ATTACHMENT 2.01

Extended Stakeholder Consultation Report

Ausgrid

Contents

01 Introduction

The overarching aim of Ausgrid's Stakeholder and Consumer Consultation Program is to ensure ongoing engagement that helps us align our business planning, policies and practices with the expectations of our customers.

A summary of the activities undertaken over the course of the program for the 2019–24 Regulatory Proposal (the Proposal) and the next steps for submission, is shown on the right.

Ausgrid has been consulting with the Customer Consultative Committee (CCC) and its sub-group, the Reset Working Group (RWG), since late 2016 in order to inform the development of the Proposal. The Proposal sets out the investments Ausgrid will make and how much we need to charge our 1.7 million customers to make sure they have affordable, safe, reliable electricity supply – now and in the future.

After receiving the Australian Energy Regulator's (AER) approval to extend the submission deadline for the Proposal to 30 April 2018, Ausgrid expanded our consultation program.

Extending the consultation program allowed an even greater level of community and stakeholder engagement on key aspects of our Proposal, specifically: price, investment efficiency (capital expenditure and operational expenditure) and overall operational performance. Representatives from the AER also participated in the extended consultation program.

With the additional time, we sought to better understand the views of key stakeholders, identify key issues, work to bring those that could be resolved to a conclusion, and note where a resolution was still outstanding.

The findings from the extended stakeholder consultation were taken to the Ausgrid Board for feedback and to be made on whether to amend the Proposal.

This report provides an overview of the Extended Stakeholder Consultation Program, a summary of the key themes discussed during the sessions, questions raised and Ausgrid's response to them. It then identifies outcomes from the program and any amendments to the Proposal, endorsed by the Ausgrid Board.

This document was shared with those involved in the ESCP and discussed at the final session on 23 March, 2018.

Activity summary

Formation of Customer Consultative Committee and Reset Working Group	Late 2016
Customer at the Centre Project	May 2017 to September 2017
Customer Consultative Committee and Reset Working Group meetings	September 2016 to December 2017
Extended Stakeholder Consultation Program	January to February 2018
Ausgrid Board Meeting (Consideration of stakeholder feedback)	13 March 2018
Final Consultation Session	23 March 2018
Ausgrid Board Meeting	23 April 2018
Regulatory Proposal Submission	30 April 2018

02 Consultation 2016–2017

In mid-2016 Ausgrid established a new CCC with a Charter that outlined its purpose, objectives, responsibilities, membership criteria, meeting procedures, planning and reporting. Out of this process came the following purpose statement.

Consultation purpose statement

To provide oversight and advice to assist Ausgrid to become a customer-centric business that is sensitive to the needs and views of its various stakeholders

To help us achieve our aim of aligning the business with customer expectations, we developed a customer insights and research plan to better understand our customers and their needs. A key initiative was the 'Customer at the Centre' research project, which was specifically designed to support the development of our Proposal.

Customer at the Centre was a multi-phase project, that incorporated: customer focus groups, deliberative forums and a quantitative survey of 2,360 customers. Participants in the project included culturally and linguistically diverse individuals, older and younger people, the vulnerable and businesses, reflecting the diversity of Ausgrid's customers.

To date, we have engaged with more than 2,500 customers through our research plan, and we continue to have regular consultation with key stakeholder organisations that represent energy consumers. A summary of research stages is included in Attachment 2.02.

Prior to the Extended Stakeholder Consultation Program, Ausgrid held seven meetings of each of the CCC and RWG. A summary of the key matters covered in these meetings is provided in attachment 2.02.

Feedback from the Customer at the Centre program clusters into five areas set out as follows.

Customer feedback

Affordability

- Reducing our cost to serve
- *See Chapter 6 of our Proposal for further details*

Price strategy

- Increased fixed charges
- Social tariff
- Inclining block tariff
- *See Chapter 10 of our Proposal*

Sustainability of expenditure

- Review of capital program
- Seeking feedback on high and low capex case
- *See Chapter 5 of our Proposal*

Climate change

- Ausgrid sustainability strategy
- Response to industry disruption
- *See Chapter 3 of our Proposal*

Independent advice

- Energy literacy program
- Energy efficiency information
- Importance of research
- *See Attachment 2.02 of our Proposal*

03 Extended Consultation Program Overview

The Extended Stakeholder Consultation Program began with the release of the Stakeholder Consultation Document on 30 January, 2018. The document was designed to:

- Enable energy customers and stakeholders to understand the basis of our proposal and to give further feedback
- Provide our key stakeholders with clarity on the investments we intend to make and the services they will receive in the next regulatory period, so they could provide detailed feedback.

Between 1 February, 2018 and 23 March, 2018 Ausgrid delivered a series of consultation sessions with stakeholders from the following organisations:

- AER Consumer Challenge Panel
- AER representatives
- Council on the Ageing NSW (COTA)
- Energy Consumers Australia (ECA)
- Energy Users Association Australia (EUAA)
- Energy & Water Ombudsman NSW (EWON)
- Ethnic Communities Council of NSW (ECCNSW)
- NSW Council of Social Services (NCOSS)
- Public Interest Advocacy Centre (PIAC)
- Retailer representatives
- Southern Sydney Regional Organisation of Councils (SSROC)
- Total Environment Centre (TEC)
- Urban Development Institute of Australia (UDIA)

3.1 Consultation expectations

At the commencement of the extended stakeholder consultation program, we asked stakeholders what outcomes they expected the program to deliver. Above all, stakeholders communicated an expectation that the Proposal should contain 'no surprises'. In other words, the reasons for all our expenditure and the way in which it impacts prices, must be made clear to stakeholders prior to the submission of the Proposal. Stakeholders also expected that the goal of the Program was to achieve agreement on the Proposal via a collaborative process, although they acknowledged that agreement on all aspects of the Proposal may not be possible and that such an outcome would be satisfactory as long as the principle of 'no surprises' was upheld. Where agreement could not be achieved, stakeholders would still have the opportunity to express their concerns via the formal AER process for submissions in response to the Proposal.

Ausgrid acknowledges that the opportunity to undertake extended consultation has required significant investment of resources by stakeholders, the AER and our own business. Accordingly, there is a shared expectation that the process and outcomes achieved are meaningful and ultimately result in net benefits to our customers.

3.2 Consultation delivery

Seven independently facilitated sessions provided the opportunity for participants to ask questions on the content of the Proposal. A total of 37 hours consultation was undertaken and a total of 25 representatives from stakeholder groups participated across the various sessions.

A wide range of representatives from Ausgrid participated in the sessions, including the Ausgrid CEO, Chief Operating Officer, Executive General Managers, Senior Executives and technical experts. In total, 32 key Ausgrid staff attended at least one session and many, multiple sessions.

3.3 General approach to presentation of information

Presentations were designed to a 'one-third speaking and two-thirds listening' rule, to allow space for open discussion. During each session, comments and questions were noted on white boards and then recorded. This information was a key source used to compile the 16 themes identified in Section 5.

Stakeholders outlined the additional detail and presentation approach they required to enable them to meaningfully collaborate with Ausgrid and challenge the draft proposal including:

- a detailed breakdown of capital expenditure by category,
- trend analysis of capital expenditure by the same categories over the last two regulatory control periods and compared to AER allowances,
- the impact of expenditure on revenue, prices and customer bills, and
- quantified justification of projects and programs via a cost benefit analysis.

To the extent practicable, these requests were addressed over the course of the Program and where that was not possible, they were still considered for incorporation into the Proposal.

04 Session Overview

DATE	SESSION TITLE	CONTENT	ATTENDEES
1 Feb	**Opening Consultation Session**	Overview of key elements of the Proposal and the previous consultation covered in the Stakeholder Consultation Document	Stakeholders 15 Ausgrid 17
7 Feb	**Capex Deep Dive** **Workshop 1 & 2**	**Capex Workshop 1** – Introduction, and overview of Augmentation and Connection capex **Introduction** • Detailed trend analysis and overview of proposed capex program • General operational documents, asset management, planning and delivery materials • Risk and investment option assessment including demand-management opportunities • Contribution of capex program to price; payback of program for customers **Augmentation and Connection capex** • Demand forecasts, demand methodologies/assumptions and customer connections • Connection policy, forecast of annual connection volumes by all user types • Top 3 programs deep-dive. Project specific, including relevant supporting documentation **Capex Workshop 2** – Non-network capex • Details about relevant trends and drivers • Deep-dive – Top IT projects and relevant supporting documentation • Deep-dive – property and fleet. Project specific, including relevant supporting documentation • Trends and drivers for business overheads	Stakeholders 12 AER 7 Ausgrid 24

DATE	SESSION TITLE	CONTENT	ATTENDEES
12 Feb	**Capex Deep-Dive Workshop 3**	**Capex Workshop 3** – Replacement capex (Repex) Overview of repex programs, including Advanced Distribution Management System (ADMS). • Approach to decision making (condition assessment, replacement expenditure analysis) • Repex analysis proposed inputs, mean asset life, standard deviation and unit costs applied in repex model. Identification of assets excluded in the repex model, and reasons for their exclusion • Long-term asset sustainability and technology factors, such as future grids and battery storage capability • Top 5 programs, including relevant supporting documentation	Stakeholders 6 AER 5 Ausgrid 22
21 Feb	**Capex Wrap Session**	Summarise conclusions and feedback from previous capex workshops	Stakeholders 6 Ausgrid 22
22 Feb	**Pricing Deep-Dive**	• Discussion on Ausgrid responses to actions from the RWG meeting on 15 December • Long-Run Marginal Cost Modelling + impact price calculation • Summary of feedback from consultation to date	Stakeholders 13 AER 2 Ausgrid 18

DATE	SESSION TITLE	CONTENT	ATTENDEES
23 Feb	**Opex Deep-Dive**	**Our opex forecast** Opex strategy - delivering an efficient opex program, keeping network bills affordable without compromising safety or reliability **Overview of our opex proposal** • 2014–19 performance and 2024 projections • Outcomes Ausgrid will deliver in 2019–24 **Our approach to forecasting opex** • Base - Step - Trend approach • Components of our opex forecast • Our base year opex • Our proposed step changes • Trend adjustments	Stakeholders 5 AER 2 Ausgrid 8
23 Mar	**Closing Consultation Session**	Presented and discussed customer feedback on key issues and Ausgrid responses, along with answers to questions tabled throughout the sessions and presented in this Extended Stakeholder Consultation Report, along with the program of innovation and additional matters.	Stakeholders 11 AER 1 Ausgrid 16

05 Key themes raised by stakeholders during sessions

During the extended stakeholder consultation sessions, 16 key themes emerged. Each of them, Ausgrid's response and the way in which the theme has been addressed within the Regulatory Proposal and the Pricing Proposal are set out below. In addition to these key themes, approximately 270 detailed stakeholder questions and views were captured. Ausgrid's responses to these questions are covered in Chapter 6 of this report along with the slides presented during the sessions.

5.1 Key themes and response for Regulatory Proposal

The table below sets out how customer and stakeholder engagement informed our Proposal.

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
1 **Capex sustainability**	Stakeholders supported Ausgrid's objective to set a sustainable level of capital expenditure going forward to avoid future peaks and troughs in expenditure and mitigate the corresponding price impacts. To confirm that Ausgrid's proposed $3.2 billion in capital expenditure for the 2019-24 regulatory period was sustainable, stakeholders required further evidence, including forward projections of capital expenditure to 2050.	Ausgrid's proposed capex is based on replacing only those assets which must be replaced this period to maintain safety, security and reliability and to provide for growth which cannot be cost-effectively managed by demand-side solutions. Our proposed replacement rate is lower than what would otherwise be required (under our base case demand forecast and current asset management practices) to achieve a sustainable level of replacement and avoid future peaks in replacement expenditure. Given future uncertainty with respect to distributed energy resources, we believe it is prudent to limit investment in renewing our asset base at this time while investing in innovation to allow us to extend the life of our asset base.	In our Proposal, we have set out indicative estimates of capital investment to 2050 under various future scenarios. This analysis demonstrates why, given future uncertainty, we believe our proposed capex for the forthcoming regulatory control period is prudent.	Stakeholders agreed that the analysis to 2050 was valuable in articulating Ausgrid's view of the future and how its capital expenditure for the 2019 to 2024 period set the foundation for it. Stakeholders are considering whether the proposed capital expenditure is sustainable in light of this information. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
2 **Previous capex underspend**	Stakeholders requested greater clarity and transparency of the reasons for Ausgrid's capex underspend for the previous regulatory period and the way in which this will affect capital expenditure for the forthcoming regulatory period. Stakeholders proposed that, in the absence of detail about the prudence and efficiency of the underspend, capital expenditure should be retained at the lower FY16/17 level. Stakeholders also requested clarity with respect to the way in which the underspend is (or will be) reflected in prices (if at all), and the interaction with the Capital Efficiency Sharing Scheme (CESS).	Following the Capex Deep Dive sessions 1 and 2, Ausgrid provided stakeholders with a detailed breakdown of the AER allowances and our underspend for the current regulatory control period, by category. Our capex in FY16 and FY17 was below AER allowances and also below what Ausgrid considers to be sustainable levels, driven in part by resource constraints during the transaction process. However, Ausgrid worked hard to ensure only those projects that could efficiently be avoided or deferred were impacted, which shows that even minor resource constraints can sometimes strengthen the prioritisation and decision-making process. Ausgrid expects to restore its capex program in FY18 and FY19, and we have also implemented efficiencies in delivering the program from FY18 forward, such as identifying prudent deferrals, developing more rigorous cost-benefit analysis, avoiding like-for-like replacement where there is a more cost-effective alternative, internal labour productivity improvements and negotiating better prices from suppliers. Overall we expect to underspend against AER allowances for the regulatory control period by $401 million (compared to our allowance determined by the AER in April 2015). We note that the regulatory framework will adjust 2019–24 revenue allowances to remove the return on, and of, capital earned on capex that was allowed, but not spent, over the 2014–19 period. **For Return on Capital:** The CESS provides a revenue decrement for the return on capital allowed for capex that was not incurred over 2014–19. **For Return of Capital:** When rolling forward the Regulated Asset Base (RAB), the return of capital (depreciation) for capex that was underspent is removed from our RAB. In this way customers receive a payback of revenues allowed for capital not spent over 2014–19 through adjustments to revenues/RAB over 2019–24.	The AER will assess our CESS calculation as part of its 2019–24 determination.	Stakeholders understood the reasons for the underspend provided. In light of this information, stakeholders are considering whether the under expenditure is prudent and efficient. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
3 **Counterfactual for replacement expenditure**	Stakeholders requested greater clarity (and quantification where possible) on a 'do nothing' approach for replacement expenditure projects and programs. Stakeholders wanted to understand the risk levels that were driving the replacement expenditure and sought justification from Ausgrid that the appropriate level of risk mitigation had been applied.	For our major replacement projects, Ausgrid quantifies the risk-based cost of 'do nothing' by monetising the probability-weighted risks associated with impacts to safety, reliability and the environment. The investment triggers for major projects are then set based on the timing of the risk-based costs of 'do nothing' exceeding the benefit of deferring the major project. Our replacement programs are developed on a bottom up basis by our asset managers based on mitigating the risk of 'do nothing'. In other words, the replacement of high risk assets is prioritised over low risk assts.	We have reviewed replacement expenditure programs and in particular the acceptability of risks associated with the 'do nothing' option. Additionally, we have assessed the opportunities for demand management and, as a result, incorporated adjustments in the timing of our switchboard replacement program.	Stakeholders found the information presented on the counterfactual for replacement expenditure valuable. Stakeholders will consider whether the replacement expenditure proposed is prudent and efficient in light of this information. Stakeholders supported the use of demand management to defer switchboard replacements. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
4 Demand forecasts	Stakeholders questioned Ausgrid's demand forecasts and underpinning assumptions, particularly as they related to battery storage uptake. Stakeholders' key concern was that Ausgrid has underestimated the potential uptake and, in doing so, has over-estimated its medium to long-term demand forecasts. While stakeholders broadly agree that uptake of battery storage will have limited impact on peak demand for the 2019–2024 regulatory control period, they were concerned that battery storage (and potentially other customer-side technology) may result in sharp decreases in demand in the medium-term future. Accordingly, stakeholders are concerned that future customers will be paying for assets they no longer require as a result of capital investments to address short term demand increases.	Ausgrid has developed our demand forecasting approach over a number of years, and it has been independently reviewed and compared favourably to those of our peers and international best practice. Our methodology statement has been provided to stakeholders. Nevertheless, we agree that our assumptions with respect to battery storage uptake in the medium term diverge from forecasts prepared by other parties (for example Bloomberg New Energy). Sensitivity testing our demand forecasts against those of other parties, suggested that our own could be reduced by 1.3% by 2030. Importantly, however, our overall capex proposal for the forthcoming regulatory control period has limited sensitivity to changes in broad base demand, with the majority of the projects driven by condition-based replacement and/or major new customer growth.	We have engaged independent consultants to provide revised DER forecasts to reflect a broader range of price scenarios and the full value stack for battery storage. While at this stage, we do not envisage that the revised forecasts will result in any change to our capex proposal (given the limited sensitivity to demand forecasts), this will be revisited in our updated Proposal.	Stakeholders supported Ausgrid revisiting its demand forecasts to potentially incorporate alternative DER forecasts in its revised proposal. Where Ausgrid retains its existing demand forecasts (underpinned by its existing DER uptake forecasts), stakeholders are able to question the assumptions in their submissions to the AER. Stakeholders will also consider the information provided by Ausgrid about the sensitivity of capex estimates to demand forecasts. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
5 **Demand management**	Stakeholders were concerned that Ausgrid had not fully explored the potential for demand management to defer or avoid capital expenditure. This view was based on the relatively small investment proposed for demand management ($10.5 million) compared to the total proposed capital expenditure ($3.2 billion). Stakeholders' view was that, given the uncertainty in Ausgrid's demand forecasts (see 4 above), demand-management options, which are flexible and modular, should be prioritised over in-flexible, long-lived, capital-intensive network solutions. Stakeholders were unclear as to the extent to which Ausgrid had considered these characteristics, and the associated real options value, of demand-management solutions.	Ausgrid appreciates that where future demand is uncertain, flexible and modular options for meeting short-term demand growth, even though potentially higher cost on a $ per MW basis, can show improved economic benefits compared to lower-cost capital-intensive network options. However, there is currently no industry agreed approach to the evaluation of real options, and in particular the quantification of demand uncertainty. Despite this, Ausgrid is actively investigating how the real options-value of demand management and the ongoing development of the market for demand-management services can be further leveraged in our planning approach.	We have revisited the potential for Ausgrid to allocate an additional $3 million per annum over the period to demand management. If supported by the AER, this will deliver the deferral of up to $60 million of capex beyond the period. We would value stakeholder advocacy to support any enablers within the AER demand management review process.	Stakeholders supported the additional capital expenditure deferral via demand management identified by Ausgrid. Stakeholders appreciated, that this demand management relied on non-traditional methods and sources and therefore required stakeholder support to secure approval. Stakeholders also encouraged Ausgrid to actively pursue a standardised method for evaluation of real options and encouraged Ausgrid to work closely with the AER to develop this. **RESOLVED (AGREE)**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
6 **Connections policy**	Stakeholders broadly did not support Ausgrid's proposed change in connection policy. By adding to the Regulatory Asset Base, the proposed change shifts a proportion of the connection costs that are currently paid for by the connecting party, to the broader customer base. While Ausgrid set out the equity benefits of the revised cost allocation under the new connections policy, stakeholders' view was that Ausgrid should, to the extent practicable, avoid any change in connections policy which results in an increase in the regulatory asset base.	Ausgrid is of the view that our revised connections policy improves the equity of our approach to the allocation of shared connection costs. This was demonstrated to stakeholders in Capex Wrap Session. Ausgrid appreciates that given the current affordability issues, which are at least in-part driven by historical network capex, there is a strong aversion by stakeholders to any policy which increases capital expenditure going into the Regulatory Asset Base.	As a result of stakeholder feedback, we have decided NOT to change our connections policy which means that capital contributions for a portion of the shared assets, will continue to be paid by the connection party rather than entering the Regulated Asset Base.	Stakeholders supported Ausgrid's decision to retain its existing connections policy. Stakeholders also encouraged Ausgrid to work with the AER to develop consistent principles and approaches to the setting of connections policies across all NSPs in the future. **RESOLVED (AGREE)**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
7 **Efficiency and productivity improvements**	During the stakeholder workshops, Ausgrid often justified its capital investments based on improved efficiency and productivity outcomes. Stakeholders requested greater clarity on the way in which the efficiency and productivity improvements will translate into reduced revenue requirements and, ultimately, prices. Stakeholders were concerned that the base-step-trend approach proposed for opex does not adequately capture these improvements, especially under the assumption (adopted by AER) of zero productivity improvement.	Productivity and efficiency improvements driven by our capital expenditure program result in customer benefits in two ways. Firstly, any capital expenditure which improves the labour productivity of our capital program results in a net reduction in our total capex. Secondly, any capital expenditure which reduces our operational expenditure will ultimately be shared with customers via the Efficiency Benefits Sharing Scheme. We agree that it is important to explain the linkages between our capital and operating expenditure, particularly where there are opportunities to optimise the way in which money is spent.	Our proposal provides a more detailed explanation of the nature of the efficiencies that we expect to achieve from different capital-expenditure initiatives. Our operating expenditure proposal also highlights how efficiency savings or productivity improvements have been factored into our forecasts.	Stakeholders understand and support Ausgrid using the incentives offered under Efficiency Benefits Sharing Scheme to drive further efficiency improvements in its business. Despite this, stakeholders do not agree with Ausgrid's starting point. Stakeholders would prefer that Ausgrid reduce its base year opex to better reflect improvements in the productivity of labour. **RESOLVED (DISAGREE)**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN THE PROPOSAL)	STAKEHOLDER RESPONSE
8 Unit rates	Stakeholders requested further information on the unit rates Ausgrid applied to develop its capital expenditure requirements. In particular, stakeholders sought to understand how efficiency improvements have been factored into unit rates for labour, materials and contracted services and how unit rates compare to those of other NSPs.	Ausgrid's capital program is affected by unit rates through two streams: volumetric programs and major projects. Ausgrid is forecasting a 2% per annum reduction in the labour component of unit costs, which results in a 10% reduction by 2024. Volumetric programs are continually reassessed as they are delivered resulting in further reductions in contracted services and material costs as the programs are refined. Additionally, external advice has been sought in order to benchmark these programs against peer NSPs in order to further focus attention on reducing inefficient unit rates. Ausgrid has also changed to a method of blended delivery, whereby it now continues to deliver certain components internally (to retain core competencies and to make use of existing expertise and efficiency) and delivers other components externally (to capitalise on the competitive market-efficient rate).	Ausgrid is ensuring efficient unit rates across all capex activities via independent review, benchmarking and improved delivery methods. The 10 percent labour reduction by 2024 has been locked in to the capex forecast. The blended delivery approach, as well as full outsourcing through competitively tendered contracts, has resulted in savings of up to 30% for major capital projects.	Stakeholders will also consider the information provided by Ausgrid on unit rates in forming their submissions. **OUTSTANDING**

5.2 Key themes and response for Pricing Proposal

The table below sets out customer and stakeholder engagement informed our proposed Pricing Strategy.

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
1 **Pricing structures (fixed charge component)**	In our 'Customer at the Centre' survey, 50% of our customers agreed that rebalancing away from non-peak variable charges towards fixed charges is important in preparing for the future. Generally, customers were ambivalent and supported increases to the extent there were no unacceptable customer bill impacts, and adequate safeguards were put in place for low energy users and vulnerable customers. However, during the Extended Stakeholder Consultation, some stakeholders indicated an in-principle objection to increases in fixed charges for both Ausgrid's inclining block mass-market legacy price and transitional time-of-use pricing structure. In particular, stakeholders expressed concerns relating to customer bill impact (especially vulnerable customers), the inability of customers to actively respond to a fixed charge to manage their bill, and the challenges passing through the safeguard mechanism would present to retailers. Stakeholders requested that Ausgrid consider increasing the charges for the 2nd and/or 3rd block of its inclining-block tariff (IBT), rather than the fixed charge. Some stakeholders suggested an alternative structure that includes a demand charge which increases over time, and a fixed charge that does not change over time (remains at existing levels).	The proposed increase in fixed charges enables a significant reduction in variable charges, and promotes efficient investment in distributed energy resources, avoids inequities between adopters and non-adopters of distributed energy resources, encourages use of the network when renewable generation is prevalent (outside of peak times) and better reflects the nature of the connection service Ausgrid provides. Given the feedback from the Extended Stakeholder Consultation, we have considered additional options for both our legacy and default pricing structures, including those suggested by stakeholders, and assessed these against the pricing principles specified in the National Electricity Rules, and the principles outlined by stakeholders in 'Pricing Directions: A Stakeholder Perspective'.	Ausgrid will continue to explore price rebalancing options towards fixed charges, including ensuring that any adverse implications of such a transition are mitigated. Ausgrid is evaluating alternative prices to assist in managing the potential effects of the network bill of lower energy users. Ausgrid is establishing a Price Reform Trial and Research plan in conjunction with stakeholders, this will consider and test forms of demand charges.	There were diverse opinions in response to Ausgrid's proposed increase in the fixed charge component, especially in the absence of a demand-based component. Ausgrid is setting up discussions to work through issues. **RESOLVED (DISAGREE)**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
2 **Transition to cost-reflective prices**	Stakeholders expressed a view that Ausgrid's proposed prices and price-assignment strategy do not give rise to a fast enough transition to cost-reflective prices and the associated economic benefits. This view was made with reference to the transition timeframe set out by Energy Networks Australia within its Energy Networks Transformation Roadmap. In order to fast-track the transition, stakeholders asked Ausgrid to consider how its proposed default price could be better structured to incentivise customers to transition to the more cost-reflective time-of-use transitional price. Stakeholders also requested that Ausgrid set out the pathway and timeframe for the transition of the majority of the customer base to a mandatory (opt-out) cost-reflective price.	Ausgrid's proposed transition pathway to cost-reflective prices is based on balancing the benefits to customers of pricing reform (lower network costs) with customer bill outcomes. At this stage, we do not have sufficient data and information to assess impacts for specific socio-demographic customer categories. We are accordingly exercising caution in rolling out any fast-tracked transition until this is better understood. Ausgrid will implement a-comprehensive research plan to be developed collaboratively with stakeholders, which will inform, and assist in expediting, our transition to more cost-reflective prices. We are targeting the collection of data to facilitate this analysis via our Price Reform Trial and Research Plan.	We propose to assign all new customers to a seasonal time-of-use price. The opt-out price structure for time-of-use customers will become a time-of-use price as well (it is currently a flat price). Ausgrid proposes to include a placeholder demand pricing structure in its Tariff Structure Statement (TSS) to provide the flexibility to be able to fast-track its transition, subject to the findings of our research plan and agreement with the AER and stakeholders on the specific details of that price and the assignment criteria.	Stakeholders expressed a view that Ausgrid's proposed placeholder demand tariff was an improvement, and requested that Ausgrid set a target date as to when the demand charge would come into place. Stakeholders will consider the information provided by Ausgrid with respect to its placeholder demand tariff to inform their submissions. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
3 **Equity considerations in prices**	With equity in mind, stakeholders requested greater clarity over the way Ausgrid plans to allocate revenue to different price classes and components. In particular, they wanted to understand the extent to which costs are allocated between business, large business and residential pricing classes. Stakeholders also requested that Ausgrid provide clear messaging with respect to the current costs and benefits that solar PV customers impart on the network, and how this has been considered within the price design process.	In the Pricing Deep-Dive session, Ausgrid presented the way in which revenue is, for the most part, allocated to price classes based on demand they exert on the network. Ausgrid explained that larger customers connect at high voltages and therefore do not use the low voltage network. It therefore costs less per MVA to service these customers than to residential customers. Our non-peak variable prices do not reflect the potential avoided network costs resulting from investments in DER, which creates inequities. Rebalancing away from non-peak variable charges will promote equity between adopters and non-adopters of DER. It will also lead to decisions to invest in DER initiatives that more effectively reduce the cost of providing the network services that customers demand.	We do not propose any change in our approach to the allocation of revenue between price classes. We will undertake further research with respect to DER customer costs and benefits to inform our ongoing price design process.	Stakeholders will consider the information provided by Ausgrid on the cost allocation approach, as well as the relative costs and benefits of DER, when forming their submissions. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
4 Regional pricing	In our 'Customer at the Centre' survey, customers generally did not support regional pricing. In the Extended Stakeholder Consultation, customer advocates did not support mandatory regional prices which discriminate on the basis of location. However, some customer advocates supported regional pricing so long as this was voluntary (opt-in) and offered in a way to incentivise rather than penalise customers to change their behaviour, in order to address regional constraints.	Ausgrid does not support mandatory regional pricing due to the potential customer impacts. We agree with the feedback that regional pricing has the potential to provide more cost-reflective signals to customers and potentially improve economic outcomes. Ausgrid is therefore proposing to undertake further research and work with customers to understand how we can deliver more sophisticated network pricing solutions. We acknowledge that rebates may be a helpful tool in addressing resistance to widespread regional pricing. We will continue to trial location-specific rebates and investigate innovative rebate programs as part of our research plan.	We are not proposing to introduce regional pricing in the next regulatory control period. We will undertake additional research to better understand how we can deliver more sophisticated network pricing solutions.	Stakeholders broadly agree with Ausgrid' decision not to introduce regional pricing at this time. **RESOLVED (AGREE)**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
5 **Transformation to a decarbonised economy**	In our 'Customer at the Centre' survey, some customers believed our pricing strategy should support the broader transformation towards a decarbonised economy. Some customer advocates also supported this view.	We understand just how important pricing arrangements are to ensuring the transition to a lower-carbon economy occurs as cost-effectively as possible, especially in an environment of affordability concerns. Our pricing arrangements are important to the transition to a lower carbon economy. Our pricing strategy is about slowly transitioning to arrangements which support a decarbonised economy. Using price structures that do not favour any particular form of technology or method of decarbonisation.	For our proposed pricing structure, we will slowly adjust our pricing arrangements to prepare for an environment of two-way energy flows and, when technology allows, implement new pricing in the form of demand and capacity charging. This improves the efficiency in investment and operation of DER compared to our current suite of prices, something about which our stakeholders had previously expressed concern. Our proposed reduction in variable charges promotes efficient investment in DER and encourages use of the network outside of peak-times, when renewable generation is more prevalent. The proposed increases in fixed charges (off-set by reductions in variable charges) will assist in facilitating the use of our network for peer to peer trading.	In light of the information provided, stakeholders will consider the extent to which Ausgrid's pricing structures support the transformation to a decarbonised economy, in light of the information provided. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
6 **Retailer pass through of transitional time-of-use prices**	Retailers were generally comfortable with the assignment of customers with access to the necessary metering technology onto the transitional time-of-use price. However, retailers were concerned that this approach could confuse customers if their prices changed at the time of receiving a new meter and again on 1 July when general price changes occurred. Retailers were also concerned with the complexity of the proposed transitional price, including the safeguard mechanism and the changes required to their billing systems.	We want to support the efforts of retailers to roll out smart meters and cost-reflective prices and will endeavour to work with them to make the transition as smooth as possible.	We are considering the proposal by retailers to delay any price change, resulting from the installation of a new meter, for existing customers, until 1 July each year. We are considering the use of rebates in light of retailer feedback on the complexity of additional safeguard and transitional pricing structures. Ausgrid is also considering the use of different prices as alternative ways to address potential bill impacts for low energy users (instead of the safeguard mechanism).	Stakeholders encouraged Ausgrid to continue working with retailers to ensure that the concerns are managed. Stakeholders expect Ausgrid to have these issues resolved within its pricing proposal. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
7 **Voluntary cost-reflective prices**	The large retailers involved in the Extended Stakeholder Consultation stated that they would have difficulty offering more innovative voluntary cost-reflective prices to customers. This was attributed to the large administrative costs associated with establishing a new price for relatively few customers. Stakeholders encouraged Ausgrid to offer voluntary cost-reflective prices, noting that innovative smaller retailers may choose to offer these products to niche markets. In this way, Ausgrid can gain experience in different price structures and the customer response to them.	We understand that overly complex prices are difficult for retailers to manage. We will work with retailers and the AER to identify simpler ways, such as rebates, to provide an appropriate transition for our most affected and vulnerable customers. Customers with high peaks in demand are unlikely to voluntarily opt-in to more cost-reflective prices. Therefore, the benefit for network costs of opt-in pricing structures is limited. Therefore, Ausgrid's research plan will provide the foundation for large scale assignment of customers to more cost-reflective prices. We are also considering introducing voluntary cost-reflective prices over time.	We are not proposing to introduce a voluntary opt-in pricing structure as part of this TSS. However, we will continue to implement trials with innovative price structures. Further, in light of customer feedback we will launch a comprehensive research plan to investigate, among other things, the design and merits of demand prices. This approach will enable Ausgrid to confidently assign customers to more cost-reflective prices on a large scale while avoiding unacceptable customer bill impacts.	Stakeholders expected Ausgrid to have already have done sufficient research to implement a voluntary cost-reflective price. Stakeholders would only support Ausgrid undertaking a comprehensive price reform trial and research plan, if that plan was well articulated, aligned to targets for introduction of demand-based tariffs and involved a significant proportion of 'in field' research rather than only desk top or survey based research. Stakeholders will consider Augrid's price reform trial and research plan in light of further detail to be provided in its regulatory and pricing proposals. **OUTSTANDING**

KEY THEME	STAKEHOLDER VIEWS	AUSGRID RESPONSE	OUTCOME (HOW HAS THE STAKEHOLDER VIEW BEEN REFLECTED IN OUR PRICING STRATEGY)	STAKEHOLDER RESPONSE
8 **Long-term pricing strategy**	Stakeholders requested that Ausgrid develop a long-term pricing strategy to provide an understanding of Ausgrid's proposed 'end point' with respect to price reform. The articulation of a long-term strategy will help stakeholders understand and challenge Ausgrid's proposed transitional prices and the way in which they promote its long-term objectives. Some stakeholders held a view that the end point must include a demand component. Other stakeholders noted that the 'end point' may change and that the TSS needs to be flexible (including triggers) to accommodate changes when new information becomes available. Stakeholders supported an ongoing research plan to enable Ausgrid to inform changes to Ausgrid's long-term pricing strategy.	The proposed increase in fixed charges enables a significant reduction in variable charges, and this promotes efficient investment in distributed energy resources, avoids inequities between adopters and non-adopters of DER, encourages use of the network, outside of peak times, when renewable generation is prevalent, and better reflects the nature of the connection service Ausgrid provides. Given the feedback from the Extended Stakeholder Consultation, we have considered additional options for both our legacy and default pricing structures, including those suggested by stakeholders, and assessed these against the pricing principles specified in the National Electricity Rules and the principles outlined by stakeholders in 'Pricing Directions: A Stakeholder Perspective'.	We are launching a comprehensive Price-Reform Trial and Research Plan to inform our view of the end point (which is likely to change through time) and the optimal approach to expediting our transition towards it. In recognition of customer feedback we are proposing to include in the TSS a placeholder demand price that could be implemented during the 2019–24 period, subject to the outcomes of the Price Reform Trial and Research plan.	Stakeholders expect Ausgrid to articulate targets and timeframes for tariff transition within its Tariff Structure Statement. Stakeholders will consider whether Ausgrid has sufficiently articulated its long-term pricing strategy in light of the information provided within the Tariff Structure Statement. **OUTSTANDING**

06 Evaluation of the Extended Stakeholder Consultation Program

6.1 No surprises

At the outset of the Extended Stakeholder Consultation Program, stakeholders expressed a main expectation that the Proposal contain 'no surprises'. Stakeholders will judge if Ausgrid has met this expectation when they review our Proposal. At the conclusion of the program, stakeholders commented that they had been provided with unprecedented insight into the way in which our expenditure proposal had been built up and the justifications underpinning the proposed investments. Ausgrid has deliberately endeavoured to provide our view of the most prudent and efficient way we can invest to achieve our expenditure objectives. Stakeholders appreciated our approach rather than the perceived historical method of setting an 'ambit claim' to be ultimately knocked down by the regulatory process.

6.2 Agreement on our proposal

At the outset of the program, both Ausgrid, the AER and stakeholders expressed an additional expectation that the program would allow Ausgrid and stakeholders to:

1. identify and explore areas of disagreement,
2. come to a final agreement, where possible, and
3. where agreement is not possible, endeavour to understand each other's position, which should result in more informed and targeted stakeholder submissions to Ausgrid's regulatory proposal.

There are a number of issues, including demand management and Ausgrid's connections policy, where Ausgrid and stakeholders have reached an agreed position. There are other issues, including the fixed charge component of Ausgrid's pricing structure and our approach to operational expenditure, where we disagree. We expect these differing views to be expressed within stakeholder submissions to our proposal.

However, for the majority of issues, stakeholders requested more information to develop their view. To the extent practicable, this information was provided to stakeholders during the deep-dives and within the attached Q&A. However, due to the limited timeframe and sheer volume of information provided, stakeholders are yet to have developed a sufficiently informed view to agree or disagree on many elements of the regulatory and pricing proposals. These have been marked as outstanding in Section 5.

Despite this, we consider that, once stakeholders have reviewed all the information provided, they will be in a much better position to provide meaningful submissions to our Proposal, at which point agreement (or lack of agreement) will become clear. We have encouraged stakeholders to continue the discussion with us. To address outstanding issues related to our pricing structure, we have established a Pricing Working Group. This group will meet regularly to discuss outstanding matters and to develop the scope for the Pricing Reform Research & Trial program.

6.2 Delivering outcomes

Even taking the above into account, the success of the Extended Stakeholder Consultation Program will ultimately be measured by the outcomes delivered to customers.

As a result of the engagement with stakeholders, Ausgrid has identified four key changes which reduce revenue requirements during the regulatory control period. These include:

- An additional capex deferral of $60 million, through $15 million in new demand-management initiatives
- A reduction in network depreciation of $100 million as a result of applying a different depreciation method
- A reduction in metering depreciation of $45 million by withdrawing our proposal to accelerate depreciation
- A reduction of $25 million in connection-related capex by deferring the proposed changes in our policy.

The net result of these changes is a 2.5% reduction in prices compared to what otherwise would have been the case.

We have also identified $58 million of investment in innovation projects and trials to deliver the 'future grid' sooner via additional trials in response to stakeholder feedback.

In addition, we believe that the information provided and the discussions held, will allow for more meaningful submissions to our Proposal from stakeholders, potentially leading to a faster and smoother process.

6.3 Moving forward

This is not the end of our journey with stakeholders. Moving forward, Ausgrid is committed to working with our stakeholders to ensure that we continue to move towards our strategic objective of customer centricity.

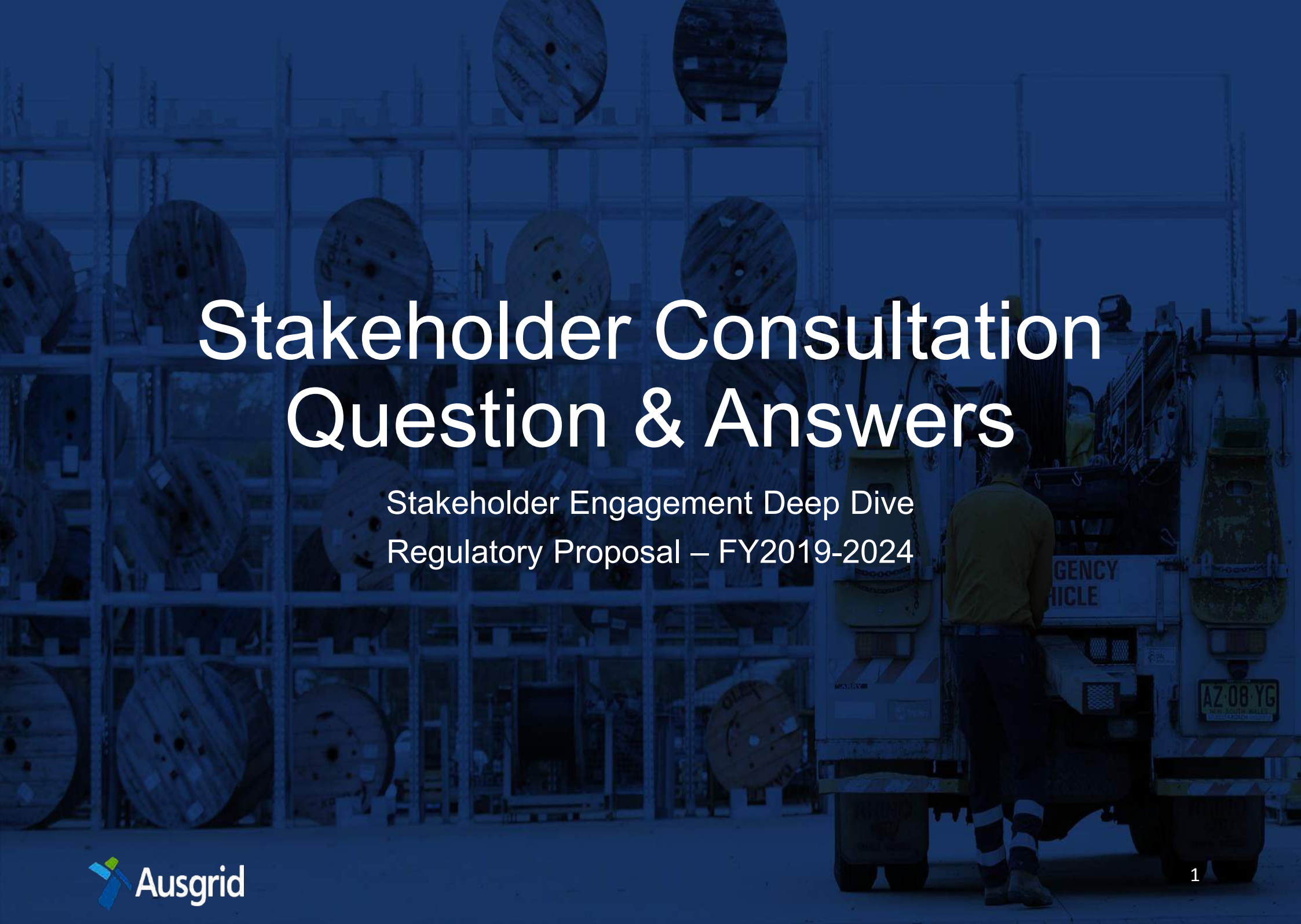
Specifically, we will continue the conversation with all our stakeholders, both before and after the submission of our Proposal, to fill information gaps where they still exist and to better understand and reflect customer views in our draft, and then revised, proposal.

Outside of the regulatory process, we will continue to work with our Customer Consultative Committee and form new stakeholder groups to inform our pricing research plan and demand-management initiatives as these evolve.

Finally, we will be undertaking regular consultation with our stakeholders, feeding back how we are performing with respect to the investments and initiatives set out in our regulatory and pricing proposals, and asking for customer views to inform future decision making.

07

Question & Answer Tables



Stakeholder Consultation Question & Answers

Stakeholder Engagement Deep Dive

Regulatory Proposal – FY2019-2024

Ausgrid

Questions and Answers Categories / Themes

Category / Theme:

1. CAPEX
- Sustainability
- Decision making process
- Delivery model
- Previous underspend

2. AUGEX
- Drivers

3. REPEX
- Drivers
- Customer impacts and benefits
- Approach to presentation information

4. Demand forecasts

5. Distributed Energy Resources (DER) forecasts

6. Demand management

7. Efficiency and productivity

8. OPEX
- Drivers
- Efficiency and productivity gains
- Regulatory approach
- Approach to presentation of information

9. Connections policy

Category / Theme:

10. Fleet

11. Property

12. Information Technology (IT)

13. Support costs

14. Metering

15. Street lighting

16. Rate of return

17. Governance

18. Future network strategy

19. Pricing
- Equity
- Tariff structure
- Customer impacts
- Transition to cost reflective tariffs
- Future proofing
- Approach to presentation information
- Retailer issues
- Long term strategy

20. General approach to presentation of information

1. CAPEX: Decision making process, Delivery model, Previous underspend and Sustainability (1/4)

Question ID	Theme	Question	Response
1.01	Capex - Decision making process	What are the benefits of a probabilistic approach? Can it be quantified? Will this be seen in the RIN data?	The benefits of a probabilistic approach are outlined on Slides 33 to 36 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2). In summary, the benefits of this approach are seen in the timing of projects. For example, when applied to sub-transmission cables the deferral benefit of probabilistic cost-benefit analysis is approximately two years and when applied to 11 kV switchboard projects it is approximately five years. This will be difficult to see in RIN data without separate documentation describing the application of the probabilistic cost-benefit analysis and the deferral outcomes.
1.02	Capex - Decision making process	Positive cost-benefit analysis not necessarily a trigger for investment. Explain when and why this is the case.	In some cases while the cost-benefit analysis may be positive in a particular year, there may be further known developments, for example due to a related project or customer connection, which lead to a decision to wait and take the opportunity to incorporate those factors into a consolidated solution.
1.03	Capex - Delivery model	How does insourcing / outsourcing impact capex?	Over recent years Ausgrid has strategically used outsourcing to improve our costs structures, both via obtaining lower costs services directly and via learnings transferred to our internal resources which have recued the cost of insourced work. These improved costs are reflected in our capex forecast. Further information about our insourcing and outsourcing approach can be found in attachment 5.12 Resource and Delivery Strategy for 2019-24 of our regulatory proposal.
1.04	Capex - Previous underspend	Provide break-up for what is in current period, next period, and carrying over for 11 kV switchboards and sub-transmission cable projects.	The breakup is provided for 11 kV switchboard and underground sub-transmission cable replacement projects on slides 37 and 38 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2).

1. CAPEX: Sustainability, Decision making process, Delivery model, Previous underspend and Sustainability (2/4)

Question ID	Theme	Question	Response
1.05	Capex - Previous underspend	What gives confidence that Ausgrid can deliver on its Capex for this regulatory control period?	Ausgrid has developed a Resource and Delivery Strategy (the Delivery Strategy) to ensure the efficient delivery of our works program (this includes capital and maintenance activities). Three key aspects of the Delivery Strategy include: 1) optimising the efficiency of the internal workforce by increased multi-skilling and competitive tension against external service providers, 2) increasing cross-regional sharing of resources, and 3) outsourcing work to external service providers where this is the most commercial outcome i.e., feasible and efficient. Our new Enterprise Bargaining Agreement removes defined skills silos and allows for greater performance recognition. The new Agreement will introduce greater flexibility to the way we can use our internal workforce. The Delivery Strategy has been embedded in our organisation by creating a new Program Delivery Division, accountable for implementing the Delivery Strategy, integrating management of capital and maintenance and formation of the Integrated Works Management Office (IWMO) to enforce accountabilities and monitor progression delivery of the works program. Further information about our insourcing and outsourcing approach can be found in attachment 5.12 Resource and Delivery Strategy for 2019-24 of our proposal.
1.06	Capex - Previous underspend	What are the impacts of FY16/17 underspend?	The impacts can be seen as an overall worsening trend in SAIDI and SAIFI as well as in fallen and hazard wires as shown in slides 9-12 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2). It is expected that this trend would continue to worsen if expenditure did not return to sustainable levels.
1.07	Capex - Previous underspend	Why is FY17 not sustainable?	Please refer to response in question ID 1.06.

1. CAPEX: Sustainability, Decision making process, Delivery model, Previous underspend and Sustainability (3/4)

Question ID	Theme	Question	Response
1.08	Capex - Previous underspend	What is the impact of capital under expenditure? (e.g. in the context of the RAB roll forward and the CESS)	Ausgrid does not benefit from capex underspend unless a true efficiency has been achieved. For more details see slide 14 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2).
1.09	Capex - Previous underspend	Provide an outline of what was approved in the previous regulatory control periods compared to expenditure. What has not been spent and how will this flow on the next regulatory period and what is the impact of CESS. All categories but particular interest in property.	Our capex in the 2014-19 period is estimated to be around $400 million (or 11%) less than the AER's regulatory allowance. We achieved these reductions through a number of cost saving initiatives. The AER's CESS shares efficiency gains 70:30 between our customers and us. As per Slide 14 (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2), the return of capital (depreciation) allowance from any unspent capex in 2014-19 is removed from future revenue allowances. This occurs within the regulated asset base (RAB) roll forward model. The return on capital (WACC x RAB) from any unspent capex in 2014-19 is removed through the CESS. Within the CESS, this is referred to as the financing benefit adjustment. The CESS financing benefit adjustment takes into account the timing of capex within the 2014-19 (e.g. if capex was forecast in 2016-17 and instead spent in 2018-19, the 2 yrs. return on capital earnt is removed (with interest) from future revenues. With regard to CESS, the AER will assess the impact of the underspend. We have proposed that the AER assess the efficiency share in accordance with the current AER CESS guideline. Even with the CESS, Ausgrid will not get to keep the return on and of capital earned on capex that was not spent over 2014-19 as described above.
1.10	Capex - Previous underspend	What repex did customers pay for that they didn't get in this period?	Please refer to response in Question ID 1.09.

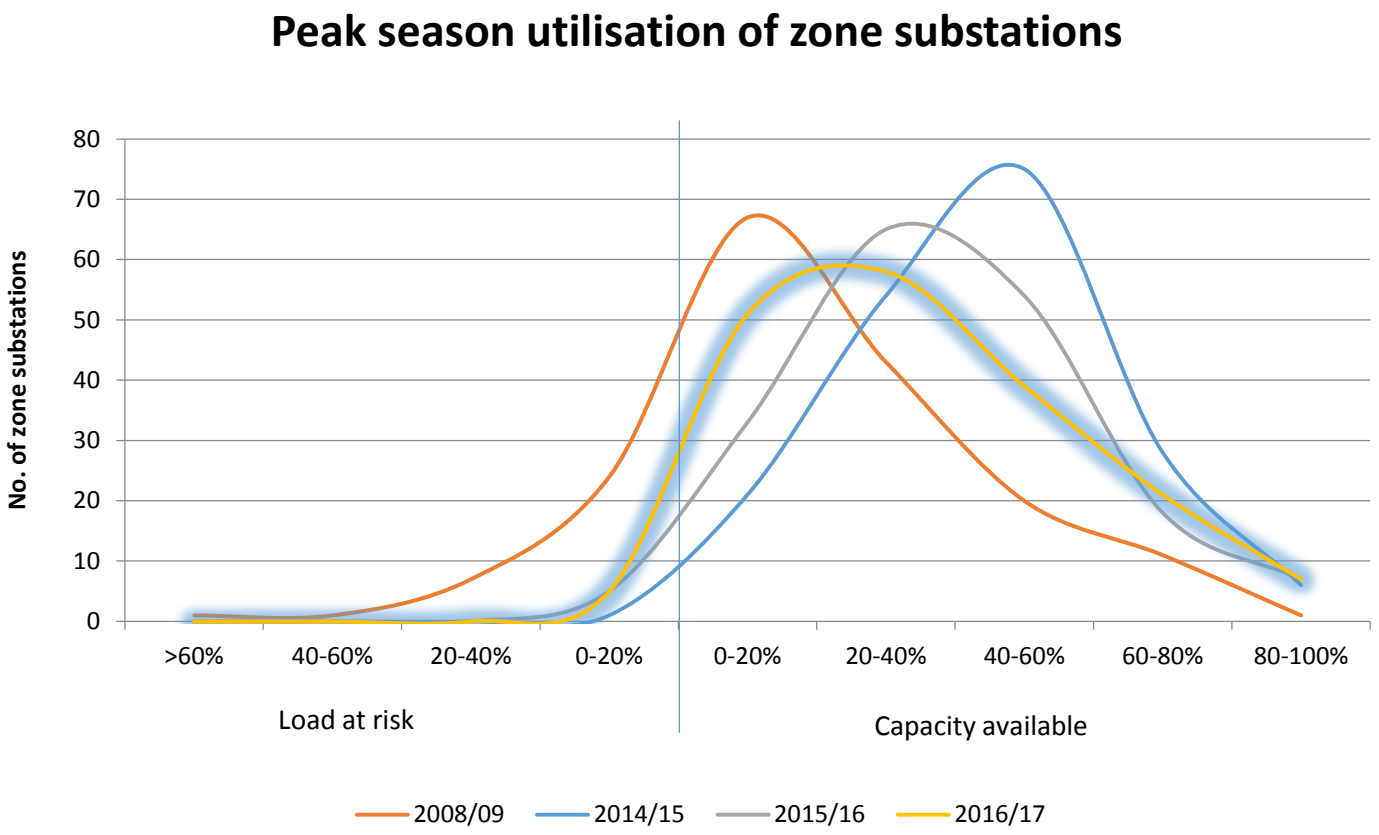
1. CAPEX: Sustainability, Decision making process, Delivery model, Previous underspend and Sustainability (4/4)

Question ID	Theme	Question	Response
1.11	Capex - Sustainability	Support sustainable spending - reduce peaks and troughs is critical	Noted. This is a key consideration of Ausgrid's regulatory submission.
1.12	Capex - Sustainability	What is the impact of capital under expenditure? (e.g. in the context of the RAB roll forward and the CESS)	Ausgrid does not benefit from capex underspend unless a true efficiency has been achieved. For more details see slide 14 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2).
1.13	Capex - Sustainability	RAB (RAB per customer) chart should go back to 2000 consistent with other charts and be projected forwards (c.f. 20 year planning)	The RAB per customer chart on slide 13 of the opening capex session (Slide Pack 2a TArmstrong Capex Introduction Augmentation and Connection) goes back to FY14 and is projected forward to FY2024.

2. AUGEX: Drivers (1/4)

Question ID	Theme	Question	Response
2.01	Augex - Drivers	Rozelle deep dive: Need confidence that discussions have taken place with WestConnex etc that size is efficient.	As noted on slide 45 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2), Ausgrid engages in close consultation with large connection customers to ensure efficient capacity requirements. For this specific project these discussion are ongoing and have not been finalised. Ausgrid will continue communicating to ensure efficient connections and to ensure that cost reflective network pricing is achieved.
2.02	Augex - Drivers	Provide graph showing increase of load at risk (system level) and how this is changing?	See graph on next slide. The graph shows the trend in utilisation of zone substations (measured as peak load relative to firm capacity). 'Load at risk' refers to substations operating at above 100% capacity in peak periods. In 2008/09 capacity was tight with over zone substations (just under 20% of Ausgrid's zone substations) operating above 100% utilisation (load at risk) and a further 67 zone substations operating at 80-100% utilisation (0-20% capacity available). Following significant investment in the network (from 2009 to 2012) by 2014/15, available capacity on the network increased and load at risk dropped significantly. Since then, utilisation of zone substations has been steadily increasing with just under one-third of zone substations operating above 80% utilisation.
2.03	Augex - Drivers	More detail on Powering Sydney Future (with respect to reliability in particular).	Ausgrid's proposal assumes that Powering Sydney's Future (PSF) will substantively proceed and at this time capex has not been allowed for alternatives to PSF proceeding. Subsequent to the stakeholder workshops, the AER in its Final Decision for TransGrid transmission determination 2018 to 2023 (May 2018), accepted TransGrid's revised PSF proposal.

2. AUGEX: Drivers (2/4)



2. AUGEX: Drivers (3/4)

Question ID	Theme	Question	Response
2.04	Augex - Drivers	More information around why data centres are emerging in Ausgrid's network and how conversion rates are factored into planning.	The basis of how conversion rates for customer connections, including data centres are factored into forecasts are included in the supporting forecasting documents circulated to stakeholders in conjunction with the session(s). Further information energy forecasts used in planning is presented in attachment 5.07 Electricity Demand Forecasts Report, 2017 of our regulatory proposal.
2.05	Augex - Drivers	What portion of capex is demand sensitive? (and therefore impacted by demand forecasts)	The capex program sensitivity to demand is detailed on slide 17 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2). Primarily augex (new connections and growth and augmentation) is demand sensitive. A small component of repex is demand sensitive (area plan major replacement projects).
2.06	Augex - Drivers	What impact do solar and storage have on capex and why? - capacity utilisation and fault current levels.	Solar and storage will have a minimal impact on capex beyond Ausgrid's current forecasts. For example, as shown on slides 25 and 26 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2), if Bloomberg's battery forecasts (referred to by stakeholders) are adopted over Ausgrid's current forecast, maximum demand is reduced by only 9MW by the end of 2024. Increasing penetration of solar and storage will require monitoring the network in regards to utilisation and growth issues (e.g. fault, thermal, voltage).

