer information systems
5.9.i	ICT & infrastructure program
5.9.j	ICT model – ICT & infrastructure
5.9.k	Data & analytics program
5.9.l	ICT model – Data & analytics

Figure 11.15 RCP meetings – Presentation index

Presentation	Date
Investment plans: ERP, cyber and data analytics	10 December 2021
Technology plan	10 December 2021
ERP options presentation	23 March 2022
Deep dive: Cyber and data analytics	19 May 2022
ERP benefits quantification	15 July 2022
ERP update	2 August 2022
Deep dive: Cyber security	16 August 2022
10 year ICT capex view	21 October

12. Fleet

12.1 Overview

Our forecast fleet and plant capex of $148 million in the 2024-29 period is 7% higher than the $138 million we expect to spend in the current period. It represents 4% of total capex.

Our fleet of vehicles and trucks support our operations in the field by providing a safe and reliable mode of transportation. 'Plant' assets refer to the equipment we use in the field— such as elevated work platforms (**EWPs**), vehicle loading cranes and pole installation equipment.

Our goal in the 2024-29 period is to reduce our total fleet and plant related costs, including the economic cost that is incurred when a fleet or plant asset is broken down and cannot be used to provide critical customer services. To reduce total costs, we are targeting efficiencies in maintenance and improvements in the productivity and reliability of our fleet and plant equipment.

Figure 12.1 Forecast fleet capex as a percentage of total capex

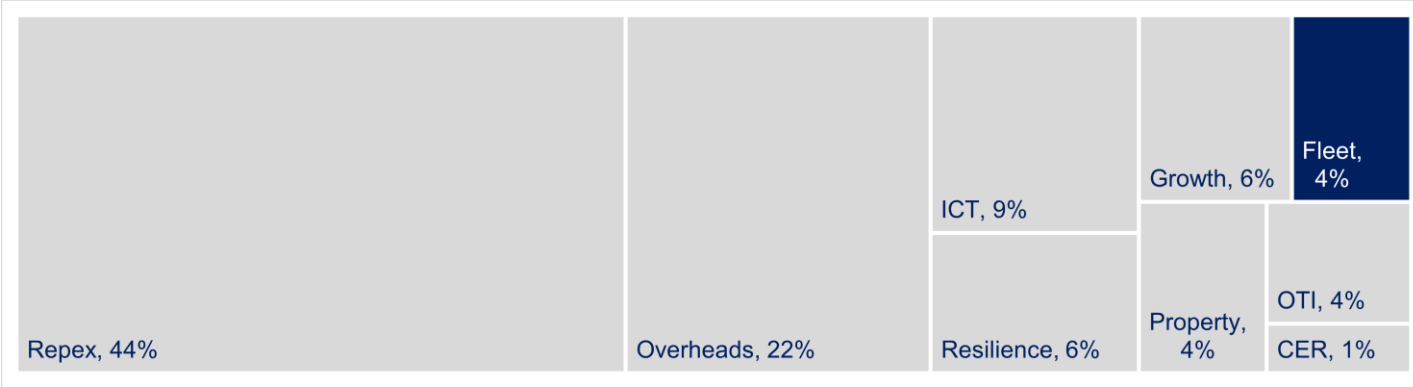


Figure 12.2 Forecast Fleet capex ($m, real FY24)

	FY25	FY26	FY27	FY28	FY29	FY25-29 (forecast)	FY20-24 (expected)	Change
Elevated work platform	13.1	11.2	11.0	10.8	10.3	56.3	43.7	+29%
Crane borer	5.9	5.3	3.2	0.6	-	15.1	11.8	+28%
Vehicle loading crane	1.6	1.8	1.8	1.7	0.8	7.7	4.4	+75%
Heavy commercial vehicle	2.5	3.1	2.6	3.0	1.1	12.3	16.5	-34%
Light commercial vehicle	9.3	11.5	9.5	2.8	8.1	41.3	36.3	+14%
Car	1.6	-	0.1	2.0	1.3	4.9	6.0	-22%

Other	3.5	3.7	1.7	1.2	0.0	10.1	19.1	-89%
Total	37.4	36.7	29.9	22.2	21.6	147.7	137.8	+7%

Figure 12.3 Factors and key proof points that demonstrate our proposal is capable of acceptance

Factor	Proof point
Trend analysis (see **section 12.2**)	Our fleet and plant capex reflects our business coming out of a trough in our investment cycle
Benchmarking (see **section 12.3**)	The size of our motor vehicle fleet benchmarks well for our network characteristics
Unlocking efficiency savings (see **section 12.4**)	Our fleet and plant investment program is targeted at delivering efficiency savings to the long term benefit of our customers

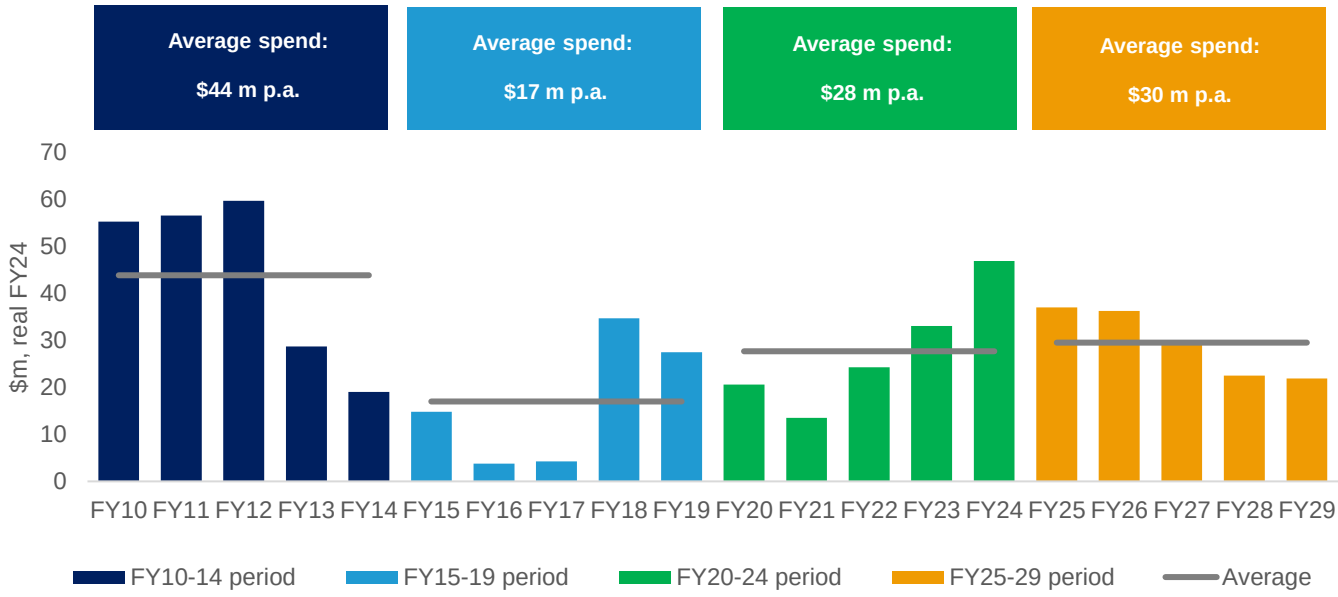
12.2 Trend in capex reflects the stage of our investment cycle

Our 2024-29 fleet and plant capex forecast is 7% higher than our current actual/estimated spend. This increase reflects historical events within the current 10-15 year investment lifecycle. Specifically, we are:

- **Exiting a trough in our investment cycle**: driven by a suspension of capital spend as we pursued an aggressive fleet reduction program between FY15-FY17; and
- **Entering a peak in our investment cycle:** to catch up on recent underinvestment and to replace aging assets that are now coming to the end of their technical life.

The peaks and troughs of our investment cycle are set out in **Figure 12.4**. It shows that our fleet and plant spend has oscillated from an average annual spend of $44 million per annum in the 2009-14 period to as low as $15 million per annum in the 2014-19 period. Relevantly, the high volume of assets acquired in the 2009-14 period -- particularly plant assets such as EWPs and crane borers – will reach the end of their technical life in 2024-29. This is leading to a peak in our investment cycle before transitioning to a more sustainable level of capex going forward.

Figure 12.4 Our fleet and plant capex forecast ($m, real FY24)



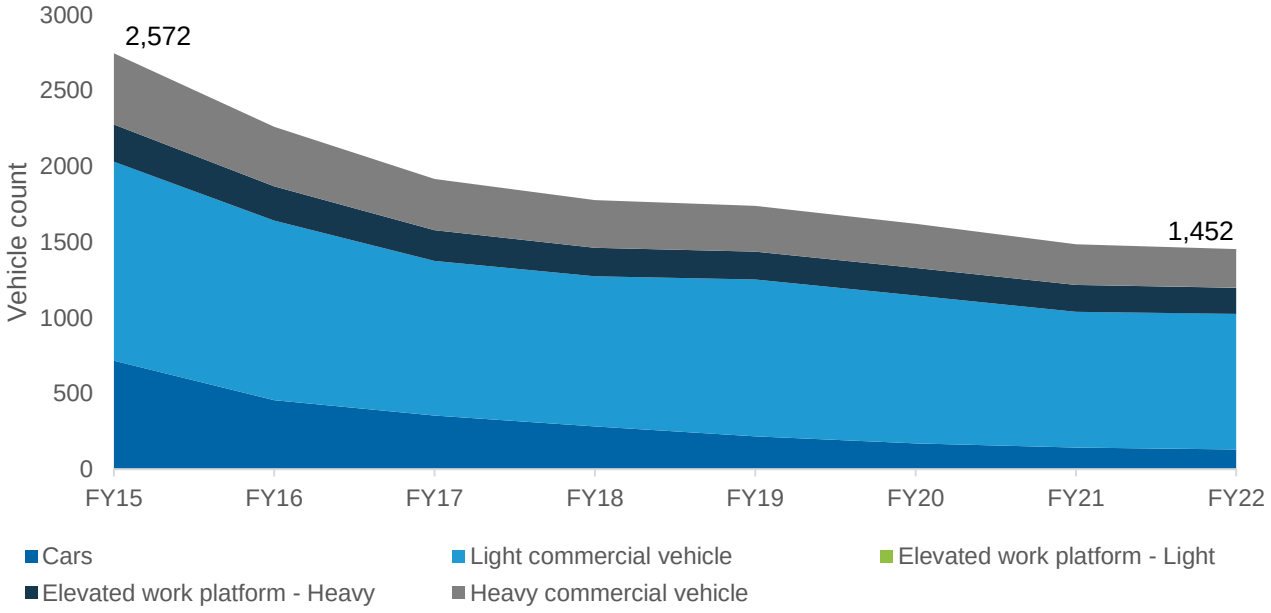
Customer perspective

The transition to a sustainable level of investment will promote long-term affordability for customers by avoiding the troughs and peaks that can contribute to higher bill outcomes if a large amount of investment needs to be delivered rapidly.

12.3 The size of our fleet benchmarks well for our network characteristics

Our fleet of motor vehicles is efficiently sized for the mix of characteristics across our network which vary from the Sydney CBD to low density, rural terrains in the Upper Hunter. **Figure 12.5** shows that we currently have 1,452 vehicles in operation, which is 44% less than the 2,572 we had in FY15. This is a significant reduction, in line with the broader transformation of our business since the partial long-term lease of Ausgrid in 2016.

Figure 12.5 Our fleet of motor vehicles is now efficiently sized



We have tested the efficiency of our motor vehicle count relative to our peers. **Figure 12.6** shows that we have 1.23 vehicles for every 1000 distribution spans on our network. This is a relatively low vehicle count, indicating a higher level of efficiency compared to most other networks. We selected distribution spans to normalise our benchmarking analysis given that more vehicles are generally required for networks with a greater volume of spans. To complement this analysis, we also considered our fleet count on a per employee basis. **Figure 12.7** shows that our fleet count benchmarks well on this measure too.

Figure 12.6 Our fleet count per 1000 distribution spans benchmarks well against our peers

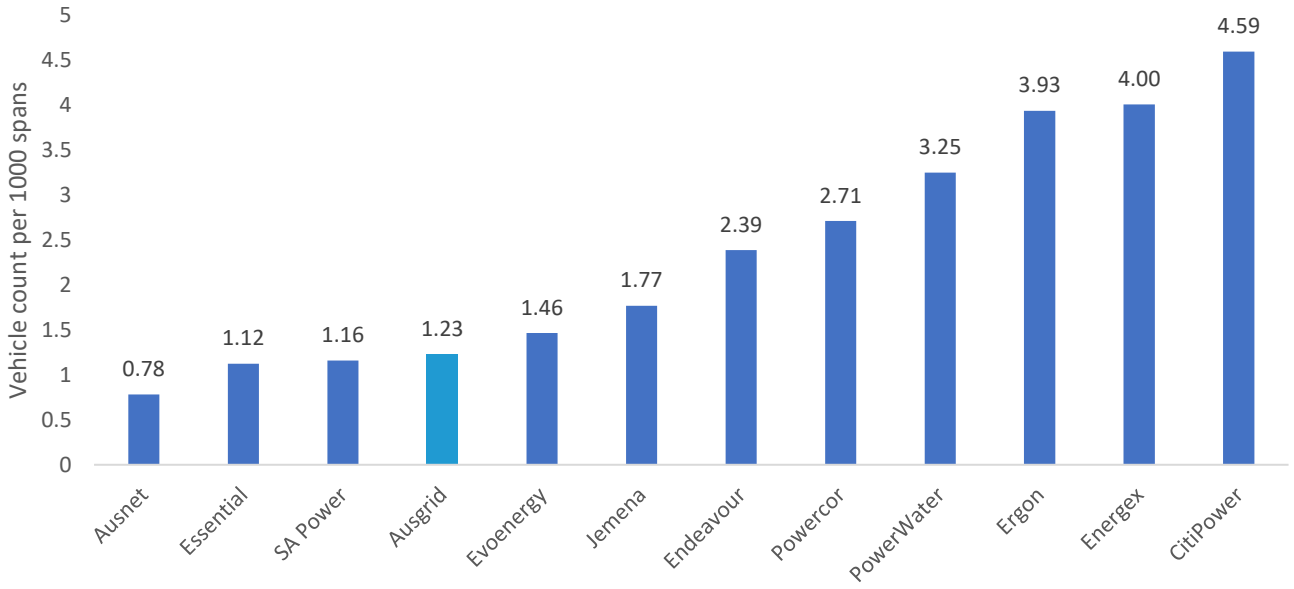
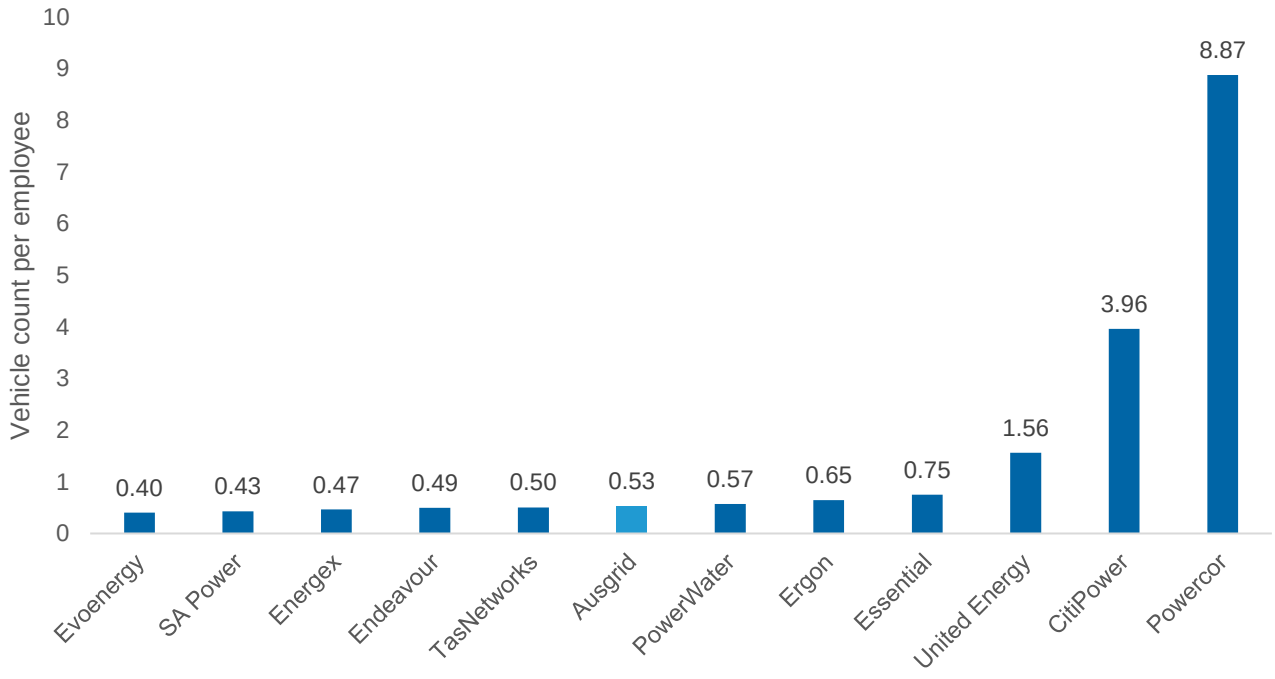