2. AUGEX: Drivers (4/4)

Question ID	Theme	Question	Response
2.07	Augex - Drivers	How do DER forecasts affect capex? Do different sensitivities of uptake affect capex (in particular cost reflective prices)	Slide 27 from capex wrap-up session 21 February (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) indicates that capex is not materially impacted by DER in the upcoming regulatory period, including when Bloomberg forecasts are considered.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (1/13)

Question ID	Theme	Question	Response
3.01	Repex - approach to presentation of information	Provide more detailed repex price breakdown (what's in, what's out)	The breakdown of replacement capex was shown in slides 17 and 18 of the capex deep dive stakeholder sessions (Slide Pack 3 Ausgrid 1924 Capex Workshop 3 FINAL) and is supported by the state of the network diagram tabled during these workshops. Attachment 5.02 of Ausgrid's proposal presents a master list of Ausgrid's projects and programs forecast in the 2019-2024 period.
3.02	Repex - approach to presentation of information	Cost breakdown Consac cable program)	The Consac cable replacement program is delivered using blended delivery approaches as per slide 31-34 of the capex deep dive stakeholder sessions (Slide Pack 3 Ausgrid 1924 Capex Workshop 3 FINAL). It proposes a total cost of $81m for replacement of Consac cables with $12m in materials, $56m in contracted services and $13m in internal labour. The internal labour also has 2% year on year productivity improvements incorporated into the proposal and the Consac program for the 2019-2024 period.
3.03	Repex - approach to presentation of information	Repex needs to be compared against "0", not just previous years / benchmarking	This is acknowledged and a focus of our submission. We believe that our bottom up, needs based development of our repex program, cross checked with a top down assessment of total repex at both total volume level and via the AER's repex model, addresses this need. Additional information provided in the replacement capex deep dive workshop and the capex wrap-up workshop aimed to demonstrate the robust nature of this replacement planning approach. Further information about the replacement capital expenditure is presented in attachment 5.01 Ausgrid's proposed capital expenditure, attachment 5.13 Project justification for replacement and duty of care programs and attachment 5.14 Project justification for 11kV switchgear, 33kV switchgear and sub-transmission cables replacement.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (2/13)

Question ID	Theme	Question	Response
3.04	Repex - approach to presentation of information	Provide a fact sheet detailing how the customer impact data was calculated (e.g. what does dollars per customer mean?)	The customer impact was calculated based upon the per annum revenue requirement (calculated using the Post Tax Revenue Model – PTRM provided to the AER) for the specific capex investment. The revenue requirement was then averaged over the customers supplied from Ausgrid's networks to provide the final impact shown in the stakeholder workshops. This customer impact is high level and indicative only and does not reflect the impact tariff arrangements would have on an individual customer segment.
3.05	Repex - approach to presentation of information	Provide stacked bar chart showing the amount of expenditure on the table for discussion versus what is a result of the RAB	The chart on slide 4 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) shows the relative components of revenue requirements for each year of the upcoming regulatory period. In particular, it shows the amount of revenue required from the existing RAB.
3.06	Repex - approach to presentation of information	Provide detail / breakdown of actual incidents (e.g. fallen wires) as opposed to number of "reported incidents"	See slides 9 and 10 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2).
3.07	Repex - approach to presentation of information	Provide Partial Productivity Factor forecast for both capex and opex	Information about Ausgrid's productivity is presented in chapter 5 Capital expenditure and chapter 6 Operating expenditure in our proposal.
3.08	Repex - approach to presentation of information	Provide details around repex deferral this period into the next	Further detail was provided and discussed in the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) regarding the major projects, particularly related to switchboards and sub-transmission cables that were deferred and had scope changes as a result of these deferrals.
3.09	Repex - approach to presentation of information	Provide % of remaining life on state of the network	Ausgrid does not utilise age based remaining life to plan replacement activities, however further detail was provided identifying the % over standard life on the updated state of the network diagram tabled in the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap Workshop FINAL v2) to indicate the number of assets currently beyond their standard life.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (3/13)

Question ID	Theme	Question	Response
3.10	Repex - approach to presentation of information	It would be useful to get the trends (other than just the arrow) for average age and quantity per asset class	Further detail was provided identifying the % over standard life on the state of the network diagram to assist in demonstrating the average age and assets of standard life trends. Additional information relating to the age profile of each asset category and average age is provided annually in the Regulatory Information Notices (RINs) to the AER. This is available on the AER's website. Attachment 5.13 Project justification for replacement and duty of care programs, presents charts showing the age profiles of various asset categories.
3.11	Repex - approach to presentation of information	Clarify customer impacts (for example zone substation switchboard failures - % of customers off for how many hours)	Slide 41 of the capex wrap-up workshop (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) describes the impacts of a recent sub-transmission cable failure. This is similar to the impact of a switchboard failure with regards to the breadth of outage, however a switchboard failure normally has a longer duration with customers without supply. Similar to an outage experienced at Enfield zone substation in February 2011 which resulted in rolling outages for 3 days.
3.12	Repex - approach to presentation of information	Trend analysis across the repex program (not just snapshot)	In addition to the additional information provided in slides 9 and 10 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) further information has been included in attachments 5.01 and 5.13 of Ausgrid's regulatory proposal.
3.13	Repex - approach to presentation of information	CBD Value of Customer Reliability (VCR) values / cross-check with major projects CBA	Ausgrid has used a higher VCR for cost benefit analysis of Sydney CBD projects reflecting the nature of CBD business activity. This higher value is consistent with the average VCR of $90/ kWh specified by IPART in the transmission licence conditions for application to the Sydney Inner Metropolitan area.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (4/13)

Question ID	Theme	Question	Response
3.14	Repex - approach to presentation of information	What are the criteria and scope for identifying major projects	In addition to information provided in slides 33 to 36 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) further information has been included in attachments 5.01 Ausgrid's proposed capital expenditure (section 2 - planning approach) and 5.14 Project justification for 11kV switchgear, 33kV switchgear and sub-transmission cables of Ausgrid's regulatory proposal. A brief excerpt is included below (noting that major projects are identified in the area planning process). Ausgrid's area planning approach takes a holistic approach to capital forecasting, looking at overall sub-transmission network performance based on a risk assessment approach to assess and develop, where necessary, investments in the form of demand management initiatives or major projects. We take into consideration asset condition, local peak demand growth, reliability, compliance issues and major customer connection activity. We then develop strategic network plans for 28 defined geographic areas, covering Ausgrid's network of 33kV – 132kV feeders, zone and sub-transmission substations. The purpose of the Area Plan is to identify those cases where it may be beneficial to develop more holistic approaches which optimise the solution, avoid duplication of scope and support efficient delivery packaging.
3.15	Repex - approach to presentation of information	Are any contingent projects being explored? (c.f. Endeavour)	Ausgrid is not proposing to put forward any contingent projects. It should be noted, however, that we have based our capex forecasts on the key assumption that TransGrid's Powering Sydney's Future (PSF) project proceeds, in the form as updated via their revised submission to the AER in December 2017. Subsequent to the stakeholder consultation workshops, TransGrid's revised PSF proposal was accepted by the AER in the May 2018 Final Decision.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (5/13)

Question ID	Theme	Question	Response
3.16	Repex - approach to presentation of information	Capital constraint on repex to simulate a competitive environment	To ensure expenditure is prudent and efficient we consolidate and prioritise identified potential projects and programs into a 10-year capex portfolio. We use a SAP based program 'Business Planning and Consolidation' to consolidate our capital projects and programs across the network and non-network portfolio. Consolidating the capex program involves a number of checks and balances to remove overlap and test against a top-down assessment. The consolidated program is subject to a well-established prioritisation process to assess and rank projects according to the level of risk associated with the assets. We have chosen to accept and manage a degree of risk. Further information is contained in attachment 5.03 Business Planning Consolidation (BPC) description and attachment 5.04 Prioritisation Investment Plan (PIP) process description.
3.17	Repex - Customer impacts/benefits	Provide price impacts / cost to customer for Advanced Distribution Management System (ADMS)	Ausgrid has provided further detail regarding the ADMS project and the remaining funding required to complete the project in the 2019-2024 period. This is included in chapter L of attachment 5.13 of Ausgrid's proposal. The associated price impacts have been calculated utilising the Post Tax Revenue Model (PTRM) provided to the AER.
3.18	Repex - Customer impacts/benefits		Further information has been included in attachments 5.01 Ausgrid's proposed capital expenditure, 5.13 Project justification for replacement and duty of care programs and 6.03 Network maintenance operating plan of Ausgrid's regulatory proposal.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (6/13)

Question ID	Theme	Question	Response
3.19	Repex - Customer impacts/benefits	What is the payback to the customer for this investment (ADMS)? Reduced SAIDI, reduced opex, reduced capex?	Ausgrid has provided further detail regarding the ADMS project and the benefits and remaining funding required to complete the project in the 2019-2024 period. This is included in chapter L of attachment 5.13 of Ausgrid's proposal.
3.20	Repex - drivers	Customer felt impacts of asset failures (e.g. switchboard failures)	Broadly, asset failures potentially result in outage, safety, environmental and other impacts (see slides 8, 9, 10 and 41 of Slide Pack 4 for figures Ausgrid 1924 Capex Wrap-up Workshop FINAL v2). An example of the impacts of a fluid filled cable failure at Milperra was included in slide 41 of slide pack 4 and a switchboard partial failure at Dulwich Hill was presented in the capex deep-dives (see slide 24 of Slide Pack 3 Ausgrid 1924 Capex Workshop 3 Consultation Final).
3.21	Repex - drivers	What is the depreciation being charged on replaced assets	In addition to the additional information provided in slides 4 of the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) further information has been included in chapter 4 of Ausgrid's proposal.
3.22	Repex - drivers	Is bio-degradable oil an option?	Since the early 1990s, mineral oil has been replaced by a blend of readily bio-degradable fluid. As such where a cable has been subject to maintenance or a leak the displaced mineral oil will have been partially replaced. This process limits our environmental impact from cable failure however it does not remove our obligations regarding environmental pollution.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (7/13)

Question ID	Theme	Question	Response
3.23	Repex - drivers	Has Ausgrid "heard" that safety is a concern?	Ausgrid's 'Customers and the Centre' research program asked research participants what were the long term interests of customers. Safety was one of the top five concerns raised. Key areas of interest are shown in the Regulatory Proposal Executive Summary on page 10. Ausgrid actively seeks feedback regarding network faults and hazards and as part of our Public Electricity Safety Awareness Plan we seek to engage with the broader community to obtain feedback on electricity safety and share information to better understand ways in which Ausgrid can improve safety. Ausgrid's operating and capital plans seek to address both known and forecast safety impacts prior to the potential safety consequences being realised noting customers concerns about affordability.
3.24	Repex - drivers	Safety is not a blank cheque - need business case	Ausgrid's proposal includes further information regarding the justification of the capital plan in attachments 5.01 Ausgrid's proposed capital expenditure, 5.13 Project justification for replacement and duty of care programs and 5.14 Project justification for 11kV switchgear, 33kV switchgear and sub-transmission cables replacement supporting our proposal for replacement capital expenditure for the 2019-2024 period.
3.25	Repex - drivers	Don't need to improve reliability - revise language in consultation slides - maintain reliability only improve where justified.	This is agreed and is a key underlying assumption in Ausgrid's regulatory proposal.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (8/13)

Question ID	Theme	Question	Response
3.26	Repex - drivers	Bushfire risk: if the risk is something that leads into plan, what of the asset base is in bushfire prone zones? Geographic picture is emotive and not representative of concentration of assets. Ausgrid to provide graphic showing concentration of assets overlayed with independent (e.g. BoM) map of bushfire risk areas.	Ausgrid utilises the identified bushfire prone areas provided by the Rural Fire Service and includes this information in its planning processes. Further information on these areas was provided identifying the % ~~over~~ of assets in bushfire prone areas on the updated state of the network diagram tabled in the capex wrap-up session (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) in addition to the summary information provided on slide 46 of this workshop session showing a BoM map of high risk bushfire areas in Australia.
3.27	Repex - drivers	IPART safety audit outcomes (bushfire audit complete, FSA ongoing). Provide outcomes where possible	Ausgrid has completed its IPART directed audit of its Electricity Network Safety Management System and an implementation audit of live work practices. This audit was found to be materially compliant with six compliance recommendations and 30 improvement opportunities to be actioned. As agreed with IPART, a project plan is to be finalised and implemented to resolve all actions. IPART also publishes an annual compliance report on their website summarising their finding.
3.28	Repex - drivers	Support only planning to replace when there is a demonstrated need and value provided to customers	Ausgrid agrees with this comment. Our overarching objective in planning the network is to identify investments that provide the most benefit to customers in terms of affordability, reliability and safety. This is consistent with the National Electricity Objective.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (9/13)

Question ID	Theme	Question	Response
3.29	Repex - drivers	Replacement blurring with augmentation capex? How are demand forecasts relevant to repex?	Demand forecasts are important inputs into augmentation capex and are also relevant for replacement capex for major projects. Among other factors, the cost benefit assessment approach we have applied to major projects considers unserved energy which may arrive from load growth (augmentation related), declining asset performance (retirement or replacement related) or both. In both cases an increasing maximum demand increases unserved energy. This impacts more directly on augmentation, however, in combination with a worsening equipment performance trend, also contributes to an increase in unserved energy over time for a replacement project as the load being put at risk by equipment failure grow.
3.30	Repex - drivers	Does Ausgrid put a dollar value on safety? What is the value of a human life?	The approach Ausgrid adopts in planning capital investment was discussed in the capex wrap-up session. The values utilised in the planning analysis are sourced from the Department of Finance and Deregulation: Office of Best Practice Regulation (Best Practice Regulation Guidance Note: Value of statistical life, Australian Government, 2014). It is important to note that these calculations are used to prioritise resources such that the most effective treatments are applied to the most critical risks.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (10/13)

Question ID	Theme	Question	Response
3.31	Repex – drivers	How are we convincing customers of the maintenance free benefits that come with repex?	The maintenance benefits that come with repex will ultimately be reflected in our actual opex (revealed costs) over the course of the regulatory control period. Notwithstanding, the maintenance benefits in terms of reduced opex, that come with repex, are not explicitly reflected in our opex forecasts. This is because our opex forecast uses a base-step-trend approach, which is a top-down forecasting methodology and AER's preferred methodology for opex. Under this forecasting approach individual components of opex (such as maintenance) are not forecast on a bottom-up basis. The forecast opex under this approach reflects the total opex required to meet Ausgrid's regulatory obligations. Changes in individual components of opex (both increases and decreases) will not be explicitly reflected in the opex forecasts, unless they are the result of external changes (such as a new regulatory obligation) or a capex-opex trade-off (e.g. demand management). Productivity or efficiency gains which occur during the regulatory control period are then shared with customers in two ways: - Via the Efficiency Benefits Sharing Scheme, where our total actual opex (revealed costs) is below our approved forecasts. - In establishing the base year opex for future forecasts where sustained, and permanent reductions in opex are revealed during the regulatory control period
3.32	Repex - drivers	Provide benchmarking on lives and unit rates	Ausgrid has undertaken market analysis where possible and appropriate for high volume replacement programs. Further insights from this analysis has been included in Ausgrid's proposal in attachment 5.01 Ausgrid's proposed capital expenditure and 5.13 Project justification for replacement and duty of care programs. Benchmark unit lives are also part of the repex modelling that is conducted as part of Ausgrid's top down analysis. Ausgrid's forecast assessable repex is approximately 13% lower than modelled repex, if using either historic or benchmark unit costs. These outcomes support Ausgrid's forecast being considered reasonable when assessed at a top down level. Comparison of forecast repex to the modelled scenarios indicates that, on average, Ausgrid's forecast repex unit costs are approximately 20% lower than both Ausgrid historic and the (public) AER benchmark repex unit rates. This has been achieved by a material productivity gain reflected in our forecast unit costs of our proposal. Further information on unit rates and benchmarking can be found in attachment 5.01 (referred to above) and attachments 5.06 Unit cost methodology and 5.15 Nuttall review of repex.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (11/13)

Question ID	Theme	Question	Response
3.33	Repex - drivers	Summary of productivity improvements (Consac cable program)	In addition to an assumed 2% year on year labour productivity improvement Ausgrid has assumed for the purposes of our proposed forecast expenditure that 50% of the Consac program will be sourced externally to manage peak workloads with a 25% reduction in unit rates applied for this portion of the program. Refer to slide 34 of Slide Pack 3 Ausgrid 1924 Capex Workshop 3 Consultation Final.
3.34	Repex - drivers	What is Ausgrid's investment basis on sub-transmission cables given "N-1"?	A pure 'deterministic'n-1 approach is no longer applied due to criticisms of it being too conservative. Ausgrid applies the cost benefit analysis described during stakeholder presentations to identify the expected unserved energy. When the annual value of this expected unserved energy, in addition to safety and/or environmental risks, increases above the deferral value of the investment the trigger is met to proceed. When we have applied this approach it has typically delayed projects by 3 years on average compared to previous deterministic approaches.
3.35	Repex - drivers	Provide details on NSW Environment Protection Authority (EPA) documentation supporting 2039 target	Ausgrid has developed a~~n~~ long-term Environmental Management Strategy for Fluid Filled Cables in consultation with the EPA aimed at incrementally reducing leakage. This strategy and correspondence has been provided confidentially to the AER for their consideration in assessing the proposed capital program.
3.36	Repex - drivers	Provide details of any augmentation benefits for sub-transmission cables repex projects	Ausgrid typically looks to size assets under repex projects to match forecast network needs, taking into account the marginal cost of additional capacity (e.g. via installation of a larger size cable) vs the fixed costs of the repex projects (e.g. cable trenching). In many cases, use of a modern equivalent asset gives an inherent rating increase over the much older assets being replaced. In the case of cable replacements it is often feasible to provide a capacity increase to cater for load growth via cable upsizing for cost margins of only 5%, due to the relatively high fixed to variable cost ratios of this work. We also note that we have a number of proposed repex/retirement projects which do not target any augmentation benefits as we have, through the above process, identified that we have adequate existing capacity or are able to take advantage of nearby capacity by reconfiguring the network.

3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (12/13)

Question ID	Theme	Question	Response
3.37	Repex - drivers	There are standards, up to Ausgrid to interpret internally (safety benefits, VSL)	Agreed, however noting that the community expects that Ausgrid must be able to justify the decision not to act on a safety or environmental standard just as robustly as the decision to invest in response to the requirements of a standard.
3.38	Repex - drivers	Customer reports on hazards - need to draw underlying repex related trends	Further information was provided on customer reports on hazards and the underlying asset failures identified in the capex wrap-up session (see slide 8, 9 and 10 of Slide Pack 4 for figures Ausgrid 1924 Capex Wrap-up Workshop FINAL v2). In addition to the additional information provided in these slides further information has been included in attachments 5.01 Ausgrid's proposed capital expenditure, 5.13 Project justification for replacement and duty of care programs and 5.14 Project justification for 11kV switchgear, 33kV switchgear and sub-transmission cables replacement of Ausgrid's regulatory proposal.
3.39	Repex - drivers	Sub-transmission cables - customer felt impact?	Slide 41 of the capex wrap-up workshop (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) describes the impacts of a recent sub-transmission cable failure.
3.40	Repex - drivers	LV cables repex - Is this an industry Issue? Does benchmark apply?	The degradation and failure of Consac LV cable is a well-known industry issue. The planned replacement programs for LV cables address known safety and loss of supply issues associated with cable degradation. Benchmarking is not appropriate for these cable replacements as the key driver of expenditure is the operating environment in which the cables were-installed in the 1960s and 1970s. The operating environment for these cables differs across electricity distributors and within Ausgrid's supply area. Further information on the Consac replacement program is presented in chapter D of attachment 5.13 Project justification for replacement and duty of care programs.

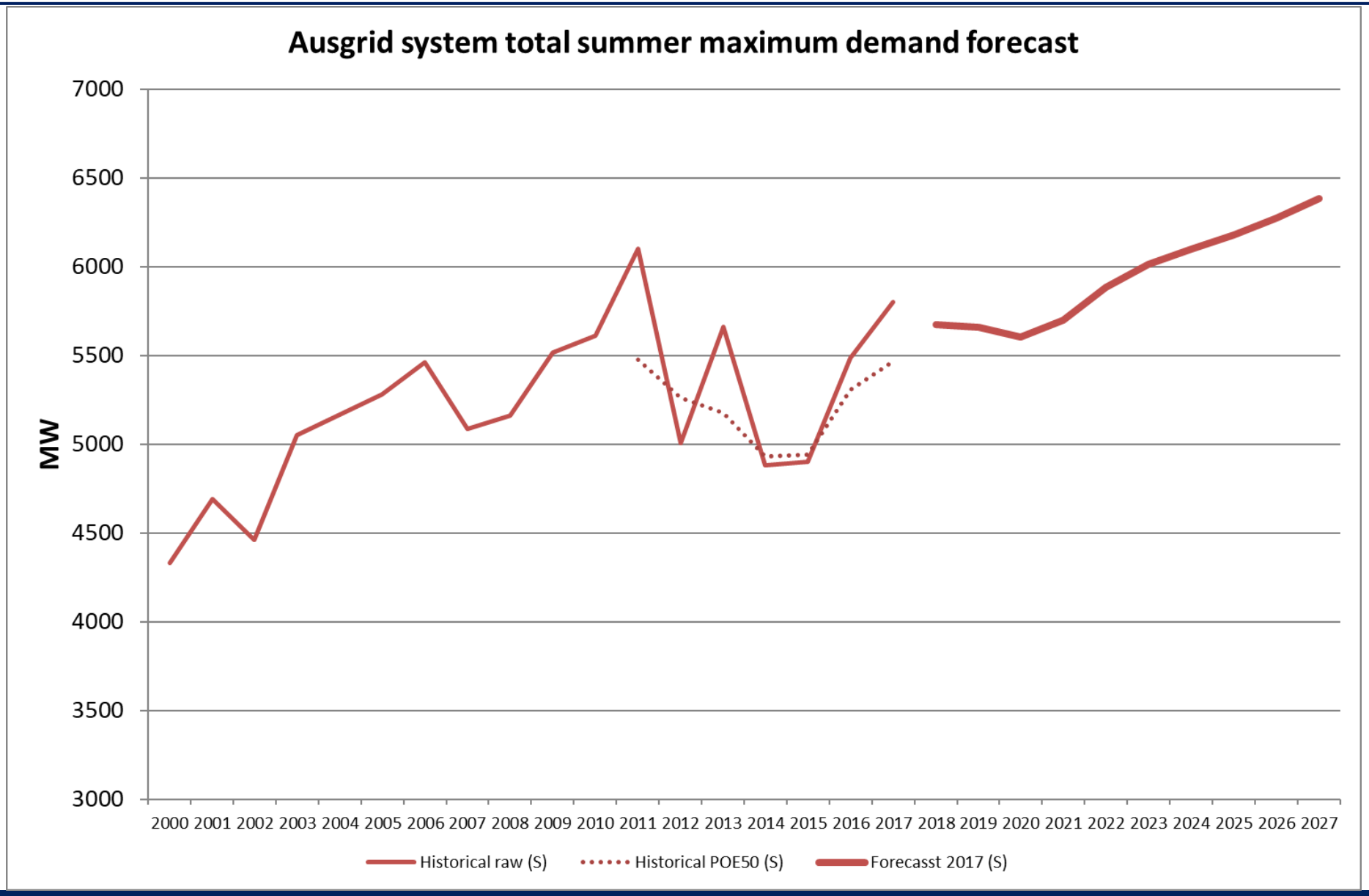
3. REPEX: Approach to presentation of information, customer impacts / benefits and drivers (13/13)

Question ID	Theme	Question	Response
3.41	Repex - drivers	Provide program rationalisation (economic)	Information on Ausgrid's proposed capital program is presented in Ausgrid's regulatory proposal (chapter 5) and attachment 5.01 Ausgrid's proposed capital expenditure, attachment 5.13 Project justification for replacement and duty of care programs and attachment 5.14 Project justification for 11kV switchgear, 33kV switchgear and sub-transmission cables replacement.
3.42	Repex - drivers	What is the "right" total level of assets at risk? Is this relevant/input to decision making?	The weighted average value at risk chart which was the subject of this question is not intended to define absolute risk, but rather to provide a very high level indicator of whether current investment levels would tend to increase or decrease the pool of aged assets. It is relevant to a high level check, in this case indicating that our proposed capex will still tend to cause the group of aged assets to grow marginally. We do not apply this measure in isolation, but it is considered in conjunction with bottom up repex needs, cost benefit analysis and top down AER repex model analysis. Refer to section 5.4.7 of the regulatory proposal for more information on the weighted average value at risk.
3.43	Repex - drivers	What is the long-term strategy to migrate from oil filled/gas filled cables?	The long-term strategy was developed in 2002 in association with NSW EPA and aims to fully migrate away from oil/gas filled cables by 2039. This involves replacement of a substantial length of cable, and as such replacements have been and will continue to be staged over time to achieve the timeframe. Replacements are coordinated with the broader Area Plan requirements and cost benefit analysis applied to determine the timing of each particular cable replacement. See slide 39 of Slide Pack 3 Ausgrid 1924 Capex Workshop 3 Consultation Final for more details.
3.44	Repex - drivers	What level of reliability are customers willing to pay for in terms of both SAIDI/SAIFI? How do Ausgrid collect this information? What have customers told us?	Ausgrid utilises the AEMO value of VCR in our probabilistic planning and analysis, noting the variance described in the answer to question 3.13 above for the inner Sydney CBD. This represents the customer value placed on reliability of supply. Ausgrid has also conducted research with over 2,500 customers to obtain views on various topics including reliability. This included customer focus groups and deliberative sessions as described in section 2.2.2 of Ausgrid's proposal.

4. Demand forecast (1/4)

Question ID	Theme	Question	Response
4.01	Demand forecast	Detail around demand forecasts - what is driving changes - can Ausgrid provide paper with assumptions and methodology?	Details provided on 5 Feb 18. Please see Slide 18 to 27 of Slide pack 4 Ausgrid 1924 Capex Wrap Workshop FINAL v2. Ausgrid's approach to forecasting is set out in attachment 5.07 2017 electricity demand forecasts report of the proposal. It is summarised in section 5.5.4 of the proposal.
4.02	Demand forecast	Demand forecasts chart need to include historical demand (back to 2000)	Refer to following slide for chart of historical information.
4.03	Demand forecast	Demand forecasts chart need to be expressed more simply (difficult to understand that wedges above POE50 line are subtracted, and the top line is meaningless)	Details describing the build-up of the demand forecast chart are provided on slides 18 to 27 of the capex wrap-up workshop (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2). Ausgrid's approach to forecasting is set out in attachment 5.07 2017 electricity demand forecasts report of the proposal. It is summarised in section 5.5.4 of the proposal.
4.04	Demand forecast	What is the relationship between price elasticity impact on MW response / MWh response / diversified demand per connection (by residential and commercial)?	Refer to Slide ~~25~~ 23 of the Capex Wrap-up workshop (Slide pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) which notes the maximum demand forecast includes an elasticity of -0.42 for residential demand and -0.39 for non-residential demand. The elasticity is the % change in demand for a 1% change in the driver variable (e.g. price, GSP).
4.05	Demand forecast	What is the relationship between income/GSP impact on MW response / MWh response / diversified demand per connection (by residential and commercial)?	Ausgrid assesses customer demand for electricity against both the NSW Gross State Product (GSP) and NSW Real Household Disposable Income (RHDI). The maximum demand forecast includes an elasticity of +0.67 for residential demand and +0.61 for non-residential demand. Ausgrid's approach to forecasting is presented in attachment 5.07 2017 electricity demand forecasts report of the proposal.

4. Demand forecast (Q4.02 – Maximum Demand from 2000) (2/4)



4. Demand forecast (3/4)

Question ID	Theme	Question	Response
4.06	Demand forecast	What are the assumptions in demand forecast with respect to cost reflective network pricing post 2020?	As noted in Section 3 of Ausgrid's 2017 Electricity Demand Forecasts Report, use of Ausgrid's time of use tariff by customers has grown steadily from close to zero small customers in 2004 to the current level of over 500,000 small residential and business customers. For this reason, the historical trend will include a demand response effect which would be included in the econometric and spatial trends used to derive the demand forecast. Ausgrid will continue to monitor the introduction of more cost reflective tariffs and assess the impact on customer usage patterns. Where customer demand is projected to change at a rate different from the past, a post model adjustment procedure will be developed and introduced. See attachment 5.07 for more details.
4.07	Demand forecast	What do demand forecasts assume about behaviour? In response to future price changes / sensitivities - has it reached its limit?	Demand forecasts include a range of elements which reflect the choices customers make when using electricity. These include projections for customer investment in energy efficiency including solar power and customer response to both changes in electricity prices and increasing disposable income. Refer to Section 3 of attachment 5.07 2017 Electricity Demand Forecasts Report for details on the drivers of demand included in the forecast.
4.08	Demand forecast	Demand forecasts for the future are important even though they may not impact capex for this period. Future declining demand will mean investments in this period will not be required by future customers but future customers will continue to pay. Concern that sharp drop-off in demand from batteries will leave consumer paying for assets no longer needed.	Sensitivity testing using the most recent Bloomberg New Energy Finance battery forecast indicates that Ausgrid's maximum demand forecasts could be reduced by 1.3% overall by 2030. Note however that the overall capex proposal has limited sensitivity to changes in broad base demand, with the majority of the projects driven by condition based replacement and/or major new customer growth.
4.09	Demand forecast	More information required around price elasticity response within demand forecasts	Please refer to response in Question ID 4.04.

4. Demand forecast (4/4)

Question ID	Theme	Question	Response
4.10	Demand forecast	How does Ausgrid demand forecast compare to others?	Ausgrid has compared the results from our spatial demand forecasts (181 zone substations) with that produced by AEMO for the much larger Sydney and Hunter regions. While Ausgrid's forecast coincident growth rate across these regions is higher that AEMO's, we believe this is largely due to AEMO's modelling approach which excludes growth from large connections such as WestConnex.

5. Distributed Energy Resources (DER) forecast (1/2)

Question ID	Theme	Question	Response
5.01	Demand forecast	How does the DER forecast change under cost reflective prices? Are there any sensitivities which have been done?	No significant sensitivity testing was undertaken for the 2017 demand forecast, due largely to the uncertainty about the transition path to more cost reflective prices. Ausgrid has engaged independent consultants to provide revised DER forecasts to reflect a broader range of tariff scenarios and the full value stack for battery storage. While at this stage, we do not envisage that the revised forecasts will result in any change to our capex proposal (given the limited sensitivity to demand forecasts), this will be revisited in our revised proposal.
5.02	Demand forecast	Does Ausgrid view that cost reflective pricing will change DER uptake?	Refer response to 5.01 above.
5.03	Demand forecast	Forecasts of battery storage which are not exponential are not credible - needs sensitivity testing	Sensitivity testing using the most recent Bloomberg New Energy Finance battery forecast indicates that Ausgrid's maximum demand forecasts could be **reduced by 1.3%** overall by 2030. Note however that the overall capex proposal has limited sensitivity to changes in broad base demand, with the majority of the projects driven by condition based replacement and/or major new customer growth.
5.04	Demand forecast	Storage could be taken up without solar - arbitrage is only one part of value proposition. Demand forecasts need to include consideration of this.	Refer response to 5.01 above.
5.05	Demand forecast	What is Ausgrid's response to EVs? Owning and having a role in EV demand?	The impact from increasing adoption of EVs are included in Ausgrid's forecast. Please refer to sections 3 and 5 of Ausgrid's Electricity Demand Forecasts Report circulated to stakeholders. To offer customers customer's choice in their preferred charging arrangements, Ausgrid offers a range of flexible, low cost tariffs including controlled load and time of use. Please refer to Ausgrid's Network Price guide found on Ausgrid's website at https://www.ausgrid.com.au/-/media/Files/Network/Documents/ES/ES7.pdf. Ausgrid is also exploring how to further support the uptake of EVs by customers through provision of information to support charging infrastructure and trials to increase customer choice and flexibility.
5.06	Demand forecast	Lazard (US) figures quoted for cost of generation are not appropriate for Ausgrid's areas	Please refer to response from Question ID 18.03 for further clarity / explanation.
5.07	Demand forecast	What is the trigger for exponential uptake of EV?	Ausgrid's forecast for EVs has been largely guided by the AEMO Insights report. The results from this report indicate that a rise in uptake occurs in 2025 which is expected to be significantly

5. Distributed Energy Resources (DER) forecast (2/2)

Question ID	Theme	Question	Response
5.06	Demand forecast	Lazard (US) figures quoted for cost of generation are not appropriate for Ausgrid's areas	Please refer to response from Question ID 18.03 for further explanation.
5.07	Demand forecast	What is the trigger for exponential uptake of EV?	Ausgrid's forecast for EVs has been largely guided by the AEMO Insights report. The results from this report indicate that a rise in uptake occurs in 2025 which is expected to be significantly influenced by EV model availability.

6. Demand management (DM) (1/2)

Question ID	Theme	Question	Response
6.01	Demand management	$10.5 million on DM seems low given importance stated	We have revisited the potential for demand management to defer our sub-transmission replacement projects, including switchboards, in light of the customer feedback, the increasing range of demand management alternatives and their potential for managing supply risk. While this application of demand management goes beyond the traditional, we plan to demonstrate the customer value to the AER and seek their support. As a result, Ausgrid has allocated an additional $15m over the period to demand management. If supported by the AER, this will deliver the deferral of up to $60m of capex beyond the period. Further information on demand management is provided in section 6.4.3 Operating expenditure of the proposal and attachments 6.01 Ausgrid's proposed operating expenditure and 6.05 Demand management cost benefit assessment.
6.02	Demand management	How does Ausgrid undertake planned/unplanned outages so as to ensure they do not occur during peak periods? Is DM required to address outages?	Ausgrid has a long standing and structured process for planning maintenance and evaluating other requesting outages to avoid outages which place the network at risk during peak periods. Despite this, at times outages may be required at peak times due to unexpected asset failures or third party damage. At these times DM can be helpful in mitigating risk and we have considered it in our projects to retire or replace equipment which are driven by the risk of failure.
6.03	Demand management	How is existing Demand Management working?	Historically, DM opportunities were only assessed where network augmentation was required to address rising demand for electricity to relieve capacity constraints. However, such opportunities are limited in the current environment of dampened load growth and a moderation in peak demand, where the dominant driver of capex is ageing assets and the risk of asset failure. Ausgrid's introduction of advanced asset management techniques to effectively assess the risks related to ageing assets now offers DM solutions the opportunity to compete with network options for these needs and significantly increases the volume of network investment where DM may form part of the least cost solution. But in contrast to the short duration summer or winter peak events where traditional DM solutions are effective, aged asset risks offer a lower probability, longer duration outage risk which can best be addressed with a mix of permanent and temporary DM solutions. It is for this reason that Ausgrid is undertaking a large-scale DM trial to refine techniques for an innovative blend of permanent demand reductions from solar and energy efficiency and temporary reductions from demand response solutions such as battery storage, load shifting and dispatchable generation.

6. Demand management (2/2)

Question ID	Theme	Question	Response
6.04	Demand management	How is Ausgrid encouraging new load to be as efficient as possible and incorporate new technologies?	As part of the customer connections process, Ausgrid has detailed discussions with customers to ensure that they have the information necessary to assess the range of options they are considering. This includes information on connection costs, tariff options and connection schedule.
6.05	Demand management	In the context of repex, how does demand management fit it?	Please refer to response in Question ID 6.04.
6.06	Demand management	DM on non-RIT-D programs	Ausgrid assesses all major capital projects and 11kV augmentation for demand management potential. This includes a number of projects with expenditure below the RIT-D threshold of $5m. Where DM assessment of such projects indicates that DM may form part of a least cost solution, Ausgrid would implement a more detailed internal review and public consultation, but with consideration for the size of the project and available DM budget.
6.07	Demand management	How does Ausgrid assess non-network solutions for assets below RIT-T / RIT-D / major project level?	Please refer to response ~~from~~ to Question ID 6.06 above.
6.08	Demand management	How is options value (favouring higher cost short term over long term lower cost) taken into account in decision making?	As part of Ausgrid's review of DM potential, an estimate of the option value was factored into the cost benefit assessment for major capital projects. The inclusion of this option value increased the efficient DM expenditure from $10.5m to $26m.
6.09	Demand management	How is DMIS taken into account in Ausgrid's decision making with DM?	The DMIS has not been included as a cost or a benefit in the cost benefit assessments for individual projects. Where DM projects are implemented, a net benefit test will assess whether a DMIS incentive is eligible under the AER's DMIS guidelines.

7. Efficiency and productivity improvements (1/3)

Question ID	Theme	Question	Response
7.01	Efficiency and Productivity	How do productivity gains to be delivered by the property program factor into opex - how does base/step/trend consider this?	Productivity gains delivered by the property program will ultimately be reflected in our actual opex (revealed costs) over the course of the regulatory control period. Notwithstanding, the productivity gains from the property sector from avoided, or reduced opex, are not explicitly reflected in our opex forecasts. This is because our opex forecast uses a base-step-trend approach, which is a top-down forecasting methodology and the AER's preferred methodology for opex. Under this forecasting approach individual components of opex (such as maintenance) are not forecast on a bottom-up basis. The forecast opex under this approach reflects the total opex required to meet Ausgrid's regulatory obligations, and changes in individual components of opex (both increases and decreases) that are not the result of external changes (such as a new regulatory obligation) or a capex-opex trade-off (e.g. demand management) will not be explicitly reflected in the opex forecasts. Under this forecasting approach, we absorb the cost for all increases in individual cost categories and have to work hard to offset these with reduction to keep our total opex stable. Productivity or efficiency gains which occur during the regulatory control period are then shared with customers in two ways: - Via the Efficiency Benefits Sharing Scheme, where our total actual opex (revealed costs) is below our approved forecasts. - In establishing the base year opex for future forecasts where sustained, and permanent reductions in opex are revealed during the regulatory control period.

7. Efficiency and productivity improvements (2/3)

Question ID	Theme	Question	Response
7.02	Efficiency and Productivity	How do the changes in labour productivity rates affect capex and opex?	The opex forecast uses a base-step-trend approach, which is a top-down forecasting methodology and AER's preferred methodology for opex. Under this forecasting approach individual components of opex (such as maintenance) are not forecast on a bottom-up basis. The forecasting approach takes into account changes in industry productivity, including labour productivity, through a productivity adjustment to our base year. Productivity or efficiency gains which Ausgrid achieves during the regulatory control period are then shared with customers in two ways: - Via the Efficiency Benefits Sharing Scheme, where our total actual opex (revealed costs) is below our approved forecasts. - In establishing the base year opex for future forecasts where sustained, and permanent reductions in opex are revealed during the regulatory control period. From a capex perspective, improvements in labour productivity result in decreased unit costs to deliver work activities (e.g. replacements) resulting in lower required capex. Slide 15 of the capex wrap session (Slide Pack 4 Ausgrid 1924 Capex Wrap Workshop FINAL v2) provides some commentary around how labour productivity improvements increasing to 10% have been included across the capital program.

7. Efficiency and productivity improvements (3/3)

Question ID	Theme	Question	Response
7.03	Efficiency and Productivity	How does expenditure in one area result in efficiencies in other areas - need to see linkages across expenditure categories	This is because our opex forecast uses a base-step-trend approach, which is a top-down forecasting methodology and AER's preferred methodology for opex. Under this forecasting approach individual components of opex are not forecast on a bottom-up basis with the exception of a small number of step-changes. No step-change has been included for increased opex for bushfire prevention. Under this forecasting approach, we absorb the cost of all increases in individual cost categories and have to work hard to offset these with reduction to keep our total opex stable.
7.04	Efficiency and Productivity	Appears "the efficiency journey is over" - is there an end point? What is driving net CPI trend?	Ausgrid will continue to seek efficiency improvements. The driving factors behind the net CPI trend include the step and trend components of the opex methodology. See slide 10 of the opex session (Slide Pack 6 23 Feb Opex slides v9 FINAL) for the quantification of the step changes and the percentage trend changes.
7.05	Efficiency and Productivity	How do Ausgrid unit rates compare to other urban NSPs?	Refer to response to question 3.32.

8. OPEX: Approach to presentation of information

Question ID	Theme	Question	Response
8.01	Opex - Approach to presentation of information	Request for AER opex person to be in the room for deep dive	Arek Gulbenkoglu (Director, AER) was present at the Opex deep-dive.
8.02	Opex - Approach to presentation of information	Opex story is good headline story	Noted. Ausgrid has achieved considerable reductions in opex as a result of its transformation and will continue to seek efficiencies moving forward. Further information on operating costs is presented in chapter 6 of the proposal and related attachments.

8. OPEX: Drivers

Question ID	Theme	Question	Response
8.03	Opex - Drivers	Can we add to the OPEX deep dive how much OPEX is increasing due to RFS increasing bush fire zones?	Opex associated with bushfire zones will ultimately be reflected in our actual opex (revealed costs) over the course of the regulatory control period. Notwithstanding, changes in opex associated with changes in bushfire prevention is not explicitly reflected in our opex forecasts. This is because our opex forecast uses a base-step-trend approach, which is a top-down forecasting methodology and AER's preferred methodology for opex. Under this forecasting approach individual components of opex are not forecast on a bottom-up basis with the exception of a small number of step-changes. No step-change has been included for increased opex for bushfire prevention. Under this forecasting approach, we absorb the cost of increases in individual cost categories and have to work hard to offset these with reduction to keep our total opex stable.
8.04	Opex - Drivers	Why is Ausgrid Opex increasing?	Compared to the last regulatory proposal, the operating cost base has reduced by over $100 million in 2019 (see slide 6 23 Feb Opex slides v9 FINAL). See slide 10 for the quantification of the step changes and the percentage trend changes. Opex is increasing slightly over the next regulatory period, mostly due to growth in our customer numbers and forecast price increases for wages. On a per customer basis, our forecast opex is stable over the next regulatory period, maintaining the savings achieved in the current regulatory period.
8.05	Opex - Drivers	Provide information about cost increases which Ausgrid has absorbed in the current period and is expected to absorb in 19-24 (in the context of difference between Essential and Ausgrid's opex trend)	The current period allowance is still subject to the remittal process, so Ausgrid is unable to isolate costs that it will absorb until the remittal decision is finalised. In terms of our forecasts for the 2019-24 period, slide 7 of the opex deep dive presentation (Slide Pack 6 23 Feb Opex slides v9 FINAL) outlines some of the initiatives Ausgrid is taking to deliver improved customer value within our opex allowance. As set out in our proposal, we are proposing to absorb a total of $38m of costs including increases in land tax ($30m), some customer operation activities ($10m), and some ICT costs ($8m).

8. OPEX: Efficiency and productivity gains (1/2)

Question ID	Theme	Question	Response
8.07	Opex - Efficiency and productivity gains	Would like a discussion on AER productivity number.	Productivity was discussed in the Opex deep-dive. The AER noted that their research to date indicated negative productivity growth. The AER proposed to continue using zero productivity growth to encourage efficiencies above this.
8.08	Opex - Efficiency and productivity gains	Question why productivity would be negative when simple KPI measures (eg opex per customer) reveal output increases with the same or lower level of costs / inputs?	The 'productivity adjustment' we apply to our base year opex measures the forecast changes in the productivity frontier for the industry (i.e. across all DNSPs) over the regulatory period. The approach we have applied adopts the AER's econometric approach to measuring a single estimate of productivity. The AER measures industry-wide productivity each year as part of its annual benchmarking report. In its last report (November 2017) the AER found that productivity (measured by total factor productivity) declined at an annual rate of -1.2% from 2006 to 2016. The econometric modelling undertaken by Economic Insights explicitly models the following cost drivers: • Input price changes • Output growth • Efficiency and productivity gains. By jointly accounting for these factors, it mitigates the risk of double counting or inappropriately accommodating the drivers of the rate of change in opex, including labour costs. The result from the Economic Insights modelling is consistent with estimates from the Australian Bureau of Statistics (ABS). Over the same 2006-2016 period the ABS estimated that multifactor productivity and labour productivity decreased by 2.6 and 1.9 per cent for electricity, gas, water and wastewater sectors. Applying a negative productivity estimate means increasing opex each year. Rather than increase our opex forecast we have decided to apply no productivity growth. This means that if productivity continues to decline in the industry, Ausgrid will absorb any cost increases above our opex forecast.

8. OPEX: Efficiency and productivity gains (2/2)

Question ID	Theme	Question	Response
8.09	Opex - Efficiency and productivity gains	Why are productivity improvements not taken into account when forecasting real price changes in labour? Any positive adjustment for wage increases should be offset by commitments to achieve productivity improvements	Labour costs represent a significant proportion of Ausgrid's costs and therefore labour price changes are an important consideration when forecasting opex. Our forecasting approach adjusts the base year to reflect forecast changes in wages at an industry wide level. It is important to distinguish between labour price changes and labour cost changes. To the extent labour prices increase to compensate workers for increased productivity, labour costs will not increase at the same rate, as less labour is required to produce the same output. Consequently, labour productivity improvements need to be captured in forecasts. Our approach to adjusting the base year to reflect forecast changes in wages has applied a forecast of labour price increases which is not productivity adjusted. Rather, labour productivity is accounted for in our opex forecast through the productivity measure which we apply to the base year. This measures productivity change in the industry, focusing on input price changes (including labour), output growth, and efficiency and productivity gains.
8.10	Opex - Efficiency and productivity gains	Provide Ausgrid's expected benchmarking scores and forecast improvement in efficiency performance relative to its peers by FY2024	As part of our effort to improve opex performance over the 2014–19 regulatory period, we regularly measure ourselves against other Australian distribution businesses. These comparisons show that we have made significant progress over a range of measures, bringing our performance into line with best practice within our industry Refer to section 6.2 of the proposal for Ausgrid's performance against other DNSPs.

8. OPEX: Regulatory approach (1/4)

Question ID	Theme	Question	Response
8.11	Opex - Regulatory approach	Need to explain anything over and above opex revealed cost model	There is nothing "over and above" the base-step-trend methodology of which revealed costs are a part of.
8.12	Opex - Regulatory approach	Appears the preference is for EBSS rather than drive efficiency in the regulatory proposal?	In the last determination process, the AER benchmarked our opex performance against our peers and told us we could do better. Our customers have also told us that they want us to be more efficient and keep costs down. Since then, our transformation has driven significant improvements in opex performance. We have made structural changes to our business and reduced our annual opex by $100 million. We've also engaged more with our customers about our operating practices so that we deliver greater value. As part of our efforts to strive for best practice, we continue to measure ourselves against our peers and the results demonstrate that our opex now compares well amongst this group. The AER can be confident that our current performance provides a fair and reasonable basis for forecasting efficient opex over the forthcoming regulatory period. Base-step-trend combined with EBSS provides clear incentives for businesses to lower costs over time, and we are committed to actively pursuing these opportunities and delivering value for our customers.
8.13	Opex - Regulatory approach	Require more detail on the revealed cost model?	Ausgrid's approach to opex is entirely captured within the base-step-trend methodology, of which revealed costs are a component. See slides 9-17 of the opex presentation 23 Feb Opex slides v9 FINAL for details of the approach.

8. OPEX: Regulatory approach (2/4)

Question ID	Theme	Question	Response
8.14	Opex - Regulatory approach	How does Ausgrid approach to Opex compare to Endeavour and Essential?	Ausgrid's approach to forecasting opex is largely consistent with the AER's preferred approach, and the approach used by other NSPs. NSPs have taken different approach to how they have applied individual components of the base-step-trend methodology as noted below: - Endeavour has applied a base-step trend approach to forecasting opex. They have applied trend adjustments using labour price growth from the Powerlink decision, internal forecasts of output factors and AER weightings and zero productivity growth. Step changes are being assessed. Total opex is flat across the last three regulatory periods (no annual figures provided in their directions paper). - Essential has forecast opex using a detailed ('bottom-up') process combined with a top-down' revealed costs' method. Their forecast includes real opex decreases of 4.4% to 6.2% p.a. between FY20 and FY24. These decreases appear to be largely driven by a significant change in the approach to vegetation management which is not compatible with the preferences expressed by our customers. - TasNetworks applied a base-step-trend approach to forecasting opex. Forecast opex increased through step changes and trend adjustments for output growth and real cost escalation. Imposed a 'top-down' stretch target of real opex reductions of 0.5% in FY21 and 1% p.a. in FY22 to FY24. - TransGrid applied a base-step-trend approach to forecasting opex in their revised proposal. They applied real labour cost increases based on an average of BIS & DAE labour price forecasts to the AER's estimate of labour as a proportion of opex. They also partially applied the AER approach to output growth, assumed zero industry productivity change (but included a real efficiency saving target of 3% for FY18 – which differs from the AER approach). The forecast opex also included 2 step changes.

8. OPEX: Regulatory approach (3/4)

Question ID	Theme	Question	Response
8.15	Opex - Regulatory approach	Should certain aspects of Ausgrid's opex proposal be "isolated" from the "base" so that they can be more easily scrutinised in terms of customer "willingness to pay". (Noted by Ausgrid that such an approach could create an overly granular approach to setting opex and lead to the AER playing a significant role in the individual business decisions of network operators)	This was raised in the context of our vegetation management proposal. The suggestion was made that to the extent Ausgrid is proposing to increase service quality, we should demonstrate a willingness to pay by consumers for this increased cost. We note that we are not proposing a step change for our vegetation management program. Our revised approach to vegetation management has been developed in response to feedback from customers, and is expected to have no material change in the overall amount in forecast opex that is related to vegetation management. Ausgrid will absorb the costs of the changes to the vegetation management program. In general, our approach to forecasting opex is to use a top-down forecasting approach. The only costs that are forecast separately to this are step changes not already included in our base year (in our proposal, emergency recoverable works (applied through an adjustment to the base year), and demand management) and non-recurrent costs (e.g. debt raising costs). This approach ensures a balanced forecast that doesn't double count, or inappropriately accommodate changes in individual components of opex, which are expected to be recurrent in nature. Under this forecasting approach, we absorb the cost of all increases in individual cost categories and have to work hard to offset these with reduction to keep our total opex stable.
8.16	Opex - Regulatory approach	Need more convincing and more support as to why the base year is at the efficient frontier, and additionally what you are planning to do to stay at the (moving) frontier for the next five years.	As part of our forecasting process, we tested our base year against a variety of measures (including the AER's benchmark assessment approach, partial indicator analysis and sensitivity analysis) which indicated that it is in line with what the AER expects an efficient network business would incur for opex. Further detail on the results of this analysis is included in our regulatory proposal (chapter 6 Operating expenditure and chapter 9 Incentive schemes and pass through). As discussed, the regulatory framework incentivises us to pursue further efficiency gains in opex over the next regulatory period.

8. OPEX: Regulatory approach (4/4)

Question ID	Theme	Question	Response
8.17	Opex - Regulatory approach	Why should 2017/18 be the base year when still experiencing benefits of bow wave?	This was raised as a question to the graph on slide 6 of the opex deep dive presentation. This graph shows expected opex for 2017/18 which includes some non-recurrent expenditure (including transformation costs) which are not expected to be ongoing and have therefore been excluded from the base year that is rolled forward. We are proposing a base year opex of $440 million (FY19) which is in line with the AER's allowance for 2017/18. We are working hard to reduce our underlying opex in 2017/18 to this level.

9. Connections policy (1/3)

Question ID	Theme	Question	Response
9.01	Connections policy	Important new connections not creating new assets that may or may not be used in the future, paid for by existing customers	Ausgrid has noted this concern and plans capex diligently and carefully to ensure that only prudent investments are made (as explained throughout the Extended Stakeholder Consultation program). Policy settings are chosen such that costs are borne by beneficiaries whether by capital contributions, fixed charges, demand charges or usage charges.
9.02	Connections policy	Developers should be contributing large share of growth expenditure (connections policy)	Ausgrid has considered the concern raised by stakeholders. The forecast assets funded by connecting customers as capital contributions is in the order of $500 million over the FY20-24 regulatory period. Ausgrid was originally proposing the reduce capital contributions from connection customers. However in response to stakeholder feedback that did not support this proposed change, we have reversed our original proposal have decided to retain the status quo connection policy.
9.03	Connections policy	How can Ausgrid introduce incentives (e.g. take or pay for capacity) to ensure that new connections right size load?	As noted on slide 45 of the 21 February capex wrap-up Slide Pack 4 (Ausgrid 1924 Capex Wrap-up Workshop FINAL v2), Ausgrid already has, and will continue to make use of demand charges, fixed charges and guarantee of revenue provisions to ensure connecting customers pay the correct charges for any Ausgrid funded assets. Under NSW contestability arrangements, customers also incur significant up front costs for dedicated connection assets and these serve as a material incentive to ensure connections are right sized.
9.04	Connections policy	Rozelle: Do the rules enable capital contributions (either partial or all)?	The rules allow capital contributions.

9. Connections policy (2/3)

Question ID	Theme	Question	Response
9.05	Connections policy	For the Rozelle deep dive, 60MVA is a large investment for only 5 customers. Should use discretion under Rules to allow for capital contributions	Ausgrid will consider an appropriate mix of capital contributions and cost reflective network pricing including fixed and variable components as allowed for under the rules, our connection and our pricing policies.
9.06	Connections policy	Provide quantified change in connection policy in percentage terms. How much will Ausgrid fund under new connection policy going forwards compared to counterfactual?	Ausgrid would have funded approximately an additional 10% of connection costs under changes initially proposed. Following stakeholder feedback we have not pursued that policy direction and therefore there will be no change.
9.07	Connections policy	More information/clarity required on current and future connection policy? How does it relate to the pioneer scheme and what are the principles underlying the change in approach?	Note that Ausgrid has decided to retain the current approach to capital contributions. The first part of this question was addressed by slides 43-45 of the capex wrap-up workshop (Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2) and other responses in this section. The proposed change related to funding of upstream shared 11kV assets rather than the localised extensions covered by pioneer schemes.

9. Connections policy (3/3)

Question ID	Theme	Question	Response
9.08	Connections policy	What will the impact of the change in connection policy be on existing customers over a 30 year timeframe (noting the difference in the time cost of money between customers and Ausgrid)	Note that Ausgrid has decided to retain the current approach to capital contributions.
9.09	Connections policy	How does Ausgrid's proposed and current connection policies compare to other NSPs?	Ausgrid currently funds a significantly lower proportion of connection costs compared to other DNSPs. The additional Ausgrid funding noted in our original presentations would not reverse this.
9.10	Connections policy	Why are Ausgrid/Endeavour both changing their connection policies now? What are the macro drivers?	Ausgrid cannot comment on Endeavour's behalf. As stated in the workshops, Ausgrid's original intention was to reduce the contribution from connecting customers. However, following clear stakeholder feedback we have not pursued this policy change.
9.11	Connections policy	Change in connection cost policy seems to be driven by a need to address current "distortions" between new connecting parties by passing on cost to all consumers. Is there another solution?	Refer to responses to questions 9.09 and 9.10
9.12	Connections policy	Not equitable to shift connection cost to existing customers from new customers - prefer no change - costs left with connecting customer	Please refer to the graph on slide 44 of Slide Pack 4 Ausgrid 1924 Capex Wrap-up Workshop FINAL v2.
9.13	Connections policy	Provide comparison of connection costs over time (split out in terms of capital cons/growth/augmentation line items) and explain changes over time.	The trend in growth capex is shown in section 5.5.3 of Ausgrid's proposal.

10. Fleet (1/2)

Question ID	Theme	Question	Response
10.01	Fleet	Does Ausgrid have sufficient plant for major event days? How does Ausgrid ensure there is sufficient plant and fleet to service major event days and still maintain high utilisation at other times?	We are able to use vehicles and plant from our various depots and redirect them to areas facing emergencies. We also are able to borrow equipment from adjacent distributor network service providers as required. Ausgrid's fleet has significantly reduced over the last 5 years and with significant input from the internal stakeholders to maintain adequate fleet resources to meet business needs.
10.02	Fleet	How is depreciation of vehicles quantified for accounting purposes? How does this impact pricing?	Depreciation of vehicles is the same as depreciation for other assets for regulatory purposes, straight line over the standard life which is 10.24 years. Depreciation of vehicles impacts revenue in the same way as all depreciation i.e. through increasing revenue as return of asset.
10.03	Fleet	Require more "flesh" around the counterfactuals for fleet expenditure?	If we do not invest in our vehicle fleet, the age profiles of vehicle will increase. As vehicles increase in age the wear and tear increases. Vehicles that suffer from wear and tear are likely to be: - Less safe. This is a risk to the safety of our workers and the community. - Prone to more breakdowns. This is detrimental to productivity and response times to emergencies and routine services - Require more servicing and maintenance which increases opex costs.
10.04	Fleet	What is Ausgrid's strategy with respect to hire vs own for fleet and plant	Ausgrid has a mix of leased and owned vehicles. Ausgrid fleet strategy is focused on reducing opex (maintenance, leasing costs) and optimising life cycle costs of capex through timely replacement of aged fleet. There are advantages of owning fleet including if business needs change before the lease term ends.