Figure 12.7 Our motor vehicle count per employee benchmarks well against our peers



Customer perspective

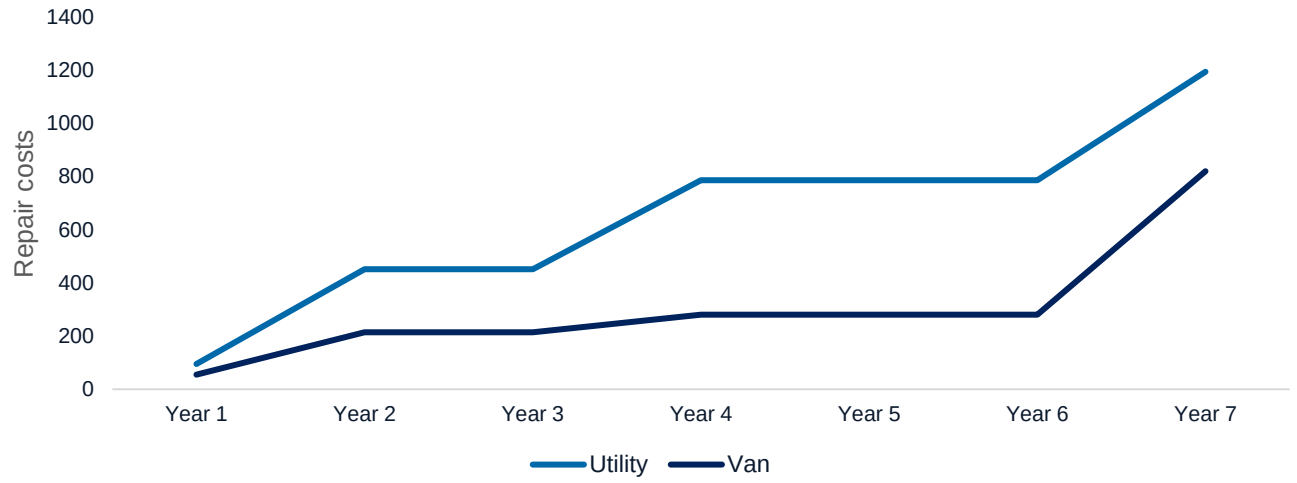
Our fleet count compares well to our peers given our network characteristics (distribution spans) and workforce (staff count). For our customers, this means that they are funding a fleet that has been 'right sized' to maintain existing service levels.

12.4 Unlocking efficiency savings to the long-term benefit of customers

We are considering ways in which we can further reduce our total fleet and plant costs. This includes options for increasing productivity, reducing maintenance costs and improving fleet reliability.

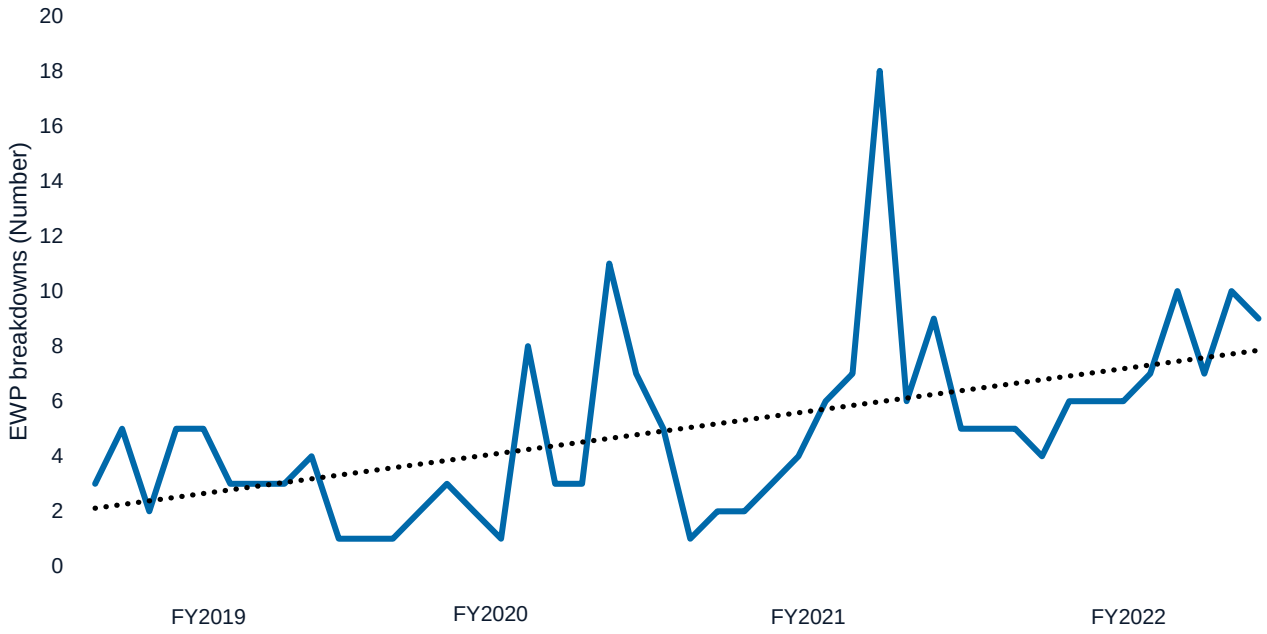
For light commercial vehicles, our analysis is revealing that maintenance and repairs costs increase after a certain vehicle age. The step change for repair costs is particularly significant. As shown in **Figure 12.8**, at six years, repair costs rise by 52% for utility vehicles and by 193% for vans. We are considering shortening our replacement lifecycle for these assets from seven to six years to achieve cost savings and meet updated safety recommendations from the Australasian New Car Assessment Program.

Figure 12.8 Repair and breakdown data for utility vehicles



EWPs are trucks with a platform attached at the rear which allows our field crews to reach overhead assets. Our analysis reveals that as our EWP fleet has aged and reached end of its technical life, we have seen a significant increase in the number of breakdowns occurring each year. Such breakdowns adversely impact on maintenance and capital delivery, with each failure representative of a significant delay and indirect cost.

Figure 12.9 Breakdown data for EWPs



To address this, we are looking into replacing up to 179 EWPs in the 2024-29 period. In addition to addressing reliability, this replacement program would unlock productivity gains for our network capex program by introducing

platforms with greater manoeuvrability and shorter setup/pack-up times, while also increasing safety by reducing worker twist/strain injuries. From an accounting perspective, most of these benefits flow to capex given that EWPs and other heavy vehicles are used for capital programs (e.g. installing / replacing assets).

Customer perspective

Our customers will benefit from a more productive fleet that allows us to maintain existing service levels.

12.5 Further supporting material

Figure 12.9 Attachment index

Att #	Document name
5.10	Fleet strategy
5.10.a	Fleet business case – EWPs
5.10.b	Fleet business case – Light commercial vehicles
5.10.c	Fleet business case – Heavy commercial vehicles
5.10.d	Fleet business case – Crane borer
5.10.e	Fleet model

Figure 12.10 RCP meetings – Presentation index

Presentation	Date
Deep dive: Fleet asset categories	3 February 2022
Deep dive: Investment approach	3 March 2022
Deep dive: Updated capex forecast	2 August 2022
AER modelling workshop	23 November 2022

13. Non-network Property

13.1 Overview

We are forecasting $145 million in non-network property capex for the 2024-29 period. This makes up 4% of our total investment in the **Figure 13.1**.

Our planned capex program aims to deliver a property portfolio which, by FY29, is flexible and adaptive to rapid shifts in customer requirements, while also maintaining the safety for our workforce and the community.

Our forecast is prudent, efficient and customer centric for the reasons set out in **Figure 13.2**. It shows that our 2024-29 forecast aligns with our spend in recent years.

Figure 13.1 Forecast property capex as a percentage of total capex

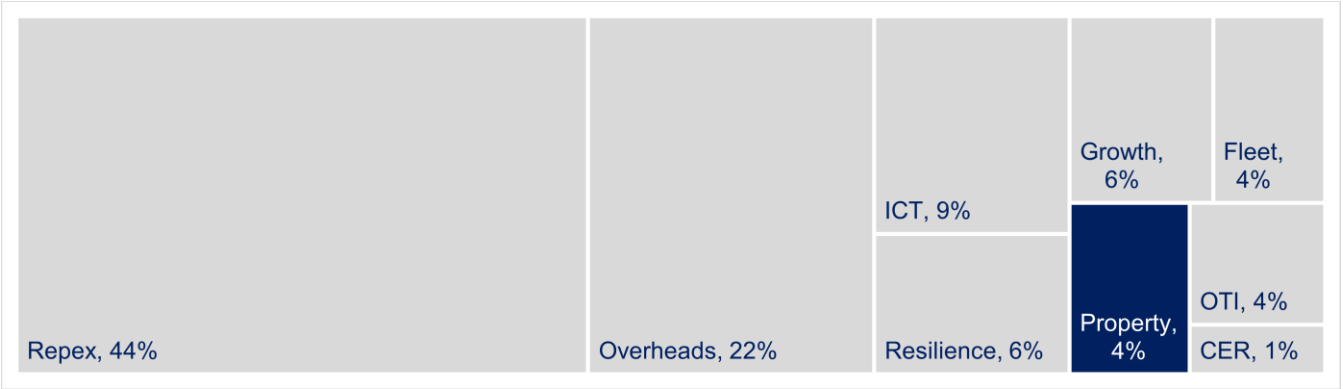


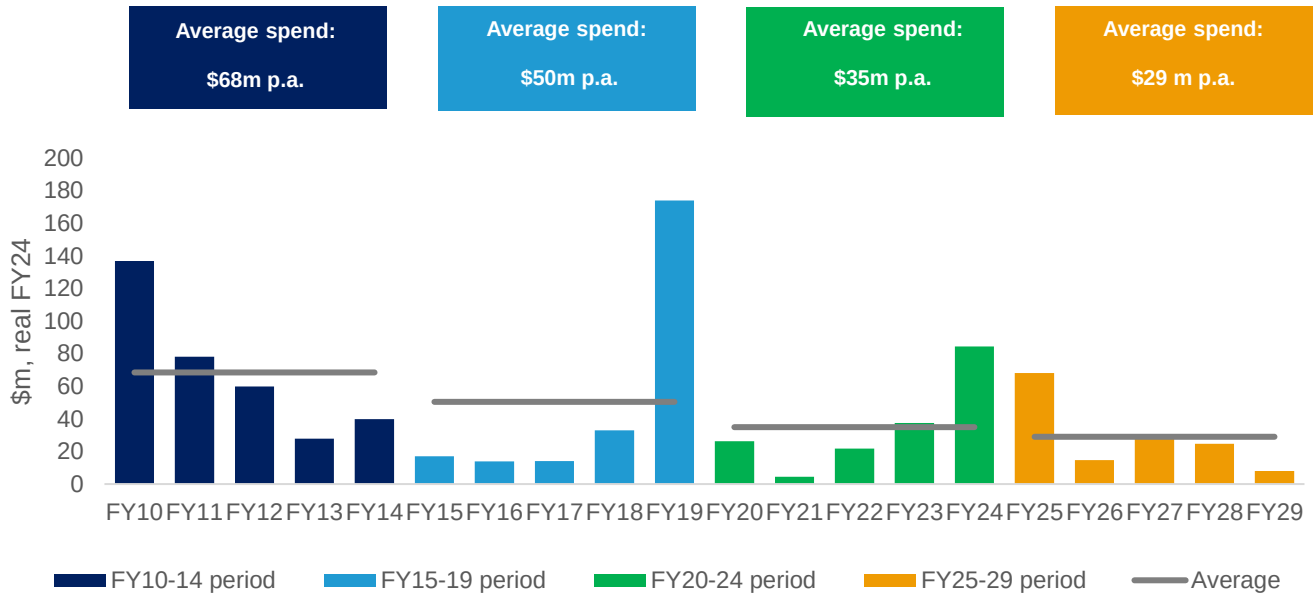
Figure 13.2 Factors demonstrating prudence, efficiency and customer centricity of our forecast

Factor	Proof point
Trend (see section 13.2)	Our forecast non-network property capex is 17% less than our current period spend
Prudent accommodation strategy (see section 13.3)	Our investment plan for the 2024-29 period is based on a prudent accommodation strategy designed to meet our customers' long-term needs

13.2 Our forecast is 17% below our current period spend

We are forecasting a 17% reduction in our non-network property capex in the 2024-29 period compared to our expected level of investment in the current period. The trend in our non-network property investment (see **Figure 13.3**) shows that our average annual spend in FY25-29 will be lower than any other regulatory period, dating back to FY10.

Figure 13.3 Our forecast non-network capex aligns to our recent level of investment



13.3 Our approach produces an efficient forecast

Our 2024-29 non-network property forecast is based on regulatory obligations, guidelines and policies, including:

- Regulatory compliance obligations – such as National Construction Code, Australian Standards, Building Code of Australia standards, Workplace Health and Safety Act, Environmental Planning Act and Heritage Act. NSW Government Workplace Guidelines;
- Ausgrid Policies – such as the Health and Safety Management System – previously known as 'Be Safe', COVID-19 Protocols and Electrical Safety Rules; and
- Ausgrid Guidelines – such as the Health and Safety Strategy, which has the key objective of 'continually improving control effectiveness to reduce the health and safety hazards and risks across our operations so far as is reasonably practicable'.

We have applied our business-as-usual investment governance processes in the development of our non-network property forecast. These processes are geared towards selecting the most efficient solutions by considering factors such as security of tenure, asset life cycles, and any efficient capex and opex tradeoffs that may be present when making investment decisions impacting our non-network property portfolio.

We have also applied our standardised NPV model, which we use across our capex portfolio, to identify the most efficient options. This approach applies quantitative analysis which considers benefits such as safety and reliability.