10. Fleet (2/2)

Question ID	Theme	Question	Response
10.05	Fleet	Require more detail around the cost and reliability factors which drive replacement decision making for fleet. Need to understand decision making process.	Decisions to replace fleet are primarily driven by age of the vehicle. Vehicles are generally replaced when they reach the 'standard age'. Fleet vehicles are permanently loaded thus increasing maintenance and wear on mechanical components. The vehicles are tools required for our staff to do their work and these need to be reliable to provide an efficient service to our customers. Most of Ausgrid's fleet is parked externally with rust and general wear and tear on the unit also being an issue from aged fleet. Major mechanical, rust and trim repairs are costly and introduce major downtime. Updating at reasonable intervals to reduce repair cost and downtime is necessary. The 'standard age' and mileage for owned vehicles ranges from: - 5 years / 100000 km life for cars and station wagons - 7 years /150000 km for light commercial cab/chassis, panel vans and utilities. Light commercial fleet is being standardised with suitable fit out reused on new vehicles reducing capital outlay. - 10 years / 200000 km for trucks - 15 years for elevated work platforms and cranes this includes a major inspection to Australian Standards requirements at 10 year. This is a cost effective extension to the life of the unit reducing required capital for early replacement whilst maintaining reliability.
10.06	Fleet	Provide data on change in utilisation of vehicles over time - (vehicles per employee suggested as useful metric and could be benchmarked against other NSPS)	Most of Ausgrid's fleet is parked outdoors with rust and general wear and tear on the unit being an issue as vehicles get older. Major mechanical, rust and trim repairs are costly and introduce major downtime. Updating at reasonable intervals to reduce repair cost and downtime is necessary. Please refer to the graph on slide 6 of the fleet presentation (Slide Pack 2e SCD Non-network Fleet) showing a 12% improvement to the ratio of vehicle numbers to number of Ausgrid FTEs over time.

11. Property (1/4)

Question ID	Theme	Question	Response
11.01	Property	Agree staff need comfortable productive workplace	Noted. Further information about proposals for non-network property can be found in attachment 5.20 Non-network property plan and attachment 5.21 Non-network property business cases.
11.02	Property	How do income streams from property impact capex? Provide gross and net figures	Unregulated income from property is governed by the AER's Shared Asset Guideline (November 2013). If the revenue amount is material (materiality is defined as >1% of a distribution network service providers total revenue) there is a revenue reduction. The threshold is not expected to be met in the forthcoming regulatory period. This income does not impact capex.
11.03	Property	What are the quantified benefits (in $) of the property program?	The benefits of the property program include the savings to operating and maintaining buildings. The majority of savings are around efficiencies gained through the implementation of modern energy efficient systems above those currently installed, which although regularly upgraded and maintained are of a significant age and accordingly less efficient. In addition all new elements within the building will be under warranty for periods of between say 12 months for minor items such as fittings and furniture and up to 10 years for glazed curtain walls and the like. Avoided increased costs have been identified as a result of the proposed developments. In addition there are unquantifiable savings in respect of staff wellbeing and a more efficient use of space leading to productivity increases.

11. Property (2/4)

Question ID	Theme	Question	Response
11.04	Property	Property capex should be expressed in terms of both gross and net effect to customers of incoming proceeds from sale of property	Under the regulatory regime we are required to forecast a gross capex number. We forecast to invest $208 million on non-system property in 2019-24 regulatory period. Disposals are treated in accordance with the AER roll forward model. The regulated asset base is reduced by the disposal value of any asset. Information on disposal of assets has been submitted to the AER.
11.05	Property	How does Ausgrid ensure that risks around delays are managed (approvals etc). Need to consider implications of timing delays and potential 'double dipping'.	External Delays: - Unforeseen delays in design development such as additional consultancy reports due to specific site circumstances that may have not been initially envisaged; - Delays in achieving development consent due to delays by consultants preparing documentation or the approval process through Council; - Issues relating to satisfying any onerous Council conditions of consent; - Delays in finalising the detailed design due to additional requirements from Council or unforeseen circumstances; - Delays due to unforeseen building conditions i.e. once development commences existing works as executed plans do not meet up with the reality of conditions on site; - Delays due to trade or builder shortages at certain times; - Delays due to lack of certain building materials, resources or furnishings; - Delays and /or onerous conditions by RMS and Utilities; - Inclement weather.

11. Property (3/4)

Question ID	Theme	Question	Response
11.06	Property	How does Ausgrid ensure that risks around delays are managed (approvals etc). Need to consider implications of timing delays and potential ‘double dipping’. CONT…	Internal Delays: - Delays in internal gate approvals leading to delays in the appointment of design consultants or builders; - General delays in procurement of various consultancies and builders as required; - Delays in contract preparation or negotiation. This may be an internal or external factor and my incorporate legal implications that were unforeseen when negotiating or entering into a contract. - Risks are mitigated as follows: - Risk identification and mitigation strategies are prepared for every project before commencement; - Formal project delivery strategies are adopted for each project; - Regular internal reporting on status both financial and progress; - Project review meetings are regularly carried out with internal and external stakeholders i.e. builder and relevant contractors and consultants; and - Appropriate project governance implementation. There is no ‘double dipping’ in relation to the seeking of funds from one regulatory period to another. Should there be a shortfall due to unforeseen circumstances this is reported in the business case request and or existing finance is carried over from one period to another.

11. Property (4/4)

Question ID	Theme	Question	Response
11.07	Property	Provide an outline of what was approved in the previous regulatory control periods compared to expenditure. What has not been spent and how will this flow on the next regulatory period and what is the impact of CESS.	Ausgrid updates its capital expenditure plan for property on a quarterly basis, and in any given period, certain projects may be deferred or cancelled due to mandatory, risk, strategic or efficiency reasons. For example, we may consider relocating our facilities in response to zoning changes associated with Local Environmental Plans or Development Control Plans in a particular area or to avoid encroaching on residential development. Please refer to response in Question ID 1.09 for additional information on treatment of capex underspend under the CESS.

12. Information and Communications Technology (ICT) (1/5)

Question ID	Theme	Question	Response
12.01	ICT	What failed in the past ICT system to require update? Was it the wrong decision? (Noting consumers should not pay for the wrong decision)	There has been no failure in-ICT systems or wrong decisions made. The maintenance program is to keep the applications and systems on current supported versions and to protect against failure of ICT systems. Ausgrid considers that the life expectancy for these contemporary systems to be in the order of four to seven years, meaning that there will be a need to 'refresh' systems. ICT systems have an expected useful life, which generally coincides with when the vendor reduces or withdraws support. Retaining systems beyond this point will result in additional maintenance costs and reliability risks, impacting on efficiency and resilience. Complex and integrated ICT environments are a mandatory investment for businesses such as Ausgrid that are required to make informed technical and economic decisions about their assets and operations. Based on the size and maturity, software vendor will normally provide "Extended" or "Sustaining support" (where available) for up to one to two versions less than the current version of the application. However, continuing to operating the business on applications older than this will result in the following risks: - Core applications no longer being supported by ICT vendors; - Security exposures increase; - ICT applications becoming increasingly unstable; - Being unable to address strategic imperatives and architectural weaknesses; - An increased rate of failure in older ICT applications, resulting in unplanned production outages; and - Unable to adequately meet the quality, reliability and security of standard control services.

12. Information and Communications Technology (ICT) (2/5)

Question ID	Theme	Question	Response
12.02	ICT	Cybersecurity - is benchmarking appropriate?	Benchmarking against other organisations is only one of the tools we have used, in the suite of approaches we have used to identify appropriate spend on cyber security. We have looked at what other organisations have done and we have identified and implemented best or better practices in cyber security. It should be noted that as part of the long-term partial lease of Ausgrid there is a new set of NSW Distributor's Critical Infrastructure Licence Conditions. These obligations differ slightly from other Transmission and Distribution businesses in NSW and do not currently apply outside NSW which should be factored into any benchmarking undertaken. NSW Distributor's Licence Sections 9 through 11 are specifically related to Critical Infrastructure Licence conditions whereby the maintenance and operation and control of the distribution system can only be undertaken within Australia, specific critical data is secured and held only from within Australia and the process for exemption and ongoing compliance and annual audit processes by IPART. An independent third party assessed Ausgrid's cyber control maturity using the US Department of Energy developed, Cybersecurity Capability Maturity Model (C2M2) framework and was found to be at a lower level of maturity compared to a benchmark made up largely of North American Power & Utilities companies. This model is used to evaluate the maturity and sophistication of the organisation's cybersecurity risk management approach at a strategic and holistic level. The model used was an energy sector-specific version that included reference material and implementation guidance specifically tailored for the energy sector. As a benchmark comparison, a major Australian airline is spending $30M on their Cyber Program over three years.

12. Information and Communications Technology (ICT) (3/5)

Question ID	Theme	Question	Response
12.03	ICT	Cloud - how do (future) capex savings compare to increased opex (excluding transition costs)	Based on an assessment performed by an independent organisation (Ernst & Young), the opex increases are expected to be minimal (~$1M) after transition is complete. The capex avoidance is significantly higher. Our proposal assumes the cloud implementation will complete by FY21 resulting in a significant capex reduction (~$8M) from the infrastructure and network investments in the current AER period.
12.04	ICT	Cybersecurity - How do we know that $20M is the right level of investment what are the risks (quantified where possible) before and after the investment?	Ausgrid management commissioned an independent review of the Ausgrid cyber security risk landscape. The review undertaken by Ernst & Young (EY) evaluated our cyber security and resilience controls, existing mitigation strategies and produced a tangible costed and executable roadmap of cyber improvement activities including ongoing continuous improvement. The core of the strategy is: (i) to embed cyber security into our people culture; (ii) strengthen key controls relating to critical systems and assets and (iii) develop a sophisticated cyber threat management capability providing greater agility in responding to cyber threats and predicting possible threats. Ausgrid further engaged an industry expert (Hakluyt) to assist Ausgrid with a strategic review of its cyber security strategy and program. The review found the Ausgrid cyber security strategy and program as “sound” and identified a number of recommendations incorporated into the Ausgrid cyber security strategy and program. In addition, the Ausgrid cyber security strategy and program has been reviewed and endorsed by the Critical Infrastructure Centre and Australian Signals Directorate (ASD) within Federal Government.

12. Information and Communications Technology (ICT) (4/5)

Question ID	Theme	Question	Response
12.06	ICT	Where do cyber security risks come from now? (internal vs external threats)	Ausgrid's top three threat actors based on an external review ~~is~~ are (1) Nation State, (2) Organised Crime, and (3) Trusted and Semi-Trusted Insiders. Nation State incudes adversaries establishing a persistent presence in the corporate network via phishing emails to employees/vendors then moving laterally to the control network, depositing targeted industrial control systems malware that compromise the integrity/availability of control systems as part of an attack on Australia's critical infrastructure. Financially motivated organised crime and errors by trusted insiders also featured in the threat analysis The most likely point of compromise is likely to be malware, entering via a successful phishing attack or through removable media.
12.07	ICT	What is counter-factual for all ICT expenditure? Can this be expressed from a customer's perspective	If we do not make this investment then the business operations will be significantly disrupted. This includes increased risk of non-compliance with licence conditions, laws and regulatory obligations. - Our systems will be out of line with normal ICT industry changes; - There would be an increased risk of a significant cyber security breach; - SAP - Maintenance schedules may not be undertaken correctly causing impact to Ausgrid assets; - Metering – Market obligations for retail billing and settlements would not be met; - Customer – Outage information not available real time, exposure of customer and life support information and data may be breached (Privacy breach, increased risk of NECF Type 1; - SAP Billing - councils would not be billed, Retailer NUOS billing impacted; - Increased risk of manual processing of documents with Ausgrid.

12. Information and Communications Technology (ICT) (5/5)

Question ID	Theme	Question	Response

12.08	ICT	Over half a billion in IT spend has occurred over the last couple of regulatory periods has resulted in benefits. Need to show benefits of this. Example: how has web based outage notification driven down costs?	Significant investment has been made in recent years to consolidate and mitigate risks across Ausgrid's ICT applications to ensure the obligations are able to be met as set out in the NER. Ausgrid needs to ensure these investments continue to be managed and maintained.
			
			Over the recent determination periods, Ausgrid's application investment strategy has been to focus on the consolidation of applications and the renewal of obsolete applications. This approach has resulted in a fairly mature and stable application portfolio including:
			
			Enterprise processes are supported largely by the integrated ERP software suite from, SAP:
			- Asset Lifecycle Management and Works Management processes are also supported by specific modules in SAP, and specialist applications like Geospatial Information System (GIS) to identify asset locations accurately.
			- Asset Operations are supported by specialist applications designed for process control including:
			  - SCADA (Supervisory Control and Data Acquisition)
			  - Distribution Network Management System (DNMS)
			  - OMS (Outage Management System) to identify potential outages from changes in electrical flow in the network.
			
			Metering is a major component of market management. Meeting our obligations in the national electricity market is supported by a suite of third-party (Itron, TIBCO) and internally developed applications (MBS) to collect meter readings and distribute them to market participants.
			
			Customer Management there is a set of specialist applications (Avalanche, Genesys) used in the contact centres to route and record phone calls and communicate statuses to customers in the event of an outage
			
			These platforms have set the foundation for business efficiency now and in the future through the Ausgrid transformation program through direct operational cost reduction (back office processing, maintenance decisions), capital deferral (Asset investment decision and analytics) , capital avoidance (cloud, replacement) and cost avoidance through digitisation (online outage information vrs contact centre FTE), In addition customer expectations of a digital Ausgrid increase.

13. Support costs

Question ID	Theme	Question	Response
13.01	Support costs	What will average labour costs be by end of the period?	Chapter 6 of the proposal presents information on forecast labour costs.
13.02	Support costs	What % of total indirect support costs are capitalised? What % of salary costs are capitalised?	Approximately 40% of total indirect support costs and 46% of total labour costs (including overtime, labour on-costs and labour hire) are currently capitalised. These percentages are broadly in line with the actual annual average since the start of the current regulatory period.
13.03	Support costs	How long do capitalised support costs stay in the RAB?	Indirect overheads are allocated to various project and programs based on direct labour so effectively they are spread across all asset classes and hence depreciated according the regulatory depreciation rates for the various RAB asset categories. The depreciation rates are in accordance with the AER's Post-tax revenue model. These depreciation rates are agreed with the AER.
13.04	Support costs	Need more granular breakdown of network divisional management and business support costs - $358 million	The $358m in network divisional management and business support costs represents indirect support costs related to the management and supervision of capital projects and programs, scheduling jobs, admin support and safety briefings. These costs originate from Ausgrid's four network divisions being, Asset Management & Operations (12%), Field Services (78%), Program Delivery (9%) and Customer (1%). This amount comprises of both labour (74%) and non-labour (26%) costs incurred within these divisions and subsequently capitalised based on Australian Accounting Standards. For a graphical breakdown of these costs see slide 7 of the capital program support costs slide presentation (Slide Pack 2d SCD Capital Program support costs).

14. Metering

Question ID	Theme	Question	Response
14.01	Metering	Stakeholders to provide views on metering offline	During stakeholder consultations, Ausgrid proposed options for recovering legacy metering assets including using accelerated depreciation. Stakeholders did not support this option. We have taken stakeholder views on board and have adopted a standard rate of depreciation rather than an accelerated rate.
14.02	Metering	What discount rate is applied for metering changes? (Depreciation)	Ausgrid has used our proposed rate of return for the 2019-24 period as the discount rate for modelling metering prices.
14.03	Metering	Not satisfied with previous decisions on metering charges. Best to be silent?	Ausgrid has decided to apply the existing charging structure for metering developed by the AER. We consider it important that this charging structure is explained to customers and have provided further information on its mechanics in attachment 8.01 Ausgrid's metering service to our regulatory proposal.
14.04	Metering	Challenge in communicating metering charge to customers	We agree that the AER's metering charging structure, which we have adopted, can be difficult to communicate. To aid understanding, attachment 8.01includes information explaining how this charging structure works.
14.05	Metering	Check that metering costs have been removed from capex for all periods to enable like-for-like comparison (may be issue 10-14 period)	Capitalised overheads related to type 5&6 metering is estimated to be $30 million. The adjusted capitalised overheads for FY10-FY14 is $1,136 million down from $1,166 million. This is a difference of 2.6%. See the graph on slide 6 of the support costs presentation (Slide Pack 2d SCD Capital Program support costs).

15. Street lighting

Question ID	Theme	Question	Response
15.01	Street lighting	In principle agree with cost reflectivity for street lighting	In principle support noted from stakeholders, with our proposal to include greater cost reflectivity in terms of how we price our public lighting services.
15.02	Street lighting	Smart controls - keen to go faster	We share stakeholder's enthusiasm for the installation of smart control devices on our public lighting network and are looking forward to a rollout of the technology once we finalise ongoing trials.
15.03	Street lighting	LED roll out not ambitious enough	LED installations continue to increase through our maintenance program with 38,467 LEDs installed as at January 2018 and more to come in the existing regulatory period. We are working with individual local councils on pricing models and ramp up options whilst ensuring a sustainable bulk roll out of existing lighting assets for the current and upcoming regulatory periods.

16. Rate of return

Question ID	Theme	Question	Response
16.01	Rate of return	What is Ausgrid's actual debt to equity ratio?	On an enterprise value basis, Ausgrid's gearing ratio (i.e.. debt to total enterprise value) is approximately 60%.
16.02	Rate of return	Can AER give assurance that RoR approach is okay? (Offline comment by CCP, PIAC and ECA)	Ausgrid is consulting with the AER.

17. Governance

Question ID	Theme	Question	Response
17.01	Governance	How does the Regulatory Investment Test (RIT) process feed in to internal process – governance	The RIT-D and RIT-T processes run in parallel with internal governance processes, drawing upon the same underlying approaches for identifying non-network alternatives which have been in place for some time. We use the preliminary board approval as an internal test and trigger to release RIT-D/T documentation for public consultation and final board approval is not granted until the RIT-D/T process has been completed. Further information about Ausgrid's governance processes can be found in attachment 5.05 Investment Governance Framework of the regulatory proposal.

18. Future Network Strategy (1/2)

Question ID	Theme	Question	Response
18.01	Future Network Strategy	Check cost assumptions for microgrid case study, seem too high for solar? Could 18 days per year in microgrid case study equate to 1 hour each year as this may not be so bad if occurring at night? Is the 18 days discretionary in terms of when it occurs?	**Solar cost assumptions** The solar cost as provided in the presentation footnote (Slide pack 5, slide 51 Tariff Deep Dive) was incorrectly quoted. Within the modelling, we used a value of $12.3k for a 10kW system (the $17k was for a 15kW system) based on SolarChoice Dec 2017 price indices. The results presented adopt the $12.3k value. **Timing of '18 days' off supply** No, it is not discretionary, the timing of when solar+storage based off-grid systems would run out of power is entirely weather dependent. We acknowledge and agree with the comment that off-grid system users could adjust consumption to a degree when faced with prolonged periods of insufficient PV generation. The reliability figures quoted were sourced from Grattan Institute's "Sundown, Sunrise" report (May 2015) – the 18 days figure is simply a conversion from Grattan's 95% reliability figure (for their 7kW+35kWh system) converted to days per annum (365 x [1-95%]). Grattan did not publish the assumptions that underpin their reliability figures, so we are unable to comment on the degree to which they took account of the ability of users to adjust consumption to mitigate outages.

18. Future Network Strategy (2/2)

Question ID	Theme	Question	Response
18.02	Future Network Strategy	A far bigger challenge for Ausgrid than complete grid defection is 'off grid' during day and "on grid" at night.	Ausgrid understands this challenge and we are seeking to address this via lowering variable charges outside of the peak period (offset by an increase in the fixed charge) and flexibility to change our peak periods within the Tariff Structure Statement where efficient to do so.
18.03	Future Network Strategy	Care should be taken in presenting the case for centralised over decentralised generation. The more Ausgrid touts the benefits of centralised generation the more future capex it can spend (scepticism).	We understand this comment relates to the analysis presented in the Pricing Deep Dive session on the relative costs of centralised vs decentralised generation. The objective of this analysis was to demonstrate that current pricing arrangements do not give rise to the optimum economic outcomes. Ausgrid does not necessarily support centralised over decentralised generation. Rather, we support the evolution of an energy system that gives rise to affordable and sustainable outcomes for our customers and community. We have an important role to play in this evolution via the signals we send to customers within our pricing structures to incentivise efficient investment in and operation of DER.

19. Pricing: Approach to presentation of information (1/2)

Question ID	Theme	Question	Response
19.01	Pricing - Approach to presentation of information	There is a need for preparatory session prior to the pricing deep dive	Completed. Session held on 16/02/2018.
19.02	Pricing - Approach to presentation of information	Ausgrid justified cost reflective pricing using cross subsidies, consider justification of reduced augmentation costs?	Prices that reflect the marginal cost of network services signal to customers the additional network costs arising from further use of the network and, thereby, encourage use of the network when the marginal benefit to customers exceeds the marginal cost. It also signals to Ausgrid the value that customers place on future investments. For these reasons cost reflective pricing is expected to result in reduced network costs in the longer run. Further, Ausgrid made a number of refinements to its approach to estimating its long run marginal costs, which further improves the cost reflectivity of its prices. Further, Ausgrid's rebalancing away from variable charges and towards fixed charges reflects a significant step in its transition to cost reflective pricing for the recovery of residual costs and will promote efficient investment in DER, which will reduce future network costs. No cross subsidy exists if the revenue recovered from customers in a tariff class is between the standalone and avoidable cost of providing services to those customers. This is a requirement of the rules that Ausgrid has always complied. Under this pricing principle no cross-subsidies exist between Ausgrid's tariff classes.
19.03	Pricing - Approach to presentation of information	Pricing story is critical - current chart not helpful - currently not clear "it's history"	See page 34 of the presentation (Slide Pack 5) Tariff Deep Dive Presentation.
19.04	Pricing - Approach to presentation of information	Getting definitions of key terms right and understood by all is important.	Ausgrid has taken this on board and has incorporated this feedback in the regulatory proposal and will take this into consideration in consultations going forward.

19. Pricing: Approach to presentation of information (2/2)

Question ID	Theme	Question	Response
19.05	Pricing - Approach to presentation of information	In providing summary of previous outcomes of stakeholder engagement related to pricing, care should be taken to reflect the diversity of responses, rather than providing motherhood general statements in support of approach.	Noted. Moving forward, Ausgrid is committed to accurately communicating the full spectrum of feedback received from any stakeholder engagements.
19.06	Pricing - Approach to presentation of information	Care with internet pricing analogy. Internet is discretionary. Capacity is not a fixed charge.	Noted.

19. Pricing: Customer impacts (1/2)

Question ID	Theme	Question	Response
19.07	Pricing - customer impacts	What are the trade-offs (winners/losers) from price reform?	The essential trade-off in network prices involves signalling marginal cost to users and recovery of 'residual' costs. As discussed in chapter 10 (Pricing structures and policies) of the proposal, cost reflective prices encourage customers to use our network more efficiently by signalling to them the future costs from further (incremental) use of the network. This can help customers decide whether using our network best meets their needs or whether investments in DER and energy efficiency is more cost effective. Ausgrid will undertake a pricing research program to help inform potential pricing decisions in the future.
19.08	Pricing - customer impacts	What is Ausgrid doing for vulnerable business customers?	Ausgrid is putting in place measures that address the effect of proposed reforms on low energy users and vulnerable customers. Options under evaluation include separate tariffs, rebates or changes to the definition of the blocks on basic tariffs. At a high level, affordability issues are addressed at the network revenue level by controlling network expenditure.
19.09	Pricing - customer impacts	Ausgrid does not reflect consumer preferences in tariff structures	Customer preferences have helped to shape the tariff strategy as evidenced by the Newgate research outcomes. By way of example, Ausgrid is proposing to put in place safeguard measures to address the effect of its rebalancing on low energy users and vulnerable customers and it is also limiting the extent of rebalancing by reference to customer bill impacts, consistent with customer feedback.
19.10	Pricing - customer impacts	What feedback has Ausgrid received on seasonal "bill shock" under seasonal TOU tariffs?	Ausgrid has designed the introduction of seasonality to avoid unacceptable customer bill impacts. Feedback from the Newgate research program flags customer support for the proposal as "Mixed". See page 7 (https://www.ausgrid.com.au/-/media/Files/About-Us/customer-engagement/Customer-at-the-Centre-Focus-Group-Report.pdf?la=en&hash=08B858B0A3C25E9E6CDA7E60EDD3D4681ED3AF86)

19. Pricing: Customer impacts (2/2)

Question ID	Theme	Question	Response
19.11	Pricing - customer impacts	Provide charts showing different options for the legacy mass market tariff (including options which do NOT raise fixed charge), comparing the impact against both the existing mass market current default tariff and the proposed TOU cost reflective tariff	Ausgrid's proposed reforms for residential tariffs are designed to be revenue neutral and so they will not affect the level of revenue recovered from residential customers. Ausgrid is currently modelling alternative options with varied extents of rebalancing.
19.12	Pricing - customer impacts	Note 6-7MWh p.a. customers can be vulnerable. How does strategy affect these customers?	These customers will largely see below CPI increases as evidenced by slides 24 and 26 of Slide Pack 5 (Tariff Deep Dive Presentation).
19.13	Pricing - customer impacts	Does Ausgrid expect new connections (under TOU) to have a lower ADMD in response to the tariff and therefore impart lower capex?	The more cost reflective price signals that arise under TOU tariffs will promote efficient use of the network and ensure that Ausgrid invests capital only in the services customers are willing to pay for. This is expected to have the effect of reducing network costs in the long term.
19.14	Pricing - customer impacts	For the load response example presented in the session: 1. How do thermal inertia/network asset characteristics impact the benefit of demand response on network costs? 2. What are the actual consumer actions that give rise to the responses presented? (algorithms vs behaviour) 3. What impact does a diversified (realistic) customer response have on the results?	Customer's decisions and network asset characteristics do affect network costs, and this warrants further investigation as part of Ausgrid's research plan.

19. Pricing: Equity (1/3)

Question ID	Theme	Question	Response
19.15	Pricing - Equity	Provide more information on cross subsidies between tariff classes (residential and business) and how this has been addressed (if at all) in pricing	The pricing principles in the rules set out that the revenue expected to be recovered from customer tariff classes must lie on or between the stand alone cost of serving the that class; and the avoidable cost of not serving those retail customers. As such, no economic cross subsidy exists if the revenue recovered from customers in a tariff class is between the standalone and avoidable cost of providing services to those customers. This is a requirement of the rules that Ausgrid has always complied with and so we believe that no cross-subsidies exist under our tariff structures.
19.16	Pricing - Equity	Provide estimate of cross subsidy between tariff class (current compared to proposed) - express this in terms of $ and bill impacts	Refer to response to question 9.15.
19.17	Pricing - Equity	Ausgrid need to provide transparent allocation between classes and tariff components	Ausgrid's residual cost allocation methodology is explained in detail in our current tariff structure statement. At a high level, residual costs are allocated to tariff classes with reference to each tariff classes relative contribution to maximum demand, as approved by the AER. Ausgrid is not proposing to change this AER-approved methodology at present.
19.18	Pricing - Equity	Business customers not paying enough for transmission given their increased willingness to pay. (noting that residential customers are also the first to be load-shed)	Ausgrid sets transmission pricing based on the locational cost reflective price set by TransGrid.
19.19	Pricing - Equity	How has and how will allocation between tariff classes change between regulatory periods?	There is currently no planned change to Ausgrid's methodology for allocating residual costs to tariff classes.

19. Pricing: Equity (2/3)

Question ID	Theme	Question	Response
19.20	Pricing - Equity	Does current allocation approach match customer views on fair and reasonable outcomes?	This was raised in the tariff deep dive and no strong objections were raised to Ausgrid's allocation methodology. That said, it may be helpful to explore this further as part of Ausgrid' research plan.
19.21	Pricing - Equity	Why have HV customer network prices rises decreased against other classes? What is the narrative?	A greater proportion of the assets used by HV customers are shared with other tariff classes. Ausgrid will investigate this further by separating our high voltage, sub-transmission and CRNP customers.
19.22	Pricing - Equity	Why are HV customer allocations relatively lower than the others on a demand basis. Perception that large businesses getting a good deal at expense of small customers (compounded by connections policy which also gives this perception)	These customers only utilise a portion of the network to deliver the same unit of energy/power that a low voltage customer would. That is, the low voltage network is not utilised by HV customers and so it costs less per MVA to service these customers. As a result they are allocated less of the residual.
19.23	Pricing - Equity	Ausgrid should be clear on the benefits/costs of DER. The $200 quoted subsidy, by some estimates, does not exist.	Ausgrid’s analysis shows that residential customers installing a typical solar PV system will save, on average, $197 per year of NUOS.
19.24	Pricing - Equity	Peak demand tariff will allow solar customers to pay for costs. Current proposed fixed charge does NOT.	The reduction in variable charges permitted by an increase in fixed charges will encourage efficient investment in solar PV and avoid inequities between adopters and non-adopters of solar PV. The fixed charge also better reflects the nature of the connection service Ausgrid provides to solar customers. That said, both demand charges and fixed charges can be utilised to more fairly allocate residual costs, they are not necessarily mutually exclusive and will be investigated in Ausgrid's research plan.

19. Pricing: Equity (3/3)

Question ID	Theme	Question	Response
19.25	Pricing - Equity	What is the evidence that solar reduces peak by 6%? Need evidence why solar cross-subsidy is the issue.	Ausgrid's zone substations peak at different times of the day. This means that the effectiveness of PV installations on reducing peaks at zone substations varies. On Ausgrid's network, the median residential peak demand occurs at 6pm. At this time the PV effectiveness on reducing the critical peak is 7.6% of its potential maximum output.
19.26	Pricing - Equity	Need to work with solar advocates to implement a cost reflective tariff. Solar advocates will assist with the transition if closely consulted	This will be explored in further detail in research plan.

19. Pricing: Future proofing (1/2)

Question ID	Theme	Question	Response
19.27	Pricing - Future proofing	Tariffs need to be future proof - adaptability to respond to changing LRMC, consumer response and retail pass through	Ausgrid agrees that tariffs need to be future-proofed. Ausgrid is investigating the potential to include triggers for re-openers during the next regulatory control period that would assist in fast-tracking its transition to cost reflective prices.
19.28	Pricing - Future proofing	What is Ausgrid doing with respect to enablers of P2P trading (pricing + ADMS)?	The rebalancing away from variable charges and towards fixed charges better reflect the nature of the connection service provided by Ausgrid and will therefore promote efficient decisions as to P2P trading. ADMS also assists the grid systems to better integrate DER.
19.29	Pricing - Future proofing	Cannot invest in grid tech to enable P2P without tariffs and tariff classes	Ausgrid continues to group customers into tariff classes and to include in each tariff class a range of tariffs, consistent with the requirements of the rules.
19.30	Pricing - Future proofing	How is Ausgrid addressing the two major uncertainties? 1) How will retailers pass through? 2) How will consumers respond?	Ausgrid is engaging with retailers on their response to potential pricing reforms and Ausgrid engaged HoustonKemp to undertake a study of how customers respond to changes in prices.
19.31	Pricing - Future proofing	Suggest that uncertainty can be addressed via the introduction of a range of tariff products as well as the potential to "re-open" TSS at year 2 or 3. Ausgrid should identify the triggers for reopening the TSS and what aspects of the tariffs can be changed at these points. AER needs clarity on triggers - e.g. availability of data identifying impacts to vulnerable customers	Ausgrid is investigating the potential to include triggers for re-openers during the next regulatory control period that would assist in fast-tracking its transition to cost reflective prices.

19. Pricing: Future proofing (2/2)

Question ID	Theme	Question	Response
19.32	Pricing - Future proofing	The future will see generation provided from local DER rather than centralised. Is Ausgrid future proofing tariffs to reflect this?	Ausgrid's proposed rebalancing away from variable charges and towards fixed charges will promote efficient investment in DER, avoid inequities between adopters and non-adopters of DER, encourage use of the network when renewable generation is more prevalent (outside of peak times) and better reflect the nature of the connection service Ausgrid provides.

19. Pricing: Long term strategy (1/2)

Question ID	Theme	Question	Response
19.33	Pricing – Long term strategy	Ausgrid's transitional tariff should aim to de-risk the transition to cost reflective tariffs. However, Ausgrid has not articulated its end point (ideal demand/capacity tariff) and has focussed on transition.	Ausgrid's rebalancing away from variable charges and towards fixed charges reflects a significant step in its transition to cost reflective pricing for the recovery of residual costs. It is also consistent with any future transition to capacity charges as a means for recovering residual costs, consistent with the stakeholder pricing principles. Consistent with the stakeholder pricing principles, the appropriate end-point is uncertain and may never be reached because it will be a perpetually moving target. Identifying the likely end-point and the appropriate next steps will be a key focus of the research plan.
19.34	Pricing – Long term strategy	What is Ausgrid's position on HWC, AS4777, controlled loads more generally?	In regard to Hot Water Control Load (HWLC) Ausgrid's position is, to the greatest degree that is practical, to maintain the existing demand reduction capabilities. The number of Controlled load hot water customers are declining at less than 1% per year and this trend has tracked steadily for the last ten years or so (as customers change to gas or heat pump hot water etc, and as new building regulations generally preclude the use of traditional electric storage hot water cylinders). HWLC is a valuable service as it provides a very cost effective tariffs for customers and negates the need to build additional infrastructure to supply what would otherwise be a higher peak load. Ausgrid currently has no large scale plans to roll out new controlled load devices. The nature of customer loads is starting to change significantly, particularly with the advent of rooftop solar, home batteries and electric vehicles. To this degree Ausgrid is continually monitoring developments so that possible controlled load applications can be found that benefit both the customer and Ausgrid, for example balancing high levels of solar generation or enabling cost effective EV charging. AS4755 is a useful technical standard for implementing load control initiatives where such are found to be viable. Ausgrid has recently undertaken an airconditioner control trial (utilising AS4755). See the interim writeup for this trial at: https://www.ausgrid.com.au/-/media/Files/Industry/Demand-Management/Ausgrid-CoolSaver-Interim-Report-2017_Final.pdf?la=en&hash=C7484A8D5D2C869C560ACF23E04B4D949BBBD001

19. Pricing: Long term strategy (2/2)

Question ID	Theme	Question	Response
19.35	Pricing - Long term strategy	Ausgrid has corporate social responsibility opportunity to respond to social and environmental issues. Ausgrid should design products to address these issues and engage in public debate.	Ausgrid's proposed rebalancing will promote efficient investment in DER and encourage use of the network at times when most renewable generation occurs, ie, outside of the peak period.

19. Pricing: Retailer issues(1/2)

Question ID	Theme	Question	Response
19.36	Pricing - Retailer issues	What influence does Ausgrid have on retailers under new MP provisions? Ausgrid could offer a lower rate for CRT to encourage uptake by retailers.	The TOU tariff is offered at a discount to the standard block tariff to encourage greater uptake of the more cost reflective tariff.
19.37	Pricing - Retailer issues	PIAC - Network tariffs (mass market) don't need to be understood by consumers (retail tariffs do).	Ausgrid agrees with this point and is proposing to work more collaboratively with retailers in the future. Further, one of the retailer functions is to package supply chain into products customers can better understand where there is value in doing so.
19.38	Pricing - Retailer issues	Variability in bills under STOU will be problematic for retailers/customers if passed through - (noting PIAC happy for retailers NOT to pass through)	Noted, seasonality is also addressed in response to questions 9.10, 19.59 and 19.60.
19.39	Pricing - Retailer issues	Large retailers more likely to adopt 'vanilla' tariffs. Mid-tier can take the more innovative tariffs (opt-in) - opportunity to test tariffs so we know the impacts	Ausgrid will continue to introduce innovative tariffs as part of its ongoing trials. In a competitive retail market retailers can innovate with their tariff offerings.
19.4	Pricing - Retailer issues	Fear that demand based products can be manipulated by "niche" retailer markets (e.g. Jack Green)	Ausgrid agrees and is cognisant of this concern. We also note the broader focus on retailer behaviour at present, eg, by the ACCC.

19. Pricing: Retailer issues(2/2)

Question ID	Theme	Question	Response
19.41	Pricing - Retailer issues	Where network fixed charges increase, customers will have visibility of this on retail bill (but may not have visibility of commensurate reduction in consumption due to retail component). This will be perceived customers as network prices going up.	Ausgrid is careful to explain that the fixed charge increases are off-set by corresponding revenue neutral reductions in variable charges, i.e., it will be much cheaper to use the network outside of the peak period, eg, it will be much cheaper to run air conditioners all night. this rebalancing will not affect the level of revenue recovered from residential customers in the short term and is expected to reduce it in the medium to long term due to the resulting efficiency benefits.
19.42	Pricing - Retailer issues	Large retailers may not pass through the 0-2MWh p.a. transitional safeguard mechanism (due to admin costs). Although likely to pass through for vulnerable customers holding concession card.	Ausgrid is investigating alternatives for addressing retailers concerns. This highlights the importance of working with stakeholders (including advocates and retailers)

19. Pricing: Tariff structure (1/9)

Question ID	Theme	Question	Response
19.43	Pricing - tariff structure	Conflict between consumer empowerment and fixed charge (via EE, solar, etc)	Ausgrid supports customer behaviour that reduces network bills when that behavioural change reduces network costs. If customers change their behaviour to reduce their network bill, but there is no resulting change in network cost, it will lead to inequitable outcomes. Indeed, in the presence of relatively high non-peak variable charges, customers experience bill reductions from reducing non-peak consumption, but there is a minimal reduction in our network costs. This is a key reason why Ausgrid is rebalancing away from non-peak variable charges.
19.44	Pricing - tariff structure	Provide a discussion around locational rebate	Evidence was produced on slide 41 (of Slide Pack 5 Tariff Deep Dive Presentation) on the regional variance in LRMC estimates. This further emphasizes that a locational price is more efficient than a network wide "smeared" price and locational rebates may be a more palatable way of achieving this. Ausgrid will continue to trial locational rebates and investigate innovative rebate programs as part of its research plan. Ausgrid acknowledges that rebates may be a helpful tool in addressing political resistance to widespread locational pricing.
19.45	Pricing - tariff structure	Provide discussion and details around how Ausgrid has undertaken allocation of residual cost	Allocation of residual costs is allocated by reference to tariffs contribution to peak demand (see slide 33 of Slide Pack 5 Tariff Deep Dive Presentation), and other relevant considerations eg, changes in customers numbers and trends in energy use.
19.46	Pricing - tariff structure	Demand tariffs should incentivise rather than penalise (rebates)	This can be explored in further detail in research program.

19. Pricing: Tariff structure (2/9)

Question ID	Theme	Question	Response
19.47	Pricing - tariff structure	Not having a kW tariff won't cut it	There is uncertainty as to the appropriate way to structure and measure a demand charging parameter and the corresponding implications on network diversity (and so future costs). In the context of this uncertainty, and the tripling of customers on a time of use tariff over the next five years (to +/- 900,000 in FY24), it would not be prudent to introduce a demand tariff without further research. This will be a key focus of the research plan. Ausgrid notes an opt-in demand tariff would be unlikely to attract those customers with peaky demand and so the likely benefits for reducing future costs would be limited.
19.48	Pricing - tariff structure	Consumer group tariff to be tabled before pricing deep-dive	Completed.
19.49	Pricing - tariff structure	Sceptical that customers accepted higher fixed charges (as stated in Slide 13). Questions were not put to Ausgrid in a balanced way. Did customers comment on demand/capacity charge?	Being considered further in research program.
19.50	Pricing - tariff structure	How can Ausgrid incorporate externalities (specifically carbon) in pricing? (Economic cost vs cost incurred by utility). Suggestion in volumetric component.	Ausgrid's proposed rebalancing will promote efficient investment in DER and encourage use of the network at times when renewable generation is more prevalent, ie, outside of the peak period.
19.51	Pricing - tariff structure	Tariff should not be technology specific - should just be based on profile at the meter (including two way flows).	Ausgrid's proposed reforms are technology neutral.

19. Pricing: Tariff structure (4/9)

Question ID	Theme	Question	Response
19.52	Pricing - tariff structure	The structure should seek to achieve both equitable cost recovery and influence efficient customer behaviour. These should be the two main objectives.	Ausgrid's proposed residual cost allocation methodology and tariff structures are consistent with promoting these objectives.
19.53	Pricing - tariff structure	PIAC supports a long term signal via peak demand charge implemented now (rather than TOU transition)	There is currently no consensus on the appropriate network price signal and this will be a key focus of the research plan. Further, the effects of potential demand tariff structures on diversity are not well understood and will be investigated in the research plan, ie, prior to implementing any demand tariff.
19.54	Pricing - tariff structure	There are concerns about any locational elements which disadvantage customers based on geography -(Note, PIAC doesn't support mandatory locational prices, but do support optional incentives/rebates for time and locational specific demand reduction).	Ausgrid is not introducing locational pricing for residential customers but will continue to trial locational rebates and investigate innovative rebate programs as part of its research plan. Ausgrid acknowledges that rebates may be a helpful tool in addressing political resistance to widespread locational pricing.
19.55	Pricing - tariff structure	Can Ausgrid incentivise location and time specific demand response outside of the tariff process? (e.g. Demand management)	Yes, Ausgrid runs trials and various demand management programs.
19.56	Pricing - tariff structure	Rather than increasing the fixed charge, Ausgrid should look to increasing the 2nd or 3rd block and keeping the fixed charge the same so as to lower impact (noting many vulnerable customers are within 2-6 MWh p.a. range) - Keep fixed charge the same? Need charts showing different options (including against CRT).	Ausgrid is currently considering alternative price levels for the second and third block.

19. Pricing: Tariff structure (5/9)

Question ID	Theme	Question	Response
19.57	Pricing - tariff structure	Why has Ausgrid moved to IBT with higher fixed? What is the underlying justification? Is this a CRP for dumb meters?	The HoustonKemp analysis identified that customer's demand is most responsive to changes in price at higher levels of consumption. A relative increase to the marginal price faced by high energy users will therefore elicit the relatively largest proportional reduction in a customers energy use. Further, the reduction in the price of the first block resulting from the introduction of an IBT assists in managing the customer bill impacts on low energy users of rebalancing away from variable charges and towards fixed charges.
19.58	Pricing - tariff structure	What is the relationship for allocation to volume and fixed components in IBT tariff? Does it assume relationship between kWh and kW?	The price of each block is determined such that, when combined with Ausgrid's consumption (kWh) forecast, it expects to recover the total efficient cost of providing network services to customers on the IBT, consistent with the requirements of the rules and as approved by the AER.
19.59	Pricing - tariff structure	Need to consider what the ultimate 'opt-out' tariff will be. PIAC - this should be an IBT with a high 3rd block.	New customers and customers that get a meter replacement will be assigned to the seasonal TOU tariff and can opt-out to transitional TOU tariff. As to the IBT, Ausgrid is currently modelling the customer bill impacts of increasing the price of the third block and reducing the price of earlier blocks.
19.6	Pricing - tariff structure	Need to consider transitional tariffs (proposed IBT) as complementary to the ultimate cost reflective tariff. How will the IBT perform as an opt-out tariff when the CRT is the default tariff? Will it encourage opt-out?	Ausgrid sets network prices such that the vast majority of customers on an non-TOU tariff (the IBT in the next regulatory period) will be better off on the TOU tariff. Further new customers and customers that get a meter replacement will be assigned to the seasonal TOU tariff and can opt-out to transitional TOU tariff.

19. Pricing: Tariff structure (6/9)

Question ID	Theme	Question	Response
19.61	Pricing - tariff structure	PIAC - do not see a case to increase fixed by ~80% by 2024.	Ausgrid's proposed rebalancing towards fixed charges will give rise to more stable network bills, promote efficient investment in DER, encourage use of the network when the marginal cost of using the network is very low and renewable generation is more prevalent and will minimise distortions to LRMC-based price signals, consistent with the requirements of the rules.
19.62	Pricing - tariff structure	PIAC - Recovering some residual in peak is ok to drive longer term outcomes	Recovering residual costs from a peak charge that exceeds the LRMC-based level will increase distortions to efficient price signals, as compared with fixed charges. PIAC proposed a monthly peak demand charge designed to recover all of Ausgrid's costs. This would give rise to significant bill volatility for customers. That said, Ausgrid is taking onboard PIAC's feedback and modelling such a tariff.
19.63	Pricing - tariff structure	PIAC has a preference for a transitional tariff composed of a fixed + volumetric + peak demand charge and slowly increasing peak and reduce volumetric over time (as opposed to Ausgrid preference at this stage to increase fixed and reduce peak and shoulder)	The effects of potential demand tariff structures on diversity are not currently known and will be investigated in the research plan, ie, prior to implementing any demand tariff.
19.64	Pricing - tariff structure	Ausgrid's approach to its transitional IBT tariff appears to be prioritising bill impact, while PIAC approach prioritises ability to respond to efficient price signals and enables greater certainty for longer term customer investment	Ausgrid's proposed rebalancing towards fixed charges will give rise to more stable network bills, promote efficient investment in DER, encourage use of the network when the marginal cost of using the network is very low and renewable generation is more prevalent and will minimise distortions to LRMC-based price signals, consistent with the requirements of the rules.

19. Pricing: Tariff structure (7/9)

Question ID	Theme	Question	Response
19.65	Pricing - tariff structure	Recovering via fixed costs is very simplistic (TEC) - takes away from customer empowerment - does not build narrative/trust	Ausgrid's proposed rebalancing towards fixed charges will give rise to more stable network bills.
19.66	Pricing - tariff structure	Consider a 'clever' voluntary demand tariff - this can have a high fixed charge and a high demand charge.	Ausgrid plans to develop innovative tariff structures as part of its research program and implement these structures in trials. Further, Ausgrid notes an opt-in demand tariff would be unlikely to attract those customers with peaky demand and so the likely benefits for reducing future costs may be limited.
19.67	Pricing - tariff structure	What is the purpose of the shoulder charge?	The shoulder charge can mitigate the risk of another peak in demand forming just outside the peak period. However, on the downside, it gives rise to inequities between adopters and non-adopters of DER and discourages the use of capacity (which customers are paying for) at times when the marginal cost of using the network is very low and renewable generation is more prevalent. Given the benefits of reducing the shoulder charge and the disadvantages of a higher shoulder charge, Ausgrid is proposing to materially reduce its shoulder charge.
19.68	Pricing - tariff structure	In previous AER decisions on TSS, AER allowed fixed charge increase, so long as did not encourage inefficient defection.	Prices that reflect both the nature (connection service) and level of Ausgrid's costs will avoid inefficient disconnection.

19. Pricing: Tariff structure (8/9)

Question ID	Theme	Question	Response
19.69	Pricing - tariff structure	Does Ausgrid consider bi-directional flows in LRMC/capex?	Bidirectional flows are at this time not a material concern for Ausgrid in the short term and so the administrative cost of accounting for the effect on costs in the calculation of LRMC outweighs the benefits. That said, Ausgrid is cognisant that this will become a material issue in the future and will revise its LRMC methodology accordingly in the future.
19.70	Pricing - tariff structure	Anytime demand charge not a good idea. Narrow demand window works better.	This appropriate design of a demand charge will be investigated further in Ausgrid's research plan. The design also depends on the objective of the demand charge, ie, is it to signals future costs, recover historical costs or both?
19.71	Pricing - tariff structure	Does Ausgrid anticipate TOU tariffs will create new peak by eliminating diversity? What are the diversity killers? When will it become a risk? In what areas? (noting this could prompt a TSS review)	Ausgrid's experience with TOU tariffs suggests the continuation of TOU tariffs in the next period will not adversely affect diversity. On the other hand, the effects of potential demand tariff structures on diversity are not currently known and will be investigated in the research plan, ie, prior to implementing any demand tariff.
19.72	Pricing - tariff structure	Consider shoulder charge to reduce risk of demand moving outside of peak but not impacting network costs (due to thermal inertia)	Ausgrid considers this risk to be low and outweighed by the risk of not reducing shoulder charges. Not reducing the shoulder price would result in inefficient investment in DER, inequities between adopters and non-adopters of DER, inefficient use of the network during shoulder periods and discourage use of the network at times when renewable generation is more prevalent (outside of peak times).

19. Pricing: Tariff structure (9/9)

Question ID	Theme	Question	Response
19.73	Pricing - tariff structure	Ausgrid states that "there is no benefit to Ausgrid to increase fixed charge". Challenge that this is the case as there is a business incentive to have a stable fixed charge.	The commercial implications of changes to Ausgrid's pricing were not considered in the development of its proposed pricing reforms. Indeed, this would be contrary to the requirements of the rules and, notwithstanding, any such benefit would be limited under a revenue cap form of control.
19.74	Pricing - tariff structure	Would rebate work better than a safeguard tariff? Further discussion with retailers needed.	Ausgrid continues to engage with retailers in relation to safeguard and transitional measures and the potential to address customer bill impacts using rebates.
19.75	Pricing - tariff structure	There are other mechanisms to return the safeguard which should be explored	Ausgrid is investigating the potential use of rebates, alternative block definitions and tariff eligibility criteria to avoid unacceptable customer bill impacts. Ausgrid is also investigating the potential to re-open the eligibility criteria for any such mechanisms during the regulatory period if it identifies potential improvements as part of its research program.
19.76	Pricing - tariff structure	What are the block thresholds and can these be adjusted? (More volume in the 3rd block.)	The block thresholds are quarterly consumption of 1,000 kWh and 2,000 kWh, ie, Block three is applied to quarterly consumption above 2,000 kWh.
19.77	Pricing - tariff structure	Is Ausgrid looking at slowly increasing fixed?	Ausgrid is investigating potential alternative rates of rebalancing between variable and fixed charges, although the current low cost of capital and recent reductions in Ausgrid's costs present a unique opportunity to increase the rate of transition to cost reflective prices.

19. Pricing: Transition to cost reflective tariffs (1/2)

Question ID	Theme	Question	Response
19.78	Pricing - Transition to cost reflective tariffs	CCP - Will argue for mandatory cost reflective pricing for new connections	All new customers will be assigned to a seasonal time of use tariff, with the option to opt-out to a transitional TOU tariff.
19.79	Pricing - Transition to cost reflective tariffs	How fast can Ausgrid get to cost reflective pricing? And why has this fast tracked approach not been selected?	As noted in the stakeholder pricing principles, the end-point is unclear and will likely be ever-changing. Ausgrid's rebalancing away from variable charges and towards fixed charges reflects a significant step in its transition to cost reflective pricing for the recovery of residual costs. It is also consistent with any future transition to capacity or demand charges as a means for recovering residual costs, consistent with the stakeholder pricing principles.
19.80	Pricing - Transition to cost reflective tariffs	When cost of capital increases it will be more difficult to implement tariff reform. (Tariff reform is easier when network costs are falling.) How will Ausgrid address this?	Ausgrid is fast-tracking its transition towards cost reflective pricing in relation to the recovery of residual costs and implementing a research plan to identify the appropriate next steps for signalling future costs. It is also investigating the potential to build into its TSS triggers that would enable it to implement more cost reflective prices during the next regulatory control period, ie, to re-open the TSS.
19.81	Pricing - Transition to cost reflective tariffs	How fast should Ausgrid go? How will AER/Ausgrid judge this? (Noting that technology uptake forecasts are critical input)	Ausgrid evaluates the benefit to consumers of more cost reflective pricing (lower future network costs) against short term customer bill impacts arising from improvements in cost reflectivity.

19. Pricing: Transition to cost reflective tariffs (2/2)

Question ID	Theme	Question	Response
19.82	Pricing - tariff structure	How does Ausgrid expect to reach full CRP (+benefits) by 2027 as identified in the CSIRO/ENA Energy Networks Transformation Roadmap	Ausgrid is fast-tracking its transition towards cost reflective pricing in relation to the recovery of residual costs and implementing a research plan to identify the appropriate next steps for signalling future costs. It is also investigating the potential to build triggers that would enable it to implement more cost reflective prices during the next control period, ie, to re-open the TSS.
19.83	Pricing - tariff structure	Ausgrid needs to be very clear about long-term direction	Ausgrid is implementing a research plan to be developed collaboratively with stakeholder to identify the appropriate direction for future reform, both in the long and short term.
19.84	Pricing - tariff structure	What are the expected tariff migrations over the regulatory period?	Ausgrid forecasts that the number of customers on a TOU tariff will increase by 100,000 customers per annum over the next five years.
19.85	Pricing - tariff structure	Why target large customers (over other customers) to shift to CRP? This seems to be the intent of the IBT. (Note that higher price elasticity for large customers was demonstrated by the Houston Kemp study)	The HoustonKemp analysis identified that customer's demand is most responsive to changes in price at higher levels of consumption. A relative increase to the marginal price faced by high energy users will therefore elicit the relatively largest proportional reduction in a customers energy use.
19.86	Pricing - tariff structure	Concern about existing customers slowly exposed to price rises to encourage switch to cost reflective tariff, essentially "boiling the frog alive" for customers unable or not sufficiently informed to switch	Ausgrid takes this into account when determining the extent to which its non-TOU tariff is, for most customers, more expensive than the TOU tariff. Ausgrid has no plan to perpetually increase the price of the non-TOU tariff due to the customer bill impacts and inequitable outcomes that would arise from doing so.

20. General approach to presentation of information (1/6)

Question ID	Theme	Question	Response
20.01	General approach to presentation of information	Need to understand breakdown and trends before we can decide whether support costs need deep-dive (before deep-dive)	Ausgrid provided stakeholders with a table providing expenditure trends by expenditure category for the previous, current and forthcoming regulatory control periods on 6th February 2018, following the capex opening session and prior to the capex deep dives. The table was updated with AER allowances (upon stakeholder request) and included in a slide in capex wrap session on 21 February 2018 (slide 5 in Slide Pack 4 Ausgrid 1924 Capex Wrap Workshop v2).
20.02	General approach to presentation of information	See Endeavour table as an example of tool used to communicate cost breakdowns	Refer to response to Question ID 20.01.
20.03	General approach to presentation of information	What is counter-factual for all expenditure? Can this be expressed from a customer's perspective?	Ausgrid endeavoured to provide stakeholders with the counterfactual for key categories of expenditure during the deep dive sessions. This is expressed quantitatively to the extent possible and qualitatively where we currently do not have the data or information required to undertake this analysis. For major repex and augex projects, the quantified risk value of the 'do nothing' approach is used explicitly to drive the timing for the triggers for investment.
20.04	General approach to presentation of information	How does expenditure link to prices - dollars per bill?	Ausgrid endeavoured to provide stakeholders with the pricing impacts for key categories of expenditure during the deep dive sessions. This is expressed in terms of the revenue impacts, which is then translated to a $ per annum impact for an average customer bill (compared to 'do nothing'), and, where the expenditure represents a price increase, the % increase for an average customer between regulatory control periods.

20. General approach to presentation of information (2/6)

Question ID	Theme	Question	Response
20.05	General approach to presentation of information	Provide one example from each major Capex category	Ausgrid endeavoured to present an example for each major expenditure category in the Capex Deep Dive 1 (see Slide Pack 2b, 2c, 2d, 2e and 2f) and Capex Deep Dive 2 (See Slide Pack 3 Ausgrid 1924 Capex Workshop 3 Consultation Final). The examples were selected based on their materiality (with respect to overall expenditure in that category).
20.06	General approach to presentation of information	Expenditure vs outcomes (business case) should be provided for all investments (e.g. price impacts vs reliability improvements)	Ausgrid endeavoured to provide stakeholders with the business case for key categories of expenditure during the deep dive sessions. The business case in terms of price impacts compared to benefits was presented qualitatively where possible, and qualitatively where we currently do not have the data or information required to undertake this analysis. For major repex and augex projects, the quantified risk value of the 'do nothing' approach is used explicitly to drive the timing for the triggers for investment.
20.07	General approach to presentation of information	Need reasonable explanations for $	We understand that this comment relates to the need to provide a clear explanation (quantified where possible) of the business case for all expenditure. We have endeavoured to address this in our deep dive sessions and in our regulatory proposal. Refer to attachments 5.13, 5.14, 5.16, 5.19 and 5.21 for project justifications and business cases for various capex categories.
20.08	General approach to presentation of information	What have customers told us that they want?	We understand that this comment relates to whether Ausgrid has explicitly asked customers what they value and the need to justify all expenditure in terms of this value. In our Foundation Consultation and Extended Stakeholder Consultation customers told us that: - Overwhelmingly they want us to improve affordability as the highest priority - They value long term price stability - They value reliability and the importance of a reliable supply especially to business customers, but that we should only seek to maintain rather than improve reliability - They seek an improved customer experience through easier access to data and information - They expect Ausgrid to support the transition to a low carbon economy.

20. General approach to presentation of information (3/6)

Question ID	Theme	Question	Response
20.09	General approach to presentation of information	What value is Ausgrid providing to customers?	We understand that this comment relates to the need to link proposed expenditure to the value delivered to customers (consistent with customer feedback on what they value). We have endeavoured to provide this link in our extended stakeholder consultation program as well as within our regulatory proposal.
20.10	General approach to presentation of information	Why are we spending? Need to provide justification	See 20.07 above.
20.11	General approach to presentation of information	There is a need to present the business case from customers' perspective	See 20.06 above.
20.12	General approach to presentation of information	"Clarify" improved customer experience	In our opening capex session we stated that we have responded to feedback to date by "improving customer experience". This relates to making data and information about our network easier to access and understand through various initiatives such as Investing in a new digital customer strategy and streamlining customer complaints process. We recognise that our customer base is diverse and continue to evolve both our digital and traditional platforms for customer engagement to reflect this diversity.
20.13	General approach to presentation of information	SCD does not provide enough detail in terms of $/volume etc	Since the publication of the stakeholder consultation document, we have provided stakeholders with a detailed breakdown of our expenditure. See questions 20.01 above.