Figure 13.4 Attachment index

Att #	Document name
5.11	Property Plan 2024-2029
5.11.a	Southern Region program feasibility study
5.11.b	Newcastle Region program feasibility study
5.11.c	Engineering design and collaboration centre program feasibility study
5.11.d	Security upgrade program feasibility study
5.11.e	Sydney North program feasibility study
5.11.f	General remediation and modernisation program feasibility study

5.11.g	Southern Region program feasibility model
5.11.h	Newcastle Region program feasibility model
5.11.i	Engineering Design and Collaboration Centre program feasibility model
5.11.j	Security upgrade program feasibility model
5.11.k	Sydney North program feasibility model
5.11.l	General remediation and modernisation program feasibility model

Figure 13.6 RCP meetings – Presentation index

Presentation	Date
Deep dive: Non-network property strategy	31 March 2022
Deep dive: Non-network property investment and rationalisation strategy	9 September 2022

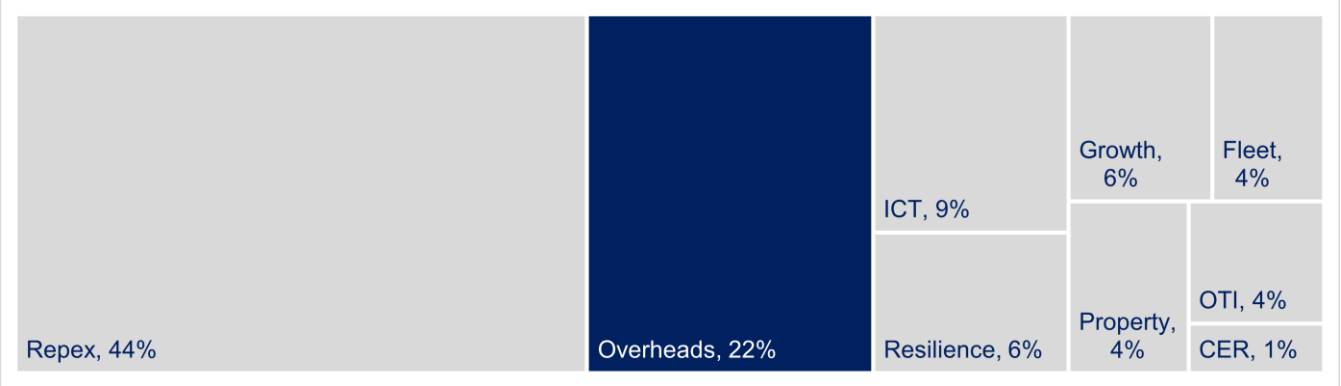
14. Overheads

14.1 Overview

Capital program support (also known as 'capitalised overheads') includes the indirect costs we incur in the delivery of both our network and non-network capex programs. This includes the costs associated with planning, managing and supervising the capex program, and a portion of administrative/corporate support costs including safety, IT, HR and finance functions.

Although these costs support the delivery of the capex program, they cannot be directly attributed to specific projects or programs. As a result, the costs are bundled together as capital program support costs. As shown in **Figure 14.1**, our capital program support costs make up 22% of our total forecast capex in the 2024-29 period.

Figure 14.1 Overhead capex as a proportion of total capex



We have developed a capitalised overhead forecast that applies the AER's standard method. The AER's standard method to calculate capitalised overheads applies a technique that uses the historic proportion of capitalised overheads to direct capex and trending this forward. The forecast for capitalised overheads is calculated by assuming that for every 4% change in direct capex, capitalised overheads change by 1%. This methodology is based on the assumption that capitalised overheads are 75% fixed and 25% variable.

Our engagement with the RCP prompted us to apply an annual 0.5% productivity adjustment to our capitalised overheads forecast. This adjustment will require us to continually find productivity gains on an annual basis and to pass on the full benefit of efficiency gains to customers. We believe we are the first electricity distributor to propose such an adjustment, on top of using the AER's method for forecasting capitalised overheads. It is an outcome that demonstrates the strength of our engagement with the RCP and the resulting customer benefits.

14.2 Further supporting material

Table 14.2 RCP meetings – Presentation index

Presentation	Date
Deep dive: Approach to forecasting overheads	3 February 2022
Update: Approach to forecasting overheads	28 April 2022

15. Rule requirements

We have proposed a total forecast capex for the 2024-29 regulatory period that we consider is required to achieve each of the capex objectives listed in clause 6.5.7(a) of the NER. The AER is required to decide whether to accept or reject our total forecast capex. The AER must accept the total forecast capex if it is satisfied that the forecast of required capex reasonably reflects each of the capex criteria, having regard to the capex factors. Below we identify how we have met the opex objectives, criteria and factors.

The NER requirements in relation to forecast capex in a building block proposal are largely contained in clause 6.5.7 of the NER. We outline how we have had regard to, and satisfy, these requirements in our regulatory proposal in **Figure 15.1** below.

NER clause S6.1.1 includes additional requirements for our capex proposal. We outline how we have addressed these requirements in **Figure 15.7** below.

Figure 15.1 How we address NER cl 6.5.7 requirements in relation to forecast capex.

NER clause	Description of requirement (and related RIN requirements where applicable)	How we satisfy requirement
Capex objectives		
6.5.7(a)(1)	Our regulatory proposal must include the total forecast capex for the 2024-29 period that we consider is required to meet each of the capex objectives in clause 6.5.7(a) of the NER (**capex objectives**). **Note:** Reset RIN 4.4.1(a) requires Ausgrid to provide justification for our total forecast capex, including why the forecast capex is required for Ausgrid to achieve each of the capex objectives.	We consider the total forecast capex proposed for the 2024-29 period as outlined in our proposal and this attachment is required to meet the capex objectives. **Figure 15.2** below provides an overview of why we consider our proposed total forecast capex is required to achieve each of the capex objectives.
Miscellaneous		
6.5.7(b)(1)	Our forecast capex must comply with the requirements of any relevant regulatory information instrument.	See **Attachment RIN.01** Response.
6.5.7(b)(2)	Our forecast capex must be for expenditure that is properly allocated to *standard control services* in accordance with the principles and policies set out Ausgrid's *Cost Allocation Method*.	See **section 2.3** above.
6.5.7(b)(3)	Our forecast capex must include both the total of the forecast capex for the 2024-29 period and the forecast capex for each regulatory year of the 2024-29 period.	See **section 2.1** above and **RIN.11 Workbook 1**.
6.5.7(b)(4)	Our forecast capex must identify any forecast capex for the 2024-29 period that is for an option that has satisfied the regulatory investment test for transmission or the regulatory investment test for distribution (as the case may be).	See **Figure 15.5** below.

6.5.7(b)(5)	Our forecast capex must not include expenditure for a restricted asset, unless in certain circumstances.	N/A – Our forecast does not include expenditure for restricted assets.
Capex criteria		
6.5.7(c)(1)	Requires the AER to, subject to subparagraph (c)(2),[31] accept our forecast of required capex if the AER is satisfied that the total of the forecast capex for the 2024-29 period reasonably reflects each of the capital expenditure criteria (**capex criteria**) in clause 6.5.7(c)(1). **Note:** Reset RIN 4.4.1(b) requires Ausgrid to provide justification for our total forecast capex, including how Ausgrid's total forecast capex reasonably reflects each of the capex criteria.	We consider the total forecast capex proposed for the 2024-29 period as outlined in our proposal and this attachment reasonably reflects each of the capex criteria. **Figure 15.3** below provides an overview of how our total forecast capex achieves each of the capex criteria.
Capex factors		
6.5.7(c)(2)	Provides that in deciding whether or not the AER is satisfied our forecast capex satisfies the capex criteria, the AER must have regard to the capex factors. **Note:** Reset RIN 4.4.1(c) requires Ausgrid to provide justification for our total forecast capex, including how Ausgrid's total forecast capex accounts for the factors in clause 6.5.7(e).	We consider the total forecast capex proposed for the 2024-29 period as outlined in our proposal and this attachment accounts for the capex factors. **Figure 15.4** below provides an overview of how our total forecast capex accounts for each of the capex factors.

[31] NER clause 6.5.7(c)(2) provides that the AER must not accept our forecast of required capex if it includes expenditure for a restricted asset, unless certain circumstances exist. Ausgrid's forecast capex does not include expenditure for a restricted asset.