20. General approach to presentation of information (4/6)

Question ID	Theme	Question	Response
20.14	General approach to presentation of information	Use of tools (Zeeting) to capture stakeholder views may not be statistically significant	We had initially proposed to use the Zeeting tool to engage with stakeholders during the extended stakeholder consultation program and capture views with respect to certain decisions. However, we agree with stakeholders that the views captured were not going to be useful given their statistical significance and that more meaningful feedback could be obtained during discussions. We therefore did not use the Zeeting tool after the Opening session.
20.15	General approach to presentation of information	Monitoring of consultation outcomes should be assessed against indices	Ausgrid does not have any formal indices against which our stakeholder consultation program will be assessed. The effectiveness of our Extended Stakeholder Consultation program will be measured against the objectives (presented to the AER) including: - To ensure ongoing engagement that helps us align our business planning, policies and practices with the expectations of our customers; - To constructively build on what we have already learnt from our stakeholders and customers to ensure truly collaborative outcomes and avoid any surprises when the proposal is submitted to the AER; - To keep our stakeholders both informed and heard, so they can continue to influence our strategic priorities and; - AER acceptance of our regulatory proposal. Ultimately the effectiveness of the consultation program will be measured in terms of improved satisfaction to customers via our quarterly customer satisfaction survey.
20.16	General approach to presentation of information	Consultation outcomes aligned to strategic objectives - why? (need to provide link between consultation outcomes and broader objectives)	Ausgrid's FY18 Strategic Priorities include a priority to become customer focussed. The stakeholder consultation program underpinning our regulatory proposal is a critical component to ensure customers are central to our decision making process. The desired outcomes (as per 20.15 above) link to this strategic objective.

20. General approach to presentation of information (5/6)

Question ID	Theme	Question	Response
20.17	General approach to presentation of information	Transparency with respect to models is important (street lighting working well)	As a result of providing greater transparency in our modelling of street lighting, we have improved our relationship with stakeholders as well as lower cost outcomes for our local government customers. Transparency is a core principle of our Reset Engagement and Empowerment Framework and we are seeking to share model and model outputs where possible.
20.18	General approach to presentation of information	Bill shock should be number one risk (affordability)	We recognise that stakeholders view affordability as the primary issue which our regulatory proposal and business more broadly must address. Accordingly we understand that any network bill shocks (unless downwards!) will have an unacceptable impact on our customer base, already deeply affected by recent price rises in their overall bill. We have communicated this view in our regulatory proposal.
20.19	General approach to presentation of information	Stability does not equal affordability	Some of our earlier consultation documents suggested that price stability and affordability was of equal importance, but we understand affordability to be the key concern of our customers. More recent stakeholder consultation documents and our regulatory proposal make this clear.
20.20	General approach to presentation of information	Review of pricing impacts presented and the logic underpinning. Consider providing table showing price impact per dollar of capex via asset categories (long lived network assets, ICT etc)	The pricing impacts presented in deep dive session showed the impact by capex category/program and/or project in terms of the total revenue required in the forthcoming regulatory control period, the average revenue required per customer and, where this represented an increase since the previous period, the %change in bill for an average customer. Since the majority of capital expenditure is recovered over a long period, the bill impacts for the regulatory control period were relatively small. To provide further context, in the capex closing session, (Slide Pack 4, slide 4 Ausgrid 1924 Capex Wrap Workshop) we presented the contribution of 2019-2024 capex to the total revenue requirement.
20.21	General approach to presentation of information	How is Ausgrid using both digital and traditional communication methods (both are important).	See response to question 20.12 above.

08

Session Presentations

8.1

Opening Extended Consultation session 1 February 2018

Ausgrid's Extended Stakeholder Consultation Program

Opening session Stakeholder Consultation Document

1 February 2018

Session purpose

PURPOSE

Today's workshop will provide you with an **overview of each chapter of our Stakeholder Consultation Document**, which covers the key elements of our 2019-24 Regulatory Proposal.

Our purpose today is to:

- **"Hear your voice"** in an open and transparent discussion on the topics covered in the Stakeholder Consultation Document

- Understand how to further "**empower you**" to question our Regulatory Proposal.

Today's session provides a high level overview. More detailed data will be provided during deep dive sessions, which have been scheduled this month.

Session guidelines

GUIDELINES

1. Session starts at 11:00 am, finishes at 4:30 pm with a one-hour-lunch break and a 15 min afternoon break

2. Guided by the **principles of the Ausgrid Reset Engagement & Empowerment framework** (i.e. “Accountable and transparent”, “Fair and reasonable”, “Respectful and Collaborative”)

3. Structured around the various topics covered in our Stakeholder Consultation Document, with questions to seek your views and issues to inform our proposal and upcoming deep dive sessions

4. We encourage you to **participate** within the sessions by:
   - Asking any questions of **clarification** to help inform your view
   - Telling us where **information is missing** or where you require more detail to inform your views
   - Providing **your views** on the questions posed
   - Providing your feedback with respect to any **other matters**

   We may park questions/ issues to be addressed either in the deep dives or off line sessions.

5. We will use the **Zeetings App** to gather some answers. When prompted, you will need to access the Zeetings page (https://www.zeetings.com/Consultation) and will be able to vote using your mobile device.

CEO Opening

Richard Gross

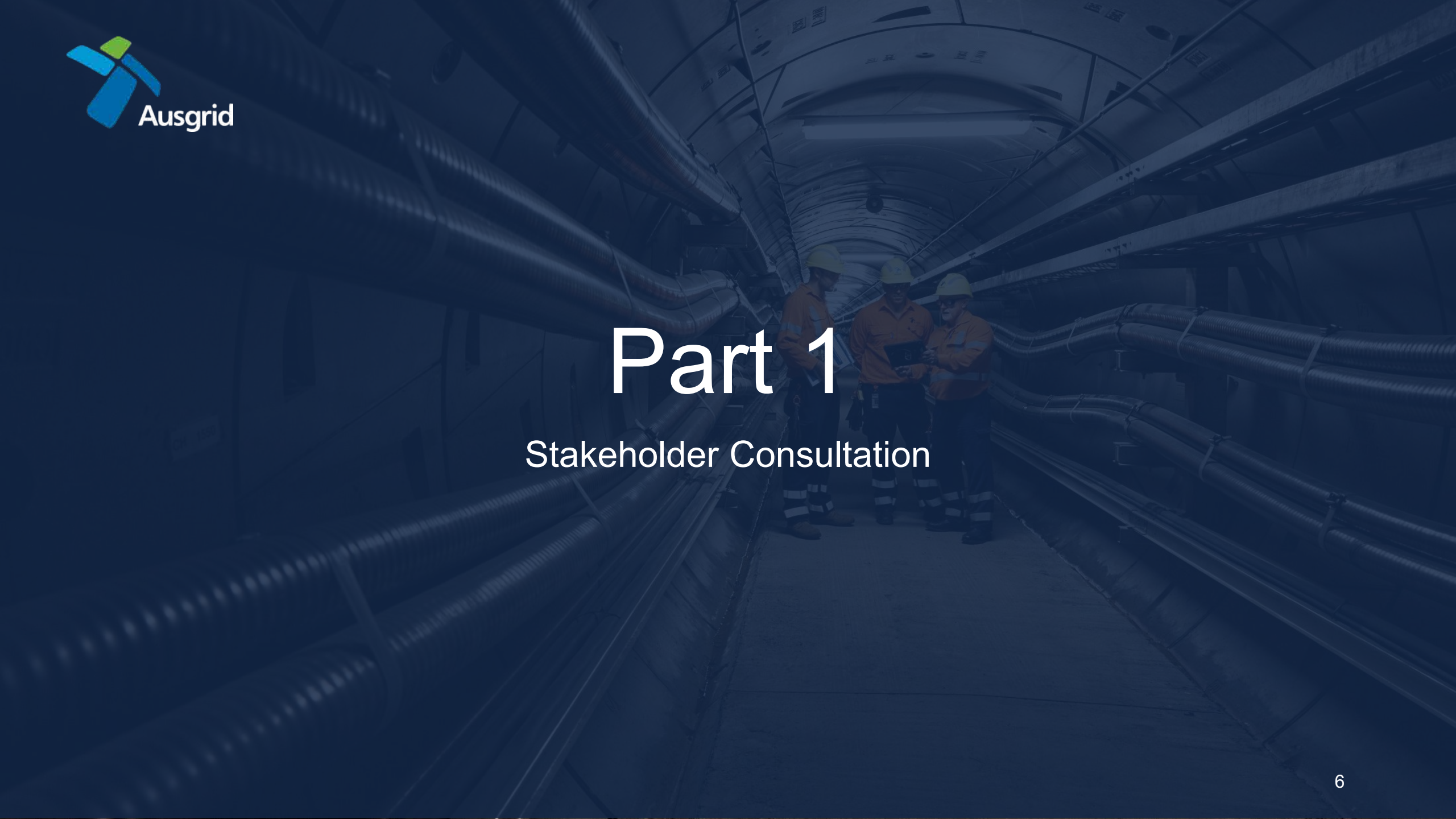
Participant introduction and expectations

Please go to:

https://www.zeetings.com/Consultation

Participant introduction

- Your name
- Your company



Part 1

Stakeholder Consultation

Consultation questions to consider

- Do you think our approach to engagement will allow concerns from all stakeholders to be raised?

- What else could Ausgrid do to seek input from customers and stakeholders?

Consultation undertaken to date

We have engaged with more than 2,500 customers through our research program, and ongoing consultation

Customers	Customer Consultative Committee (CCC)	Local Government	Retailers	Other Stakeholders
Customer at the Centre Program. We asked customers what they want from the network, **their knowledge and attitude to electricity, what they expect of Ausgrid** and how we could become a more customer-centric business	The CCC and RWG helped Ausgrid to map out the framework **of principles and key criteria to guide the development of our 2019-24 proposal.** We tested details of our regulatory proposal and Tariff Structure Statement with the CCC and RWG	We met with councils to discuss the transition to energy efficient **LED lighting**, and to better balance network reliability requirements and community expectations of **vegetation management**	We met with retailers to discuss how we plan to **structure our prices** and how our plans might impact them	We tested ideas for **encouraging customers to use technology like solar panels and batteries**, to help us manage peaks in demand

What we have heard so far from our customers and stakeholders

Education - Greater focus on educating the public

Sustainability – We are Supportive of solar, renewables and new energy technology

We are concerned about **reliability** and energy security

Street Lighting - Reduce energy bills and carbon emissions through the transition to LED lighting

Safety should be a continuous point of emphasis

Vegetation - Reduce clearances and improve canopy cover in non-bush fire areas

Improve **Customer Service**

Affordability – We are concerned about high prices and 'bill shock'

Fairness – We are looking for a fee structure that is fair and equitable

What customers expect of Ausgrid

- Raise its profile
- Provide information to help people take control of their energy bills
- Be efficient and keep costs down
- Monitor new technology and global best practice
- Proactive real-time information about outages
- Incentives solar/renewables/ sustainability
- Underground powerlines
- Partner with businesses

Key issues raised by our customers and stakeholders

Reliability

A fundamental expectation and a particular concern for business

Safety

Should be a continuous point of emphasis

Fairness

Stakeholders are looking for a fee structure that is fair and equitable

Education

Greater focus on educating the public

Affordable

Customers and stakeholders top priority for Ausgrid

Sustainability

Renewables and New Energy Technology

Street Lighting

Reduce energy bills and carbon emissions through the transition to LED lighting

Vegetation

Reduce clearances and improve canopy cover in non-bush fire areas

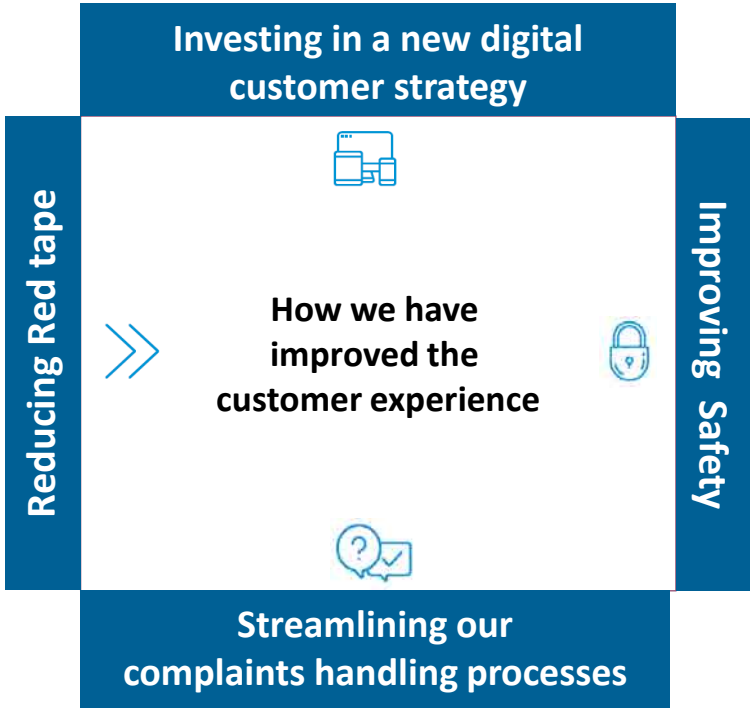
Customer Service

With the assistance of our customers and stakeholders, we now have a better understanding of what's important to our customers and how we can serve them better

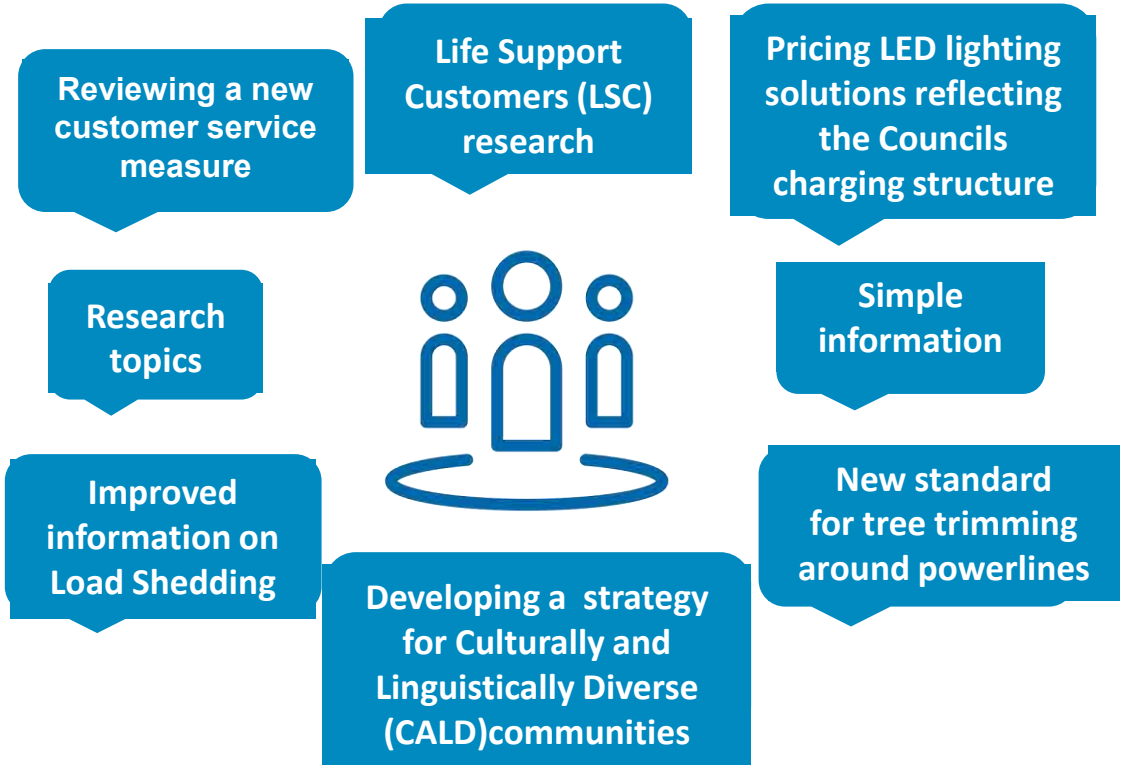
How we have responded so far to what we heard

We have worked with the CCC and Local Government to improve how we understand and communicate with customers

1 Improving customer experience



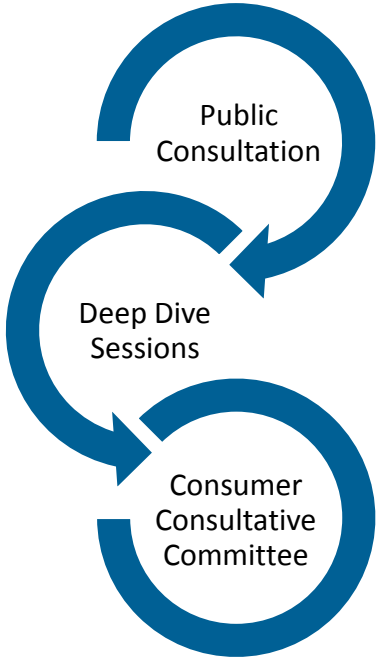
2 Changing the way we engage with customers



Identified risks and benefits for customers from our proposal

Benefits for customers…	…and how we will achieve them
Improved **affordability**	Lower total network costs
Vulnerable customers will be assisted - **Affordability**	Safeguard pricing for vulnerable low use customers
Improved customer experience through easier access to the information they need – **Customer Focus**	Focus on customer service and engagement and our digital customer strategy
Network price stability - **Affordability**	Sustainable network investment over the long term
Maintain **reliability**	Focus on investment that improve reliability and provide best value for customers
New uses for the network: distributed energy resources, selling energy, trading, demand management - **Sustainability**	Focus on future use of the network and invest to meet the changing needs of customers
Risks for customers…	**…and how we will manage them**
Pace of industry change means the assets we build tomorrow may not be right for the future - **Reliability**	Use demand management and innovative solutions rather than building new or replacing assets where feasible
Power outages due to loss of upstream supply or damage/ fault on our network - **Reliability**	Replace aging parts of the network and those in poor condition at the right time
Cyber attacks compromising the security of the network and potential loss of data - **Reliability**	Invest in cyber security measures to protect the network consistent with critical infrastructure requirements
Bill shock - **Affordability**	Use sustainable investment and pricing transition strategies

Consultation timeframe



Key outcomes from our consultation program will be complied into an **Extended Consultation Document** to highlight what we have heard

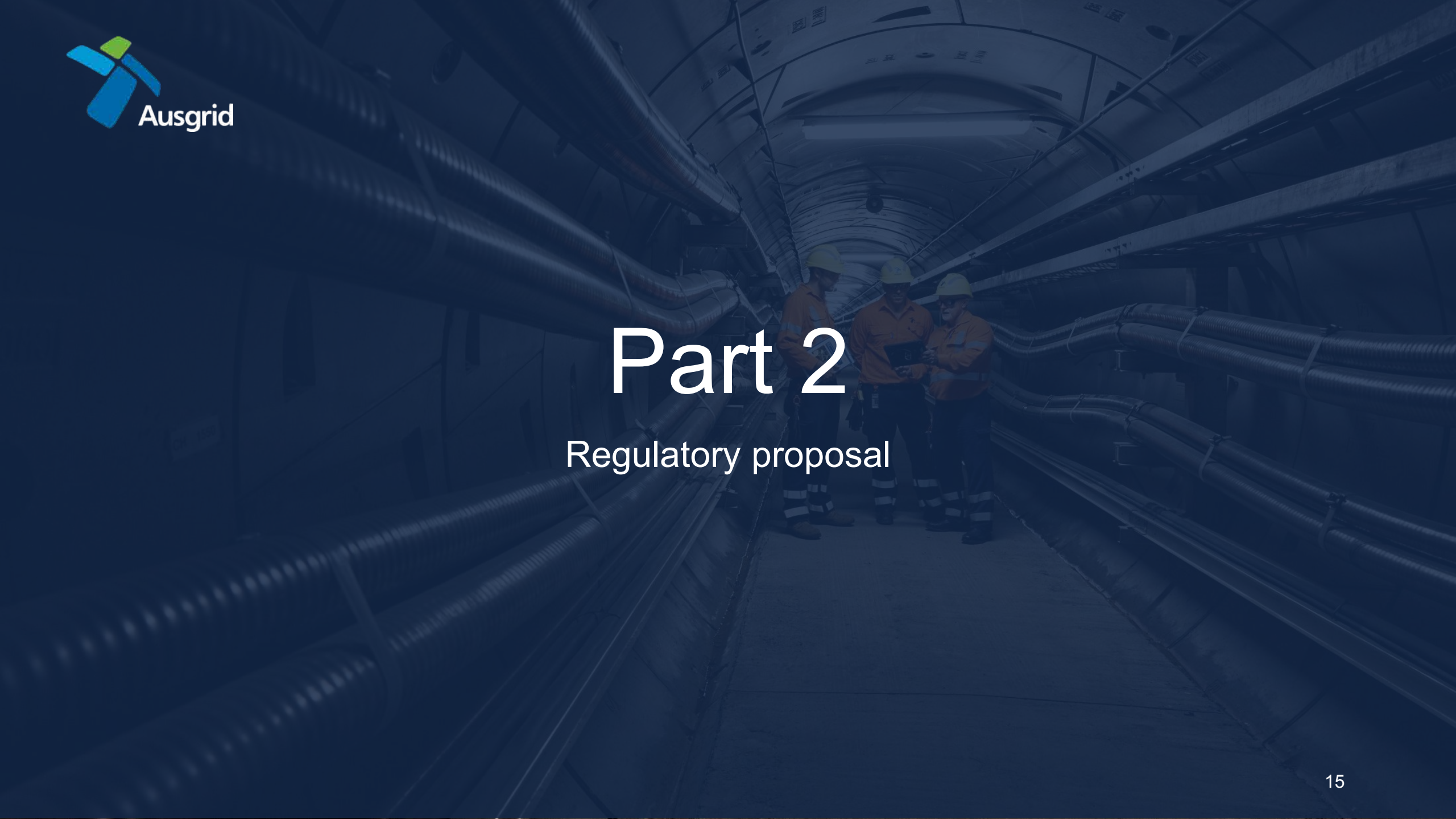
Timeline	
Jan 2018	Distribute Stakeholder Consultation Document to CCC members and other key stakeholder groups
	Release Consultation Draft on Website
	CCC meeting with additional stakeholders, to review the Stakeholder Consultation Document
Feb 2018	Capex Deep Dive Workshops
	Pricing Deep Dive Workshop
	Full CCC meeting to present Extended Consultation Summary Report The Future of Energy Networks session
Mar 2018	Meetings with key business groups
April 2018	Submit 2019-24 Regulatory Proposal to AER
Oct 2018	Draft Determination released by AER
Nov 2018	CCC meeting to consider Ausgrid's Revised Regulatory Proposal
Dec 2018	Revised Regulatory Proposal submitted

Consultation questions to consider

- Do you think our approach to engagement will allow concerns from all stakeholders to be raised?

You can share your view on Zeetings.
https://www.zeetings.com/AusgridSCD

- What else could Ausgrid do to seek input from customers and stakeholders?



Part 2

Regulatory proposal

OUR ROLE IN A CHANGING ENVIRONMENT

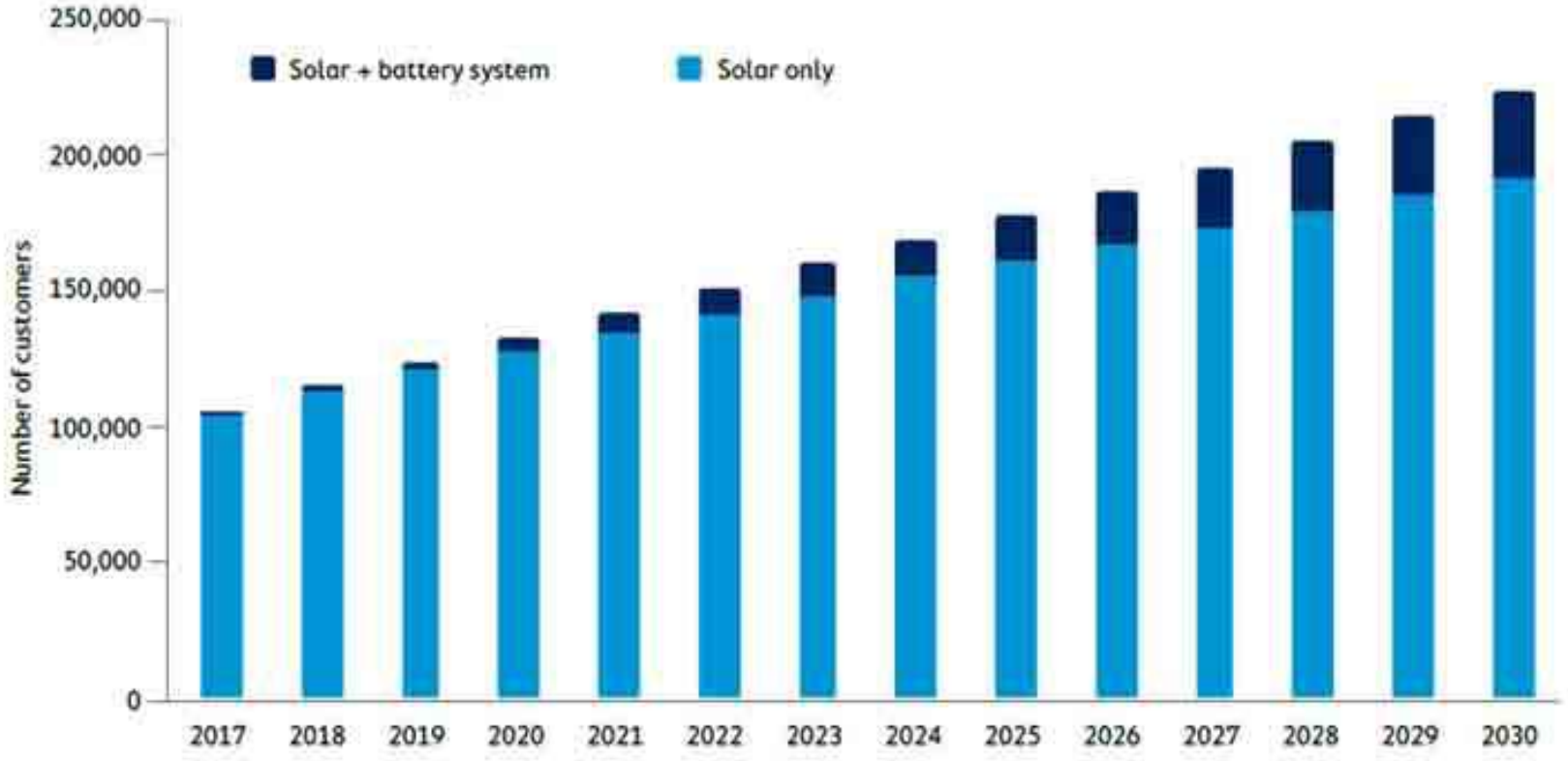
Consultation questions for us to consider

- What do our customers need and expect from us in a changing world?

- What actions can we take over the next five years to put us on the right path to delivering services that our customers want at a price they are willing to pay?

Growth in Solar and Battery uptake

Number of customers with small scale solar and battery systems



Costs of solar panels and batteries coming down.

A **doubling of customers** on the Ausgrid network with solar and battery systems is expected in 2017-30 period.

We are already making solar easier by:

- Lowering connection costs
- Fast & Simple connection process
- Trialling micro grids.

Our role in changing energy market

Changing interests:

- Solar power
- Home battery storage
- Solar hot water
- Home Energy systems
- Home Monitoring Usage and costs
- Electric vehicles

How we are addressing the changing role of the consumer in the longer term

- Increasingly operate grid with **two-way energy flows**
- Transform our passive distribution network into an **inter connected 'smart-grid'**
- Support an energy mix with high proportion of **renewables**
- Invest in **grid technology** to enable customers sell locally generated power

How we are addressing the changing role of the consumer in our proposal (next five years):

- Systematic consideration of **Demand Management** for all major augex and repex projects
- Investment in **Advanced Demand Management System**
- Introduction of more cost reflective prices

Interaction slide

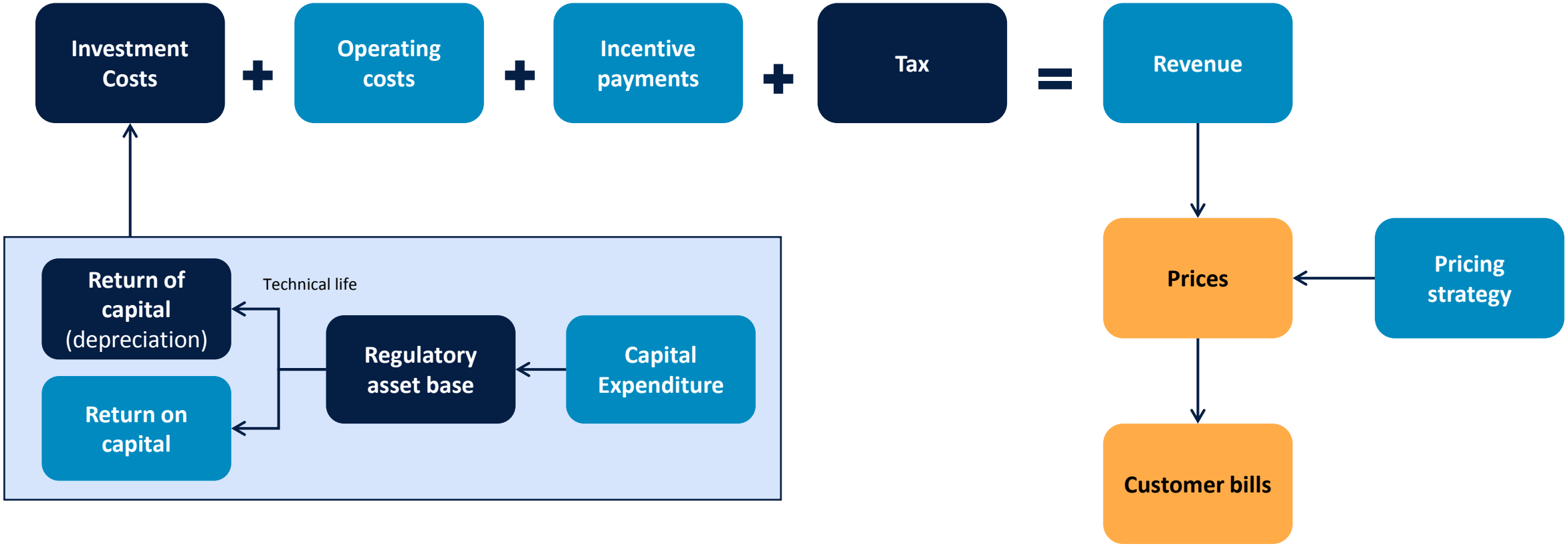
- What do our customers need and expect from us in a changing world?

- What actions can we take over the next five years to put us on the right path to delivering services that our customers want at a price they are willing to pay?

KEY COMPONENTS OF OUR REGULATORY PROPOSAL

Our regulatory proposal

Key components of our proposal and how they fit together



CAPEX

Consultation questions to consider

- Do you agree with our rationale for capex? If not, why?
- Do you agree with the trajectory of our capex forecasting? If not, why?
- Do you agree with the commitment to invest in ADMS?

Our rationale for capex

We are taking a new approach to capex to make sure we get the best outcomes for customers.

1

We plan to invest **only when there is clear value to customers**. Our replacement programs carefully target expenditure on assets that ensure the safety of our staff/customers and mitigate reliability risks.

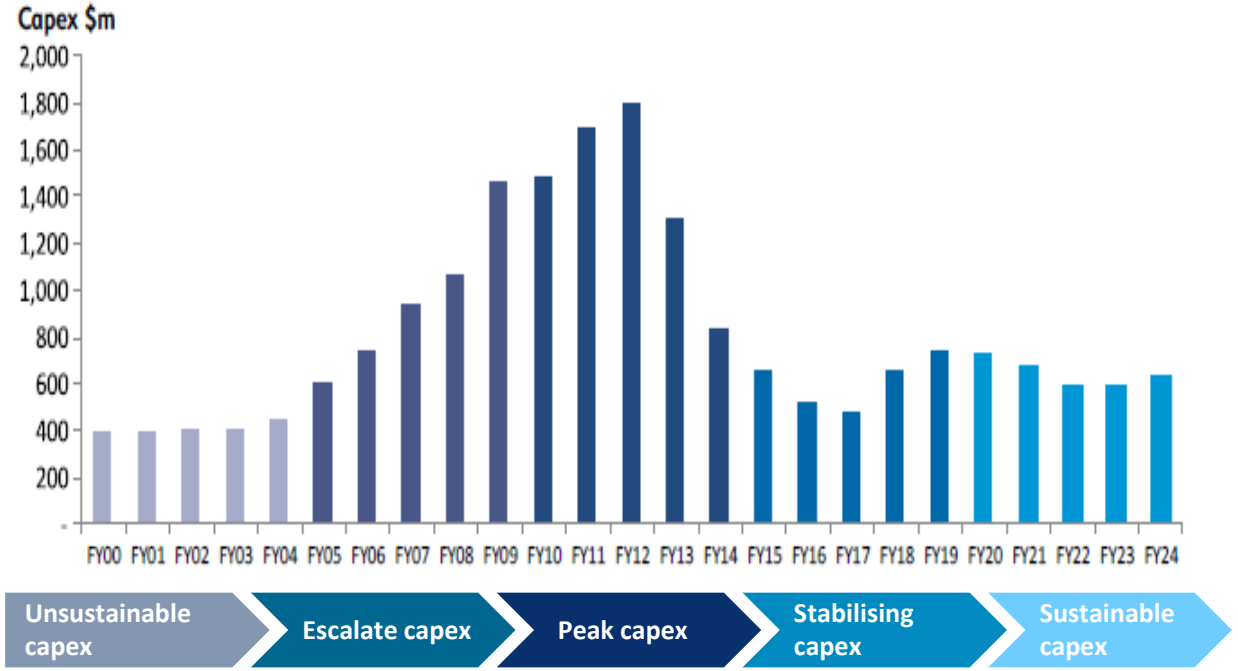
2

Rather than simply building more infrastructure, we are looking first at where **new technology, innovation and partnering** with other companies and our customers will **solve the problem at a lower cost.** This includes demand management solutions.

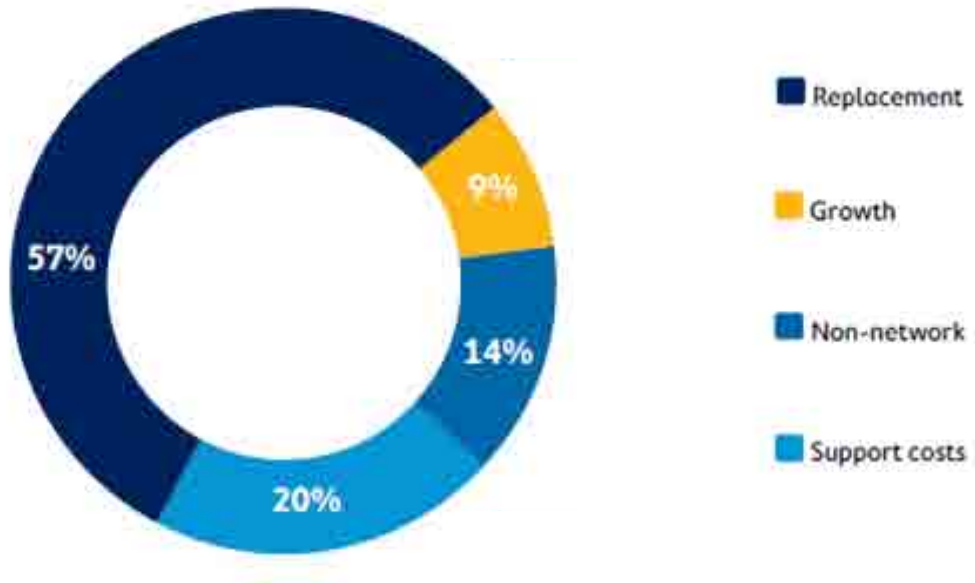
Our capex forecast for 2019-24 is between $3.2 billion to $3.5 billion (real, FY19)

We aim at renewing our ageing distribution network and preparing for the future grid (ADMS, Cybersecurity)

Ausgrid's capex between 2019 and 2024 ($m, real 2019)



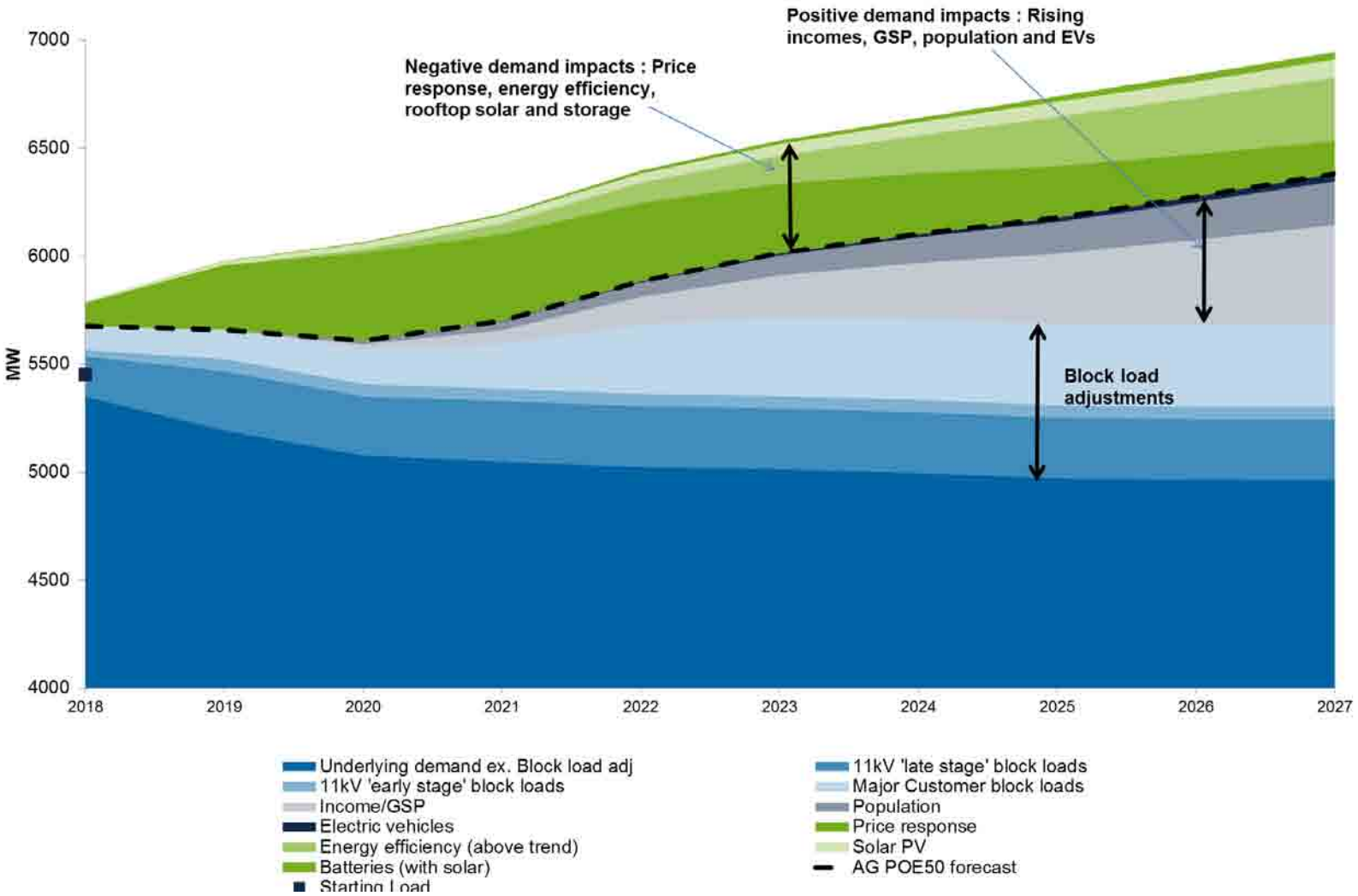
Breakdown of Ausgrid's forecast capex by AER categories 2019-2024 (%)



After a few years of peak capex, we are achieving a more sustainable capex level in this period thanks to the results of major transformation programs in the previous period.

Most capex will be on replacing assets. Almost a quarter (24%) of our assets are over technical life (50 years old). We have a relatively low level of growth capex compared to long-term trends. Our non-network capital expenditure for IT, property and fleet is relatively consistent with those trends.

Electricity Demand Forecasts



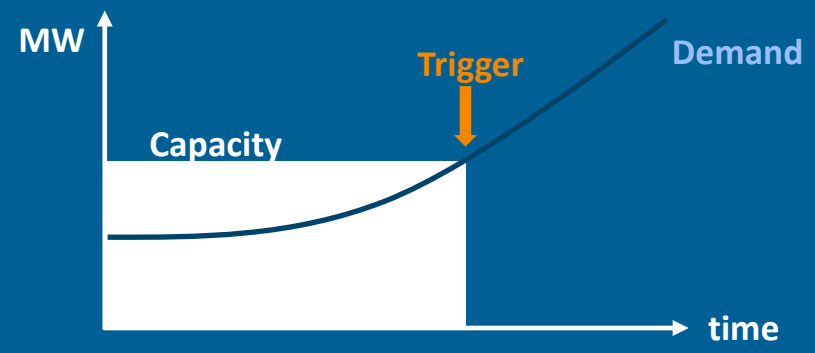
- Peak demand to increase by 1.6% per year between 2019 and 2024
- Price response to recent and near term prices rises forecast to reduce demand by 400 MW
- 40% of zones with forecast growth in summer in next 5 years. Down from 60% in 2016
- Growth skewed to Sydney South region associated with new customer connections to 11kV network.

Approach to Decision Making

Deterministic (linear)

Investment triggers where **explicit limits** are exceeded, such as Network Capacity

Preferred options are developed at least cost and incorporated into a broader planning strategy, developed to address the emerging network needs.



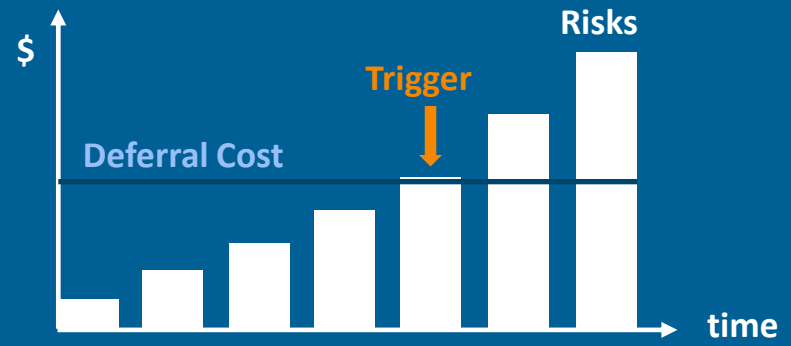
Asset condition drivers are explicitly defined based on age and condition reports and prioritised according to severity

Probabilistic (recursive)

Network risk is quantified according to:

- Asset Condition – rate of failure and restoration time
- Network Capacity
- Quality and Security of supply

Preferred options are developed with optimised timing determined using a **cost vs benefit** analysis



Key Network Capital Projects

Advanced Distribution Management System ADMS

Concord Zone Substation 11kV Switchgear Replacement

Castle Cove - Mosman 132kV Cable Replacement

Poles
4% of Ausgrid's 440,000

Underground Cables
2% of Ausgrid's 15,000km

Switchgear
5% of Ausgrid's 139,000

Overhead Conductors
4% of Ausgrid's 25,000km

Macquarie Park Substation Augmentation

Roselle Subtransmission Substation Upgrade

Powering Sydney's Future

Interaction slide

- Do you agree with our rationale for capex? If not, why?

You can share your view on Zeetings.
https://www.zeetings.com/AusgridSCD

- Do you agree with the trajectory of our capex forecasting? If not, why?
- Do you agree with the commitment to invest in ADMS?

OPEX

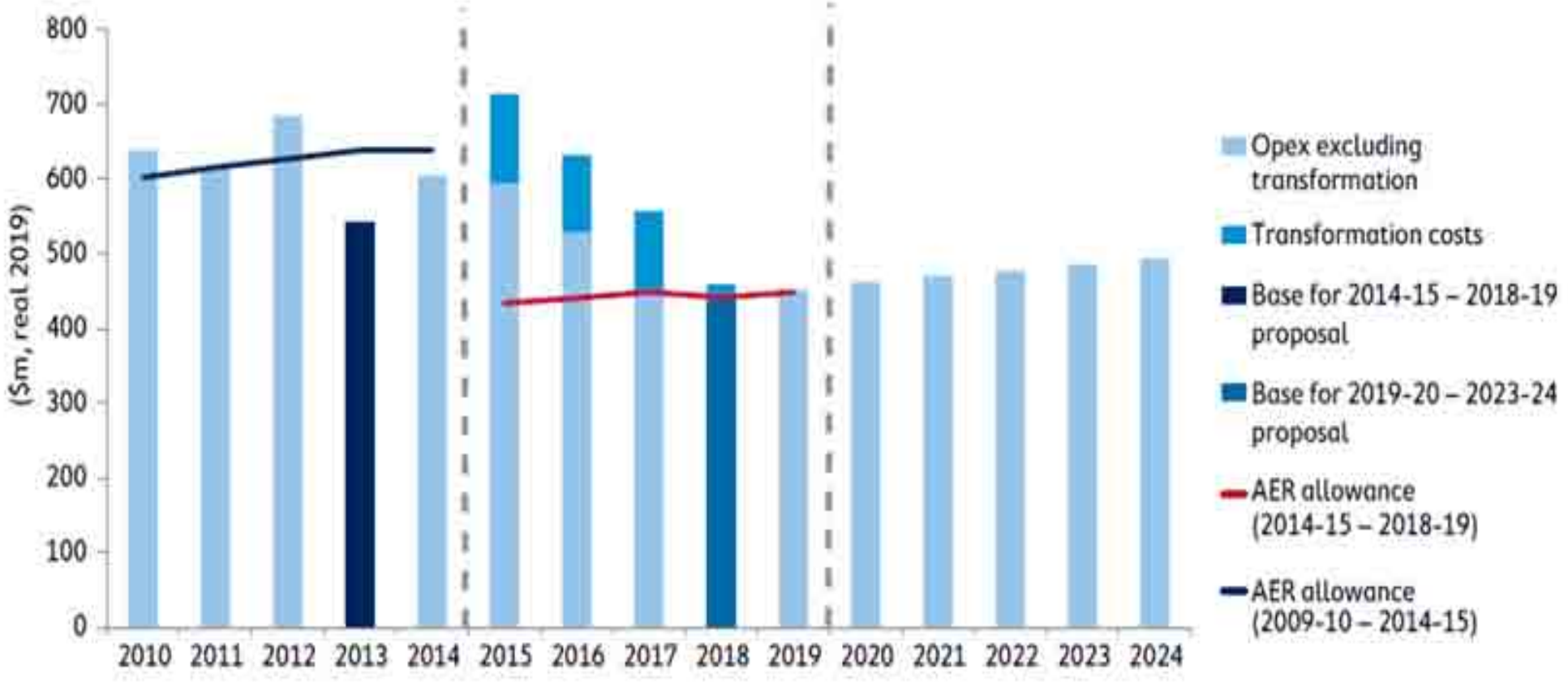
Consultation question to consider

- Do you think we have applied an appropriate approach to forecasting the opex we need over the 2019-24 period? Why/Why not?

Key facts - Our performance from 2014-2019

Affordability is a key issue for our customers and we are working hard to achieve sustainable operating cost reductions

Actual and expected opex 2009-10 to 2023-24 (in real FY19 terms)



We have invested **$330m in right-sizing our operations.**

Compared to our last proposal, we have **reduced our operating cost base by over $100m or 19%.**

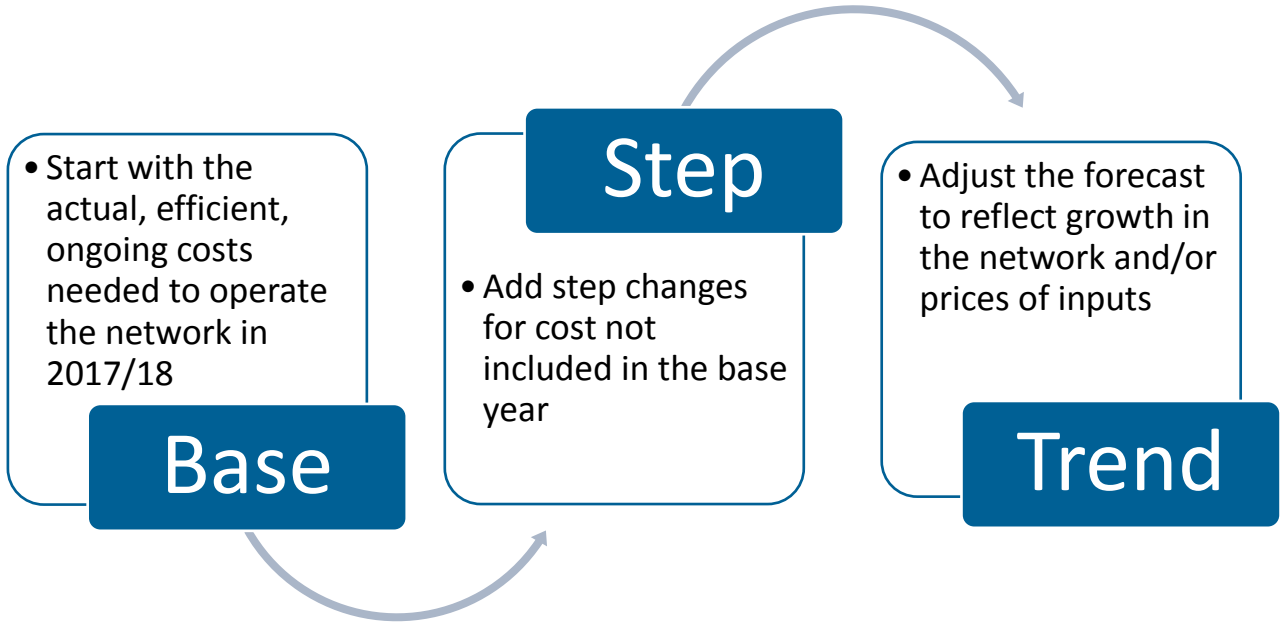
Every dollar spent on our transformation program will deliver 5 dollars of opex savings to customers.

Ausgrid

Rationale - We forecast our opex using the base-step-trend approach

Opex funds the day-to-day operations needed to keep power flowing to our 1.7 million customers.

We follow a Base/Step/Trend approach



Adjustments to the base year opex

Step Change: Funding to repair the network when it is damaged by third parties (e.g. car hitting a pole) who cannot be identified

($5 million per year)

Step Change: Demand Management projects

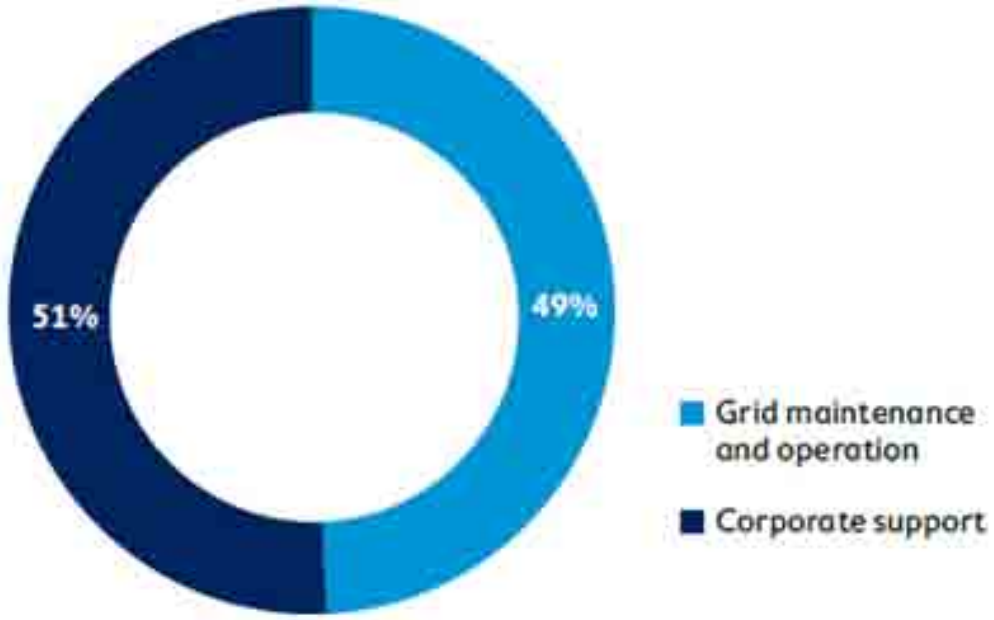
($2 million per year)

Trend: Taking into account growth in the size of our network and price increases for wages, materials and suppliers

Key facts - Our opex forecast for 2019-24 is $2.4 billion (real, FY19)

We plan to spend $0.5 billion (real FY 19) less than we forecast to spend in the 2014-19 period

Forecast opex by program ($m, real 2019)



We are embedding $100M p.a. of operating cost savings, **benefiting customers by $79 a year**

This is in line with the AER's allowance for 2017/18

We use the opex funds to:

1. **Inspect and maintain our network to ensure it is safe**
2. **Respond to emergencies and restore power as soon as possible**
3. **Deliver corporate support which includes keeping business systems and IT running smoothly**

Ultimately, the objective of our opex strategy is to
keep network bills affordable
without compromising safety or reliability

Ausgrid

Interaction slide

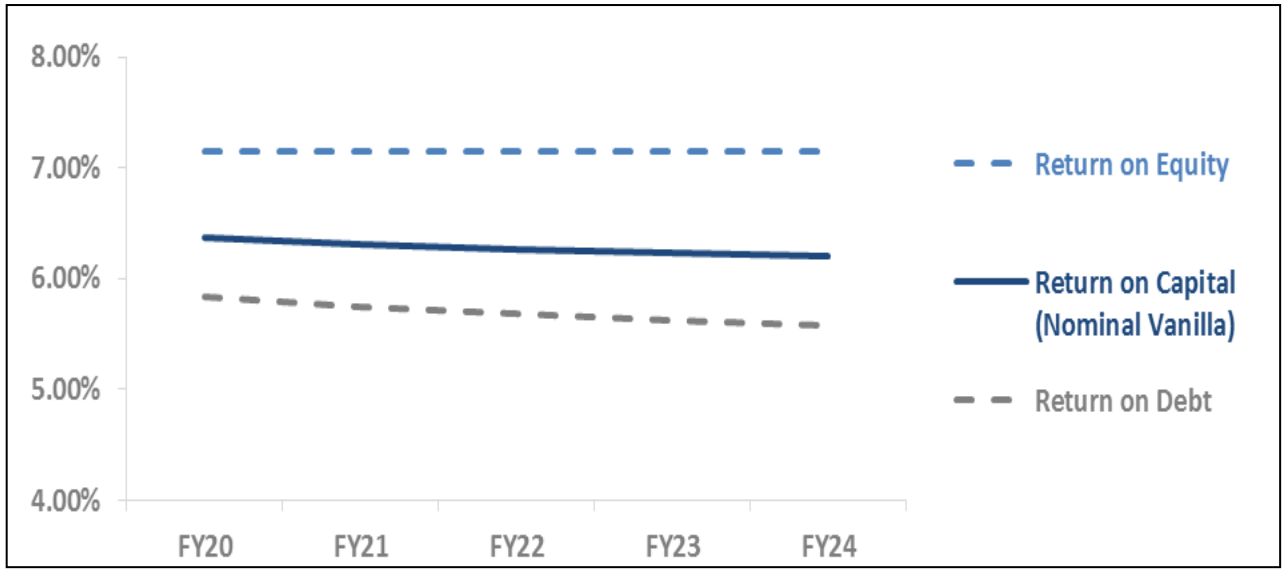
- Do you think we have applied an appropriate approach to forecasting the opex we need over the 2019-24 period? Why/Why not?

You can share your view on Zeetings.
https://www.zeetings.com/AusgridSCD

RATE OF RETURN

A reasonable return on capital is important because it ensures we can secure long-term investment in the network.

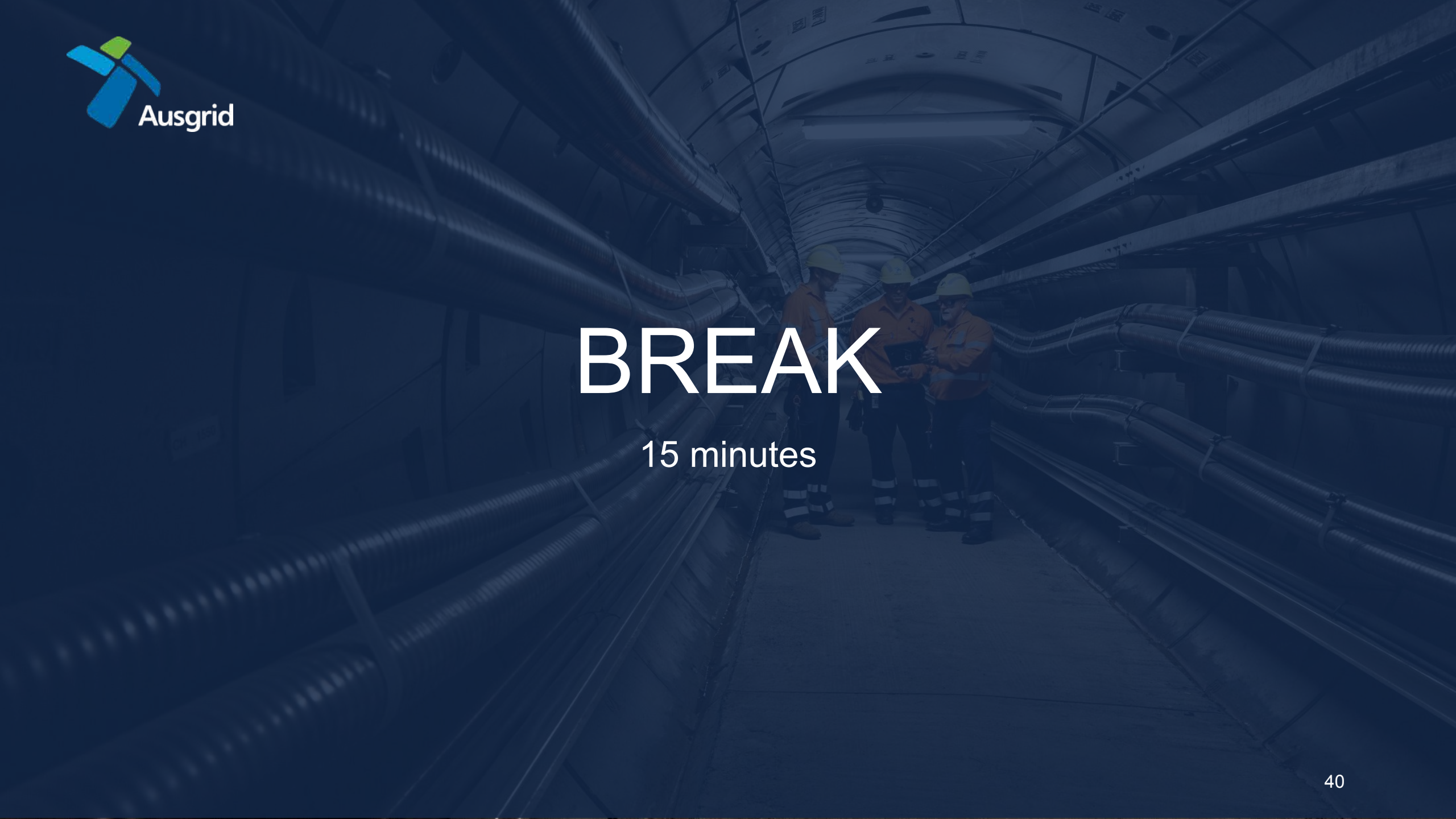
7.15%	**Return on equity using AER's guideline approach**
2.60%	Risk Free Rate
0.70	Equity Beta
6.50%	Market risk premium (using AER historic average)
5.84%	Return on debt (using AER transition to 10yr trailing average)



To give consumers more certainty and stability, Ausgrid is proposing to adopt the AER's rate of return guideline and preferred approach for the 2019-24 regulatory period.

Interaction slide

- Do you have any comments on our proposed approach to setting the rate of return?



BREAK

15 minutes

ALTERNATIVE CONTROL SERVICES

Consultation questions to consider

- Do you agree that our approach to recovering the cost of our legacy metering assets is in the long-term interests of consumers?

- Do you support an increase in public lighting maintenance charges for older lamps and a decrease in prices for newer technologies if it leads to greater cost reflectivity?

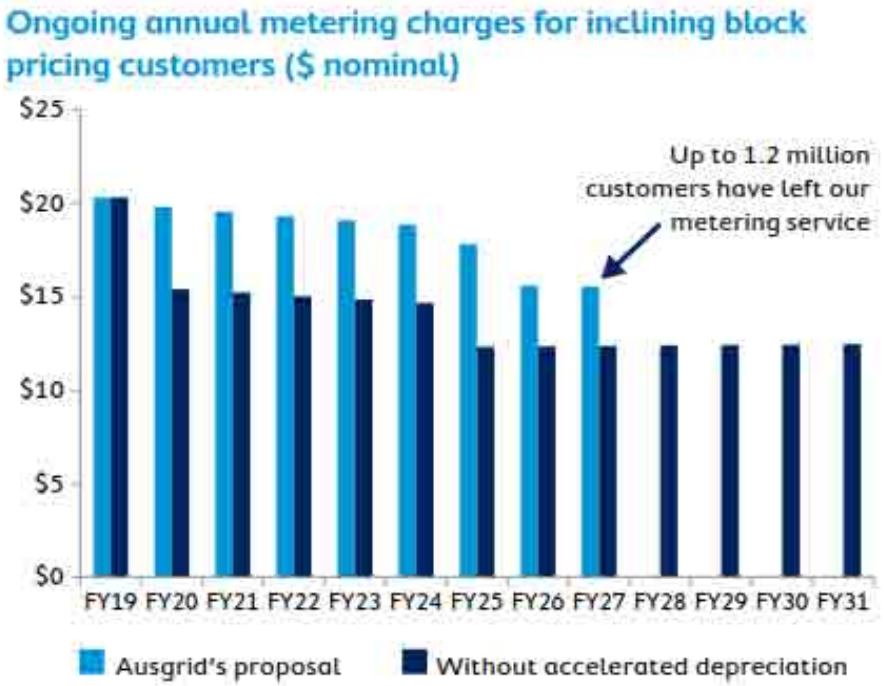
Ausgrid

Alternative Control Services

Type 5 and 6 metering

Metering

Under our proposal, customers who leave our metering service will stop paying all Ausgrid metering fees **four years earlier**



Policy framework

Power of Choice reforms now provide customers with the ability to switch to an advanced metering service managed by retailers

Charging structure

When a customer leaves our metering service they **continue to pay an ongoing Ausgrid metering charge**.

The AER developed this charging structure at our last determination after a period of consultation. **The ongoing charge is paid until our metering asset base (MAB) is fully depreciated.**

Stakeholder views

Given the current policy framework and charging structure, **is our proposal to accelerate our metering capital cost recovery in the long term interests of customers?**

Alternative control services

Public lighting

Public Lighting

Our public lighting service is undergoing **major transformation** with LED installation and smart controls implementation

We are replacing older luminaries with **Light Emitting Diodes (LED),** resulting in:

- A more sustainable, energy efficient service
- Lower energy bills and reduced carbon footprint

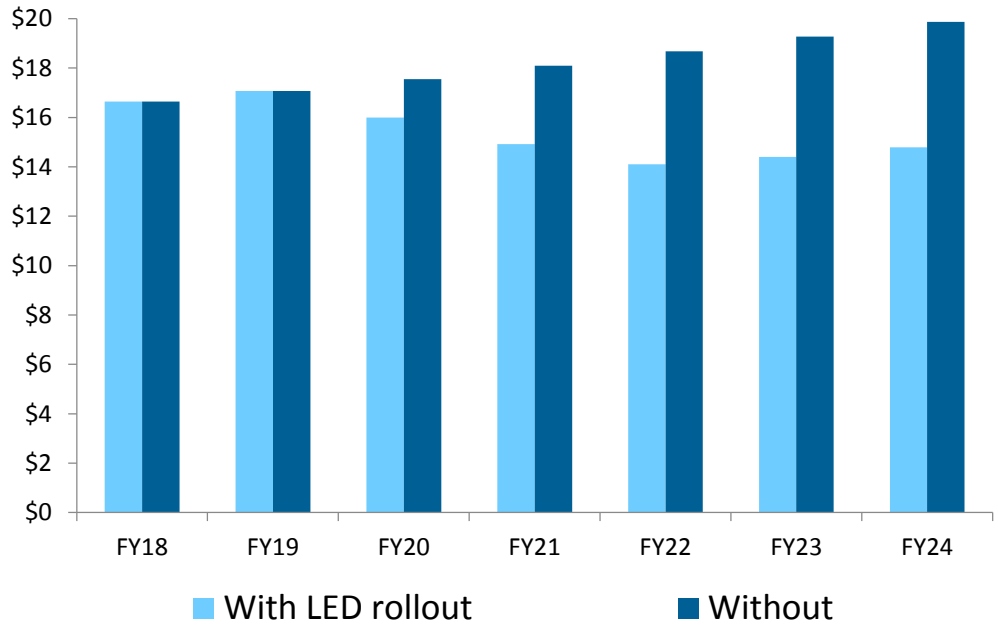
We are also trialling **Public Lighting smart controls** which have the capacity to:

- Increase maintenance efficiencies
- Provide Councils a backbone for smart cities

Greater cost reflectivity will be introduced, with public lighting maintenance charges to:

- Increase for older lamp types
- Decrease for newer technologies, such as LEDs.

Public lighting opex with and without LED rollout ($million, nominal)



Opex savings from our planned **LED rollout** will lead to **lower public lighting charges** for customers

Interaction slide

- Do you agree that our approach to recovering the cost of our legacy metering assets is in the long-term interests of consumers?

You can share your view on Zeetings.
https://www.zeetings.com/AusgridSCD

- Do you support an increase in public lighting maintenance charges for older lamps and a decrease in prices for newer technologies if it leads to greater cost reflectivity?

Ausgrid

PRICING AND REVENUE

Consultation questions to consider

- Our research to date suggests customers can accept an increase in the fixed connection charge component, as long as it is offset by a lower variable component of the tariff. Do you agree?
- Do you support our approach to protect low energy customers and vulnerable customers from bill shocks under our strategy?
- Is there anything else we should consider?

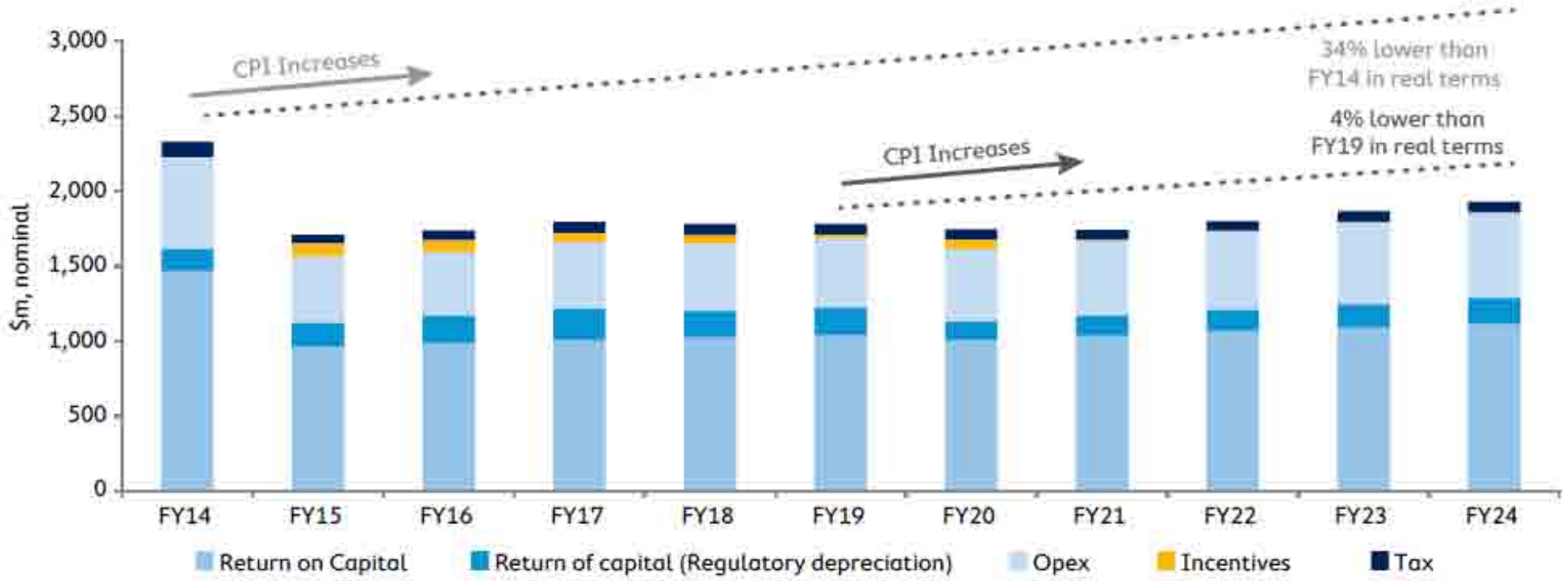
Revenue and impact on bills

We are committed to keeping revenues flat or declining in real terms over the 2019-24 period

Ausgrid's building block revenues by component ($m, nominal)

The following chart indicates $1b reduction in building block revenues of in real terms since 2013-14.

Building Block revenues are projected to be 34% lower in FY24 than if we had let costs increase along with inflation since 2013-14.

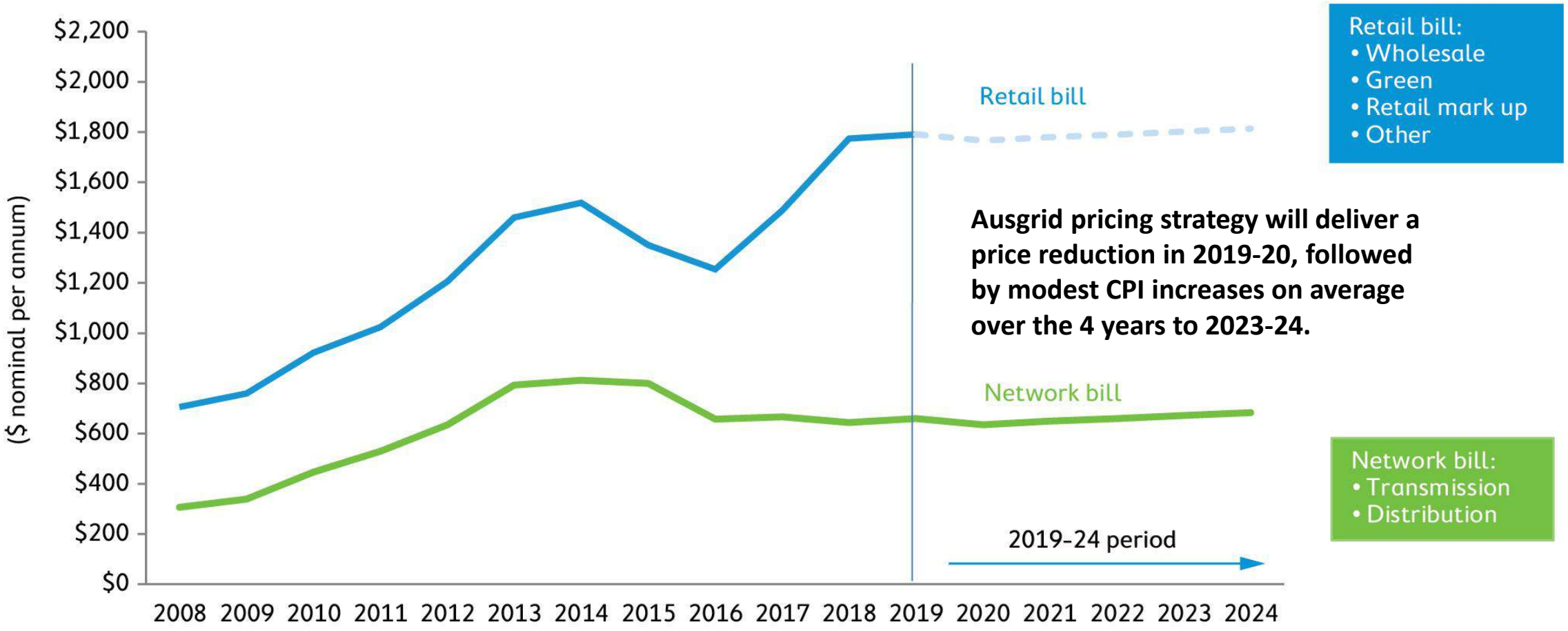


Source: Ausgrid analysis

Pricing impact

A typical residential customer's network bill will be flat over the 2019-24 period

Annual network and retail bill outcomes for a typical Ausgrid residential customer



Ausgrid pricing strategy will deliver a price reduction in 2019-20, followed by modest CPI increases on average over the 4 years to 2023-24.

Our new understanding of customer and stakeholder priorities has heavily influenced our proposed pricing strategy.

In response to insights from customer and retailer research, we are proposing:

1

We propose to **match fixed connection charges increases with a corresponding reduction in inefficient energy charges**

2

We propose to introduce a **comprehensive transitional pricing arrangement** in the next regulatory control period to apply to **low energy users and vulnerable residential customers** using less than 2 MWh pa

3

We are looking to **slowly restructure our pricing arrangements** to prepare for an environment of two way energy flows and, when technology allows, to implement new pricing, in the form of demand and capacity charging, to support demand response and distributed generation.

4

We are not proposing to introduce regional pricing or more cost reflective prices for customers with smart metering in the next regulatory control period. This will enable us to undertake **additional research over the next few years to better understand the customer acceptance issues.**

5

Providing customers with smart meters will enable the wide-spread introduction of cost reflective prices. Therefore we want to support the efforts of retailers to roll out smart meters, so we will be considering a proposal by retailers to delay any tariff change resulting from the installation of a new meter for existing customers until 1 July each year.

6

We will work with retailers and the AER to identify **simpler ways to provide an appropriate transition for our most affected and Vulnerable customers**, such as through a rebate.

Ausgrid

Interaction slide

- Our research to date suggests customers can accept an increase in the fixed connection charge component, as long as it is offset by a lower variable component of the tariff. Do you agree?

- Do you think demand charges should be extended to lower use customers? Why and to what level of usage?

- Do you support our approach to protect low energy customers and vulnerable customers from bill shocks under our strategy?

You can share your view on Zeetings.
https://www.zeetings.com/AusgridSCD

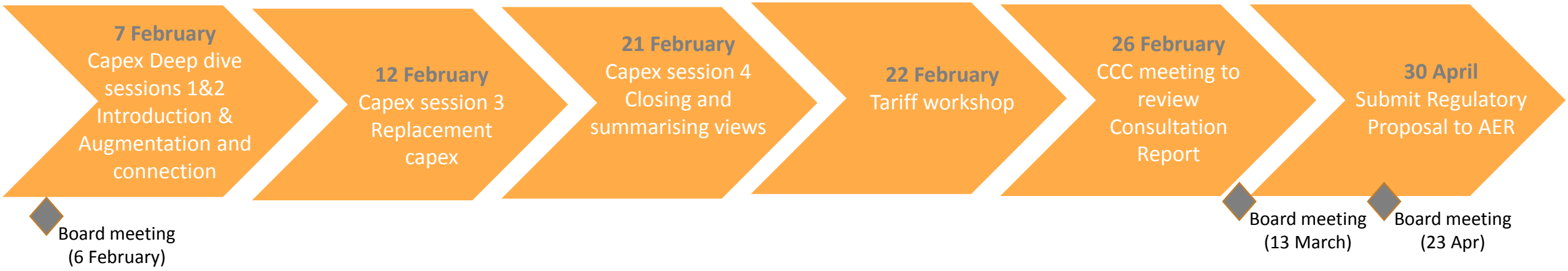
- Is there anything else we should consider?

Session closing and expectations review

Thank you

Next steps and thank you

More consultation to follow and your contribution today will inform our Regulatory Proposal



We look forward to continuing our consultation process with you.

Thank you

8.2

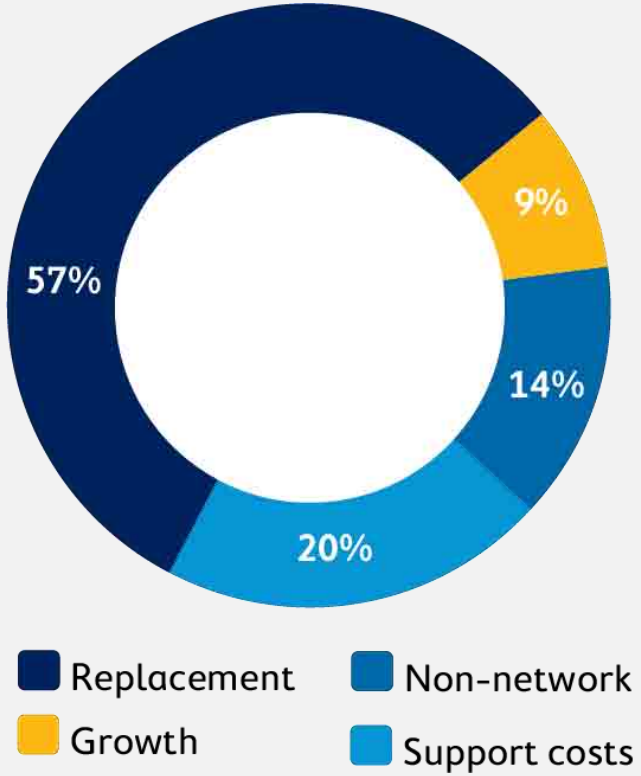
Capex Deep Dive
7 February 2018

Key statistics from Stakeholder Consultation Document

Capital Expenditure

- Our capex forecast for 2019-24 is **between $3.2 billion to $3.5 billion** (real, FY19)
- **Replacement: $1,700** to $2,000 m of investment renewing the grid
- **Growth: $300 m** major infrastructure projects Rail, Roads, Data Centres, Localised Demand Growth
- **Non-Network: $500 m** on IT, Corporate Property, Fleet
- **Support Costs: $700 m** on Corporate support

Capex Breakdown



Operating Expenditure

- Our forecast opex for 2019-24 is **$2.4 billion** (real, FY19)
- $100m lower than baseline opex in FY13, **benefits customers by $79 a year**
- **Base year opex of $426m** forecast in FY18

4%
Revenue reduction from FY19

Capex Introduction, Augmentation & Connection

Workshop 1 – Stakeholder Engagement Deep Dive
Regulatory Proposal 2019 – 2024

Trevor Armstrong

Purpose and Agenda

The purpose of today's session is to provide further details to you regarding our capex investment.

Today we will cover:

- Moving to sustainable capex
- Trend of capex components
  - Sydney Growth
- Transformation of costs
- Delivery of Program

Our rationale for capex

We are taking a new approach to capex to make sure we get the best outcomes for customers

1. We plan to invest **only when there is clear value to customers**. Our replacement programs carefully target expenditure on assets that ensure the safety of our staff/customers and mitigate reliability risks.

2. Rather than simply building more infrastructure, we are looking first at where **new technology, innovation and partnering** with other companies and our customers will **solve the problem at a lower cost.** This includes demand management solutions.

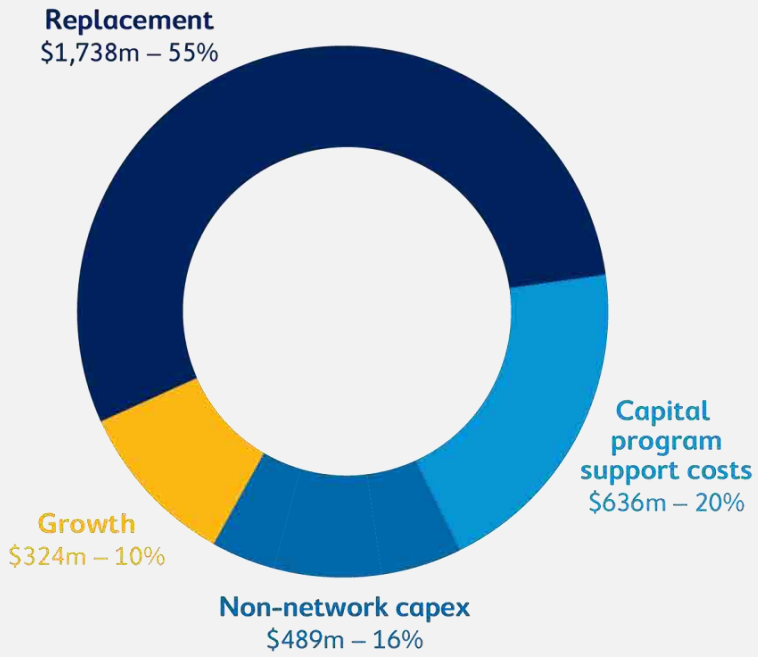
3. Keep our **revenues flat or declining** over the regulatory period to deliver lower prices for customers. Our proposal delivers a **4% reduction** in FY20 on FY19 prices in real terms and then tracks at CPI to 2024.

Key statistics

Capital Expenditure

- Our capex forecast for 2019-24 is **$3.2 billion** (real, FY19)
- **Replacement: $1,738 m** of investment renewing the grid
- **Growth: $324 m** major infrastructure projects Rail, Roads, Data Centres, Localised Demand Growth
- **Non-Network: $489 m** on IT, Corporate Property, Fleet
- **Support Costs: $636 m** on capital program support

Capex Breakdown

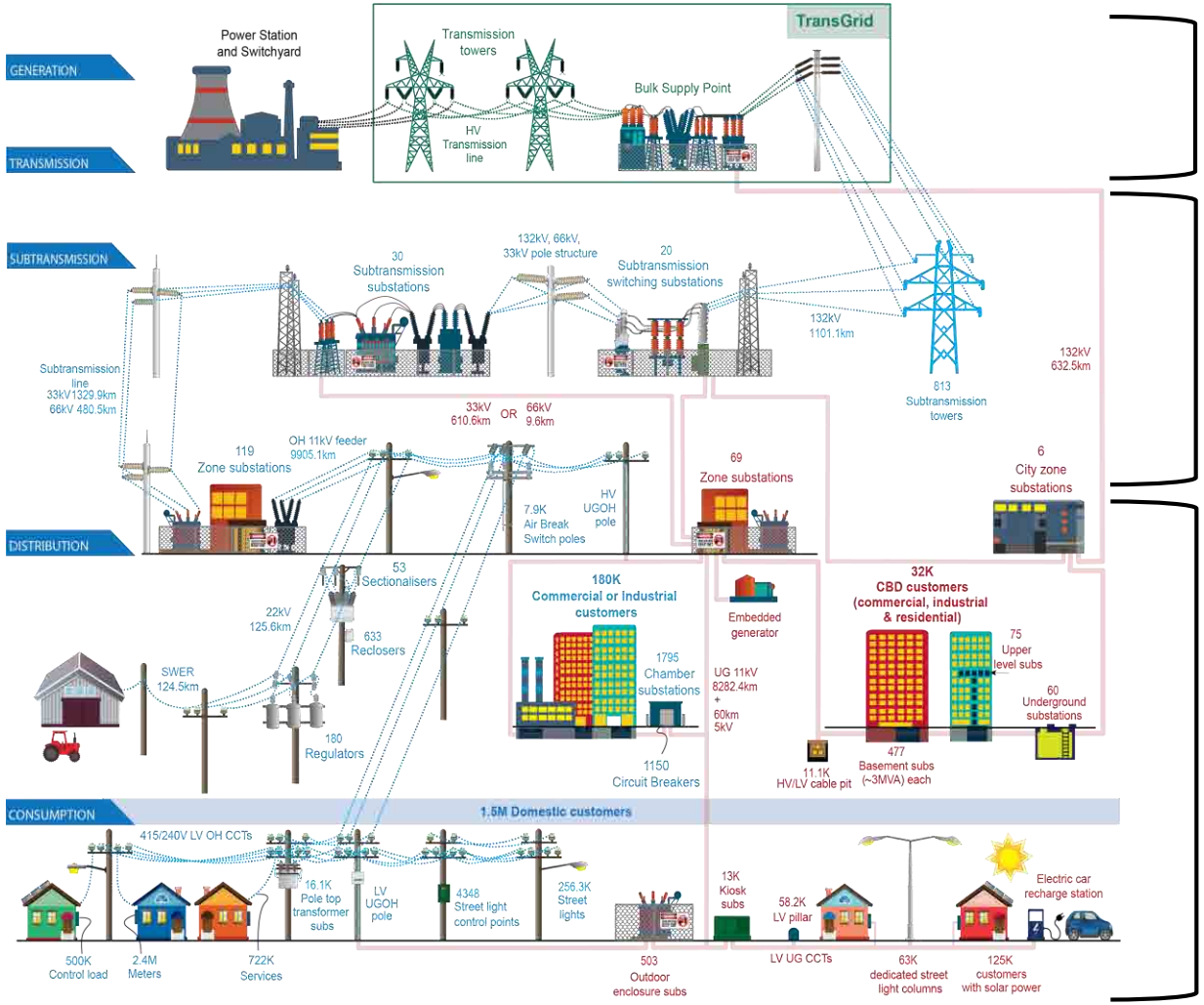


Our capex forecast for 2019-24 is $3.2 billion (real, FY19)

($m Real 18/19)	2009 to 2014 Actual	2014 to 2019 Actual / Forecast	2019 to 2024 Proposal	Sub Program Description	Sub Program Value	Deep Dive Discussions Examples
New Connections	342.1	96.5	52.2	Major Connections	10.2	
				HV & LV Connections	42.1	Combined HV/LV Augmentation & Connections Policy
Growth /Augmentation	2,242.7	163.7	258.7	Major Projects (Area Plan)	77.1	Rozelle STS Upgrade
				High Voltage Reinforcement	153.2	Combined HV/LV Augmentation & Connections Policy
				Distribution Centre and LV Reinforcemen	12.0	
				Reliability	16.4	
Replacement	3,031.7	1,677.2	1,725.5	Major Projects (Area Plan)	593.1	Switchboards - Concord Zn Oil/Gas Cables - Castle Cove to Mosman ADMS
				Programs - Planned	599.5	Consac/HDPE LV Cable
				Programs - Condition Based	310.3	Poles (Sub-trans/HV/LV)
				Programs - Reactive	222.6	Distribution Txs / HV Cables
Other network	106.2	32.2	25.5	System Operational Technology Plan	25.5	
Total System Capital	**5,722.8**	**1,969.6**	**2,061.9**		**2,061.9**	
IT	207.9	197.8	156.9	Maintain, Protect, Comply, Adapt	156.9	IT Program; Cyber Transformation Program; Data and Digital Enablement Program
Vehicles	142.8	54.7	98.6	Cars, vans, trucks	98.6	Fleet renewal and capability upgrades
Other Non-Network	357.8	189.0	233.7	Land & Buildings	208.3	Zetland depot replacement; Homebush depot; Wallsend office replacement
				Furniture, Plant & Equipment	25.4	
Total Non-System Capital	**708.5**	**441.4**	**489.3**		**489.3**	
Total Network Support Cost	**1,166.2**	**701.8**	**635.6**		**635.6**	
Total Capital	**7,597.5**	**3,112.9**	**3,186.7**		**3,186.7**	
AER Allowance	**8,392.1**	**3,522.9**				

Ausgrid Network Overview

Network Geography & Asset Types

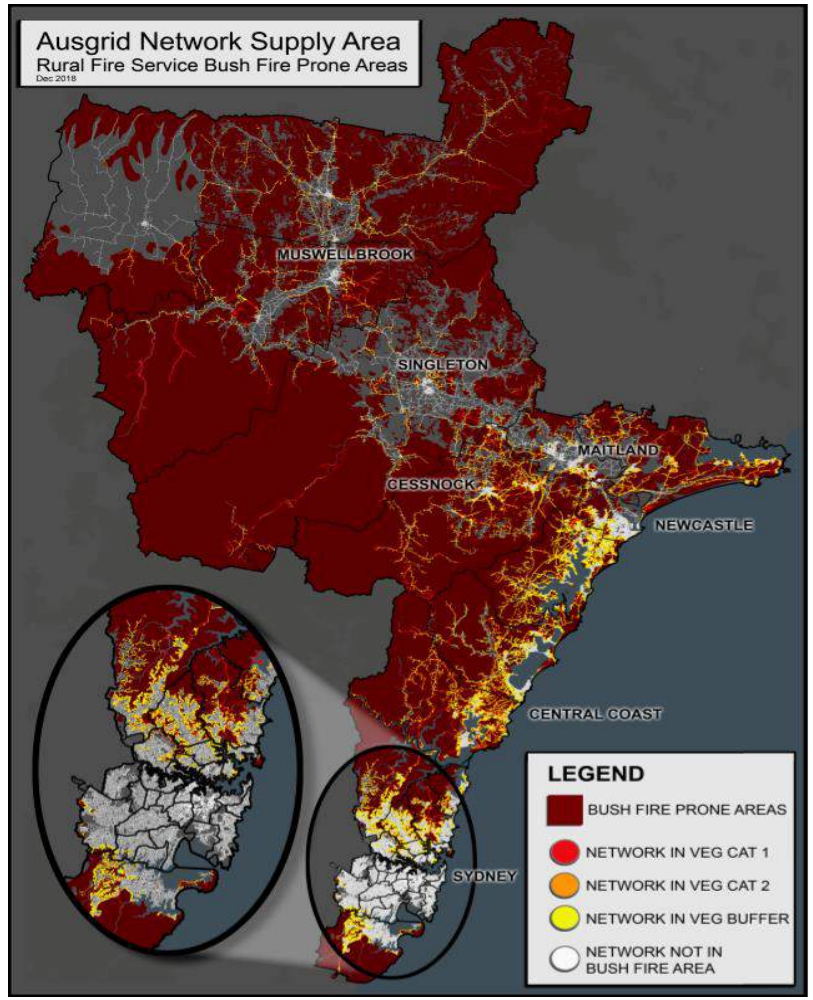


Bulk Generation & Transgrid

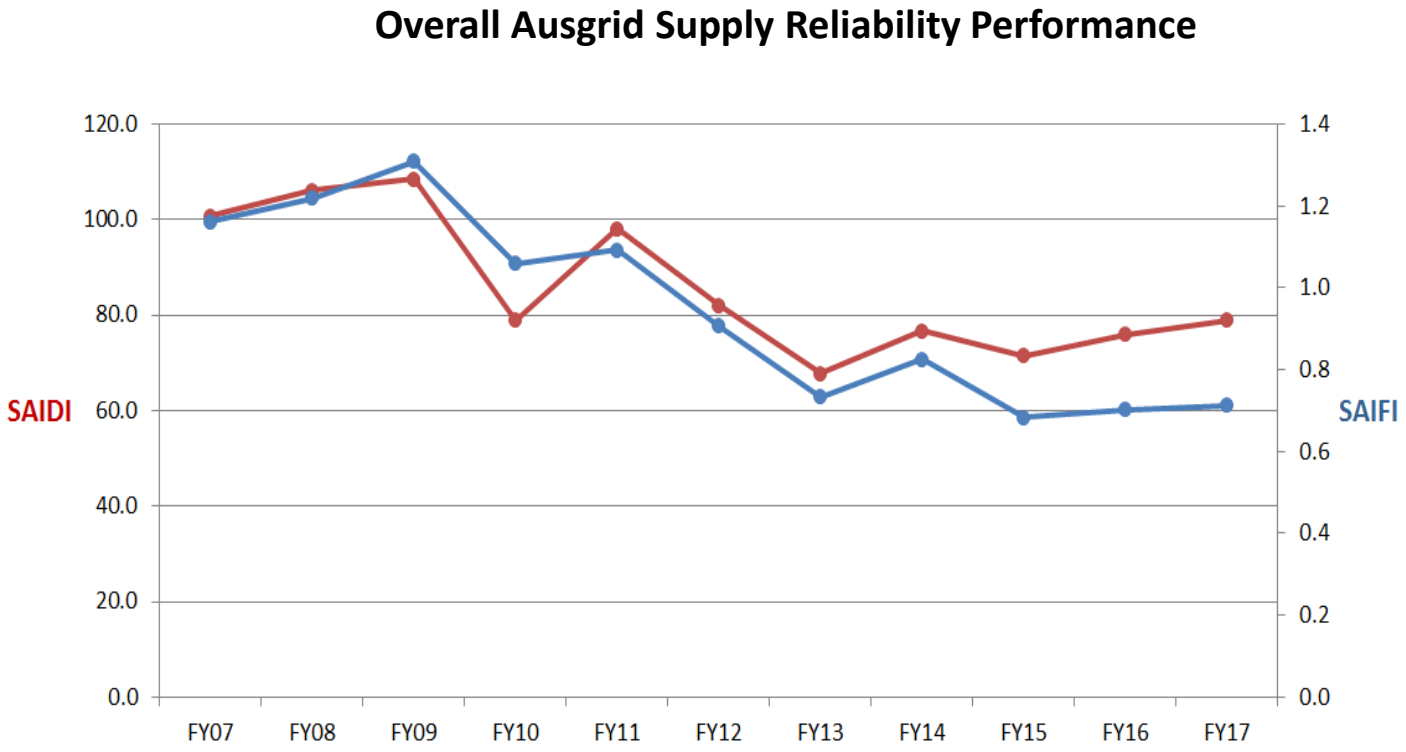
Ausgrid Transmission Network

Ausgrid Distribution Network
(incl. embedded generation)

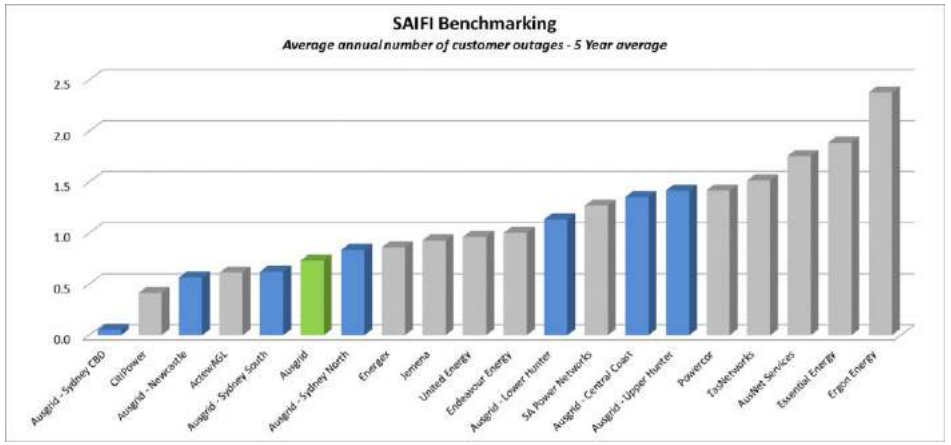
Network – Geographic Diversity

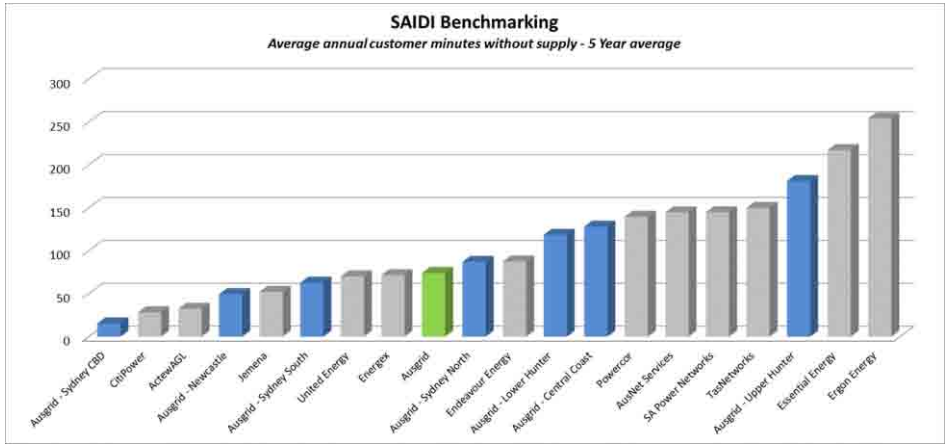


Network Supply Reliability



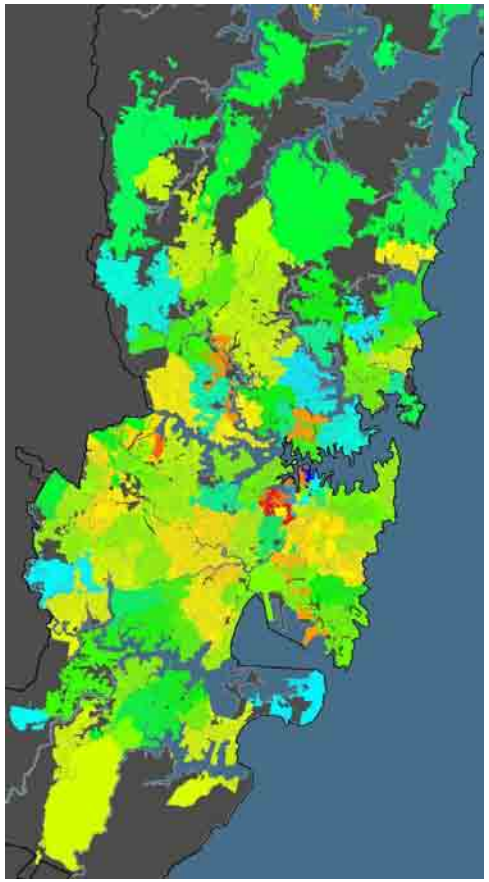
Note: Reliability performance excludes impacts from major event days



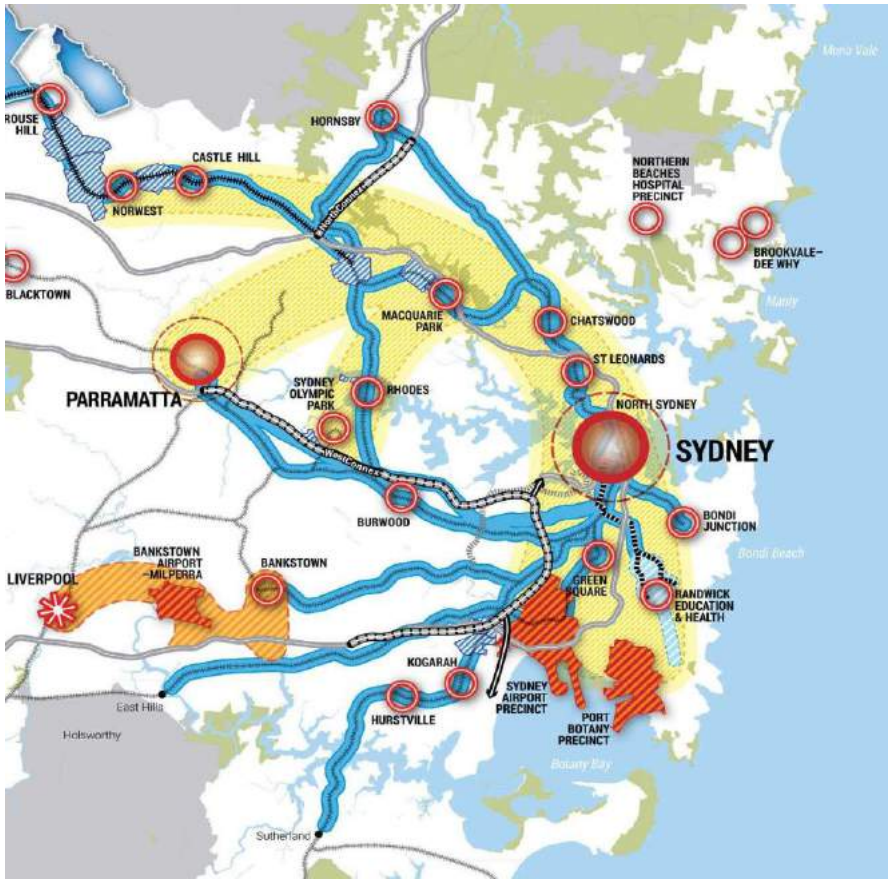


Sydney growth

- **75% of NSW growth occurs in Sydney**
- Global economic corridor driving growth
- NSW **Infrastructure Projects**
- Metro
- Westconnex
- Sydney Light Rail
- Strong **population growth**



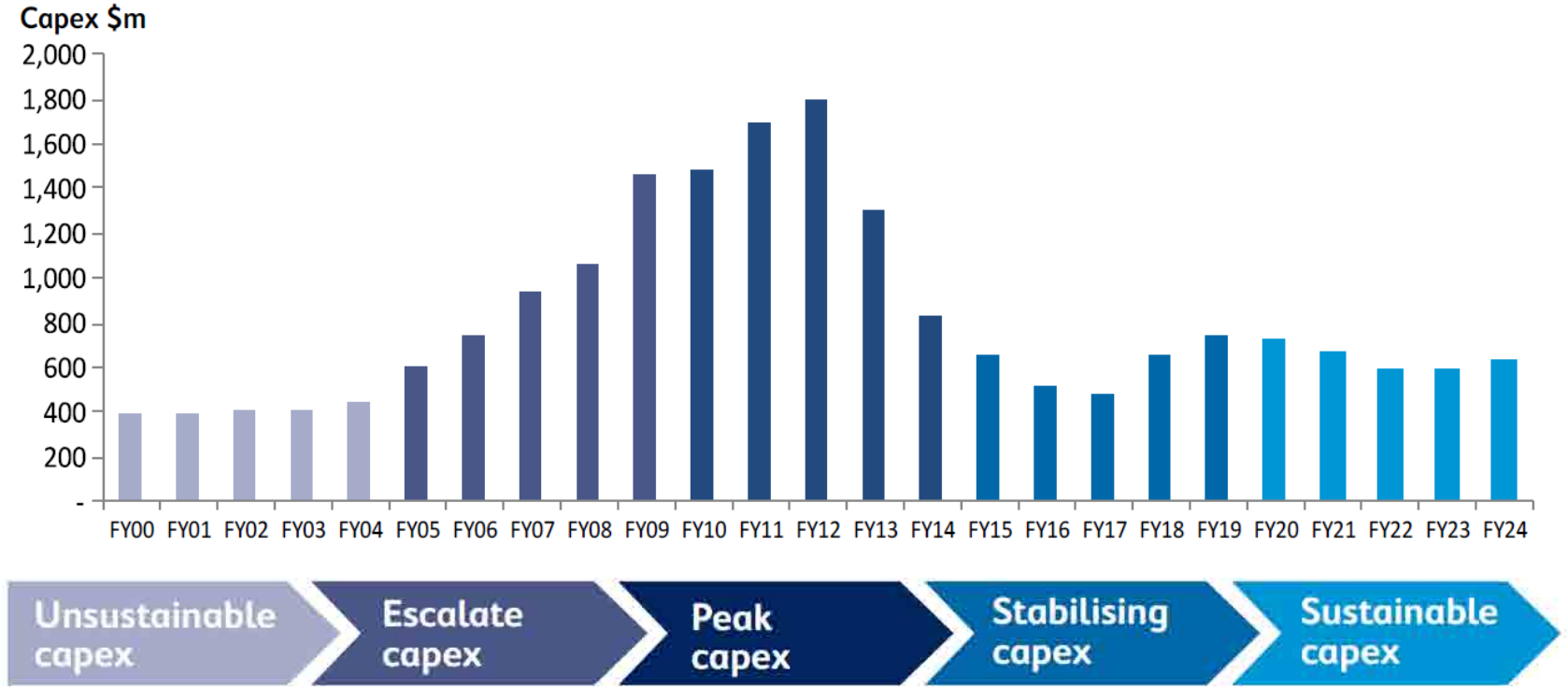
Load Growth



Sydney's Development

Our capex forecast for 2019-24 is between $3.2 billion to $3.5 billion (real, FY19)

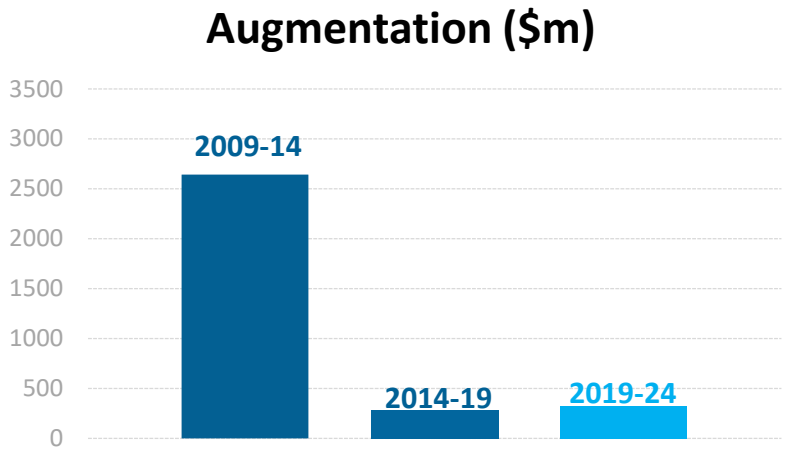
We aim at renewing our ageing distribution network and preparing for the future grid (ADMS, Cybersecurity)

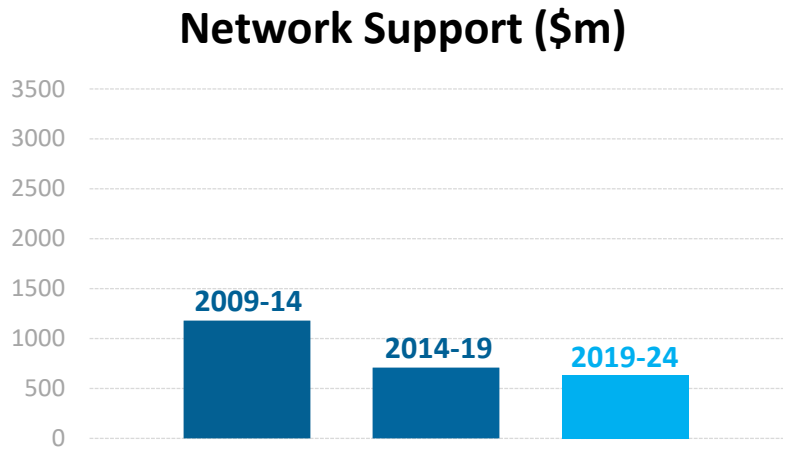


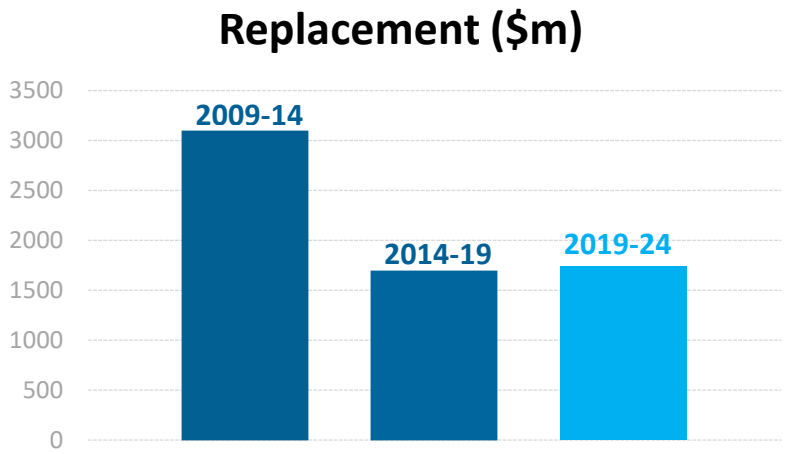
After a few years of peak capex, we are achieving a more sustainable capex level in this period thanks to the results of major transformation programs in the previous period.

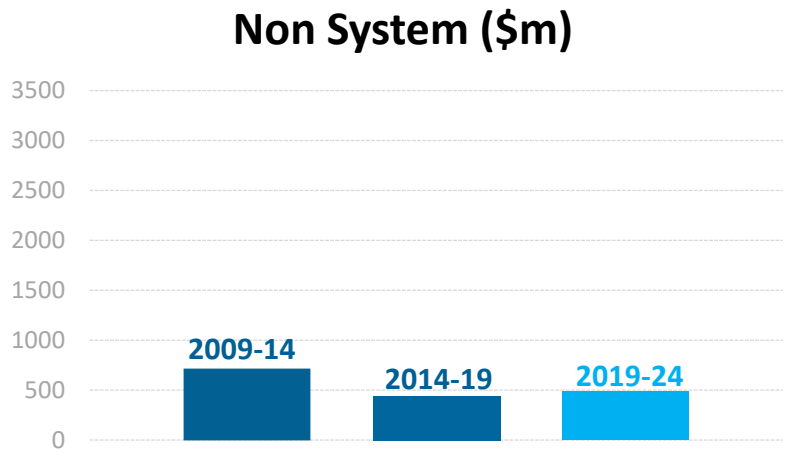
Most capex will be on replacing assets. Almost a quarter (24%) of our assets are over technical life (50 years old). We have a relatively low level of growth capex compared to long-term trends. Our non-network capital expenditure for IT, property and fleet is relatively consistent with those trends.