Figure 15.2 How our total forecast capex is required to achieve the capex objectives

NER clause	Capex objective	Why our total capex forecast is required to achieve objective
6.5.7(a)(1)	Meet or manage the expected demand for standard control services	We have used the most up-to-date information on forecast peak demand and customer connections in determining that our total forecast is required to meet or manage the expected demand for standard control services. The analysis supporting this aspect of our total capex forecast, including independent verification of our demand and customer forecasts, is set out in: • **Attachment 5.6.a – Maximum demand forecast** • **Attachment 5.6.b – Maximum demand forecast and DER integration model review** • **Attachment 5.6.i – Forecast new connections model - SCS customer contribution** • **Attachment 5.6.j – Forecast new connections model - SCS**
6.5.7(a)(2)	Comply with all applicable regulatory obligations or requirements associated with the provision of standard control services	Our total capex forecast is required so that we can comply with all applicable regulatory obligations or requirements associated with the provision of standard control services. We have set out all applicable regulatory obligations or requirements related to the provision of standard control services in **RIN.10 – Ausgrid DNSP 2024-29 – Reset RIN – Workbook 1 – Forecast Data** (see '7.3 Obligations' tab).
6.5.7(a)(3)	Maintain the quality, reliability and security of supply of standard control services and the distribution system	Our total capex forecast will maintain existing levels of quality, reliability and security of supply of standard control services and the distribution system. This is supported by the top-down tests in **section 3** above**.** For example, our total capex forecast is 1% higher than our 2019-24 expected spend, which aligns with maintaining, rather than improving, the quality, reliability and security of supply. More generally, we manage our assets in a manner that ensures that we maintain the quality, reliability, and security of supply of standard control services and our distribution system. Our policy and procedure documentation relating to the achievement of this objective is listed in **RIN.10 – Ausgrid DNSP 2024-29 – Reset RIN – Workbook 1 – Forecast Data** (see '7.1 Policies and Procedures' tab).
6.5.7(a)(4)	Maintain the safety of the distribution system	We have conducted economic analysis at the capex driver level (repex, growth, resilience, CER, ICT, fleet, property) which demonstrates our total capex forecast is required to maintain the safety of the distribution system. This analysis is embedded in various attachments making up our proposal (these include **Attachment 5.4.a to 5.4.i**, **Attachments 5.6.a to 5.6.k**, **Attachments 5.5 to 5.5.f**, **Attachments 5.7**, **Attachments 5.9 to 5.9.l**, **Attachments 5.10.a to 5.10.e**, and **Attachments 5.11 to 5.11.l**). The inputs into this economic analysis, including how we have quantified safety benefits, are set out in **Attachment 5.2.c – Customer value framework** while our CBA approach is outlined in **Attachment 5.3.d – Principles of CBA**.

Figure 15.3 How our total forecast capex achieves each of the capex criteria

NER clause	Capex criterion	How our forecast reasonably reflects the criterion
6.5.7(c)(1)(i)	Reflects the efficient costs of achieving the capex objectives	We consider our total forecast capex reasonably reflects the efficient costs of achieving the capex objectives because, in preparing our capex forecasts, we: • Engaged extensively with our customers and incorporated their feedback on investment options and expenditure levels (see **Attachment 3.1 – Engagement overview**) • Undertook CBA analysis to select the most efficient option to an identified need, as measured by the economic benefits. For an explanation of our approach see **Attachment 5.2.c – Customer value framework** and **Attachment 5.3.d – Principles of CBA** • Incorporated productivity improvements in our capitalised overheads forecasts (see **section 14** above) • Applied the AER's repex model and observed that it supports the efficiency of our modelled repex forecasts based on NEM benchmark unit costs and asset replacement lives (see **section 6** above and **Attachment 5.4.A – Asset replacement program**) • Subjected our proposed forecasts to review and challenge by internal governance bodies and customers (see **section 4** above).
6.5.7(c)(1)(ii)	Reflects the costs that a prudent operator would require to achieve the capex objectives	We consider our total forecast capex reasonably reflects the costs that a prudent operator would require to achieve the capex objectives because: • We have employed a standardised NPV model to calculate the costs and benefits of investments using a common tool across our capex portfolio (see **section 4.2.2** above) • Our resilience capex forecast is based on a climate impact assessment and an independent assessment of its reasonableness (see **Attachment 5.5.b – Climate impact assessment** and **Attachment 5.5.e – KPMG Partner letter for climate impact assessment work**) • We have had our peak demand and customer connection forecast independently reviewed and found to be a reasonable expectation of demand and customer connections (see **Attachment 5.6.b – Review of maximum demand forecast and DER integration model review**) • Our proposed forecasts have been subjected to prudent oversight from internal governance committees (see **section 4** above and **Attachment 5.2.b – Investment Governance Framework**) • We have incorporated a delivery and resourcing strategy into the development of our total capex forecast so that it is based on the most efficient and effective resources (see **Attachment 5.3.a – Resourcing and delivery strategy for 2024-29 period**).
6.5.7(c)(1)(iii)	Reflects a realistic expectation of the demand forecast and cost inputs required to achieve the capex objectives	We consider our forecast reflects a realistic expectation of the demand forecast and cost inputs required to achieve the capex objectives. We have used the most up-to-date information and employed sophisticated techniques, such as agent-based modelling (see **section 8.4.3**), to make our forecast as realistic as possible. The analysis supporting this aspect of our total capex forecast, including independent verification of our demand forecast, is set out in: • **Attachment 5.6.a – Maximum demand forecast**

		• **Attachment 5.6.b – Review of maximum demand forecast and DER integration model review** In relation to costs inputs, we have: • Applied a comprehensive estimation approach that has produced cost inputs that reflect the expected costs to achieve the capex objectives (see **Attachment 5.3.b – Cost estimation approach**) • Applied independent analysis of real price changes in cost inputs (see **RIN.04 – Real materials and Land Escalation Report** and **RIN.05 – Real Labour Escalation Report**).

Figure 15.4 Summary of how our total forecast capex accounts for the capex factors

NER clause	Capex factor to account for	How our capex forecast accounts for this capex factor
6.5.7(e)(4)	The most recent annual benchmarking report that has been published under rule 6.27 and the benchmark capex that would be incurred by an efficient DNSP over the relevant regulatory control period	We have had regard to the annual benchmarking reports published by the AER under rule 6.27. In **section 3.1.4** above we assess our capital MPFP scores in the 2022 benchmarking report for Ausgrid and other electricity distributors. This includes a summary of our engagement with customer advocates on this metric, which has led us to continue exploring other ways to benchmark our performance. We have used additional tools to identify that our capex forecast reflects the expenditure that an efficient DNSP would incur over the 2024-29 period. This includes the AER's repex model which, based on benchmark unit rates and age profiles, supports the efficiency of our asset replacement forecast.
6.5.7(e)(5)	The actual and expected capex of the DNSP during any preceding regulatory control periods	Our capex forecasts have had regard to historical trends in expenditure over the current and previous regulatory periods. We discuss the reasons for the key changes in the forecast from the preceding regulatory periods throughout this attachment and **Chapter 5** our **Regulatory Proposal**.
6.5.7(e)(5A)	The extent to which the capital expenditure forecast includes expenditure to address the concerns of electricity consumers as identified by the DNSP in the course of its engagement with electricity consumers	Customer consultation has been a key consideration in the development of our capex forecast. We have engaged directly with customer advocates via the RCP and residential and small business customers through our VoC Panel. Customers played a direct role in reductions made to our resilience capex as a part of a trade-off involving our proposed opex based community resilience initiatives (see **Chapter 5** of our **Regulatory Proposal**). We also held a Town Hall meeting to gauge customer support for our capex forecast (see **section 1.3** above). Our engagement report (see **Attachment 3.1 – Engagement Overview**) provides a detailed overview of the breadth and depth of the discussions we have had with customers. See also **Chapters 3 and 5** of our **Regulatory Proposal**.
6.5.7(e)(6)	The relative prices of operating and capital inputs	We have sought to assess all feasible options when addressing a need including opex and capex solutions. When doing so, we have used best practice methods for deriving the relative cost of opex and capex solutions, and have applied a common method for real cost escalation. We have applied appropriate escalators to the relative prices of inputs in our opex and capex forecasts. For further details, see **Chapters 5** and **6** of our **Regulatory Proposal** and **Attachment RIN.05 – Real labour escalation report**.
6.5.7(e)(7)	The substitution possibilities between operating and capital expenditure	We have considered the substitution possibilities between opex and capex in developing our forecast capex. A key step in our capital network investment planning process is to consider a full range of alternative options, including whether there may be an opex solution that is more efficient in addressing the investment need. Examples of how we have considered the substitution possibilities between capex and opex include:

		• Reducing our capital investment in network resilience solutions as an efficient trade-off for community based opex initiatives (see section **Chapter 5** of our **Regulatory Proposal**) • Considering the consequential impact on forecast opex from capex investment interactions, including in relation to certain step changes (see Section 6 of **Attachment 6.1 – Proposed operating expenditure**).
6.5.7(e)(8)	Whether the capital expenditure forecast is consistent with any incentive scheme or schemes that apply to the DNSP under clauses 6.5.8A or 6.6.2 to 6.6.4	The regulatory framework, coupled with our commercial focus and customers' expectations, provide strong incentives for Ausgrid to act prudently and efficiently when assessing our expenditure needs for the forthcoming regulatory period. The significant incentive schemes that our capex forecast considers include: • CESS – this scheme will provide us with an incentive to reduce our capex in each year of the 2024-29 regulatory period with the efficiency benefits shared with customers • STPIS – this scheme will help us maintain and improve our service performance and ultimately deliver better outcomes for customers. • CSIS – this scheme will help us maintain and improve our performance in areas of service that our customers have told us they most value improvement in. • Demand Management Incentive Scheme and Innovation Allowance – together, these schemes will provide benefits to our customers by reducing network investment over time and thereby lowering prices in future regulatory periods.
6.5.7(e)(9)	The extent the capital expenditure forecast is referable to arrangements with a person other than the DNSP that, in the opinion of the AER, do not reflect arm's length terms	All capex forecasts are not referable to arrangements with a person other than Ausgrid.
6.5.7(e)(9A)	Whether the capital expenditure forecast includes an amount relating to a project that should more appropriately be included as a contingent project under clause 6.6A.1(b)	Our capex proposal does not include an amount relating to a project which should more appropriately be included as a contingent project under clause 6.6A.1(b).
6.5.7(e)(10)	The extent the DNSP has considered, and made provision for, efficient and prudent non-network options	Non-network options play a key role in the development of our capex forecast. We are also investing in new technology that will support the rapid identification of suitable non-network options, such as community batteries (see **Attachment 5.8 – Network innovation program**).
6.5.7(e)(11)	Any relevant final project assessment report (as	

	defined in clause 5.10.2) published under clause 5.17.4(o), (p) or (s)	See **Figure 15.6** below.
6.5.7(e)(12)	Any other factor the AER considers relevant and which the AER has notified the Distribution Network Service Provider in writing, prior to the submission of its revised regulatory proposal under clause 6.10.3, is a capital expenditure factor	N/A – This factor is relevant for submission of a revised regulatory proposal and not this initial regulatory proposal.

Figure 15.5 Forecast capex that has an option that has satisfied a RIT-D (NER, clause 6.5.7(b)(4))

Final project assessment report	Capex ($, real FY24)
Addressing reliability requirements in Burwood load area	885,350
Addressing reliability requirements in Zetland and Waterloo load areas	5,220,440
Addressing reliability requirements in Zetland and Waterloo load areas	606,423
Addressing reliability requirements in Tarro load area	1,254,991
Addressing reliability requirements in the Kingsford load area	4,476,128
Addressing reliability requirements in the Concord area	1,220,531
Ensuring Reliable Supply for the Sydney Airport network area	122,322
Ensuring reliability requirements in Sydney CBD	686,590
Total	**14,472,775**

Figure 15.6 List of relevant final project assessment reports (NER, clause 6.5.7(e)(11))

Final project assessment report	Date of report
Addressing reliability requirements in Burwood load area	January 2023 (expected)
Addressing reliability requirements in Zetland and Waterloo load areas	13 December 2022
Addressing reliability requirements in Tarro load area	4 November 2022
Addressing reliability requirements in the Kingsford load area	5 August 2022
Addressing reliability requirements in the Concord area	11 December 2020
Ensuring Reliable Supply for the Sydney Airport network area	6 March 2020
Ensuring reliability requirements in Sydney CBD	8 June 2018
Addressing reliability requirements in Burwood load area	January 2023 (expected)

Figure 15.7 Information requirements in Chapter 6 of the NER

NER clause	Information requirement	Where this requirement is addressed
S6.1.1(1)	A building block proposal must contain a forecast of the required capital expenditure that complies with the requirements of clause 6.5.7 and identifies the forecast capital expenditure by reference to well accepted categories, such as: i) asset class (eg. distribution lines, substations etc); or ii) category driver (eg. regulatory obligation or requirement, replacement, reliability, net market benefit, business support etc), and identifies, in respect of proposed material assets: iii) the location of the proposed asset; iv) the anticipated or known cost of the proposed asset; and v) the categories of distribution services which are to be provided by the proposed asset.	**Subclause (i)** Attachment 5.1.b – Capex Model – FY25-29 **Subclause (ii)** Attachment 5.1 – Proposed capital expenditure **Subclauses (iii)-(v)** Attachment 5.1.c – Master list of SCS capital projects Attachment 9 – Technology plan 2024-29 Attachment 5.10.a – Fleet Strategy Attachment 5.11 – Property plan 2024-29
S6.1.1(2)	A building block proposal must contain the method used for developing the capital expenditure forecast.	Attachment 5.1 – Proposed capital expenditure
S6.1.1(3)	A building block proposal must contain the forecasts of load growth relied upon to derive the capital expenditure forecasts and the method used for developing those forecasts of load growth.	Attachment 5.6 – Maximum demand forecast Attachment 5.6.b – Maximum demand forecast and DER integration model review
S6.1.1(4)	A building block proposal must contain the key assumptions that underlie the capital expenditure forecast.	Attachment 2.2 – Key Assumptions and Directors' Certification of Key Assumptions
S6.1.1(5)	A building block proposal must contain a certification of the reasonableness of the key assumptions by the directors of the Distribution Network Service Provider.	Attachment 2.2 – Key Assumptions and Directors' Certification of Key Assumptions
S6.1.1(6)	A building block proposal must contain capital expenditure for each of the past regulatory years of the previous and current regulatory control period, and the expected capital expenditure for each of the last two regulatory years of the current regulatory control period, categorised in the same way as for the capital expenditure forecast and separately identifying for each such regulatory year: i) margins paid or expected to be paid by the Distribution Network Service Provider in circumstances where those margins are referable to arrangements that do not reflect	Attachment 5.1 – Proposed capital expenditure

	arm's length terms; and ii) expenditure that should have been treated as operating expenditure in accordance with the policy submitted under paragraph (8) for that regulatory year;	
S6.1.1(7)	A building block proposal must contain an explanation of any significant variations in the forecast capital expenditure from historical capital expenditure.	Attachment 5.1 – Proposed capital expenditure
S6.1.1(8)	A building block proposal must contain the policy that the Distribution Network Service Provider applies in capitalising operating expenditure.	Attachment 5.12 – Capitalisation policy

16. Regulatory Information Notice (RIN)

The RIN that the AER issued on us in relation to our 2024-29 reset includes information requirements in section 4. Our response to the information requirements relating to our capex forecast are outlined below.

16.1 RIN requirement 4.4.1(a) to (c)

Our response to the RIN requirements 4.4.1(a) to (c) are concurrently addressed with the NER requirements in **Chapter 15** above.

16.2 RIN requirement 4.4.1(d)

The RIN requires, under section 4.4.1(d), an 'explanation of how the plans, policies, procedures and regulatory obligations or requirements identified in Workbook 1 – Forecast, regulatory templates 7.1 and 7.3 have been used to develop forecast capex'. This is dealt with in section 16.2.1 and 16.2.2 below.

16.2.1 Template 7.1: Plans, policies, procedures and strategies

Our response to Template 7.1 in the RIN lists the plans, policies, procedures and strategies which collectively make up our capital planning and investment governance framework. We explain how we have applied this framework to develop our 2024-29 capex forecast in **Chapter 4** above.

16.2.2 Template 7.3: Regulatory Obligations

The regulatory obligations set out in Template 7.3 of the RIN can influence the need and timing of our capital investments. We have considered these obligations when developing our 2024-29 capex forecast. In particular:

- The *Electricity Supply Act* imposes performance requirements for our network. It includes a requirement us to hold a DNSP licence, which in term imposes conditions in respect reliability and performance of the network. For example, our NSW Government mandated Licence Conditions require us to comply with a minimum average level of reliability for segments of our network, together with a minimum performance level for individual feeders. This has informed our augex forecast which, as outlined in **section 8** above, includes capex to address reliability issues.
- Our Licence Conditions require us to use 'best industry practice' to ensure our network and ICT systems can only be accessed, operated and controlled from within Australia.[32] This is a ratcheting regulatory obligation that requires us to monitor our level of cyber security protections against best practice in our industry, and take action when we are at risk of falling behind this standard. This has informed our 2024-29 capex forecast for cyber security.
- The *Security of Critical Infrastructure Act 2018* (Cth) applies to Ausgrid. It includes new powers that allow the Federal Government to require the disclosure of information and order Ausgrid to act in certain ways. It also requires our business to maintain a Risk Management Program that addresses a range of prescribed risks, which has informed our 2024-29 cyber security capex forecast.

[32] Critical Infrastructure Licence Conditions, section 9.2(a).

- The National Electricity Law and NER regulate Ausgrid's participation in the National Electricity Market as a Network Service Provider (both and TNSP and DNSP) and cover a range of matters including system and network reliability and security, network planning, connections procedures, and system and network standards. These matters necessarily form part of our capex forecast and investment governance decision making.

Ausgrid is also subject to more general obligations and requirements which direct the way we design and operate the network. These obligations are mainly concerned with environmental protection, and public and worker safety. These influence our drivers of investment, for example, we may replace an asset if the safety consequences to our workforce or the general public cannot be appropriately mitigated through maintenance. The standards also influence our construction and designs, for instance by adhering to environmental, planning and heritage legislation.

In addition to our key role of providing electricity services, we are also required to meet our obligations as a corporation in respect of governance and financial accountability. These can drive the need for investment in IT and financial systems, and non-system property to house staff performing these functions.

As a prudent electricity distributor, Ausgrid adheres to codes and guidelines that provide direction on how to meet our overriding obligation to operate our network in accordance with good electricity industry practices. Often these programs will influence our decisions to invest in replacing an asset, or on the construction standard that we apply.

16.3 RIN requirement 4.4.1(e)

We are required to provide an explanation of how our response provided to paragraph 4.4.1(a) to (d) is reflected in any increase or decrease in expenditures or volumes, particularly between the current and 2024-29 regulatory period. This explanation is provided in **Chapter 2** above.

For ease of reference, the percentage change in expenditure between the current and 2024-29 period is set out in Table 16.1 below. The source of where further information can be found is also noted.

Figure 16.1: Information relating to RIN requirement 4.4.1(e)

Driver	FY25-29 period	FY20-24 period	% change	Further information on expenditure and volume increases/decreases
Repex	1446	1523	(5)%	Attachment 5.4.a – Asset replacement program Attachment 5.6.b – Major Projects - 11kV Switchgear replacement Attachment 5.6.c – Major Projects - Sub-transmission cable replacement Attachment 5.6.d – Major Projects – Other replacement Attachment 5.5 - Climate resilience program Attachment 5.8.a – Network innovation program Attachment 5.8.C – Control system core refresh program Attachment 5.8.d – Operational technology program

				Attachment 5.8.e – Network digitisation program
Resilience	194	0	n/a	Attachment 5.5.a – Resilience implementation plan
Growth	190	207	(9)%	Attachment 5.6.a to Attachment 5.6.k
CER	47	4	1,175%	Attachment 5.7 CER integration program
OTI	117	204	(43)%	Attachment 5.8.a-h – OTI Programs & Models
ICT	301	282	7%	Attachment 5.9 – Technology plan 2024-29
Fleet	148	138	7%	Attachment 5.10 – Fleet strategy
Non-network property	145	174	(17)%	Attachment 5.11 – Property plan 2024-29
Overheads	724	743	(3)%	See **Chapter 14** above
Total	3311	3277	1.0%	See **Chapter 2** above

16.4 RIN requirements 4.4.2, 4.4.3 and 4.4.4

Our response to the RIN requirements in clauses 4.4.2, 4.4.3 and 4.4.4 are set out in Tables 16.2 to 16.4 below.

Table 16.2 RIN requirement 4.4.2

Requirement	Description	Network capex	ICT capex	Fleet capex	Property capex
4.4.2	Identify which items of Ausgrid's forecast capex are:				
4.4.2(a)	derived directly from competitive tender processes;	Attachment 5.3.b - Cost estimation approach	Not Applicable	• Cars • Light commercial vehicles • Elevated work platforms	
4.4.2(b)	based upon competitive tender processes for similar projects;	Attachment 5.3.b - Cost estimation approach	Not Applicable		

Requirement	Description	Network capex	ICT capex	Fleet capex	Property capex
4.4.2(c)	based upon estimates obtained from contractors or manufacturers;	Attachment 5.3.b - Cost estimation approach	Applicable to specific non-recurrent programs.	• Crane borer • Plant • Heavy commercial vehicles • Vehicle loading crane	
4.4.2(d)	based upon independent benchmarks;	Attachment 5.3.b - Cost estimation approach	Non-recurrent capex programs considered independent benchmarks.		Forecast informed by independent benchmarks from JLL and other sources referenced in business cases.
4.4.2(e)	based upon actual historical costs for similar projects; and	Attachment 5.3.b - Cost estimation approach	Actual historical costs of similar projects were used to forecast recurrent ICT capex		Forecast informed by actual historical costs for similar projects completed by Ausgrid.
4.4.2(f)	reflective of any amounts for risk, uncertainty or other unspecified contingency factors, and if so, how these amounts were calculated and deemed reasonable and prudent.	Attachment 5.3.b - Cost estimation approach	Forecast capex is specified where applicable and informed by historical costs or independent benchmarking.	Forecast capex is not reflective of risk, uncertainty or other unspecified contingency	

Table 16.3 RIN requirement 4.4.3

Requirement	Description	Network capex	ICT capex	Fleet capex	Property capex
4.4.3	Provide all documents which were materially relied upon and relate to the deliverability of forecast capex and explain the proposed deliverability.	Attachment 5.3.a - Resourcing and delivery strategy for 2024-29 period	Attachment 5.9 – Technology Plan 2024-29	See business cases for Elevated work platforms and Light commercial vehicles	

Table 16.4 RIN requirement 4.4.4

NER clause	Information requirement	Where this requirement is addressed
4.4.4	Describe each capex category and expenditures relating to these categories identified in the regulatory templates, including:	
4.4.4(a)	key drivers for expenditure	See **section 2.1** above.
4.4.4(b)	an explanation of how expenditure is distinguished between:	
4.4.4(b)(i)	greenfield driven and reinforcement driven augex	As part of our network planning, we implement the option that is least cost on a net present value. This may give rise to greenfield or reinforcement driven augmentation capex. Greenfield augmentation is where we install new substations (for example, zone substations) or new feeders on the shared network to meet growth in peak demand or to meet reliability licence conditions. Reinforcement augmentation is where we increase the capacity of an existing shared asset, for example, by upgrading the capacity of an existing feeder, or adding a transformer to an existing zone substation.
4.4.4(b)(ii)	connections expenditure and augmentation capex	We have categorised connection capex as new installations on, or upgrades to, the shared network to provide a reliable supply to a customer. Our connection policy determines the extent to which connection capex is included as a standard control service or funded by the connecting customers (capital contributions). The customer pays a contribution for any dedicated asset, or upgrades to the shared network when augmentations refer to installations on our shared network in response to an increase in peak demand. Augmentations also include reliability programs to meet licence conditions.
4.4.4(b)(iii)	replacement capex driven by condition and asset replacements driven by other drivers (e.g. the need for greenfield or reinforcement driven augex)	Most of our replacement is driven by an issue with the condition of a network asset. The condition of the asset may be due to ageing, an inherent issue with the manufacturing quality of the asset, operating conditions, or damage due to weather events. In some cases, the asset's condition may be not compromised, but we need to replace the asset for other reasons. For example, the

		asset may not contribute to meeting modern day safety and environmental standards even if its condition is sound. A further example is when we replace an asset on the basis that the technology is obsolete and no longer capable of integrating with the efficient design of the network.
4.4.4(b)(iv)	Any other capex category or opex category where Ausgrid considers that there is a reasonable scope for ambiguity	We have not identified any other case where the definition of an opex or capex category has reasonable scope for ambiguity in its classification.