Capital Expenditure Trends



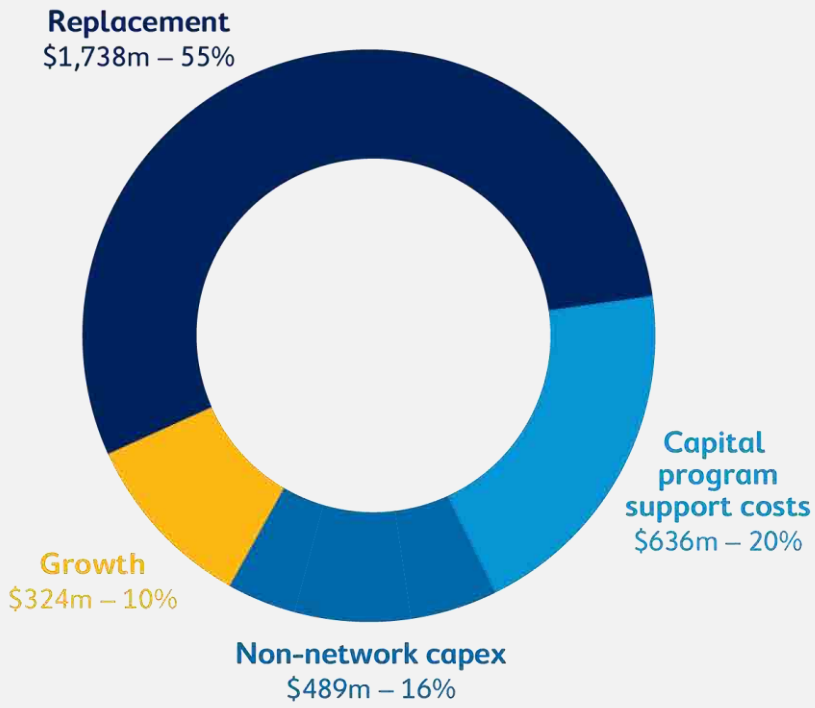




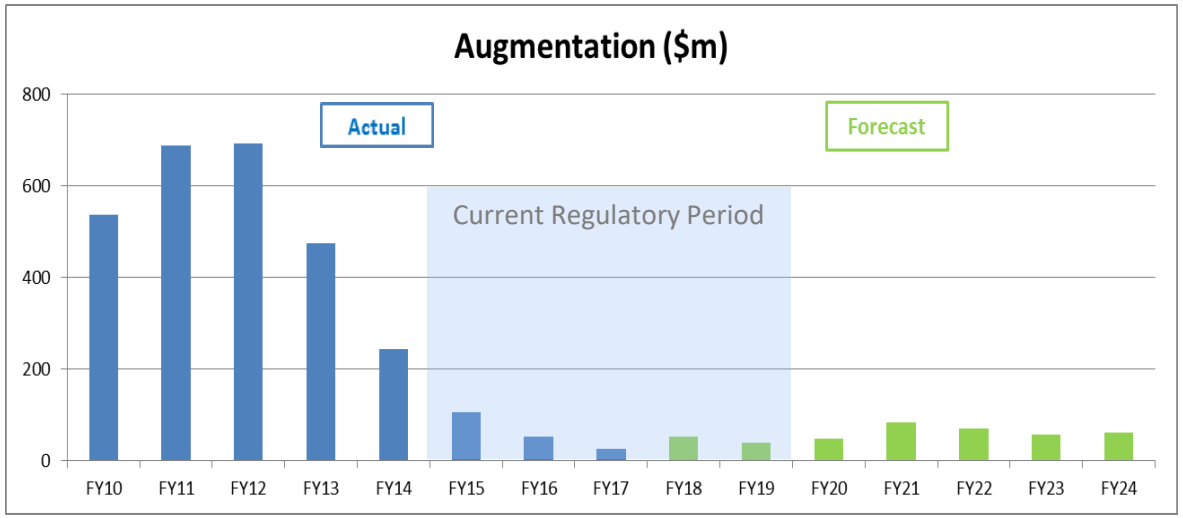


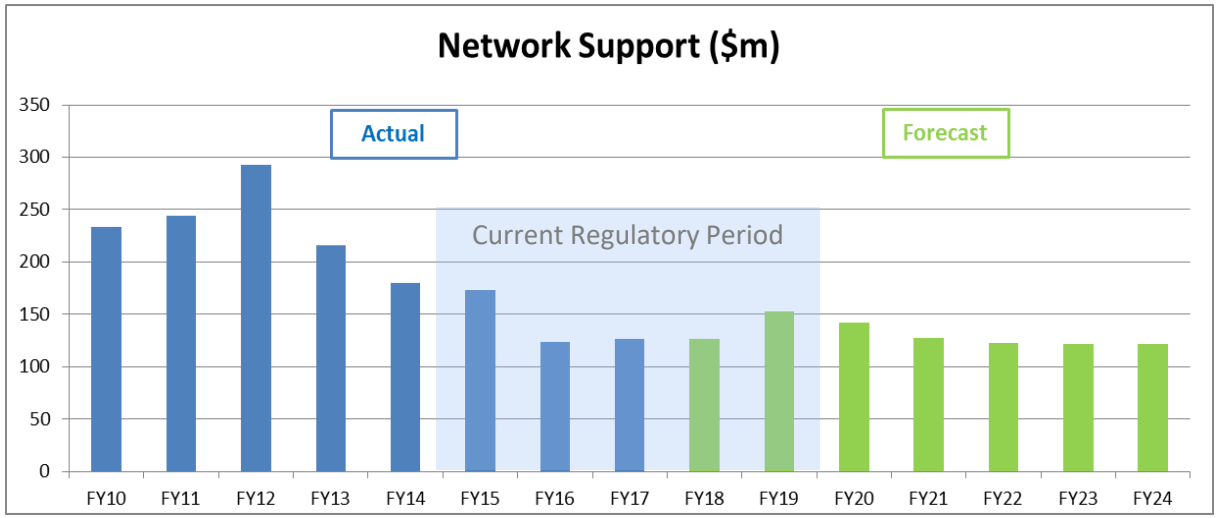
Overview of Capital Expenditure Proposal

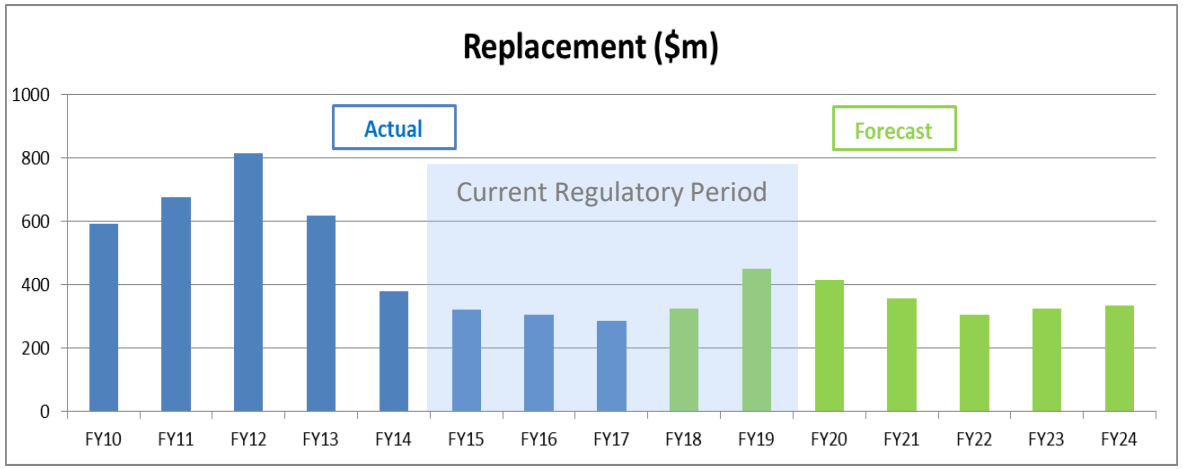
Capex Breakdown

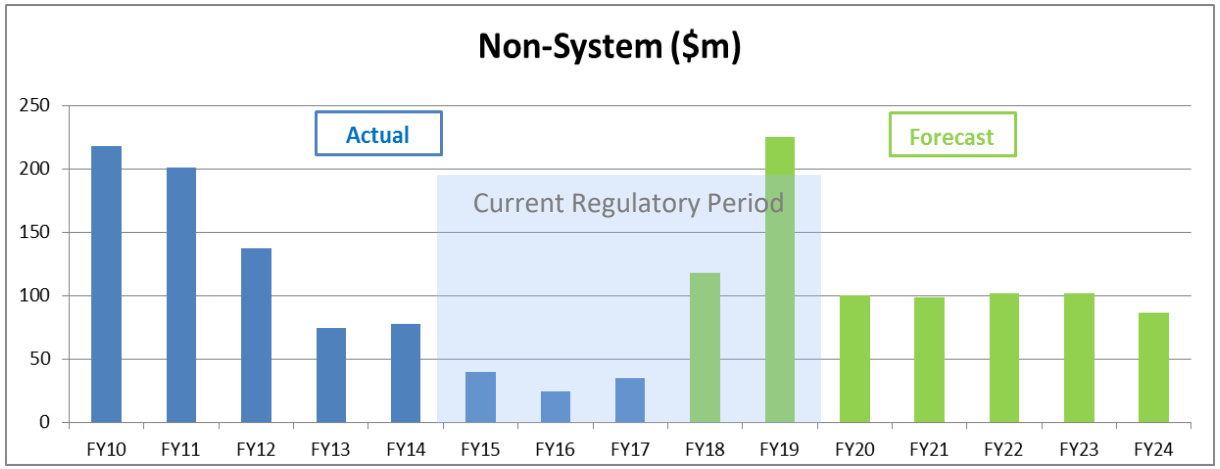


Overview of Capital Expenditure

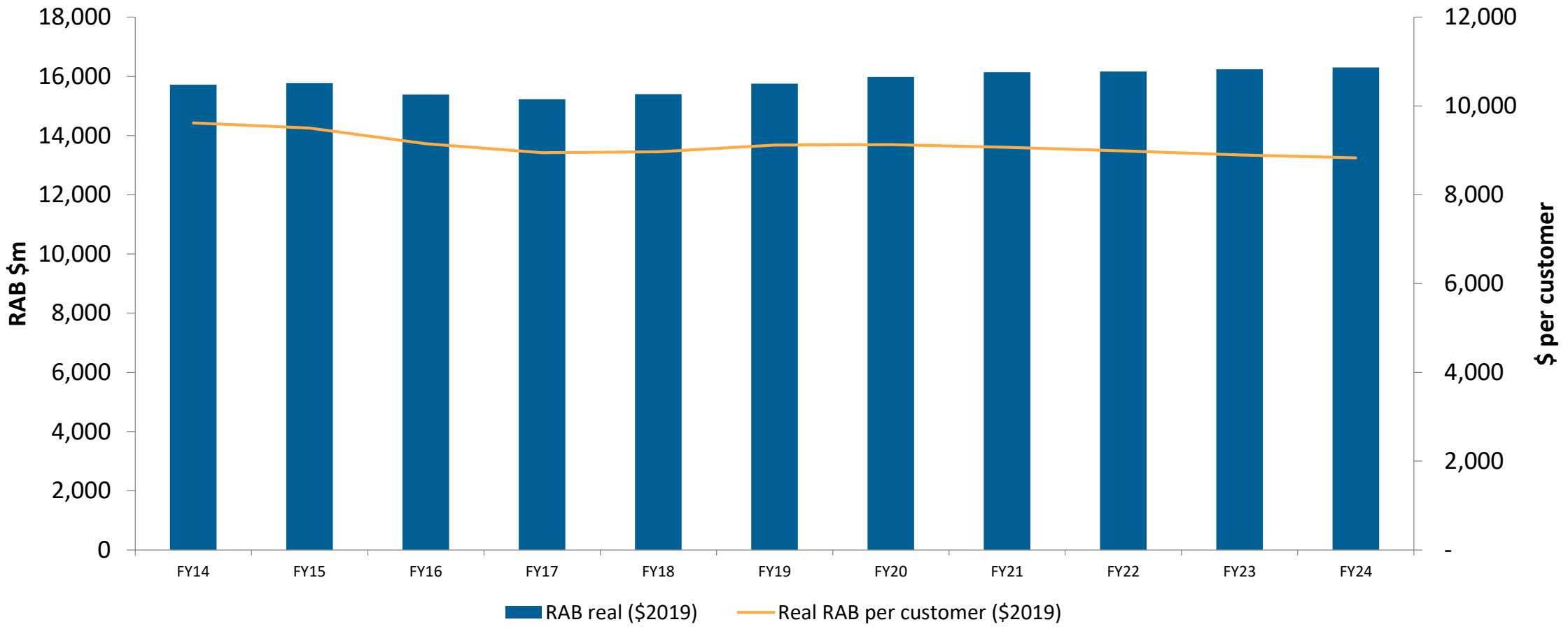








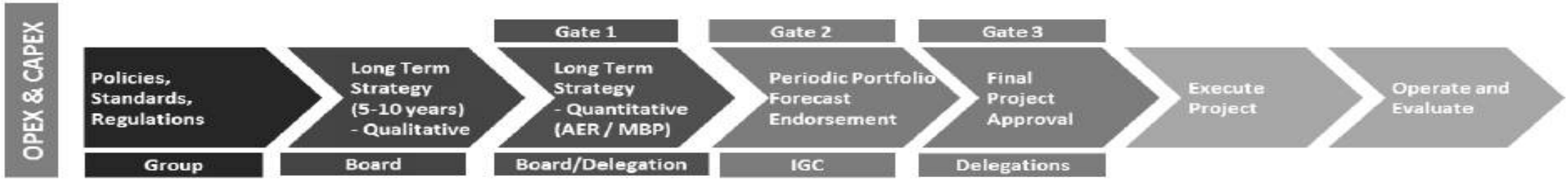
Regulated Asset Base



Network investment governance framework

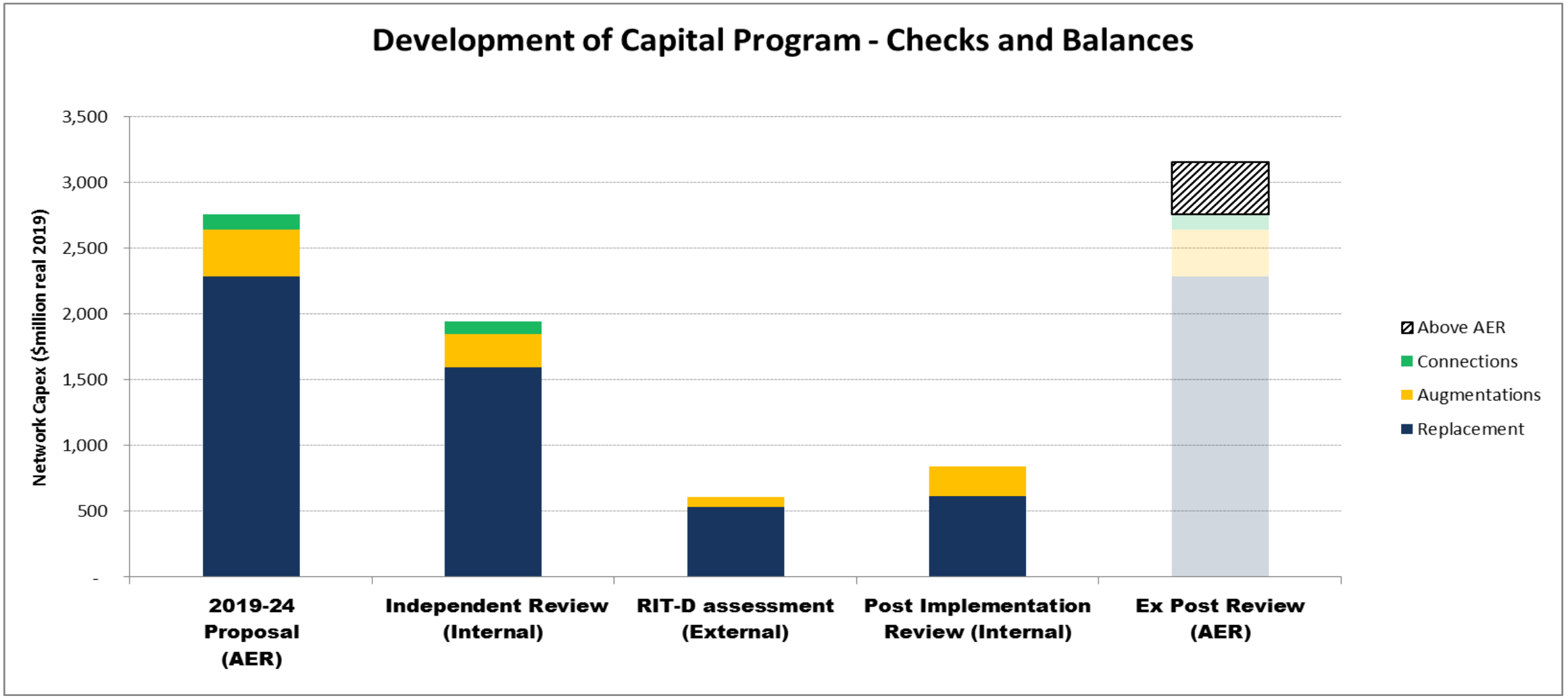
Ausgrid maintains an **Investment Governance Framework** (IGF) to provide clear guidance and accountability in respect of the development, **determination and approval of investments**, both network and non-network.

This framework provides the basis for making investment decisions in a transparent and efficient manner by taking into account a full life cycle approach to such investments, and thereby providing assurance to the board and other stakeholders that the investment decisions made are efficient, consistent and informed.



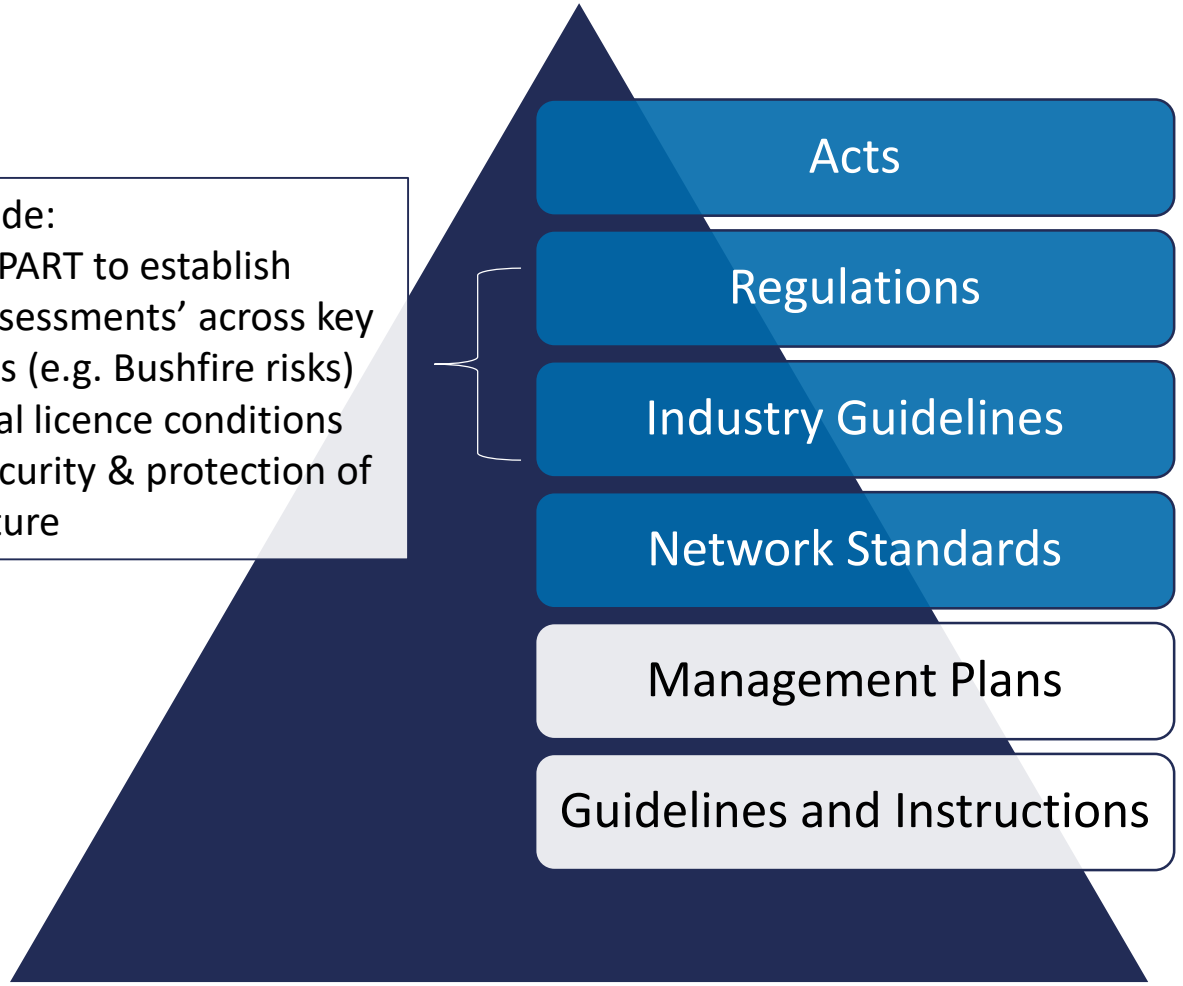
- Board approval of long term plan to safeguard sustainable & informed investments
- Supported by robust delegations framework to ensure appropriate level of ongoing oversight & control
- Investment Governance Committee chaired by CEO provides independent review & endorsement of programs/projects prior to approval
- Investment Evaluation Unit reviews all investments prior to the Investment Governance Committee
- The prioritised plan informs forward delivery & resourcing plans

Network capex checks and balances



Ausgrid's Compliance Requirements

Recent changes include:
- Requirement by IPART to establish 'Formal Safety Assessments' across key network risk areas (e.g. Bushfire risks)
- Revised ministerial licence conditions including cybersecurity & protection of critical infrastructure



Compliance objectives related to:
- Public & employee safety
- Safe, reliable & secure supply of electricity
- Protection of environment & property

Changes in compliance requirements are reflected systematically in the way Ausgrid manages, operates & maintains the network and its assets

Key NSW Legislative Requirements

- The Electricity Supply (Safety and Network Management) Regulation 2014 (the ES(SNM) Regulation) is one of the key regulations that govern electricity network operators in NSW.

- It requires that the network operator have a Safety Management System in place, and outlines five primary objectives of the Safety Management System as follows:
  1. **The safety of members of the public;**
  2. **The safety of persons working on networks;**
  3. **The protection of property (whether or not belonging to a network operator);**
  4. **The management of safety risks arising from the protection of the environment; and**
  5. **The management of safety risks arising from loss of electricity supply.**

- The ES(SNM) Regulation requires that the Safety Management System be prepared in accordance with AS 5577-2013 – Electricity network safety management systems (ENSMS).

Capital Delivery Capability

Organisational Design

Creation of Program Delivery Division, accountable for:

- Developing a single plan for all programmed network activity
- Streamlining end-to-end capital processes including design
- Oversight of the program of works

Integrated Management

Integrated management of capital and maintenance requirements through:

- 'One Plan' – a single, integrated and granular view of supply and demand requirements
- Identification of key constraints & development of associated action plans

Visibility, Collaboration & Accountability

Formation of 'Capital PMO' to:

- Provide visibility on progress
- Enforce clear accountabilities
- Resolve conflicting priorities between planning & delivery

Achieved through:

- Dashboards & key metrics
- Regular 'stand-up' meetings with senior management

Transformation of Unit Rates

- Unit rates are **consistently applied** across the capital program
- **Regular reviews** are undertaken, and completed projects inform future estimates
- **Independent advice** has been sought on unit rates for key replacement programs

Intrinsic Drivers of Unit Costs

Diverse Geography
Extremely diverse network area – Sydney CBD to Upper Hunter Valley

Traffic & Congestion
High traffic congestion in city areas & Long travel distances in remote areas

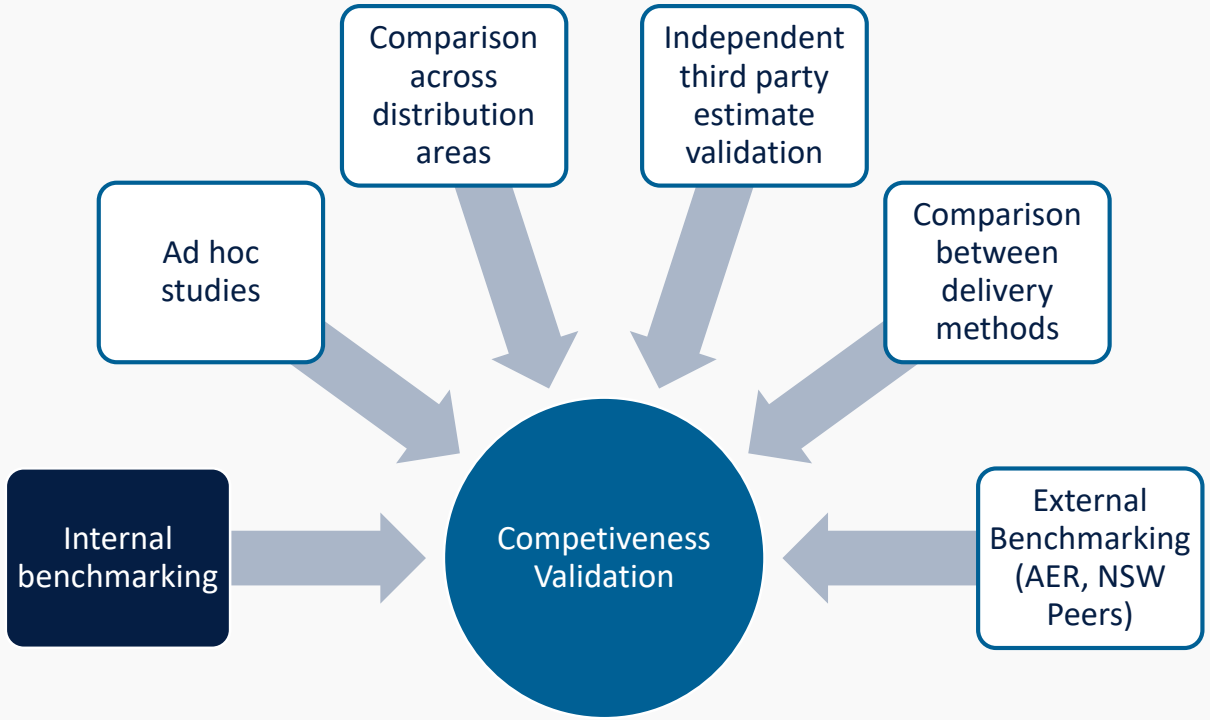
High Capacity Assets
Over 1,000 extremely high capacity distribution substation assets

Pits & Duct Systems
Complex & highly congested underground infrastructure in city areas

Community Streetscape
Customer preferences & requirements for aesthetics & street-scaping

Competiveness Assessment

Ausgrid uses a variety of internal and external competitiveness validation techniques



We are developing parametric estimating models to increase our internal benchmarking rigour

Scope & Quantity Info + Execution Environment Factors + Delivery Practices ≈ Cost Benchmark

Transformation of Unit Rates

Strategies Reducing Unit Costs

Increased use of **blended delivery** across projects & programs

Engagement with telco authorities to **streamline transfer of third party assets** attached to Ausgrid assets

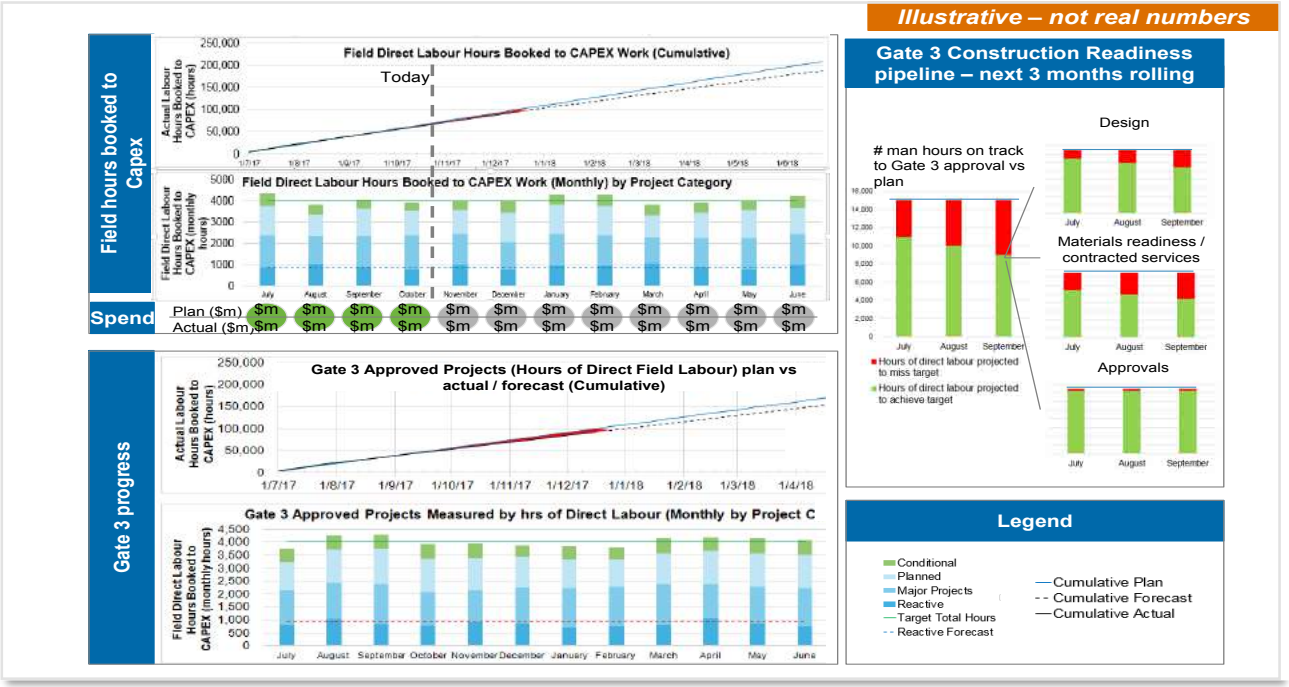
Significant volume of works delivered through **competitively tendered contracts**

Streamlining & benchmarking of internal processes for high volume programs

Labour productivity improvements increasing to 10% have been included across the capital program – with improvements to be identified over time

Works PMO / 'war room' being established to create forward-looking transparency and drive action at all levels

Works PMO: focus on direct hours, and development of construction-ready jobs pipeline



....as part of a new way to manage and de-risk delivery

Key metrics

- Hours booked to capex, vs plan
- Construction-ready jobs created, vs plan
- Forward-looking projection of construction-ready jobs, vs plan
- Spend vs plan, units vs plan

Bi-weekly meetings with COO

- Senior Portfolio Managers, Regional Managers, Procurement...

To be cascaded to regions and depots

- We will provide support

This has provided a consistent way of working across portfolio management teams to get forward-looking visibility and proactively manage the pipeline

Significant Investments

- **Major Projects**
  - Willoughby – Cremorne 132kV oil cable replacement
  - Rozelle 132/33kV STS upgrade
  - Concord Zone switchboard replacement
- **Programs** – Planned, Conditional & Reactive
- Completion of **ADMS** Implementation
- **Depot Relocation**
- **ICT**

Discussion

8.2

Augmentation and Connection Capital

Augmentation and Connection Capital

Workshop 1B – Stakeholder Engagement Deep Dive
Regulatory Proposal – FY2020-2024

Matthew Webb

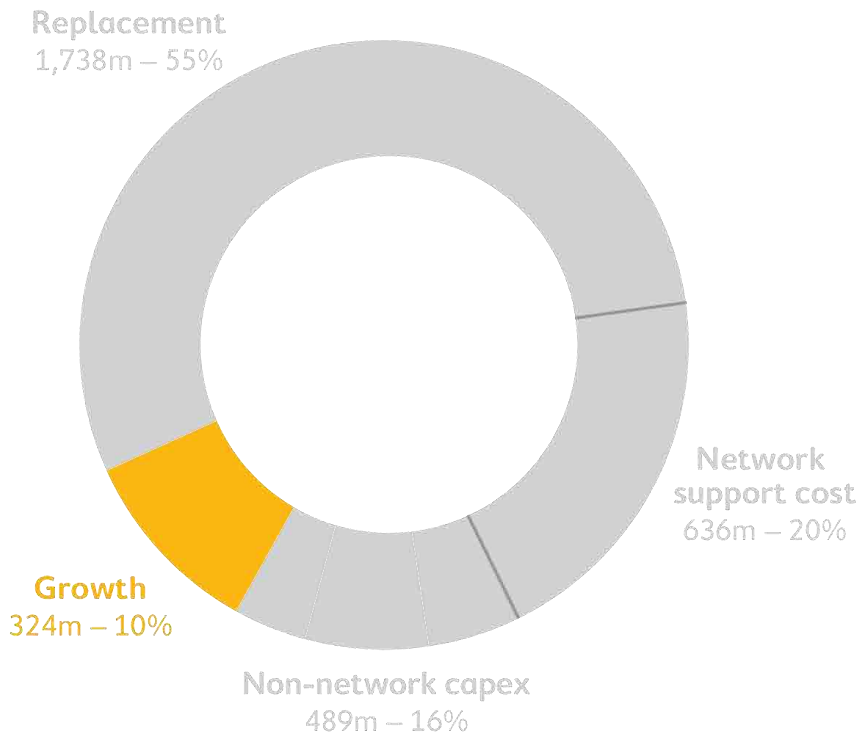
Ausgrid

Augmentation and Connection Capital - Agenda

1. Introduction – Drivers for Growth Programs
2. Key Indicators
3. Demand Forecasting Process and Results
4. Approach to Decision Making and Project Development
5. Demand Management
6. Deep Dive - HV & LV Augmentation
7. Deep Dive - Rozelle Subtransmission Substation
8. Reference Materials

Introduction – Key Drivers for Growth Programs

- Our capital program has materially shifted away from growth as a driver
- Modest underlying growth offset by energy efficiency and solar, but major infrastructure spot loads are emerging
- Relaxation of the NSW licence conditions
- Capacity headroom is being used up over time and localised investments are still needed
- Revisions to our connection policy also affect capex



Most capex will be on replacing assets. We have a relatively low level of growth capex compared to long-term trends.

Capital Programs and Trends

($m Real 18/19)	2009 to 2014 Actual	2014 to 2019 Actual / Forecast	2019 to 2024 Proposal	Sub Program Description	Sub Program Value	Deep Dive Discussions Examples
New Connections	342.1	96.5	52.2	Major Connections	10.2	
				HV & LV Connections	42.1	Combined HV/LV Augmentation & Connections Policy
Growth /Augmentation	2,242.7	163.7	258.7	Major Projects (Area Plan)	77.1	Rozelle STS Upgrade
				High Voltage Reinforcement	153.2	Combined HV/LV Augmentation & Connections Policy
				Distribution Centre and LV Reinforcemen	12.0	
				Reliability	16.4	
Replacement	3,031.7	1,677.2	1,725.5	Major Projects (Area Plan)	593.1	Switchboards - Concord Zn Oil/Gas Cables - Castle Cove to Mosman ADMS
				Programs - Planned	599.5	Consac/HDPE LV Cable
				Programs - Condition Based	310.3	Poles (Sub-trans/HV/LV)
				Programs - Reactive	222.6	Distribution Txs / HV Cables
Other network	106.2	32.2	25.5	System Operational Technology Plan	25.5	
Total System Capital	5,722.8	1,969.6	2,061.9		2,061.9	
IT	207.9	197.8	156.9	Maintain, Protect, Comply, Adapt	156.9	IT Program; Cyber Transformation Program; Data and Digital Enablement Program
Vehicles	142.8	54.7	98.6	Cars, vans, trucks	98.6	Fleet renewal and capability upgrades
Other Non-Network	357.8	189.0	233.7	Land & Buildings	208.3	Zetland depot replacement; Homebush depot; Wallsend office replacement
				Furniture, Plant & Equipment	25.4	
Total Non-System Capital	708.5	441.4	489.3		489.3	
Total Network Support Cost	1,166.2	701.8	635.6		635.6	
Total Capital	7,597.5	3,112.9	3,186.7		3,186.7	
AER Allowance	8,392.1	3,522.9				

Key Indicators

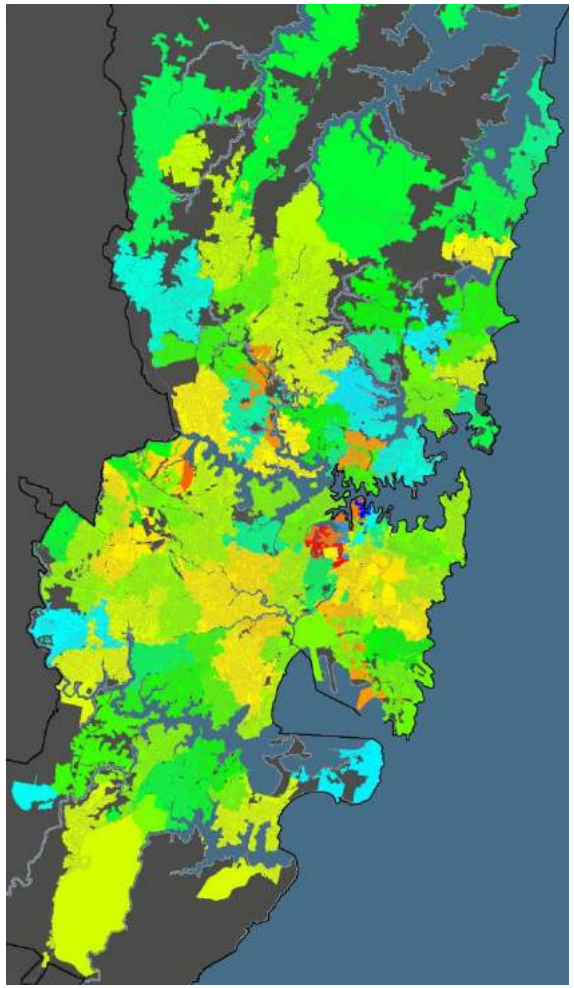
Key indicators of needs:

- Load trends (short term)
- Economic indicators (medium to longer term)
- Customer applications and conversion rates
- Renewable connection rates
- Energy efficiency
- Price elasticity

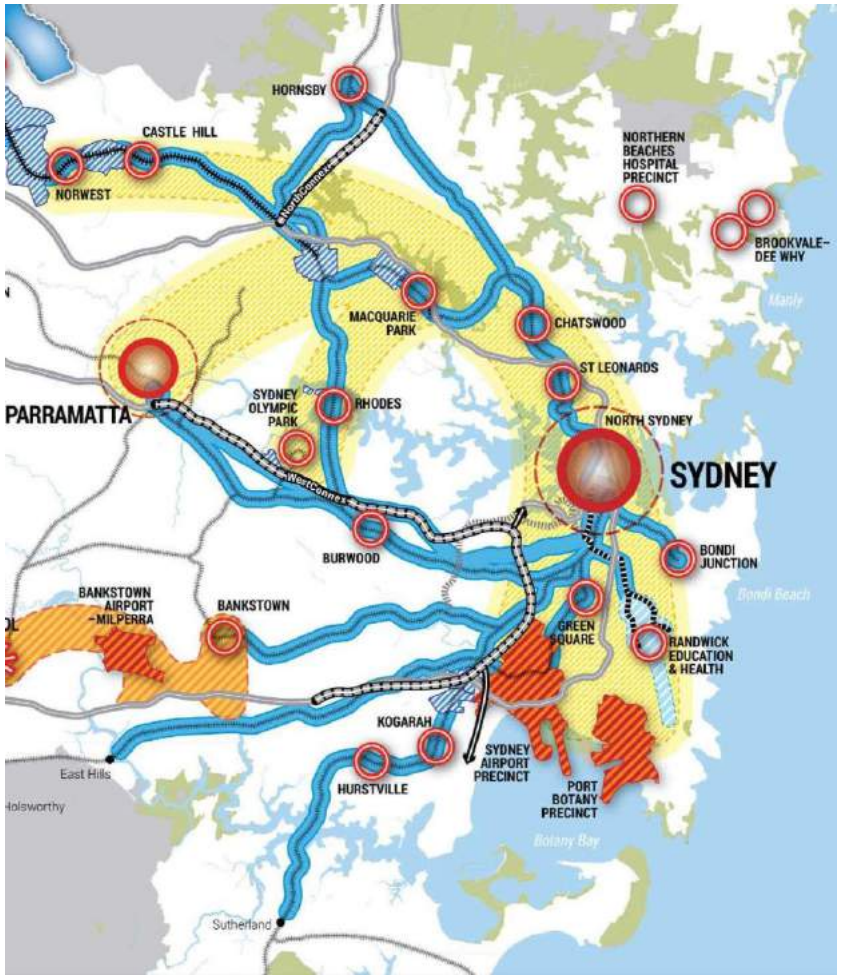
Key changes:

- Major infrastructure projects
- Data centres
- Continuing re development near transport hubs

Growth Centres

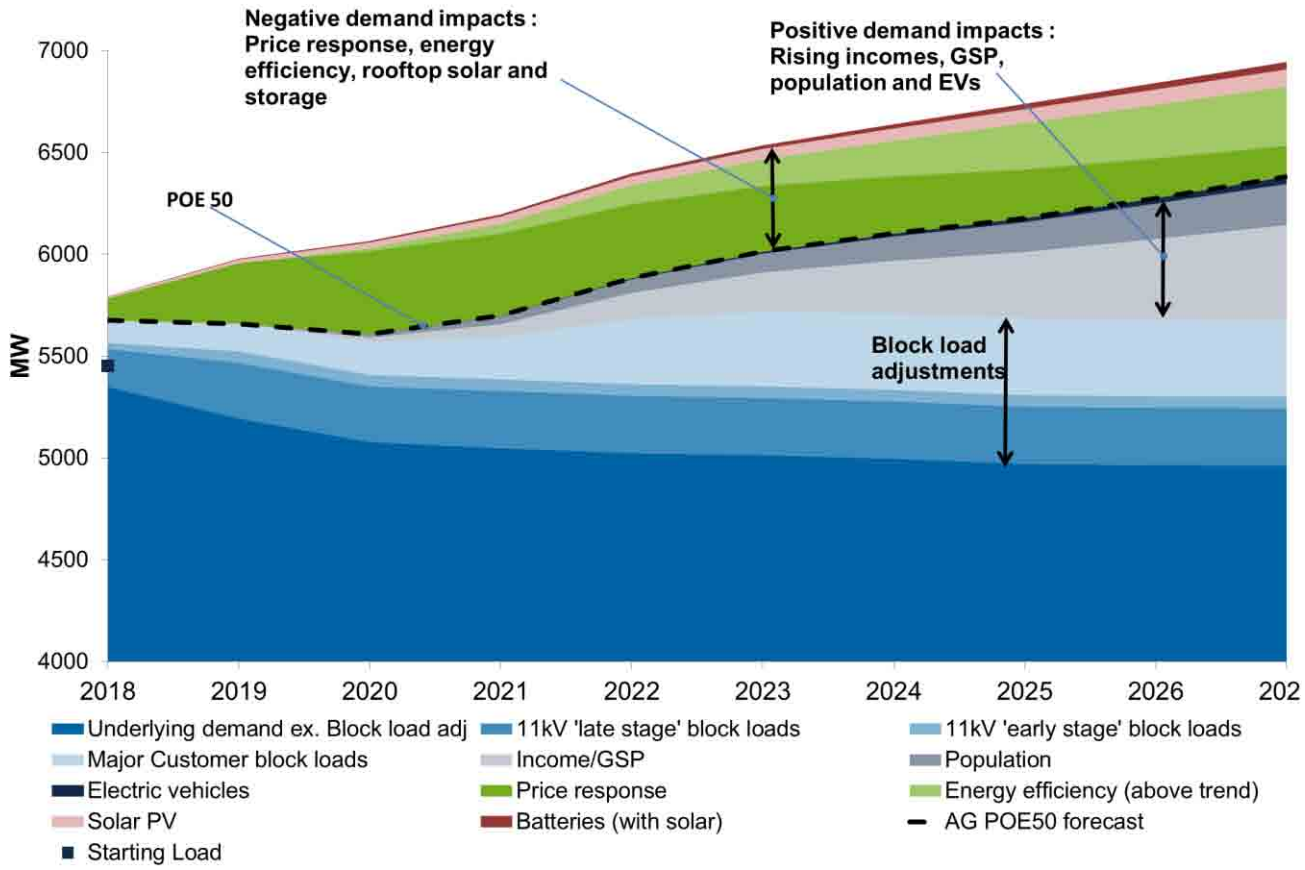


Development Areas



Electricity Demand Forecasts - Process

- Summer and winter forecasts for 181 Zone and 33 sub-transmission substations
- 50 POE (central), 90 POE and 10 POE forecasts (reasonable scenarios test)
- Spatial trend and system level econometric models
- AEMO sourced data for driver variables of NSW GSP, residential household disposable income (RHDI) and residential and non-residential elec prices
- Post model adjustments for energy efficiency, rooftop PV, storage, EVs, population and block loads
- Post model adjustments based on combination of expert external advice and internal analysis
- 2017 methodology review by GHD Advisory



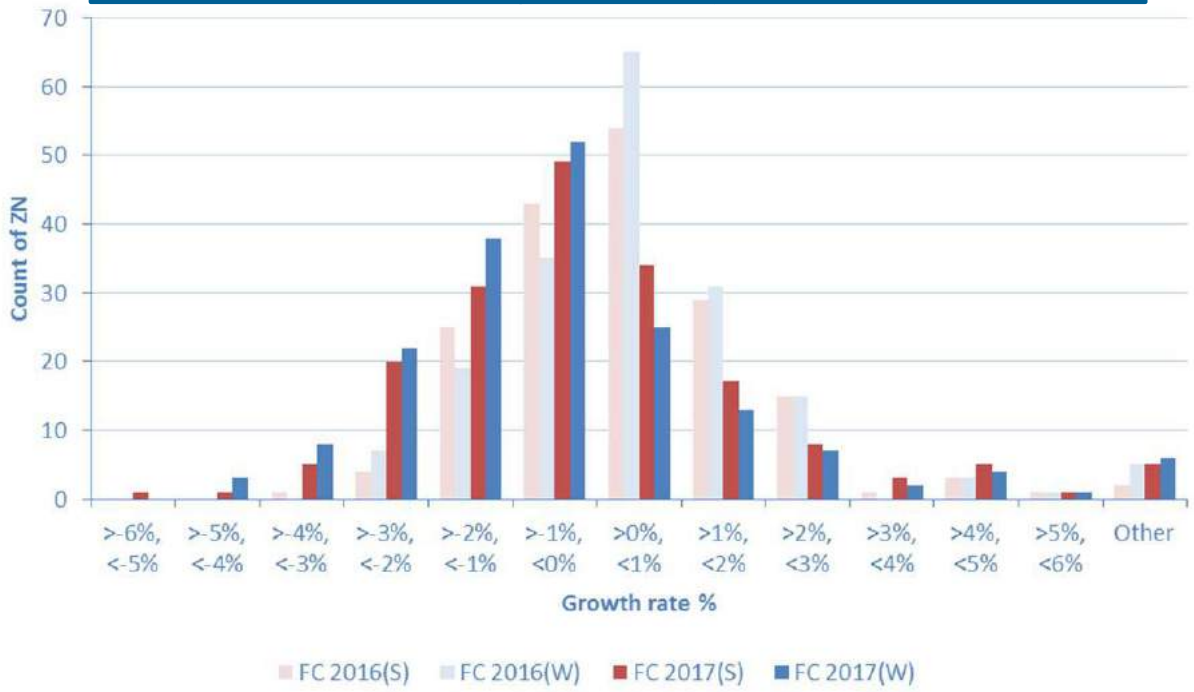
- ❖ Solar PV and storage make only minimal impact in the next 5-10 years (0.98% and 0.35% by 2024)
- ❖ Above trend energy efficiency and price response make largest impact on forecast maximum demand

Electricity Demand Forecasts - Results

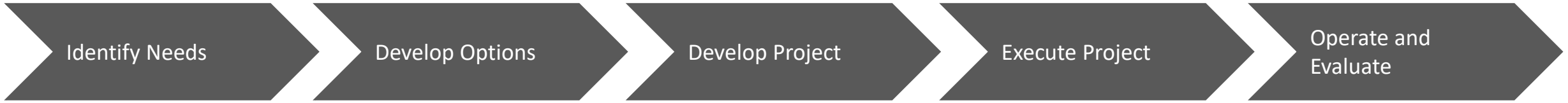
- The proportion of zone substations (ZS) experiencing growth in maximum demand has reduced
- Average growth in ZS maximum demand has reduced
- However ZS growth is very localised and skewed to Sydney - 43% of 11kV customer connections in 15 zones with growth > 3% pa
- New customer connections largest source of rising demand
- Zone substations experiencing growth are aligned with higher density (re)development near transport hubs
- Largest customers connect at subtransmission

Distribution of Annual Zone Substation Growth (FY18-22)

Reduced capacity needs addressed by retirement /renewal when required	Average Growth	Areas where investment in additional capacity may be required



Approach to Decision Making



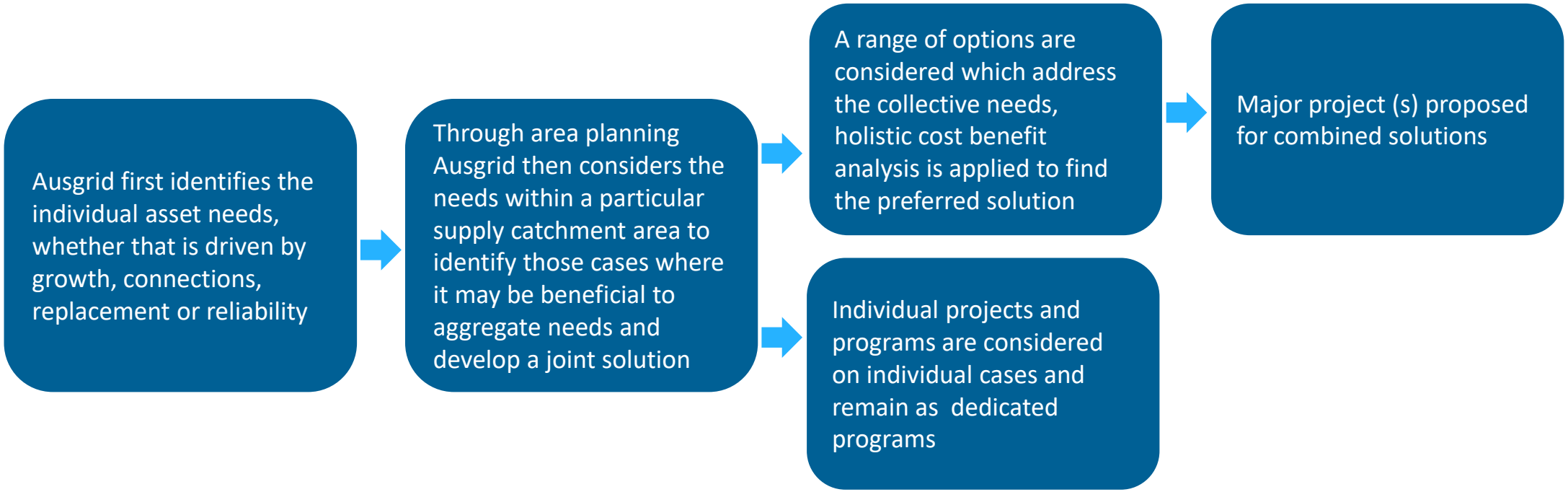
Ausgrid's Company Procedure outlines what is required to obtain approval at various stages of the Network Investment Governance process

Ausgrid have previously implemented this process by means of deterministic planning criteria and have now transitioned to a probabilistic planning criteria in order to promote efficient investment across the asset base by promoting:

- Risk management: Quantifying and managing uncertainty
- Transition from **net present cost** to **net present benefit** for options comparison
- Optimised project timing to maximise return on investments
- Ability to adapt quickly to changes in the planning environment

Approach to Capex Project Development

Ausgrid takes a holistic approach to capital forecasting, both looking at individual asset needs and overall network needs



This has the benefit of both developing more efficient combined solutions and addressing the risk of duplication of projects/programs across drivers

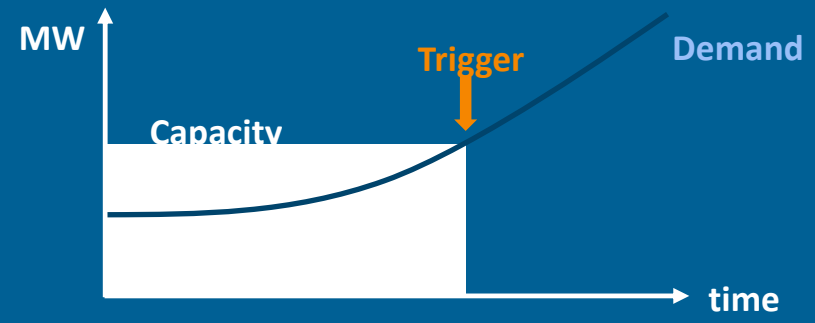
Approach to Decision Making

Old - Load > Capacity

Deterministic (linear)

Investment triggers where **explicit limits** are exceeded, such as Network Capacity

Preferred options are developed at least cost and incorporated into a broader planning strategy, developed to address the emerging network needs.



Asset condition drivers are explicitly defined based on age and condition reports and prioritised according to severity

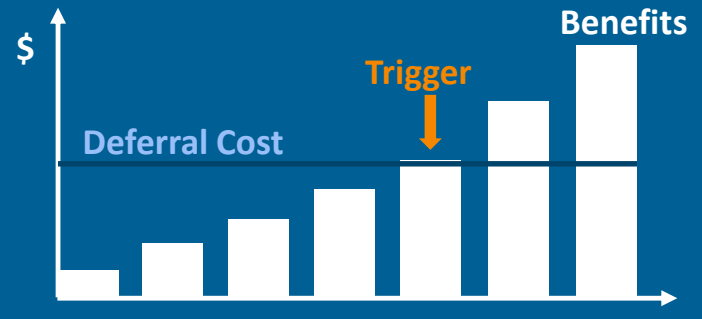
Customer Value > Deferral Benefits

Probabilistic (recursive)

Network risk is quantified according to:

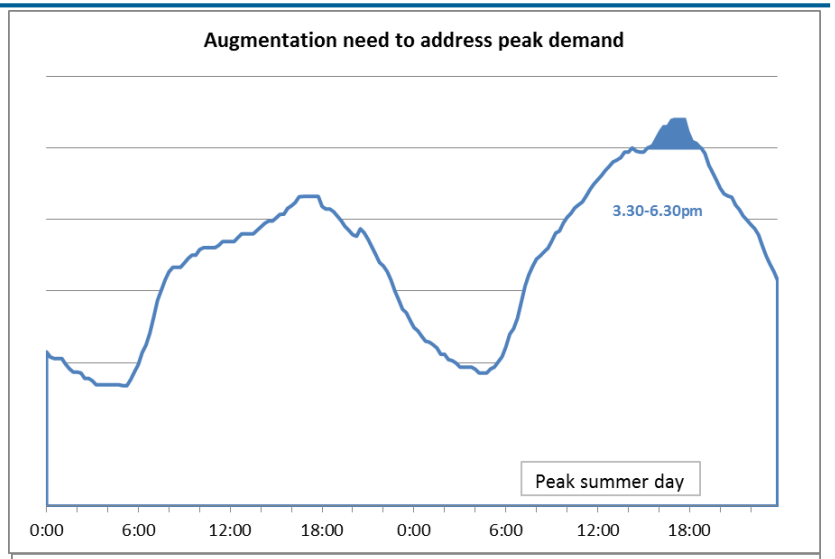
- Asset Condition – rate of failure and restoration time
- Network Capacity
- Quality and Security of supply

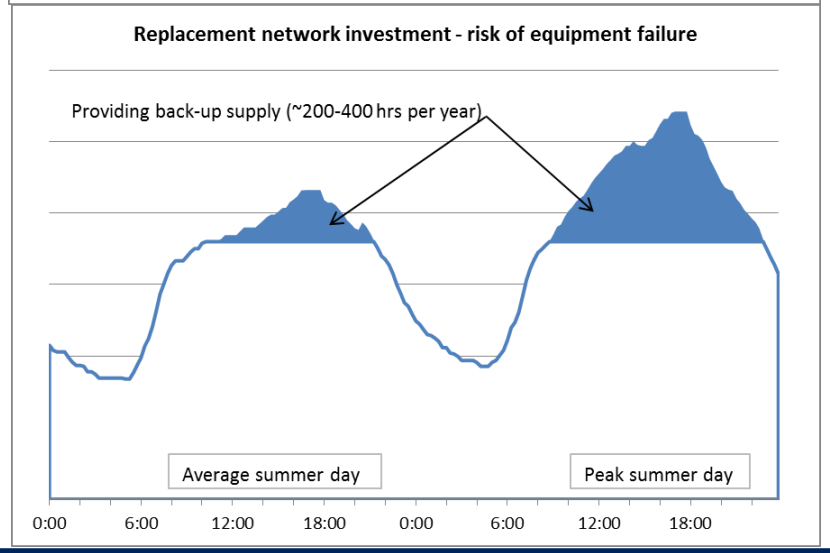
Preferred options are developed with optimised timing determined using a **cost vs benefit** analysis



Demand Management

- Ausgrid considers DM for all capex projects > $1m ($450m total)
- CBA/Probabilistic assessment process
- DM forms part of preferred solution for 6 Repex projects
- $10.5M ($2016/17) in DM Opex for 19-24 period
- New DM solutions to meet Repex deferral requirements
- Portfolio approach required = Solar + Energy efficiency + Demand response (DMIA trial underway to refine techniques)
- ADMS a future enabler





Discussion

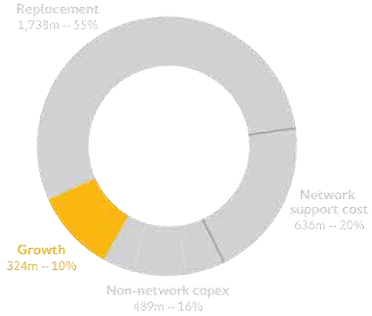
Deep Dive – LV & HV Augmentation

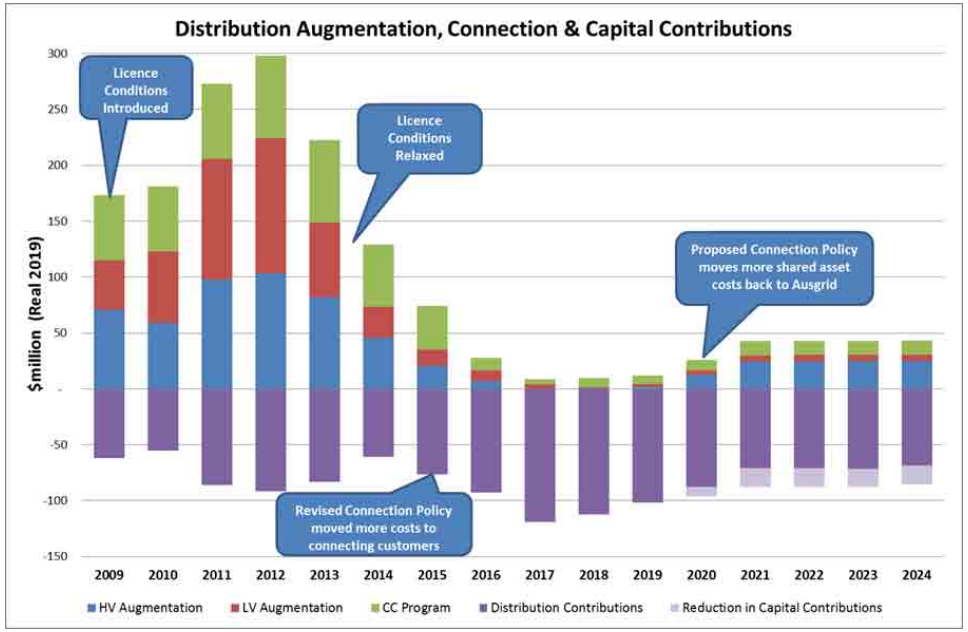
Proposal

We propose to invest $147 million on augmentations and $39 million on connections to the 11kV and LV network in response to new customer applications and organic growth within the network

Counterfactual

If we do not carry out this work, feeders will become overloaded, resulting in increased number of customers impacted by outages and longer switching times before restoration. In some cases pickup of load will not be possible.





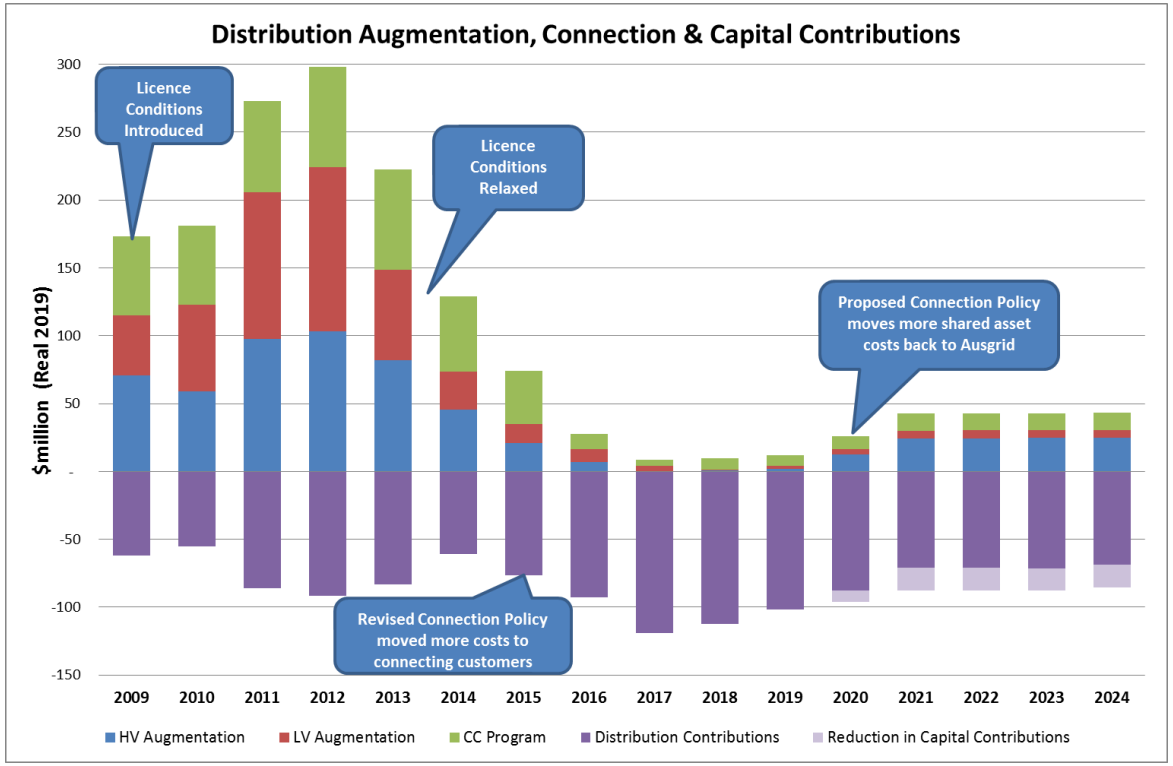
Reasons for Investment

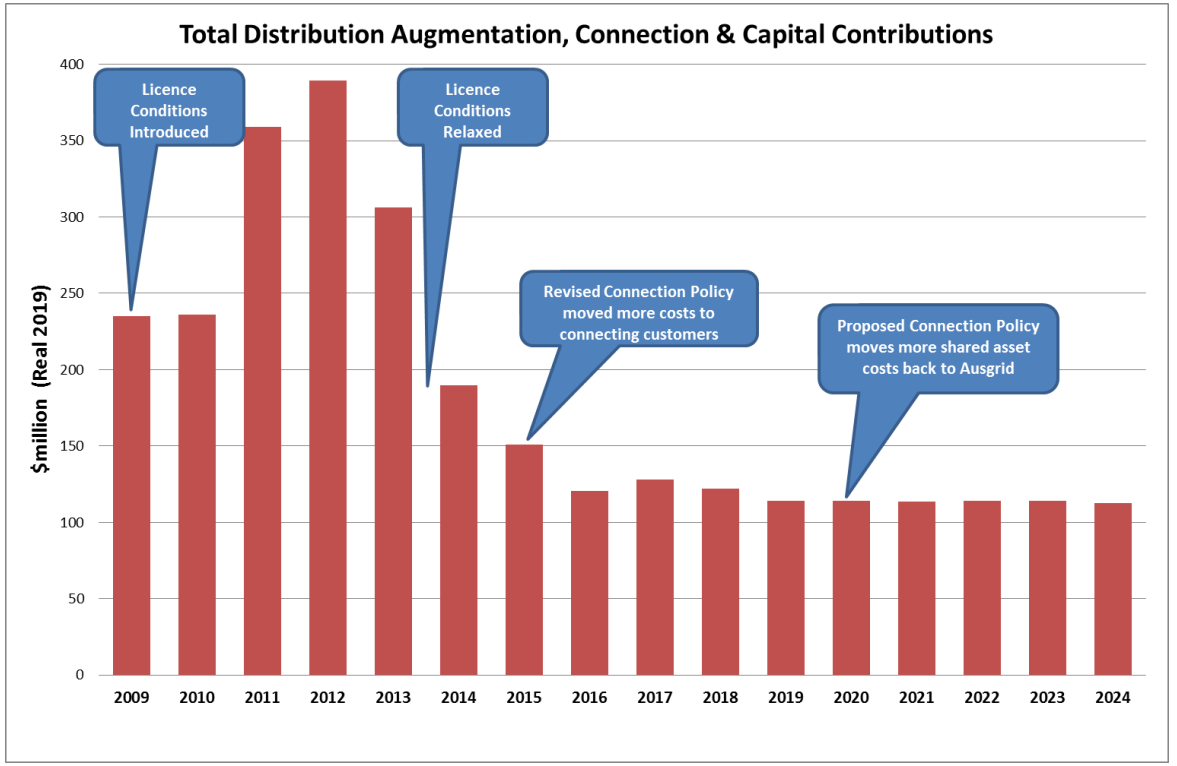
We expect approx. 100,000 extra customers to connect to our network over the 2019-24 period, requiring investment in their connection and upstream augmentation to ensure loads on the shared network are within acceptable limits

Impact on pricing

The proposed project/program will contribute approx. $17 million per annum to revenue requirements by the end of the 2019-24 Regulatory period (or approx. $10 per customer)

11kV & LV Augmentation





Ausgrid's proposed Connection Policy for 2019-24

Connection Policy

- When and how customer's pay for connection services
- Recovered as upfront charge

Augmentation Allowance (AUGEX)

- Amount that Ausgrid can spend on network development
- Recovered via tariffs

Equitable allocation of costs

- Connecting customer's still fund dedicated assets
- Similar customers pay similar costs
- Lower up front expenses

Efficient network development

- Holistic consideration of network needs to access economies of scale
- Greater opportunity for demand management
- Reduced design and administration costs

Approach to Connections and Augmentation

Assessing the need for augmentation

- Augmentation capex has been assessed by modelling local load growth from the maximum demand forecast against existing feeder configuration and capacities to identify locations where the load on a feeder could not be picked up from adjacent feeders in the event of a failure.
- In urban areas capital investment has been proposed to augment the capacity of the network to the point where the increased load could be picked up from adjacent feeders post augmentation
- In non urban areas the network is generally less dense, in most cases radiates from smaller urban areas such as towns. Not all loads can be completely picked up from adjacent feeders due to lack of interconnection.
- In non urban areas the capex program proposed would address only approximately 50% of the load growth which could not otherwise be picked up.
- The total augmentation needs are then divided between those which will be met by connecting customers and those which will require funding by Ausgrid.

Connections

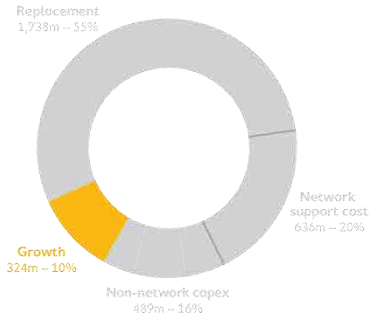
- Current policy had imposed cost of deeper augmentations on connecting customers, over and above the costs of dedicated connection assets
- Impact is approximately **$80 million** move between customer funded connections and Ausgrid's augmentation capex

Discussion

Deep Dive – Rozelle Subtransmission Substation

Proposal
We propose to invest $26 million on augmentation of Rozelle Subtransmission Substation to install a 33kV busbar and upgrade 132/33kV transformer capacity

Counterfactual
If we do not carry out this work Westconnex load can not be supplied and we will forego the opportunity for achieving economies by consolidating a number of overlapping needs to develop a joint solution. We would also fail to take advantage of the marginal cost aspects of this established site

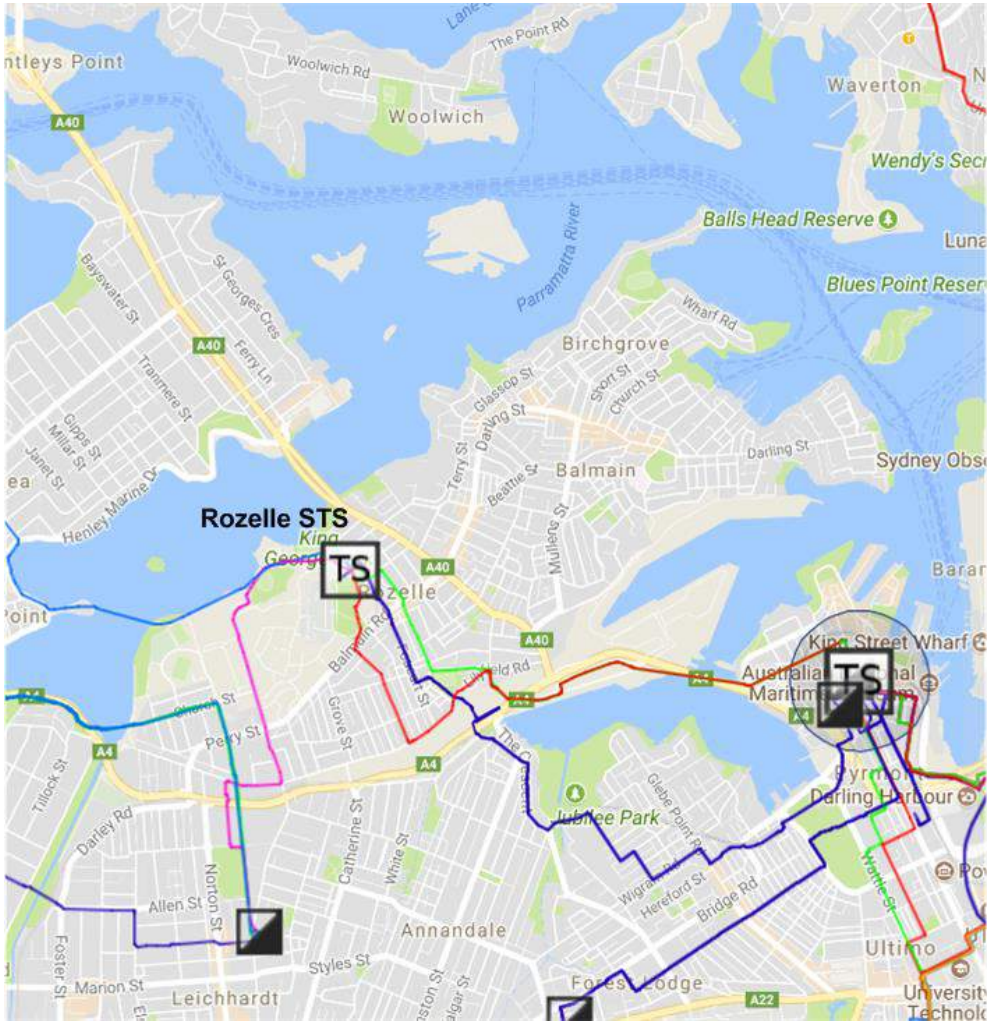


Reasons for Investment
The Westconnex road project will take a major 33kV supply from Rozelle STS, adjacent to the interchange with Victoria Rd and the proposed Western Harbour Tunnel. It is also the logical point to provide supply to the Western Harbour Tunnel , White Bay precinct as it is developed and for adjacent redevelopment

Impact on pricing
The Rozelle STS upgrade will contribute approx. $1.8 million per annum to revenue requirements on completion (or approx. $1 per customer)

Deep Dive – Rozelle Subtransmission Substation

- Rozelle 132/33kV STS is situated close to the junction between Victoria Road, and the Western Distributor.
- It is interconnected to Drummoyne, Leichhardt, Pyrmont and City Central substations at 132kV. It supplies 33kV to the Sydney Trains network.
- The substation has one 60MVA and one 30 MVA 132/33kV transformer for a firm capacity of just over 30MVA. It has a 132kV busbar which is relatively young and in good condition. There is currently no 33kV busbar
- Significant 33kV loads are expected in surrounding areas in the near term
- The marginal cost to upgrade Rozelle STS to consider and cater for the combined impact of these loads leads to the proposed option



Deep Dive – Rozelle Subtransmission Substation

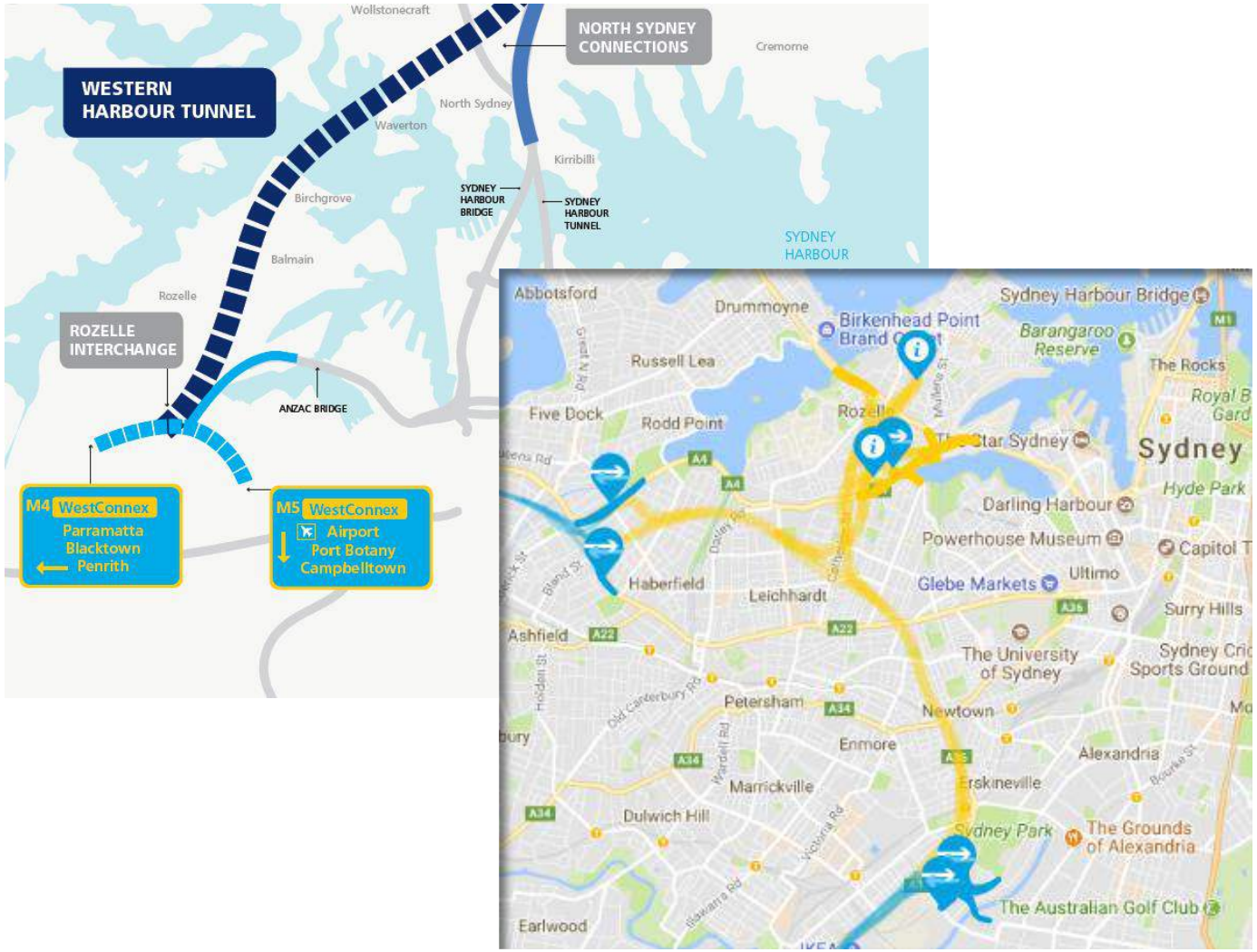
The Rozelle interchange, near the existing Victoria Rd & Western Distributor junction is one of several Transport NSW major transport infrastructure projects across Sydney.

The Rozelle Interchange links:

- WestConnex M4 transport corridor from Parramatta
- WestConnex M45 corridor to Sydney Airport
- ProposedWestern Harbour Tunnel

Rozelle STS is the preferred electrical supply point due to proximity to the proposed interchange site

Rozelle is well located to supply 33kV loads for White Bay redevelopment precinct and Balmain Peninsula, either directly, or via a zone substation

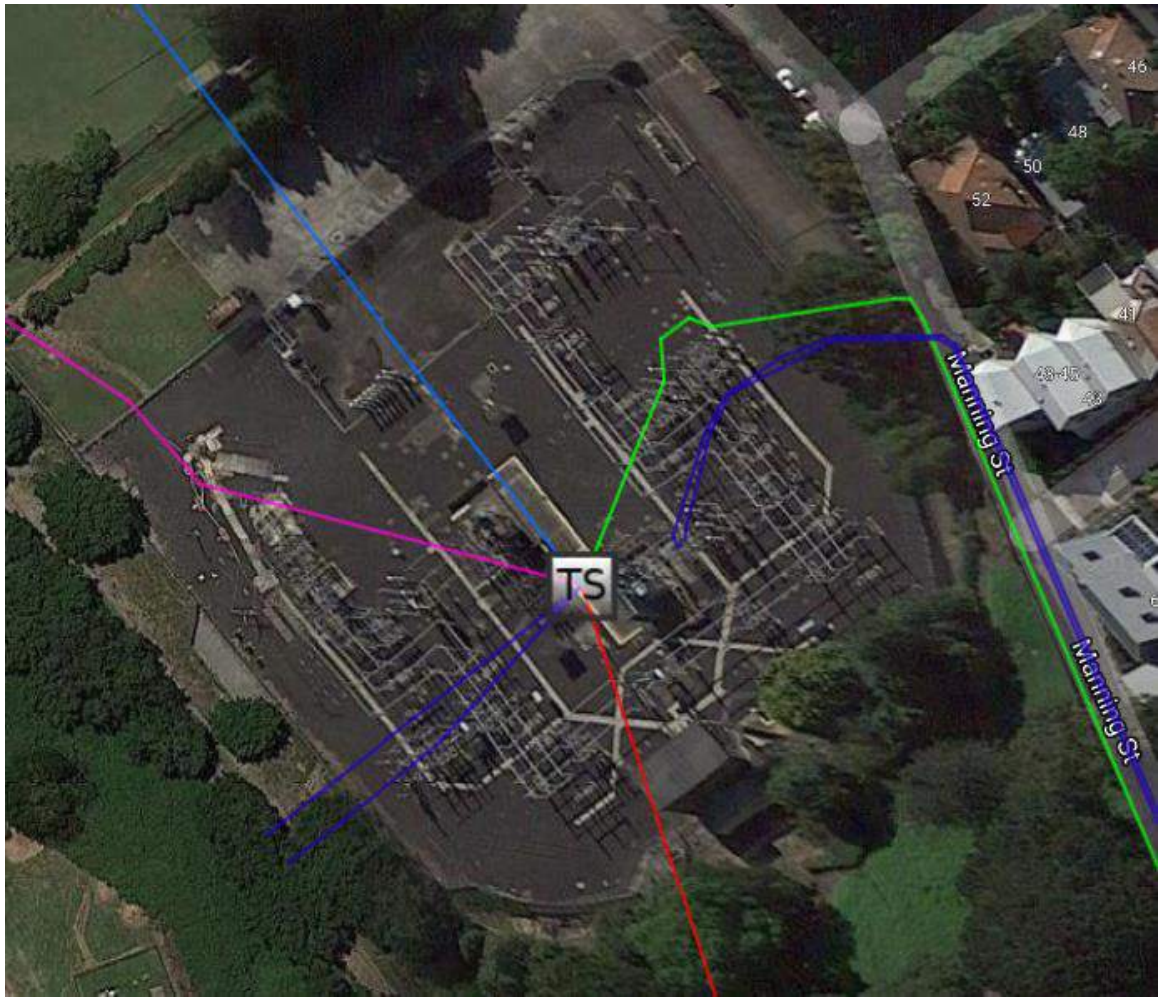


Deep Dive – Rozelle Subtransmission Substation

Customer	Initial Load	Comments
Loads included in Planning Forecast:		
Existing Sydney Trains	13 MVA	
WestConnex Stage 3	23.6MVA	Potential for further 9.4 MVA
Western Harbour Tunnel	20 MVA	Potential for further 12 MVA
Loads NOT included in Planning Forecast due to insufficient certainty:		
White Bay Cruise Terminal	Potential for up to 13.5 MVA	
White Bay Precinct	Potential for up to 60 MVA over the 2019-2035 period	

Deep Dive – Rozelle Subtransmission Substation

- Preferred strategy is to upgrade the supply capacity at Rozelle STS to allow for foreseeable connections.
- 132/33kV transformer upgrade and the addition of a new 33kV switchable busbar, will supply capacity in excess of 70MVA .
- Provision to expand further in the longer term via upgrade of the 2 x 60 MVA transformers to 120 MVA.
- Solution fully utilises Rozelle STS at the existing location
- Takes advantage of existing 132kV busbar, feeder connections and site facilities in a location, well suited to connection of 33kV feeders.
- Establishment of a new site in the area would be very costly and would be of considerable community concern



Discussion

8.2

Non-network ICT

Non-network IT capex

Stakeholder Consultation 7 February

Hannah McCaughey

Ausgrid

Information technology

Today we will cover

- Capex Summary
- Our IT environment
- Key drivers
- Trends in capex
- Top 3 programs

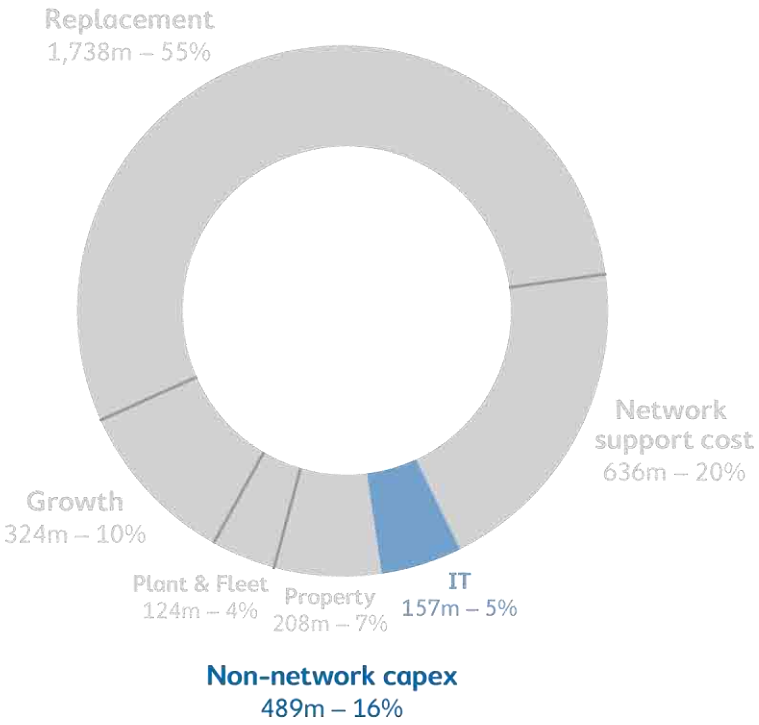
Summary of proposal – IT

Proposal

We propose to invest $157 million to maintain and adapt technology in line with normal IT industry changes to deliver safe, secure, reliable and affordable customer service and business operations.

Counterfactual

If we do not make this investment then the business operations will be significantly disrupted. There would be an increased risk of a significant cyber security breach. Increased risk of non compliance with licence conditions, laws and regulatory obligations.



Reasons for investment

IT technology underpins critical business processes, the program reduces the risk of potential failure and/or unplanned production outages.

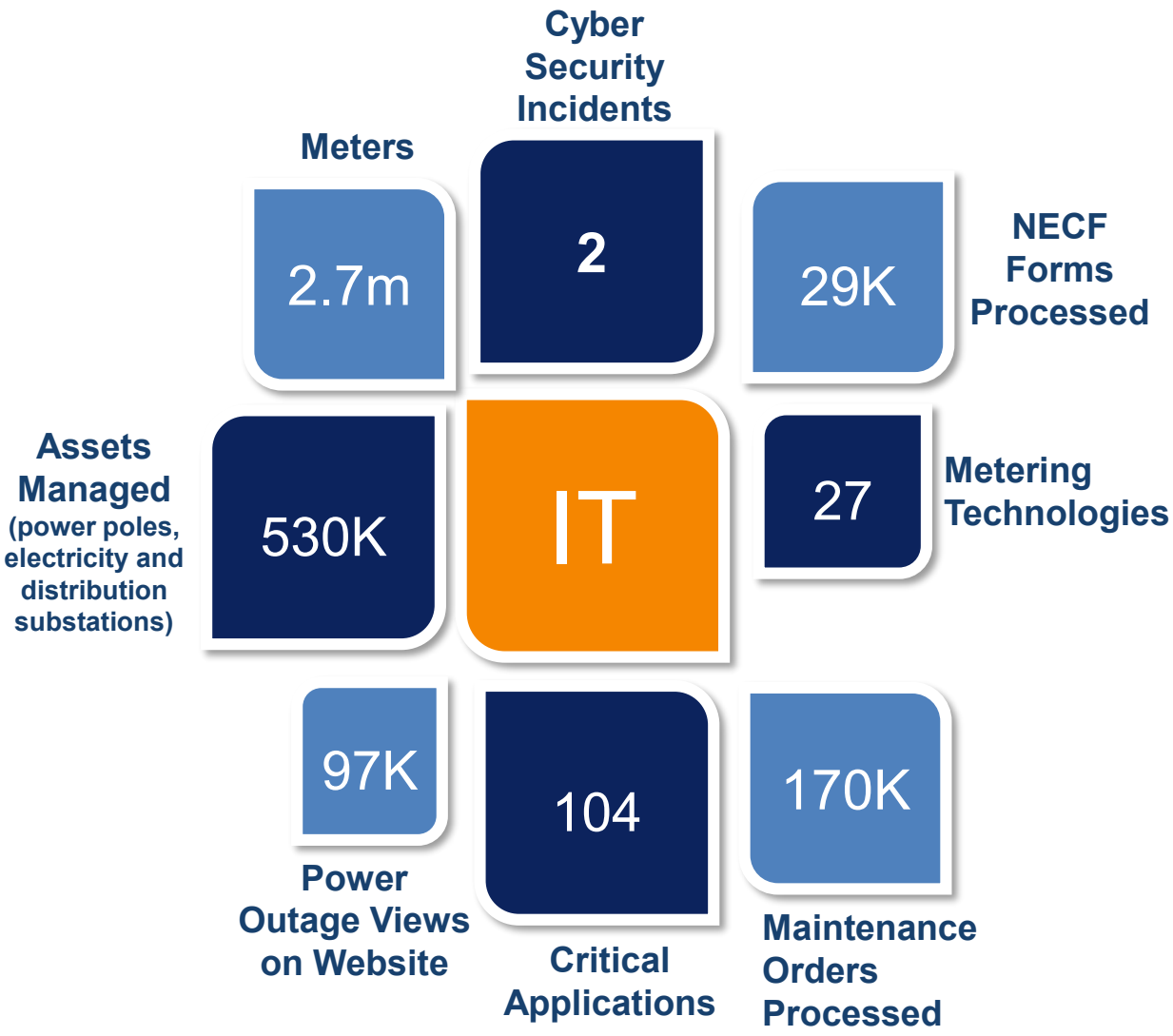
To comply with regulatory requirements including critical infrastructure and licence conditions. Provide customers with improved access to information and data and to improve data driven decisions

Impact on pricing

The total investment of $157 million on IT will contribute around $71.7 million to revenue requirements by the end of the 2019-24 regulatory period or an average of $40 per customer. This is represents a price impact of around 0.66%.

Our IT environment

- **Applications** that enable business operations required to run the network
- **Security** programs and hardware that provide secure links and detect intrusions
- **Communications** and storage of data
- **Devices** to support workplace and field activities



Information technology plan

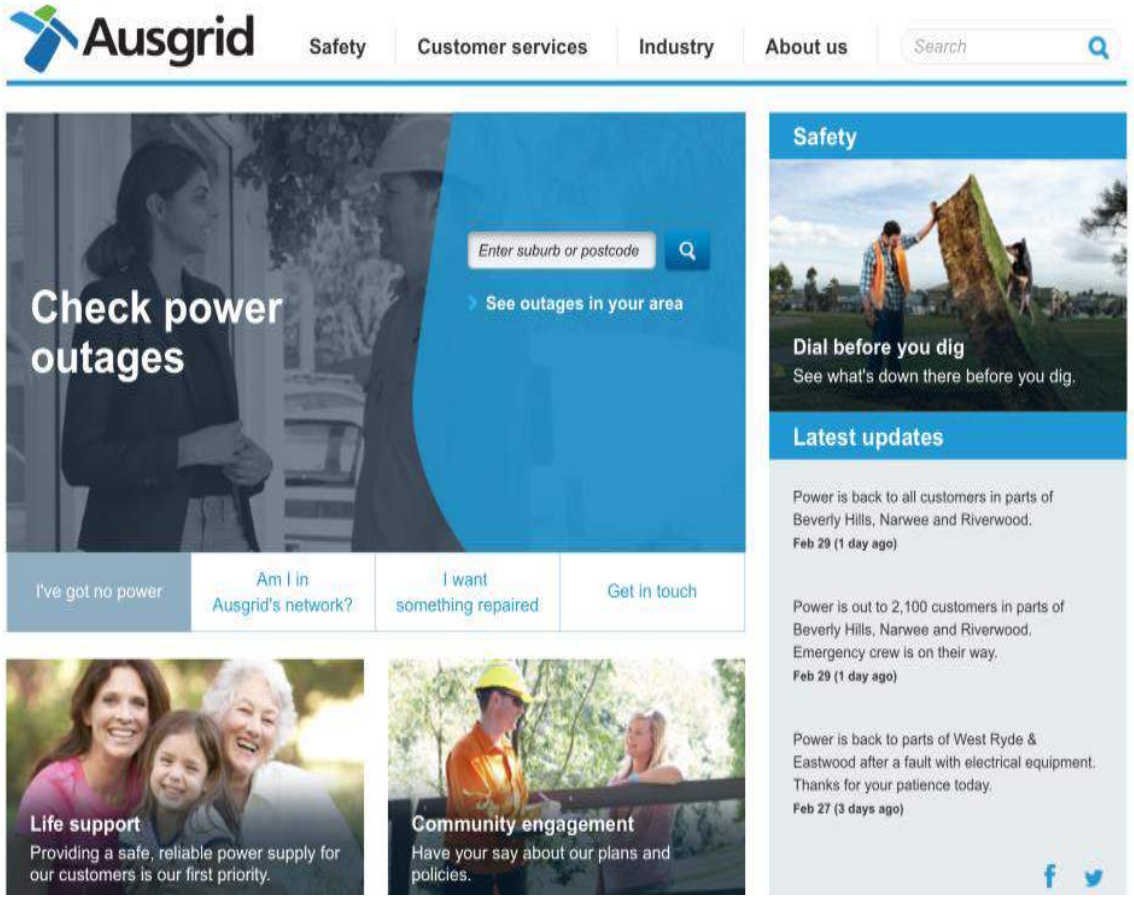
Key Drivers

- **Maintain** safe, reliable and affordable customer service and business operations
- **Protect** the electricity network, our staff and customer information
- **Comply** with licence conditions, laws and regulatory obligations
- **Adapt** Ausgrid systems and capabilities to form data driven customer centric decisions

Information technology plan

What it means for customers

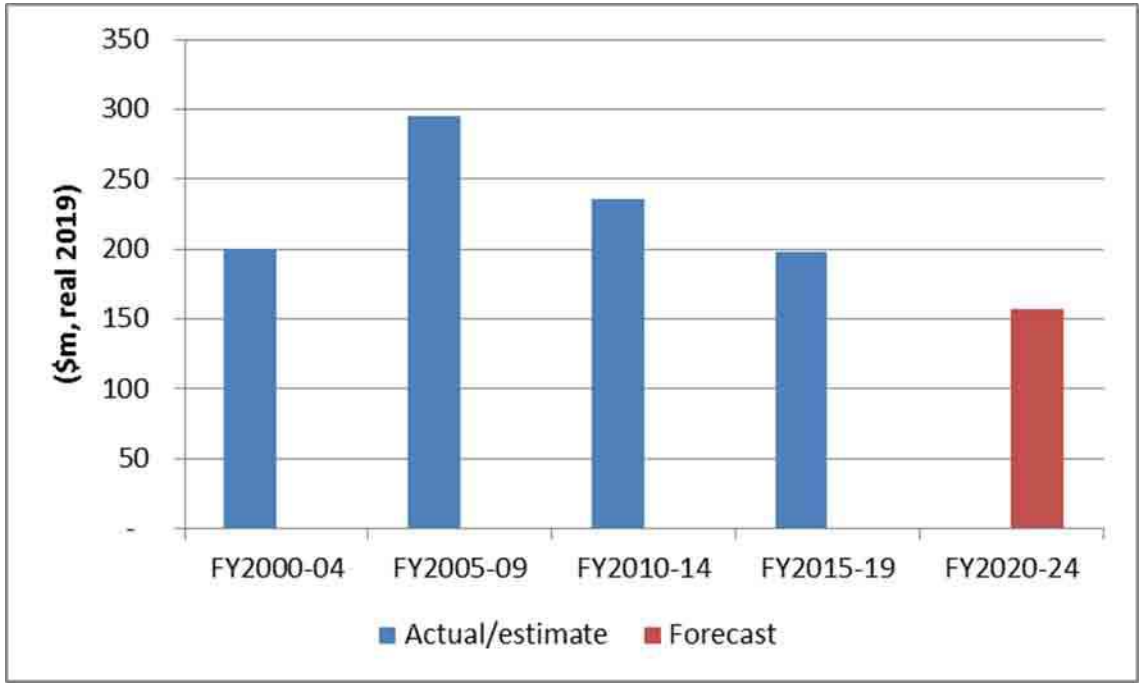
- **Safe** and **secure** services
- Increased **responsiveness**
- **Access** to data
- Improved **affordability** enabled by technology



Trends in IT Capex

Long Term Trends

- Historically IT non network investments are refreshed every 3-5 years
- Investment in modernising the technologies commenced in FY18
- Focus on sustainable IT Capex investment
- Non network capital investment per DNSP customer is below other Australian utilities as indicated in KPMG 2016 Utilities IT Benchmark

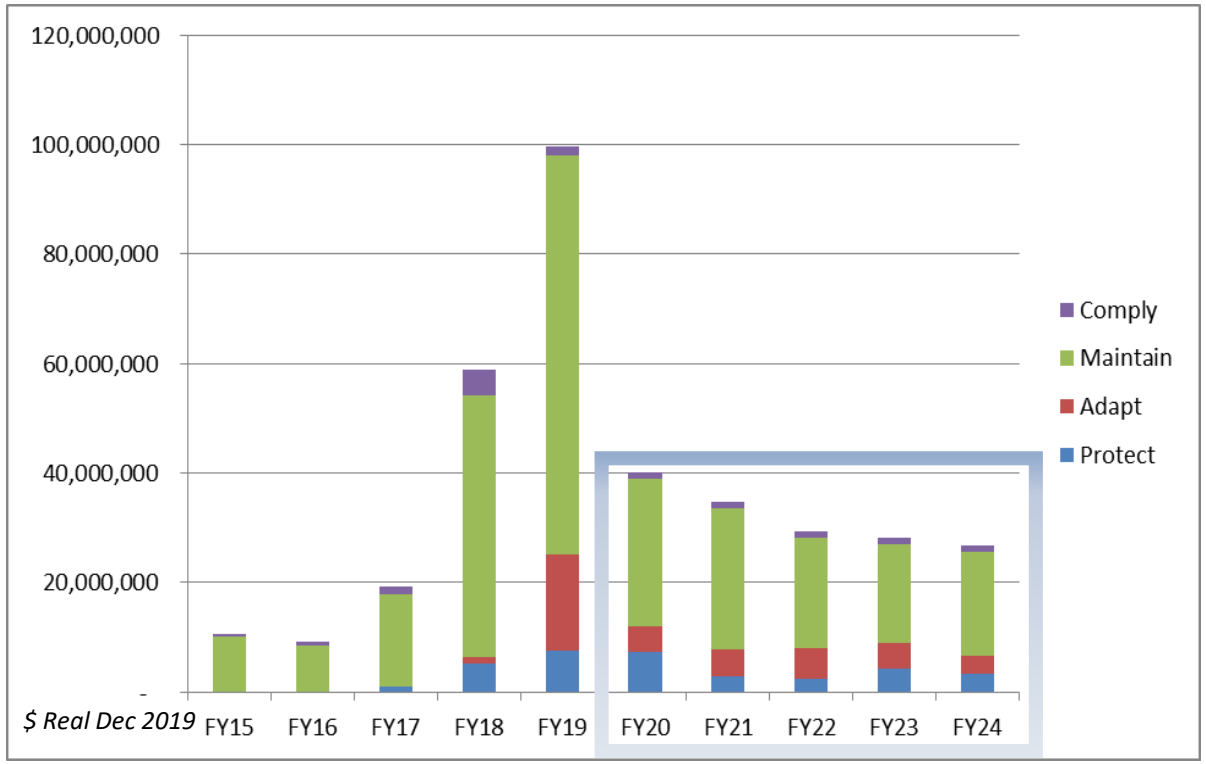


IT capex forecast by key driver

FY20-24 IT capex forecast $156.9m is lower than $197.7m in prior period

- Maintain technology in line with IT industry changes
- Consistent compliance investment
- Increased investment in cyber protection
- Adapting technology to align with customer expectations and better decision making

Forecast by key driver



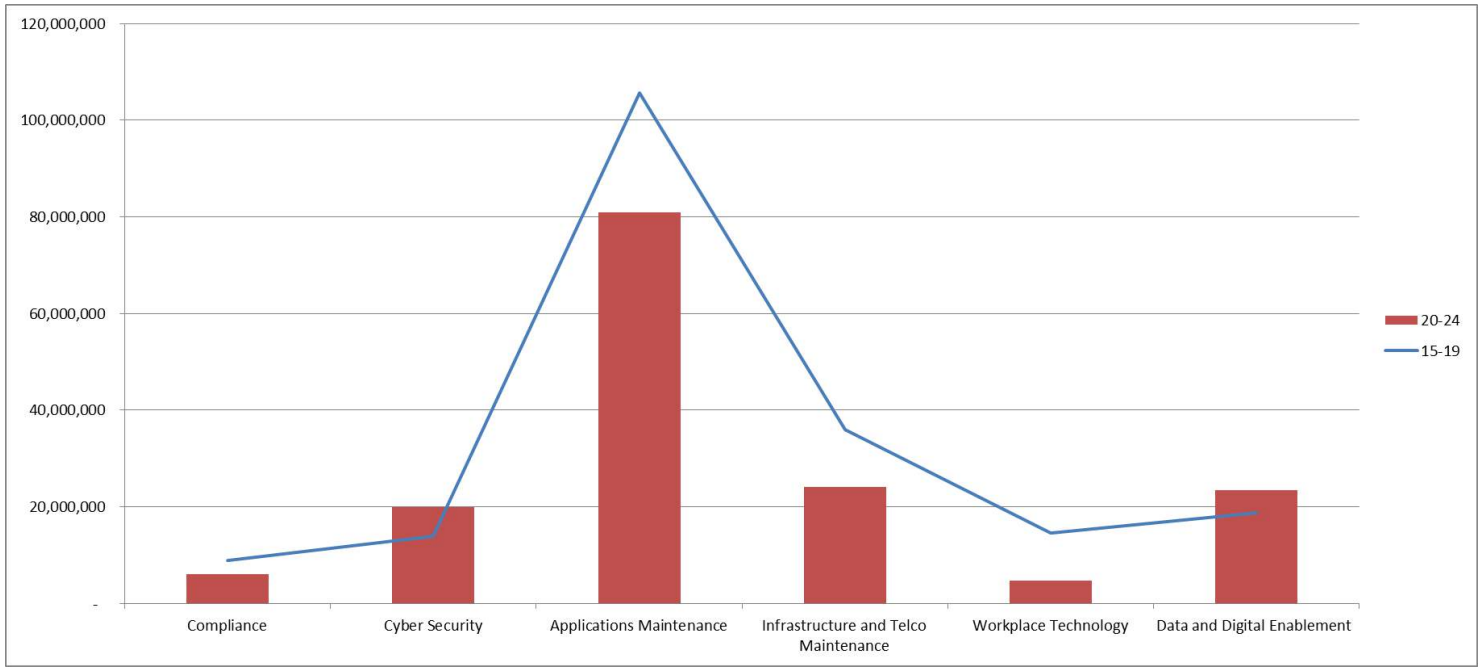
Reduction in IT Capex following significant change

IT capex forecast by program

Capex investment is changing in line with IT industry trends

- Compliance program remains steady
- Sustainable cyber program
- Cloud applications and platforms reduce capex
- Data and digital supports proposed efficiencies

Forecast by program



Top 3 programs

- Application Maintenance
- Cyber security
- Data and Digital Enablement

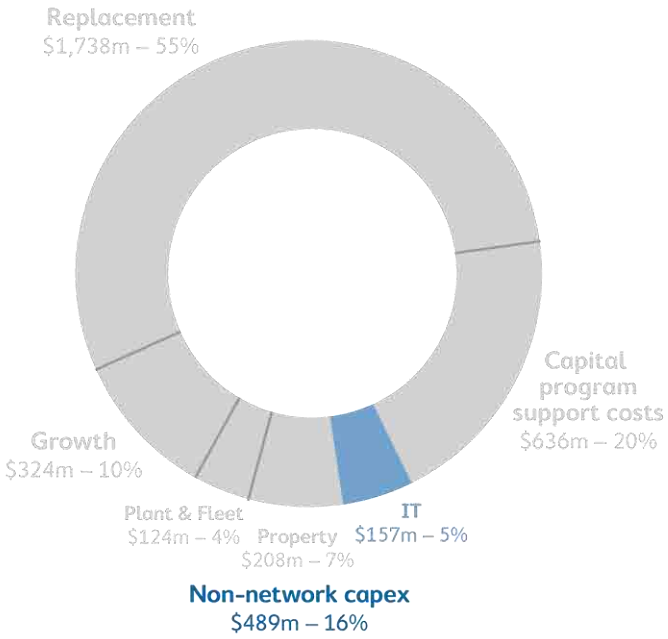
Application Maintenance Program

Proposal

We propose to invest $81m into an IT Maintenance Program to deliver safe, reliable and affordable customer service and business operations. The program classifies applications and defers investment based on business impact to critical business processes, risk assessments, supplier roadmap timing and application lifecycle.

Counterfactual

If we do not undertake this program, then we increase the risk of vulnerabilities, security breaches and downtime for business operations. This would also introduce inefficient ways of working, increased operational spend with people doing manual processes, and non compliance to regulatory requirements. There are safety impacts for all customers, including life support customers, hospitals, schools and transport if services are impacted.



Reasons for investment

A program of work to maintain end of life applications has been established to ensure current versions of critical IT applications continue to be vendor supported and security patches applied.

This will ensure application technical currency is maintained reducing the risk of potential failure and/or unplanned production outages.

Impact on pricing

The total investment of $81 million on IT Maintenance will contribute around $42 million to revenue requirements by the end of the 2019-24 regulatory period or an average of $23 per customer. This is represents a price impact of around 0.4%.

Cyber Transformation Program

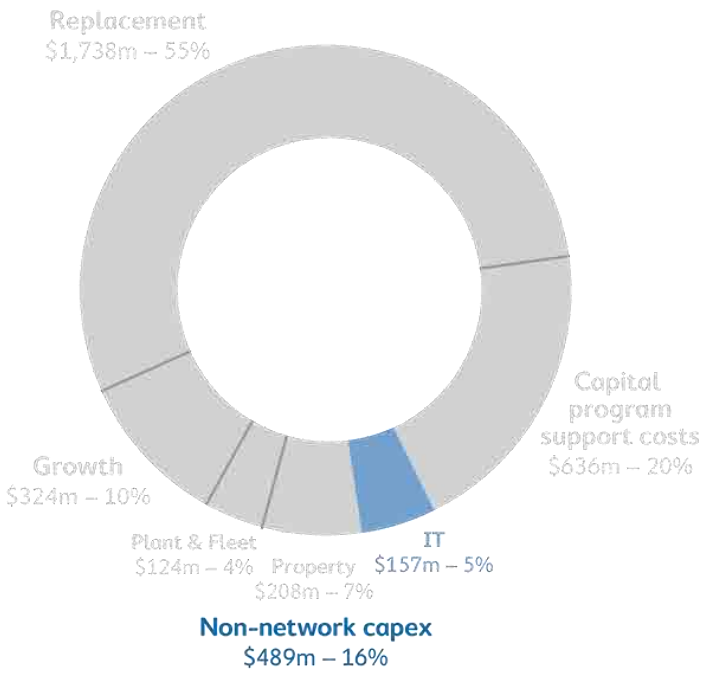
Proposal

We propose to invest $20m to reduce risk of our critical systems being impacted by cyber attacks, virtual or physical, in response to recent global security events and continued compliance with licence conditions. This investment protects our people, our assets and customers from cyber threats.

Counterfactual

If we do not undertake this program we are at a high risk of impacts from cyber threats which could expose critical information about our supply of electricity and release personal information. This would also lead to service interruptions to Sydney's financial hub, defence, industry and customers.

We will be non compliant with our licence conditions.



Reasons for investment

Cyber crime and attacks are a very real threat in the world we live in today.

We operate critical infrastructure in a high and increasing threat environment. We support 20% of the nations GDP and 40% of the NSW population. There are rapid changes occurring in global markets making us an attractive target.

Impact on pricing

The total investment of $20 million on cyber transformation represents will contribute around $10 million to revenue requirements by the end of the 2019-24 regulatory period or an average of $5.5 per customer. This is represents a price impact of around 0.09%.

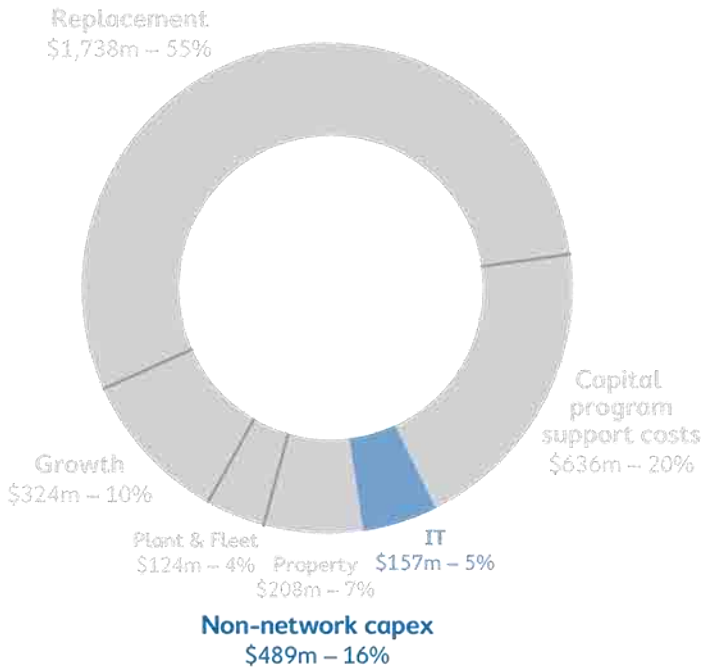
Data and Digital Enablement Program

Proposal

We propose to invest $23m into a Data and Digital Enablement Program to provide the data and digital technologies required to support the efficiencies already built into the proposal and meet changing customer expectations.

Counterfactual

If we do not undertake this program, our costs will increase as we will continue to manage using old technologies creating manual processes for both our customers and our employees. Without programs that enable the use of digital technologies, safety, response times and investment decisions will not improve.



Reasons for investment

The IT industry is moving to digital technologies which create insights enabling better decision making for capital investments, forecasting maintenance, and introduces safer ways of working.

This investment provides better intelligence from data to meet customer expectations of faster response times and real time information.

Impact on pricing

The total investment of $23 million on data and digital enablement contribute around $14 million to revenue requirements by the end of the 2019-24 regulatory period or an average of $7.8 per customer. This is represents a price impact of around 0.13%.

8.2

Non-network Capital Program Support Costs

Capital Program Support Costs

Stakeholder Consultation 7 February

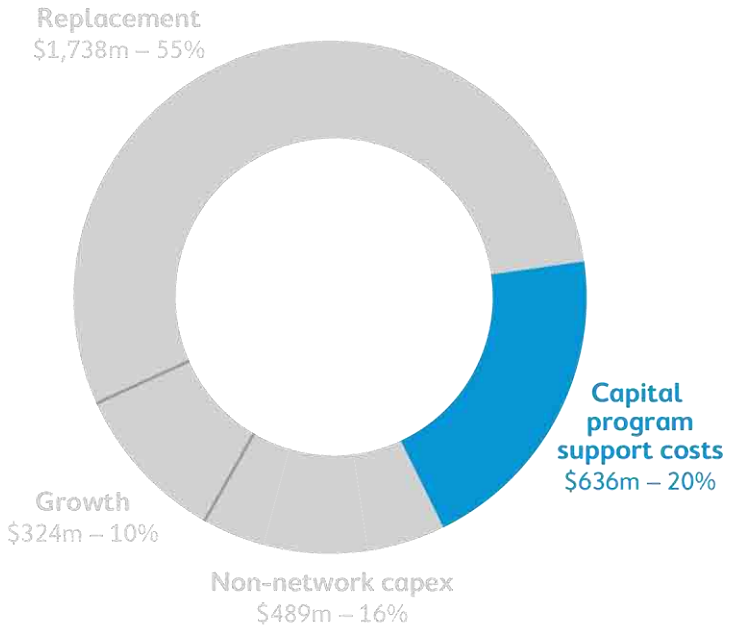
Jacob Muscat

Ausgrid

Capital program support costs

Proposal

We propose to invest $636 million on support costs for the 2019-24 capital program (real $ FY19).



Reasons for investment

The investment is needed to support and deliver the Augmentation, Replacement and Non-Network capital programs.

Counterfactual

If we do not invest we will not be able to appropriately support and deliver the proposed Augmentation, Replacement and Non-Network capital programs.

Impact on pricing

The total investment of $636 million will contribute around $106 million to revenue requirements by the end of the 2019-24 regulatory period or an average of $58.70 per customer. This represents a price impact of around 0.97%.

Capital program support costs

Description

Capital program support costs are costs allocated to capital projects in accordance with Australian Accounting Standards and Ausgrid's Cost Allocation Methodology (CAM) approved by the AER.

Capital program support costs comprise of two distinct components:

1. Network Planning

- Costs related to the Network Planning function within Ausgrid.
- Team responsible for network planning activities, developing Ausgrid's capital investment programs and major projects and seeking related approvals.
- Network Planning costs are recognised as capital expenditure when incurred.

2. Indirect Support Costs

- Costs related to other functions and services that support the capital program, but which cannot be directly attributed to a specific capital project.
- Includes divisional management and business support functions, certain corporate support functions, fleet, logistics and procurement and IT (see next slide for further detail).
- Indirect support costs are allocated to projects and programs via the use of labour and non-labour costing rates.

Capital program support costs

Table 1: Indirect capital program support costs

Item	Description	% of Indirect Support Costs[1]	Proposal 2019-24 (Real $'m FY19)
Network divisional management and business support functions	Costs related to the management and supervision of capital projects and programs, scheduling jobs, admin support and safety briefings	64%	$358
Fleet	Vehicle running costs (i.e. fuel, registration, insurance and servicing), vehicle lease costs and costs associated with running the fleet function	20%	$112
Corporate support functions	Includes certain corporate support functions including: ***Finance Operations:*** payroll, accounts payable/receivable and transactional processing; ***Commercial Finance:*** financial and decision support; ***Human Resources:*** employee relations and recruitment; and ***Safety Operations:*** safety support and awareness services.	9%	$50
Logistics, warehousing and procurement	Costs of logistics, warehousing and procurement functions	4%	$22
IT	Certain IT costs such as desktop support, computer / device leasing and telecommunication charges	3%	$17
Total			**$559**

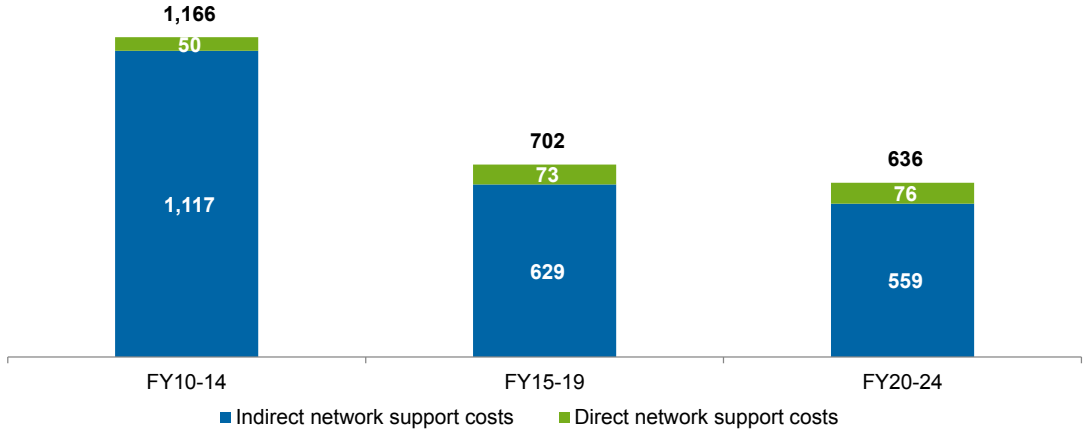
[1] Based on FY18 budget

Capital program support costs

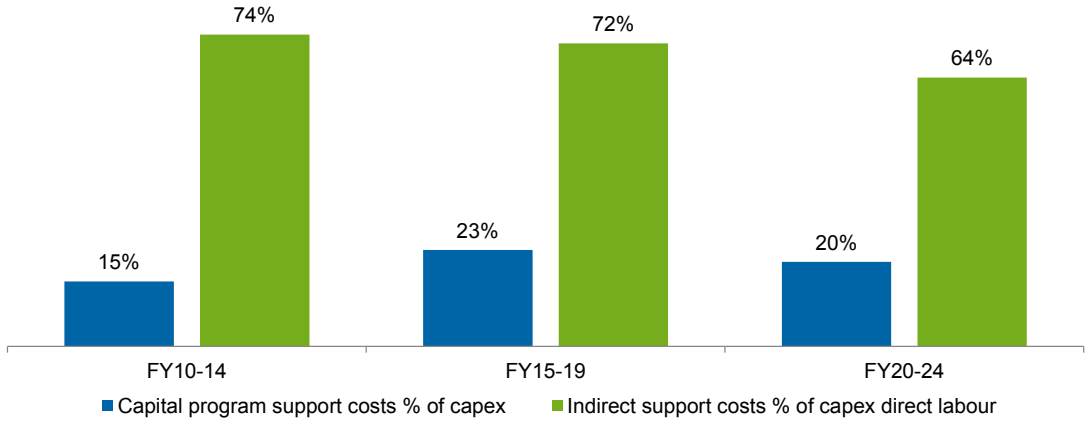
Trends

- Capital program support costs have decreased significantly in the current regulatory period, both as a percentage of direct labour and in dollar terms.
  - From ~$230m per annum in FY10-14, to ~$125m in FY18.
  - From 74% of direct capex labour in FY10-14, to 64% of direct capex labour in FY18.
- Decrease is driven by sustainable cost reductions arising from Ausgrid's Transformation Program – decreases in total cost pool resulting in lower indirect support costs allocated to capital.
- Support costs for the FY20-24 period have been forecast based on the current level of support costs to direct capex labour (i.e. 64% of forecast direct capex labour).

Support costs (real $ FY19)



Support costs as a % of total capital program and direct labour



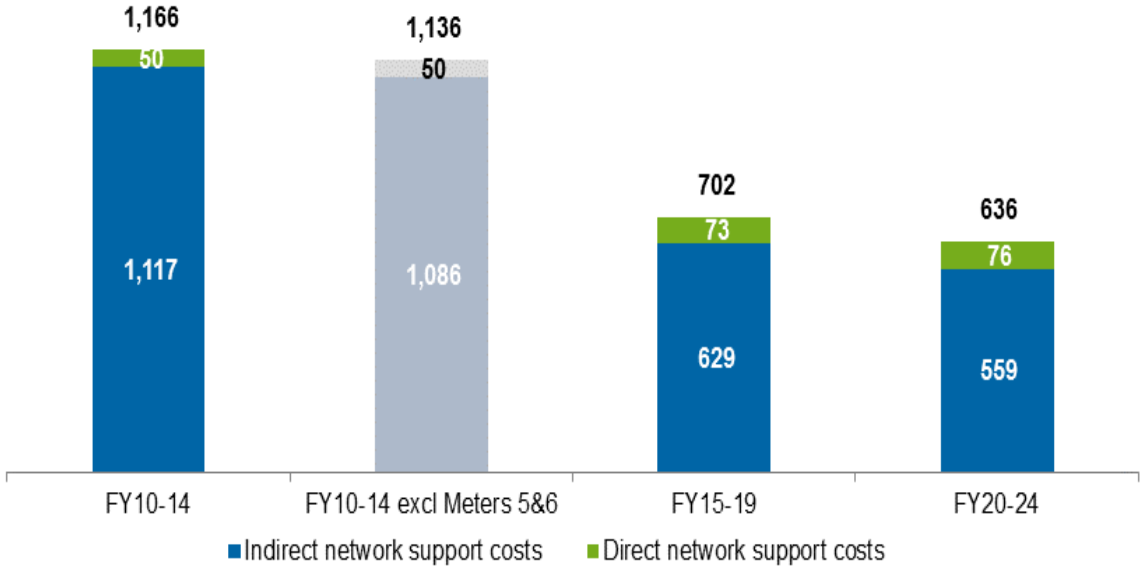
Capital program support costs – adjusted for metering

Metering adjustment

- To ensure a like-for-like comparison metering costs that do not appear in FY15 onwards have been removed from the FY10-14 period.

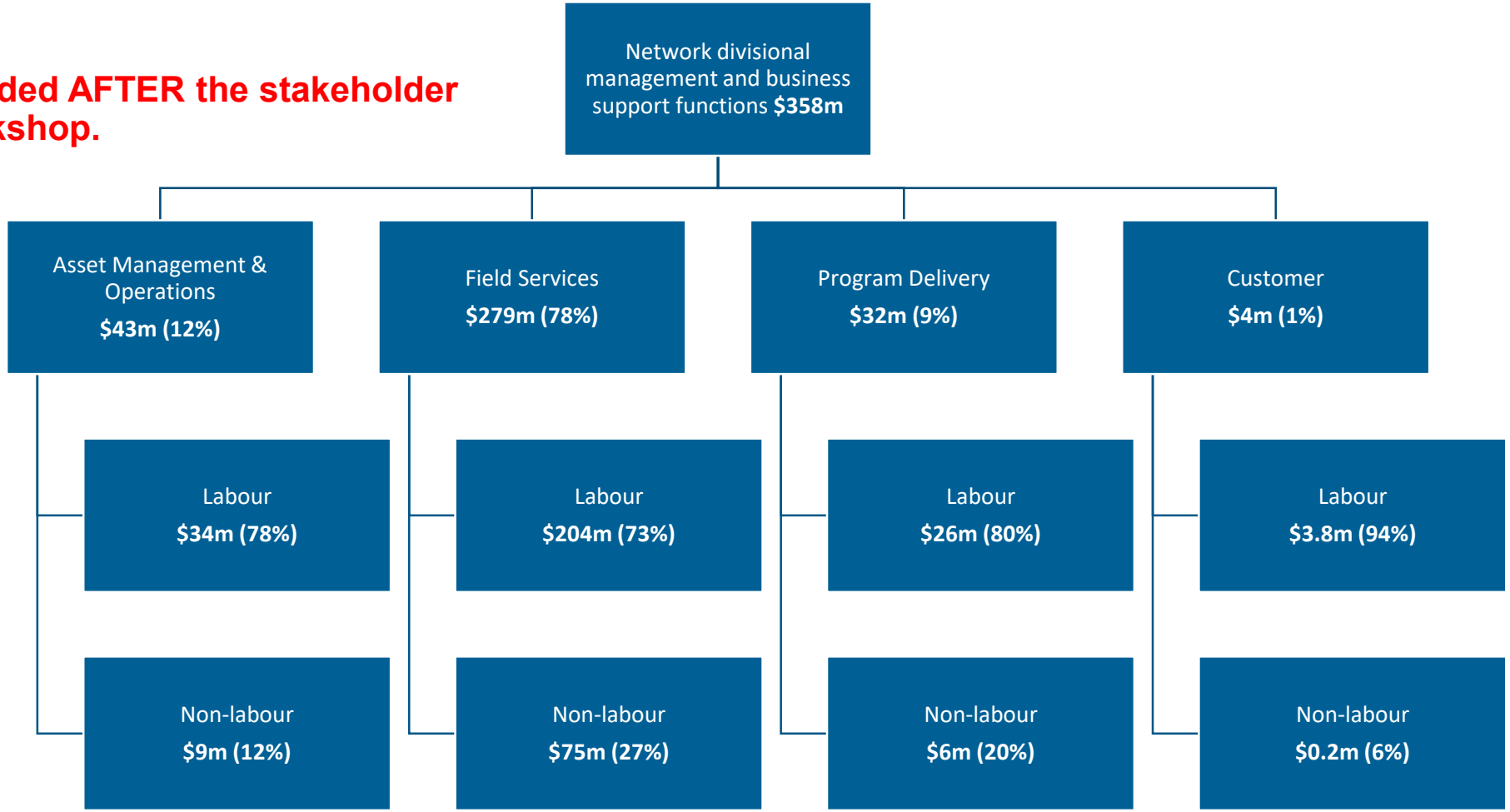
- **This slide was added AFTER the stakeholder engagement workshop.**

Support costs (real $ FY19)



Network management and business support – breakdown

- **This slide was added AFTER the stakeholder engagement workshop.**



8.2

Non-network Fleet and Plant

Fleet and Plant

Stakeholder Consultation 7 February

Mark Chalmers

Fleet and plant

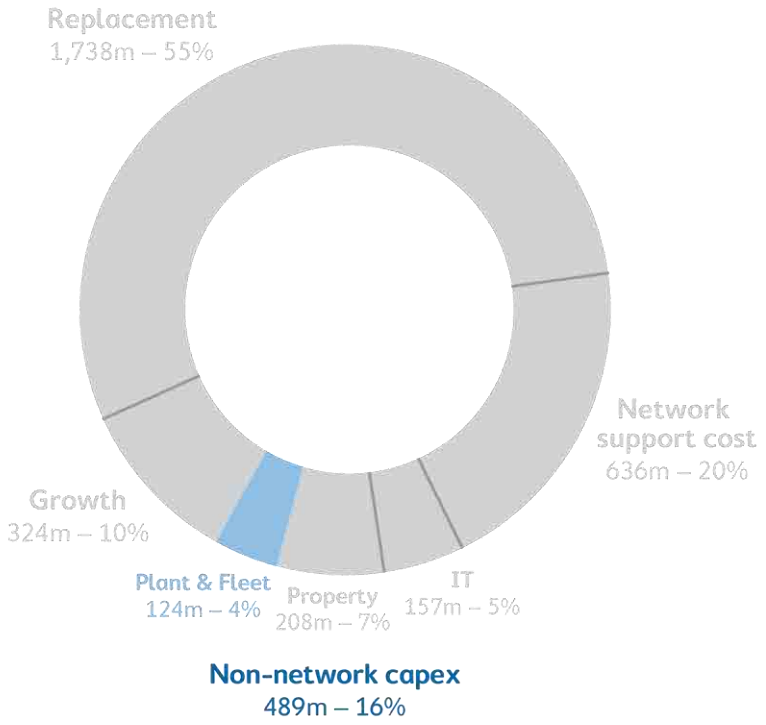
Today we will cover:

- Summary of proposal
- Forecast and trends in capex
- Our strategic plan for fleet and plant
- Key drivers for investment
- Top 3 key projects
- Benefits to customers

Summary of proposal – Fleet and plant

Proposal

We propose to invest $124 million on fleet ($98.6 million) and plant ($25.4 million) (real, $FY19) for standard control services.



Reasons for investment

The investment is needed to maintain the safety and efficiency of Ausgrid's fleet of vehicles and plant. Introducing telematics to improve safety and utilisation of the fleet.

Counterfactual

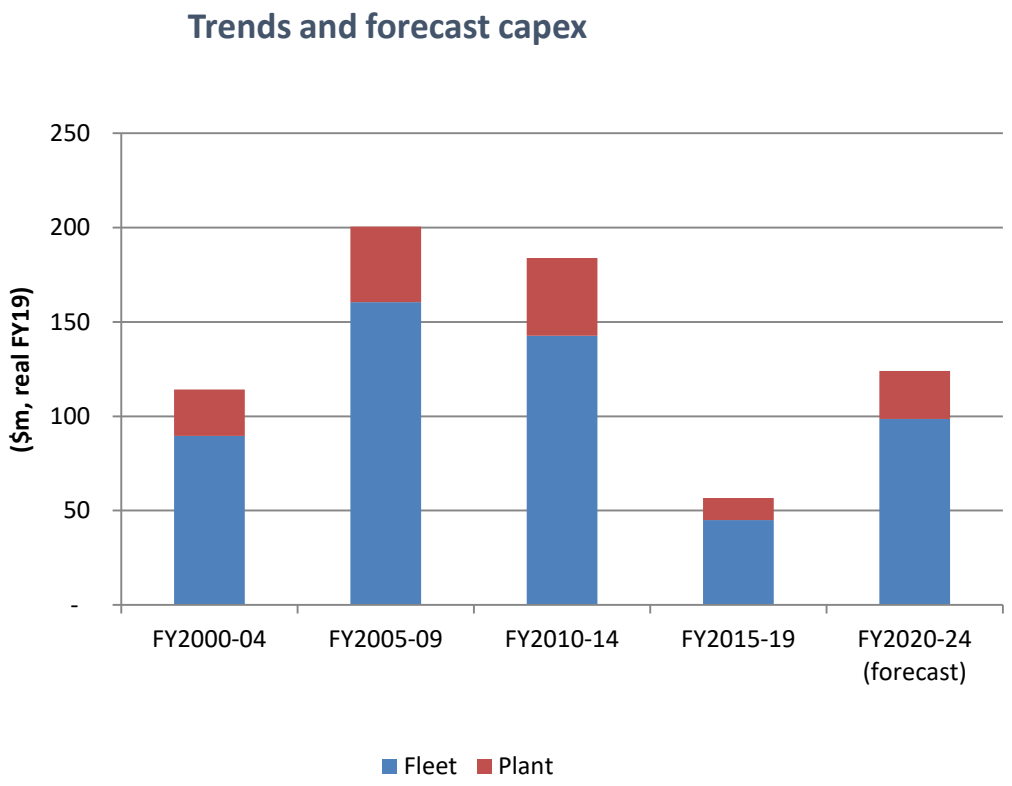
If we do not invest, the age profiles of vehicle and plant will increase.

The likely risk is that vehicles and plant would be less safe, have more breakdowns and need more servicing and maintenance.

Impact on pricing

The total investment of $124 million will contribute around $32 million to revenue requirements by the end of the 2019-24 regulatory period or an average of $17.7 per customer. This represents a price impact of around 0.29%.

Summary of proposal



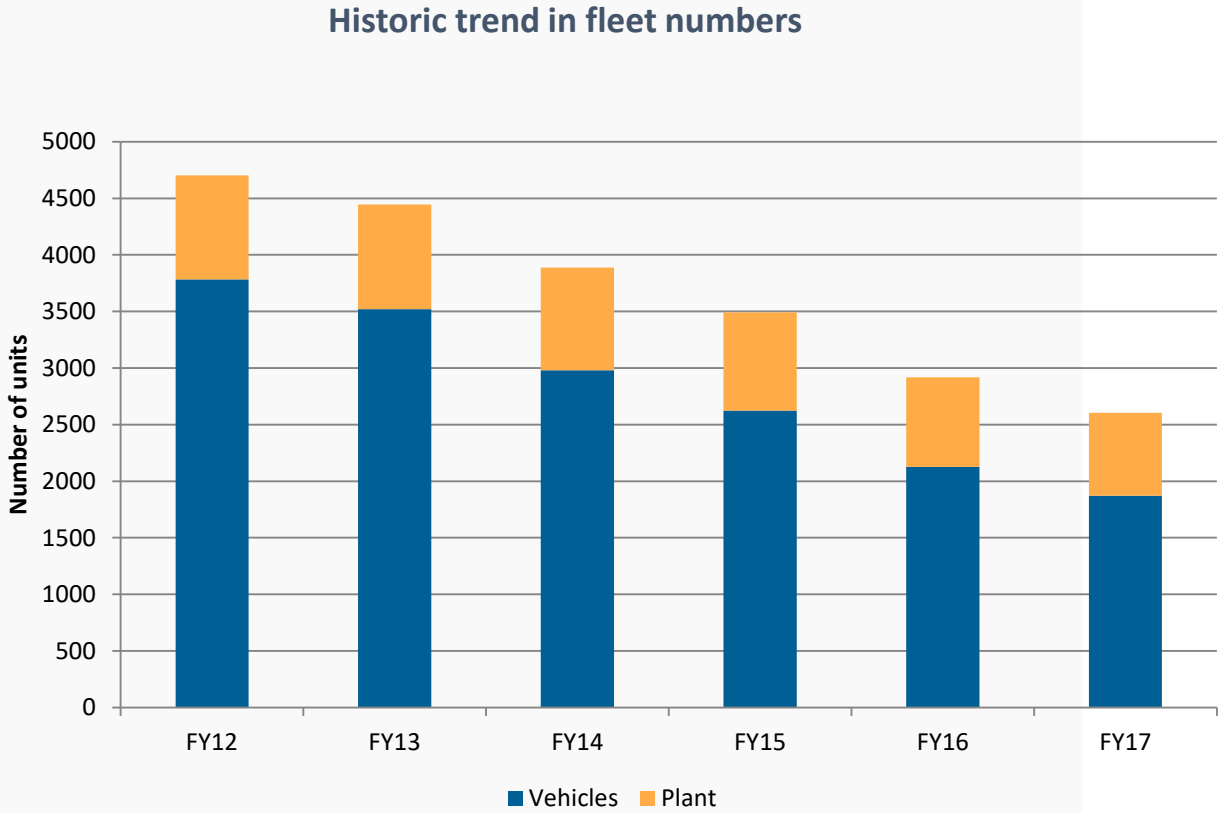
We propose to invest:

- $98.6 million for fleet and
- $25.4 million for plant (real, $FY19) for standard control services.

The ramp up of network capital program from 2005 to 2014 drove the increased need for fleet.

This was followed by a period during 2015 to 2019 of reducing vehicle numbers to increase utilisation rates.

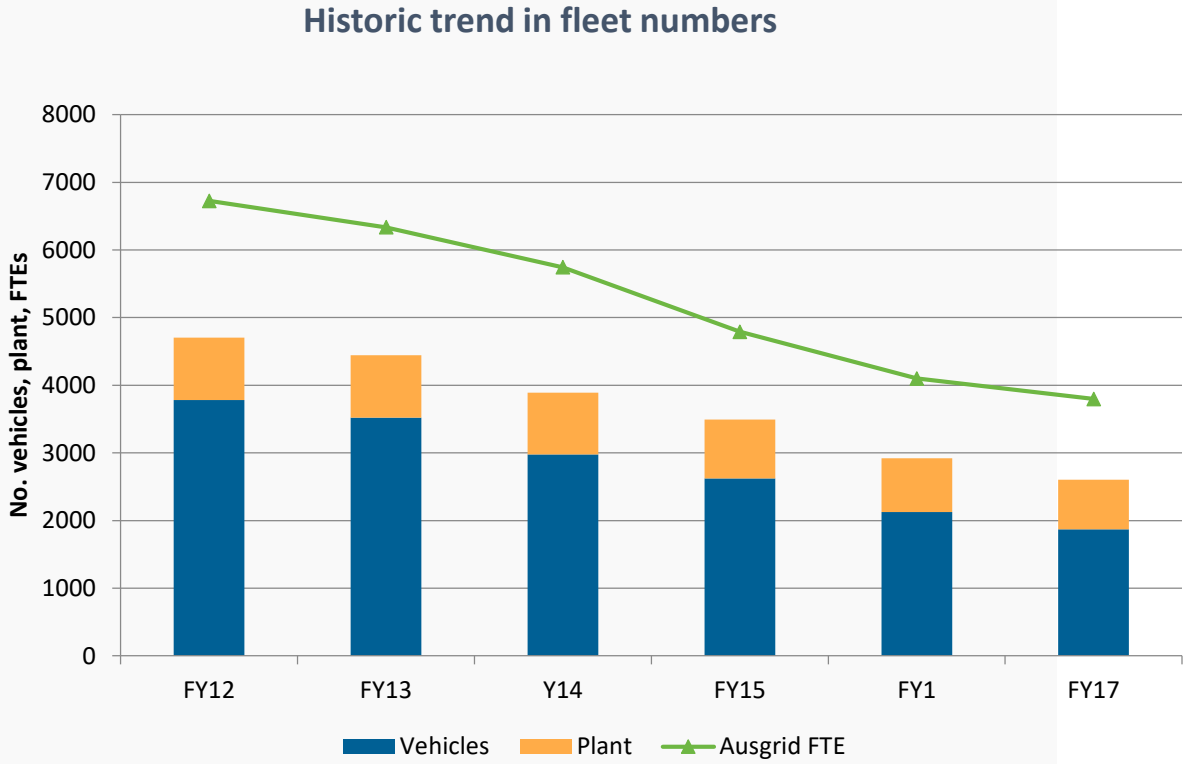
Historic trend in fleet numbers



We have reduced the number of fleet from 3,783 in FY12 to 1,871 in FY17 (or 50%)

We propose to increase investment to ensure that the fleet is safe and efficient.

Historic trend in fleet numbers – with Ausgrid FTEs



We have reduced the number of fleet from 3,783 in FY12 to 1,871 in FY17 (or 50%)

The trend in Ausgrid FTEs is also shown.

This slide was added AFTER the stakeholder engagement workshop.

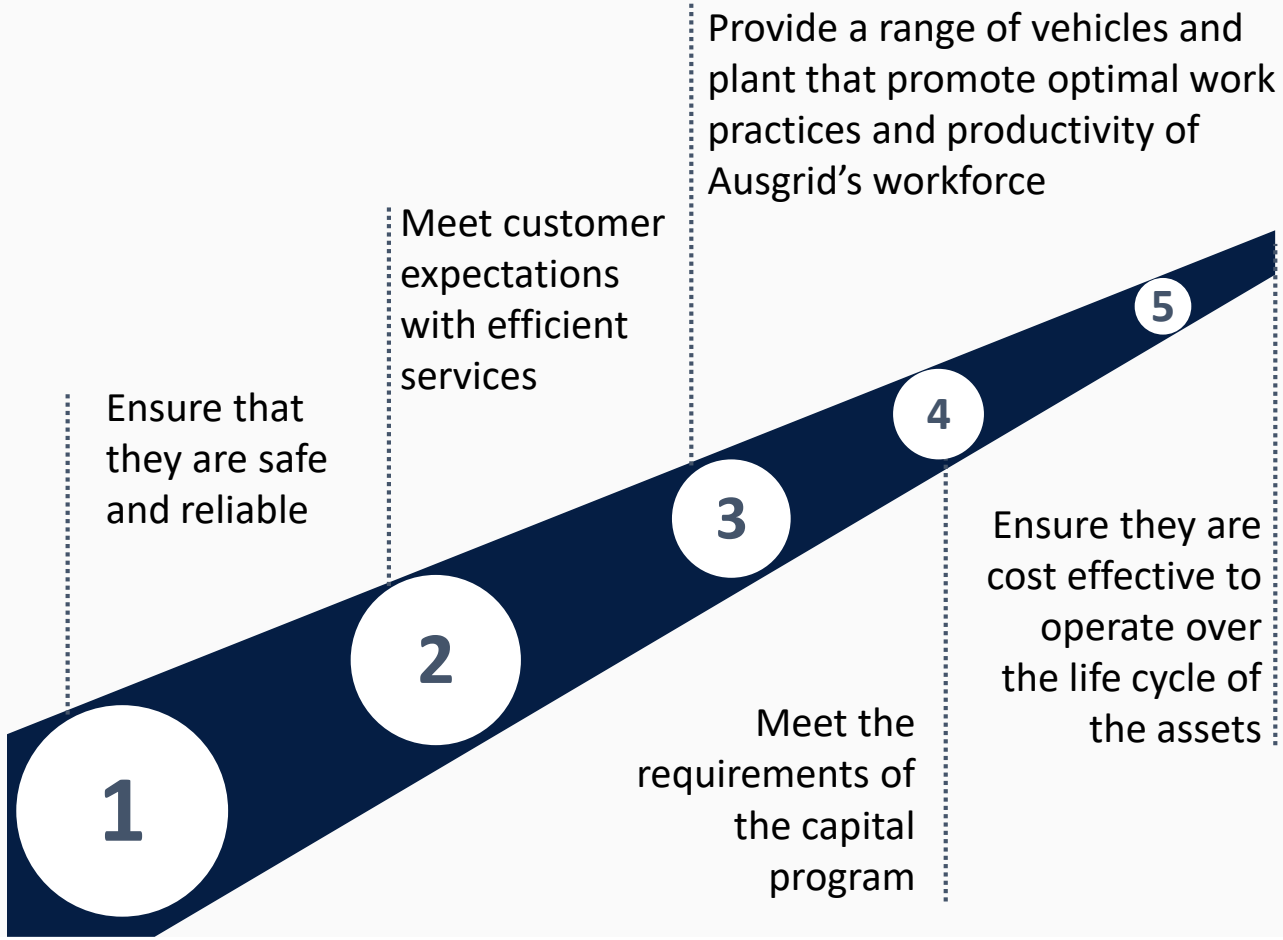
Our strategic plan for fleet and plant

Ausgrid has diverse range of fleet and plant to meet the needs of a large multi-functional workforce:

- Cars
- Vans
- Trucks

- Air compressors
- Generators
- Mobile substations elevated work platforms
- Crane borers
- Pole loaders etc…

The strategic aim of Ausgrid's plan for fleet and plant is to:



Key drivers for investment

The fleet program is focused on:

- **Increasing employee safety** purchasing fleet with improved safety features **reducing maintenance and leasing cost**
- **Standardising fleet** to increase buying power leveraging volume discounts
- **Optimising the life cycle costs of capex** through timely replacement of aged fleet.

Note: Forecast is based on estimate number of replacement units, adjusted for refurbishments of heavy plant and current replacement costs

Top 3 key projects

1. Telematics to manage driver behaviours, improve fleet utilisation providing benefits in operator safety and operational efficiency

2. Review of operations with elevating work platforms with a focus on smaller more agile units and more standardisation to reduce operational cost, improve efficiency for staff and impact on other road users with reduced footprint

3. Renewal of fleet

Benefits to customers

A safe fleet of vehicles and plant is necessary to ensure **safety** of our workforce

A renewed focus on lifecycle costs assist in achieving **lower costs** in the longer term

Promoting **optimal work practices** by having the right types of vehicles and plant and productivity of Ausgrid's workforce.

8.2

Non-network property

Non-network property

Stakeholder Consultation 7 February

Kayn Miller

Ausgrid

Summary of proposal – Property

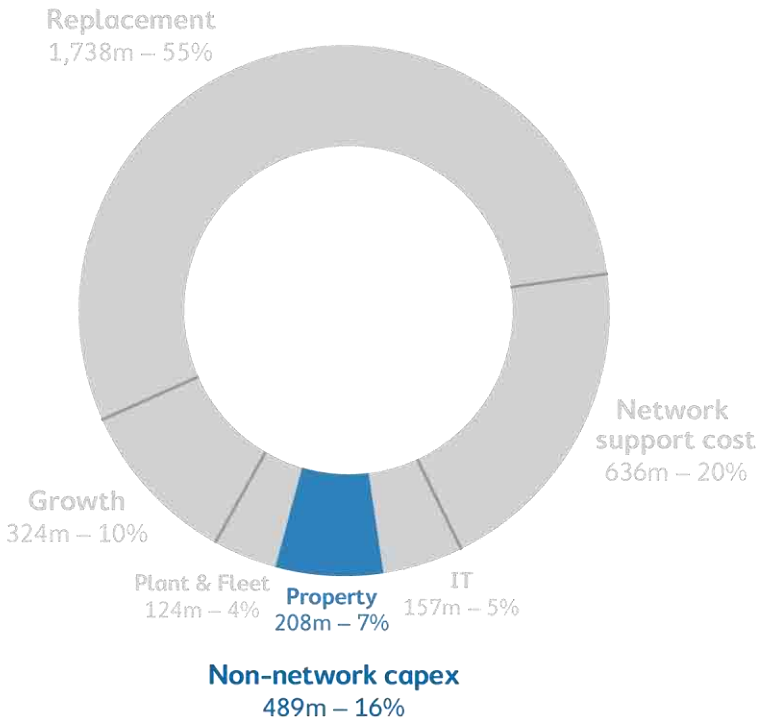
Proposal

We propose to invest $208 million in capital to respond to an ongoing strategy to consolidate depots and other work places in strategic locations that better assist in servicing the network.

Counterfactual

Lack of consolidation will reduce level of service and emergency response times to customers.

Lack of compliance



Reasons for investment

Consolidation and renewal of depots, offices and specialist supply sites in the right locations will assist in reducing response times in an event of an outage or emergency. The portfolio is ageing with a number of properties not meeting mandatory compliance or environmental requirements.

Impact on pricing

The total investment of $208 million will contribute around $28 million to revenue requirements by the end of the 2019-24 regulatory period or an average of $15 per customer. This is represents a price impact of around 0.25%.

Capital drivers

Ausgrid conducts annual reviews to assess the state of the property portfolio and how changes in the underlying business environment or external circumstances are likely to drive requirements of the portfolio.

Non-network Property Investment Strategy
• Ensure service delivery is not dependent on accommodation needs wherever possible
• Are accommodation assets appropriately located for effective service delivery
• Provide accommodation assets with sufficient capacity to provide the required service delivery
• Provide accommodation assets that are suitable for optimum service delivery

Why invest capital?

Property Planning Principles	Do nothing impact
• Right size the property portfolio	• The portfolio may be over capitalised and serviced
• Co-locate Ausgrid network and non-network property functions where feasible	• Continued siloed business environment with loss of collaboration between a diverse range of teams
• The primary function of depots is to accommodate the workforce, fleet and logistics resources required to maintain the assets of the region	• Depots are non-efficient and inappropriate to service the customer base
• Develop life-cycle depots (40 years) that are designed to suit internal (in-sourced), blended and external (out-sourced) business delivery models	• Ill equipped, safety risk and non-compliant depots will not meet the needs of teams and ultimately customers
• Location within employment, industrial zones	• Increased risk of residential encroachment
• Provide environmentally sustainable work places through design reducing overheads and costs	• Increased operating costs through maintaining environmentally inefficient buildings

Depot programme

Project	Description	Proposed Cost $M/Strategic Benefits
Zetland depot replacement (Alexandria)	New green-field development to enable replacement of the existing Zetland depot due to aging assets, encroachment by residential development and local council infrastructure development	$15.4M – Compliance with NSW EPA orders regarding noise limitations due to impinging residential development
General depot refurbishment	Program of works at various minor sites to address aging assets and compliance requirements	$12.5M – Address outstanding building compliance matters and incidental projects on a fit for purpose needs basis
Homebush depot replacement	Staged rebuild of the depot facilities at the existing Homebush site to provide fit for purpose facilities and replace aging assets	$65M – Maintain strategic location and upgrade the depot at the end of it's functional life
Hornsby depot replacement	New green-field development to enable replacement of the existing Hornsby depot due to aging assets	$26M – Strategic location with capacity to support the upper North Shore. Address incompatibility with impinging residential development
Oatley depot replacement	New green-field development to enable replacement of the existing Oatley depot due to aging assets	$27M – Strategically located to support Sydney South operations. Consolidation of business units and efficient capital recycling
Wallsend depot upgrade	Staged rebuild of the depot facilities at the existing Wallsend site to provide fit for purpose facilities and replace aging assets	$25M – Maintain support for Newcastle region. Consolidation of business activities and addresses future growth in the region

Zetland depot replacement

Key Information	
Proposed Budget	$15.4M
Construction Period	Q4 FY 2017 to Q4 FY 2020
Employees Impacted	Up to 400 staff

Benefit to Customers	Description
Surplus Land	Existing surplus land at Zetland will be sold with the proceeds removed from the regulated asset base
Functionality	Replaces a depot that is at the end if its functional life and provides a fit for purpose facility with security of tenure
Growth	Addresses current and future growth demands of the Sydney CBD/Eastern Suburbs Sydney Airport, Port Botany and associated expanding high tech employment zones
Compliance	Meet EPA and local resident issues with respect to the incompatibility of current depot operations encroaching on the expanding residential neighbourhood

Zetland

Existing Depot with Encroaching Residential Development

Overcrowded Warehouse Space

Shipping Containers used due to lack of storage space

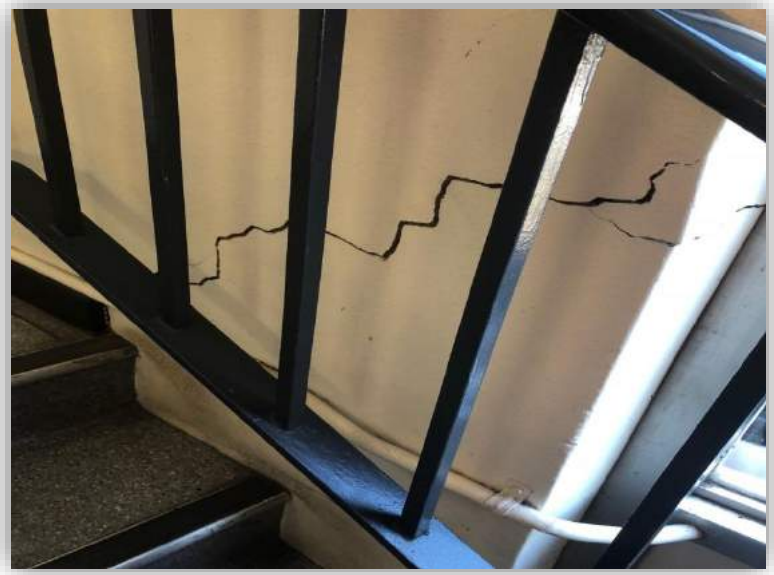
Use of demountable to accommodate training facility

Homebush

Key Information	
Proposed Budget	$65M
Construction Period	Q4 FY 2020 to Q3 FY 2024
Employees Impacted	Up to 400 staff

Benefit to Customers	Description
Support	Maintain proximity and capacity to support the Sydney South area addressing current and future growth demands
Functionality	Replaces a depot that is at the end if its functional life and provides a fit for purpose facility with security of tenure
Location	Located in close proximity of major arterial roads and public transport hubs in the area
Consolidation	Consolidation of business unit activities through the implementation of revised depot typology
Capital	Efficient capital recycling of the Regulated Asset Base Non-Network property portfolio

Homebush depot



Internal Building Cracking

Cramped poorly designed warehouse space

Lack of internal storage space

Aged 1960's buildings

Cramped poorly designed warehouse space

Additional storage in containers due to lack of space

Office program

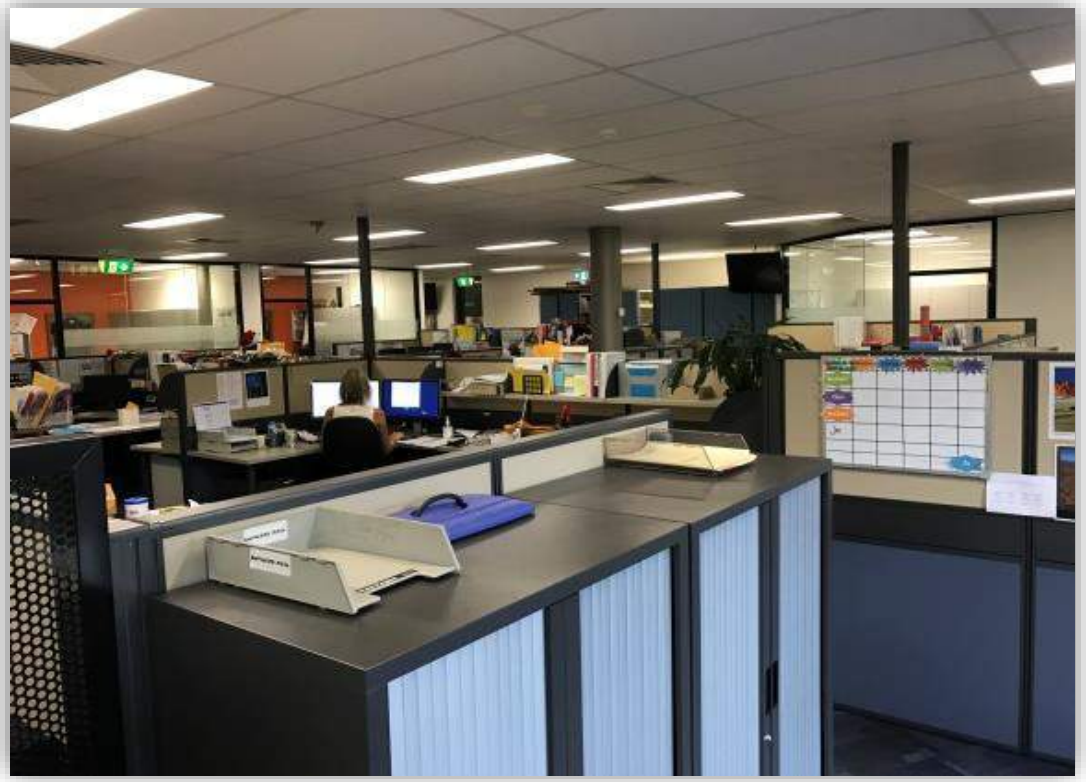
Project	Description	Proposed Cost $M/Strategic Benefits
Wallsend office replacement (Beresfield)	New green-field development to enable replacement of the Wallsend Admin Building	$29.6M – Co-locates offices and depots with infrastructure. Future space for expansion and meets concerns from impinging residential development on current facility
Future workplace program	Program of works at various sites to support the cultural transformation by providing a collaborative work environment that sponsors productivity, growth and creativity	$7.5M – Provide workspaces that will encourage interaction and support business objectives through long term cost reduction

Wallsend

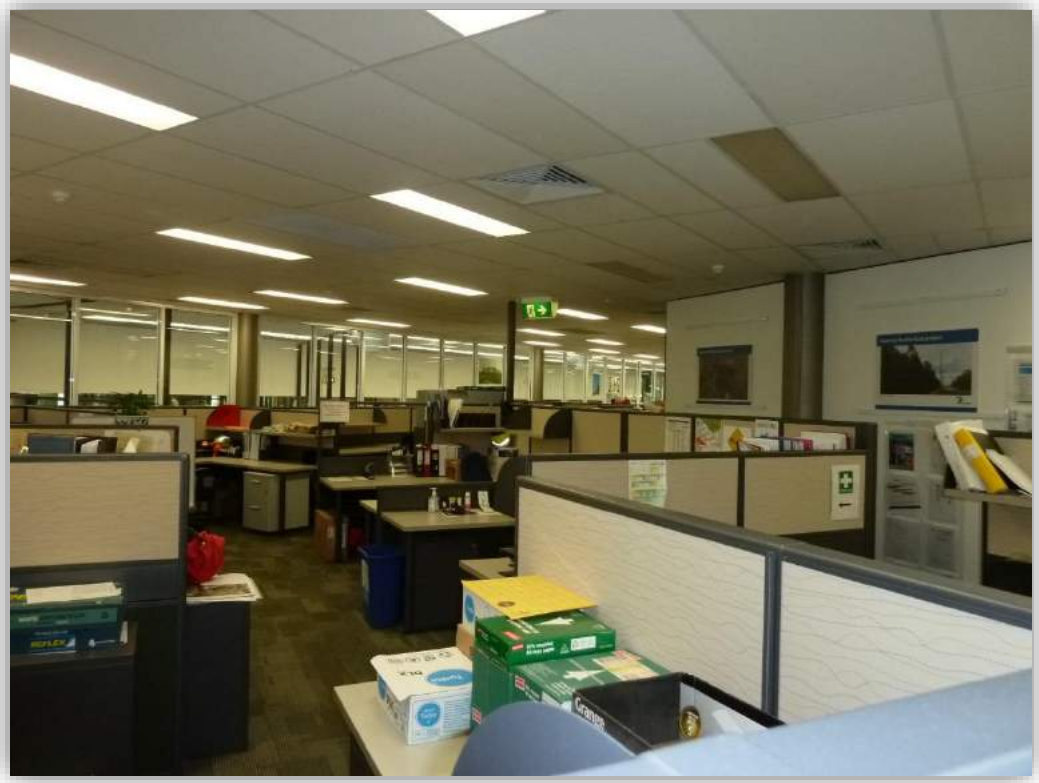
Key Information	
Proposed Budget	$29.6M
Construction Period	Q4 FY 2018 to Q4 FY 2021
Employees Impacted	Approximately 300 staff

Benefit to Customers	Description
Co-Location	Support the corporate strategy of co-locating offices and depots adjacent to existing network facilities
Functionality	Replaces an office that is at the end if its functional life (fully depreciated) and provides a fit for purpose facility with security of tenure
Cost	Minimise cost by consolidating the depot and office in one location
Efficient Workplace	Co-location of workers allowing for lower overheads with fixed costs spread among more staff and better use of available space with greater information sharing and innovation by bringing together diverse work groups
Management	Provides future opportunities to develop the site for compatible Ausgrid activities or seek external leasing maximising the property portfolio potential

Wallsend office



Inefficient Poorly Organised Office Space

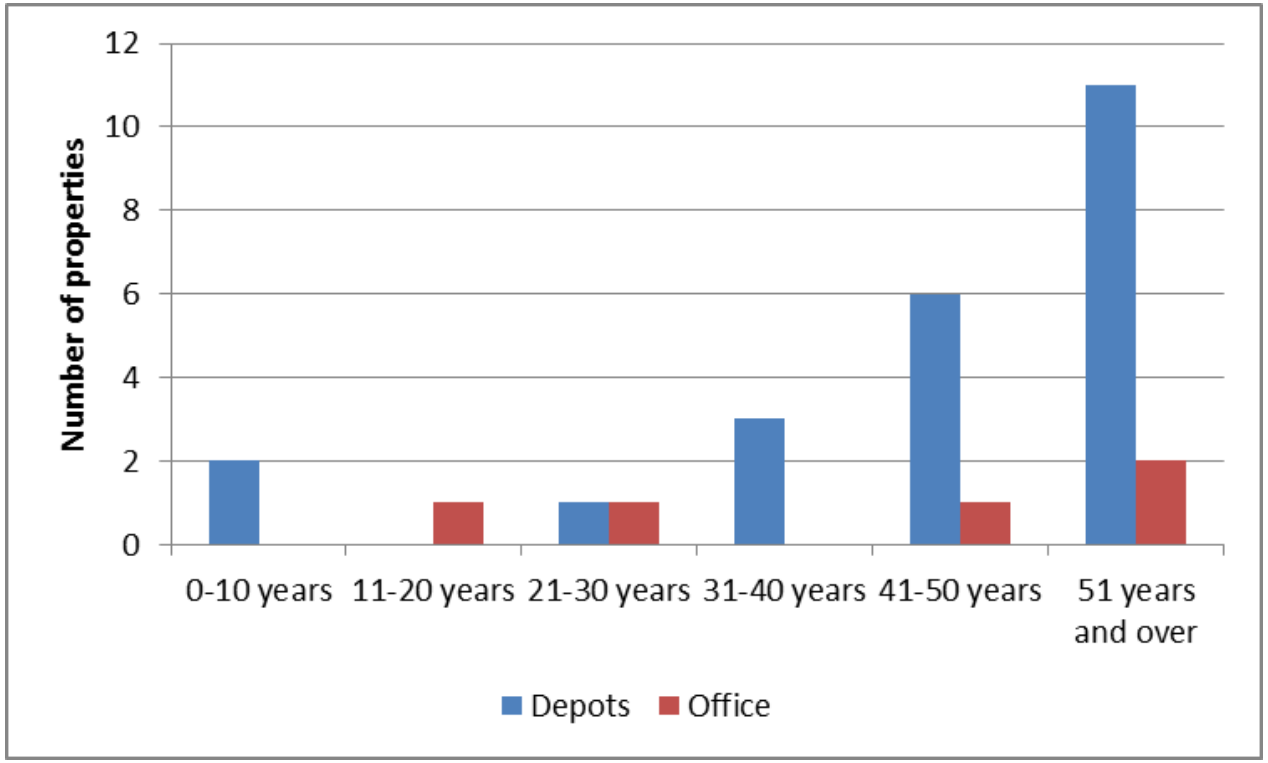


Older Style Modular Layout Restricting Work Place Collaboration

Key customer benefits

- **Community, public and team members safety and wellbeing is a paramount focus**
- Increased proximity of depots to strategic Ausgrid assets and customers allowing for faster response times to outages and emergencies
- Minimise ongoing costs for depots and offices through the provision of ‘least cost’ options
- Co-location of offices and depots allows for:
  - lower overheads with fixed costs spread over more staff
  - better use of space and greater information sharing
  - innovation by bringing together different types of skills within the organisation
- Effective and ongoing management of the property portfolio to ensure stable investment over the long term while providing the services needed today

Appendix 1 – Age profile of assets



- Depots are built to be in use for 40 years (become non-compliant with relevant codes and add risk in the ability of staff to efficiently and effectively service the network through ageing infrastructure)
- 11 depots are currently over the standard age of 40 years
- 3 out of 5 offices are over 40 years old

Depot information also includes minor depots co-located at zone substations

8.3

Replacement Capex Deep Dive 12 February 2018

Replacement Capital

Workshop 3 – Stakeholder Engagement Deep Dive
Regulatory Proposal – FY2020-2024

Murray Chandler

Ausgrid

Agenda

- Replacement introduction
- Replacement drivers
- Approach to decision making and overview
- Break
- Major replacement project and case studies
- Lunch
- Replacement programs and case studies
- Further discussion

Our rationale for Capex

Ensuring the best outcomes for customers

1. We plan to invest **only when there is clear value to customers**. Our replacement programs carefully target expenditure on assets that ensure the safety of our staff/customers and mitigate significant reliability risks.

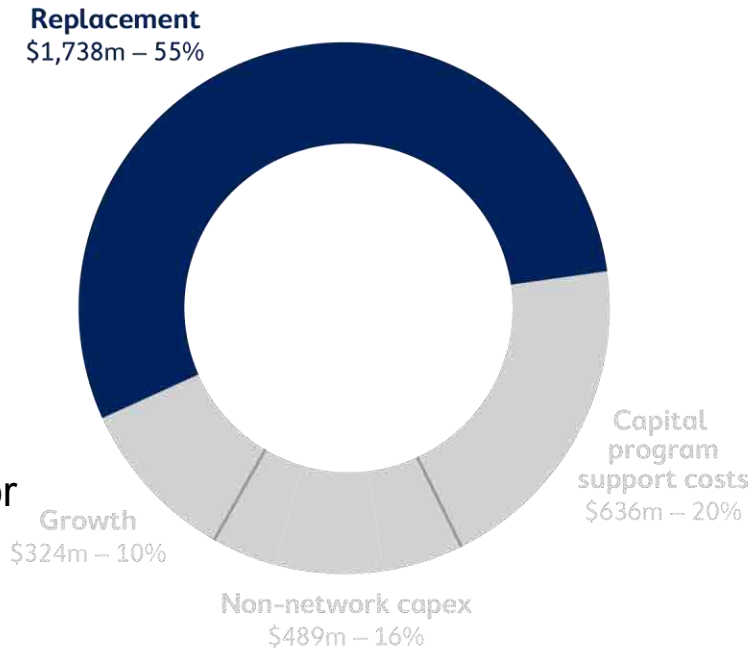
2. Rather than simply building more infrastructure, we are looking first at where **new technology, innovation and partnering** with other companies and our customers will **solve the problem at a lower cost.** This includes demand management solutions.

3. Keep our **revenues flat or declining** over the regulatory period to deliver lower prices for customers. Our proposal delivers a **4% reduction** in FY20 on FY19 prices in real terms and then tracks at CPI to 2024.

Replacement Capital program

Proposal

We propose to invest $1.738 billion on replacement costs for the 2019-24 capital program (real $ FY19).



Reasons for investment

The investment is needed to continue to ensure the safe and reliable operation of Ausgrid's assets in delivering energy to customers.

Counterfactual

If we do not invest in replacement of poor condition assets there is likely to be a significant increase in injuries of members of staff and the public with potential fatalities. Sustained long term outages are also likely to be experienced by proportions of the customer base

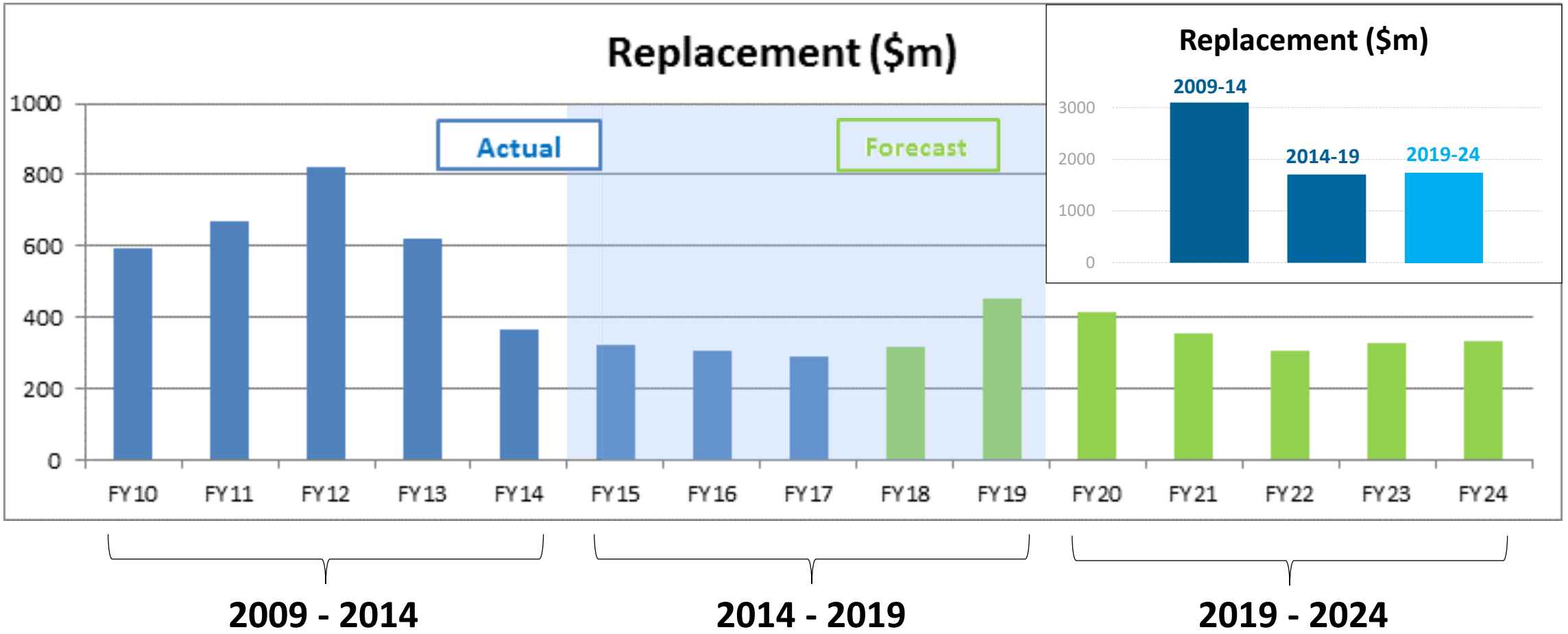
Impact on pricing

The total investment of $1.738 billion will contribute around $97 million to annual revenue requirements by the end of the 2019-24 regulatory period or an average of $54 per customer per year. This represents 5% of the customers price.

Our capex forecast for 2019-24 is $3.2 billion (real, FY19)

($m Real 18/19)	2009 to 2014 Actual	2014 to 2019 Actual / Forecast	2019 to 2024 Proposal	Sub Program Description	Sub Program Value	Deep Dive Discussions Examples
New Connections	342.1	96.5	52.2	Major Connections	10.2	
				HV & LV Connections	42.1	Combined HV/LV Augmentation & Connections Policy
Growth /Augmentation	2,242.7	163.7	258.7	Major Projects (Area Plan)	77.1	Rozelle STS Upgrade
				High Voltage Reinforcement	153.2	Combined HV/LV Augmentation & Connections Policy
				Distribution Centre and LV Reinforcemen	12.0	
				Reliability	16.4	
Replacement	3,031.7	1,677.2	1,725.5	Major Projects (Area Plan)	593.1	Switchboards - Concord Zn Oil/Gas Cables - Castle Cove to Mosman ADMS
				Programs - Planned	599.5	Consac/HDPE LV Cable
				Programs - Condition Based	310.3	Poles (Sub-trans/HV/LV)
				Programs - Reactive	222.6	Distribution Txs / HV Cables
Other network	106.2	32.2	25.5	System Operational Technology Plan	25.5	
Total System Capital	5,722.8	1,969.6	2,061.9		2,061.9	
IT	207.9	197.8	156.9	Maintain, Protect, Comply, Adapt	156.9	IT Program; Cyber Transformation Program; Data and Digital Enablement Program
Vehicles	142.8	54.7	98.6	Cars, vans, trucks	98.6	Fleet renewal and capability upgrades
Other Non-Network	357.8	189.0	233.7	Land & Buildings	208.3	Zetland depot replacement; Homebush depot; Wallsend office replacement
				Furniture, Plant & Equipment	25.4	
Total Non-System Capital	708.5	441.4	489.3		489.3	
Total Network Support Cost	1,166.2	701.8	635.6		635.6	
Total Capital	7,597.5	3,112.9	3,186.7		3,186.7	
AER Allowance	8,392.1	3,522.9				

Program Expenditure Overview – Regulatory Periods

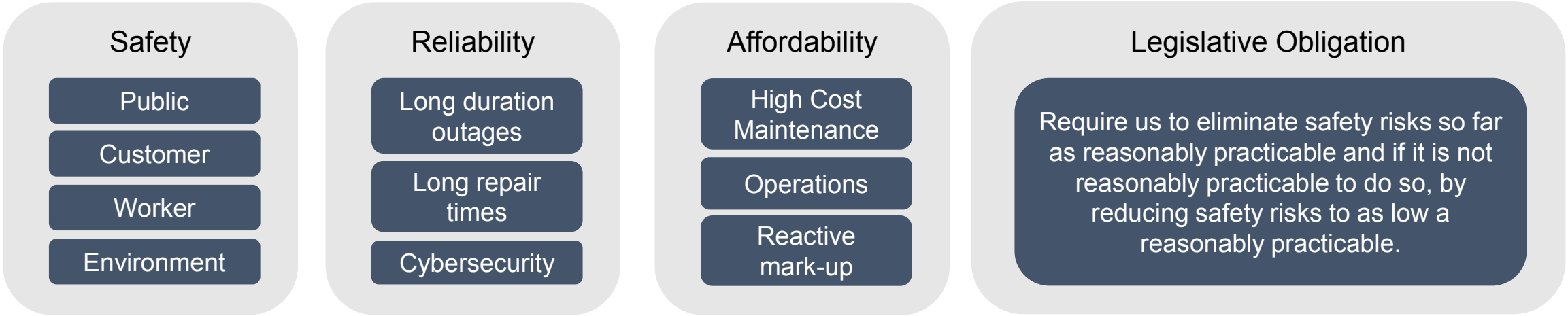


Replacement Drivers

- Key Drivers & Regulatory Changes
- Network Health / Customer Impacts
- Network Geography & Asset Types

What Drives Replacement Expenditure?

Our replacement programs are developed to continue to deliver a **safe**, **reliable** and **affordable** supply of electricity to our customers. The programs achieve their objectives, by managing:



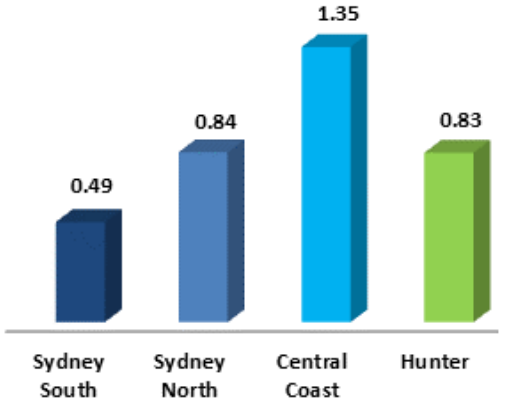
Expenditure forecast methods include:

- Costs associated with the preferred option (from option analysis) to address the asset specific condition:
  - **Cost Benefit Analysis** (includes risk assessment/option analysis proportionate to the investment size)
- Historical information with trend analysis for all reactive asset programs:
  - **Probabilistic** and declining trends utilised to remove any contingency

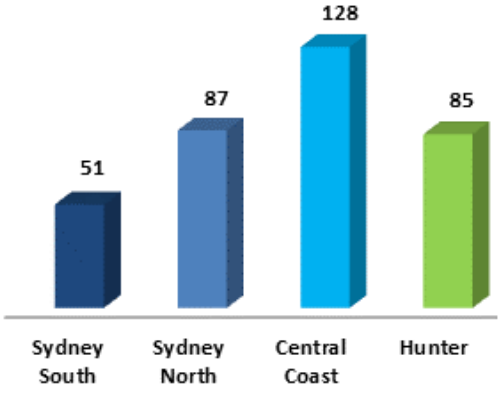
All capital expenditure follows Ausgrid's **investment governance** process prior to and during project execution

Network Health / Customer Impacts

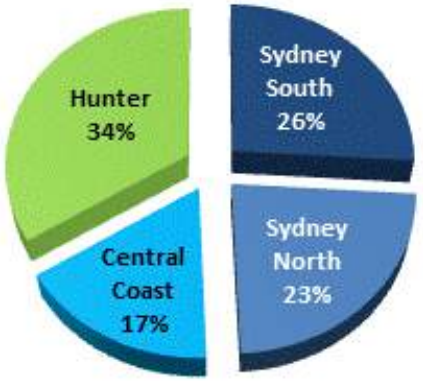
Reliability (SAIFI)
Average annual customer outages



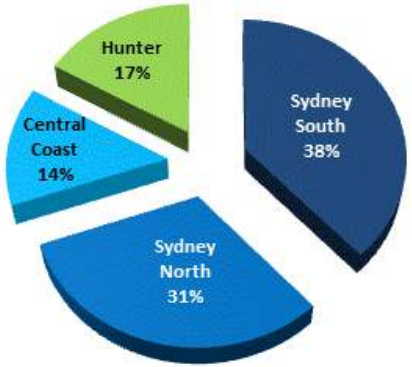
Reliability (SAIDI)
Average annual customer minutes without supply



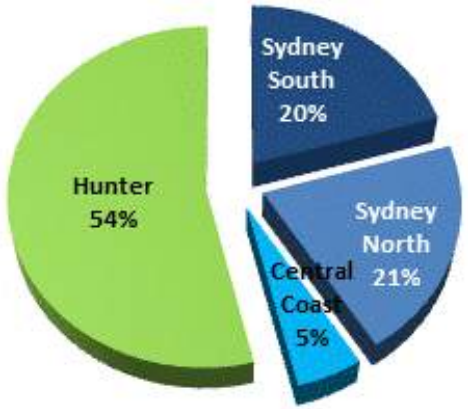
Domestic Electric Shocks
Due to Ausgrid network (68 p.a.)



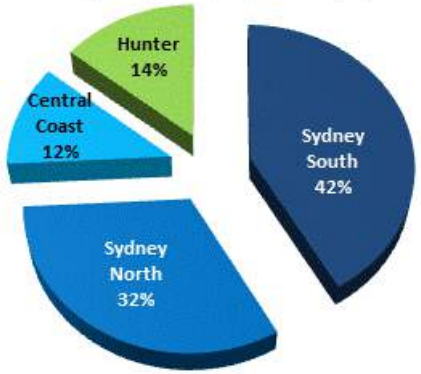
Customer Reported Fallen Wires
4,968 p.a. (Avg last 5 years)



Fire Starts
39 in 2017 (90 fire events)

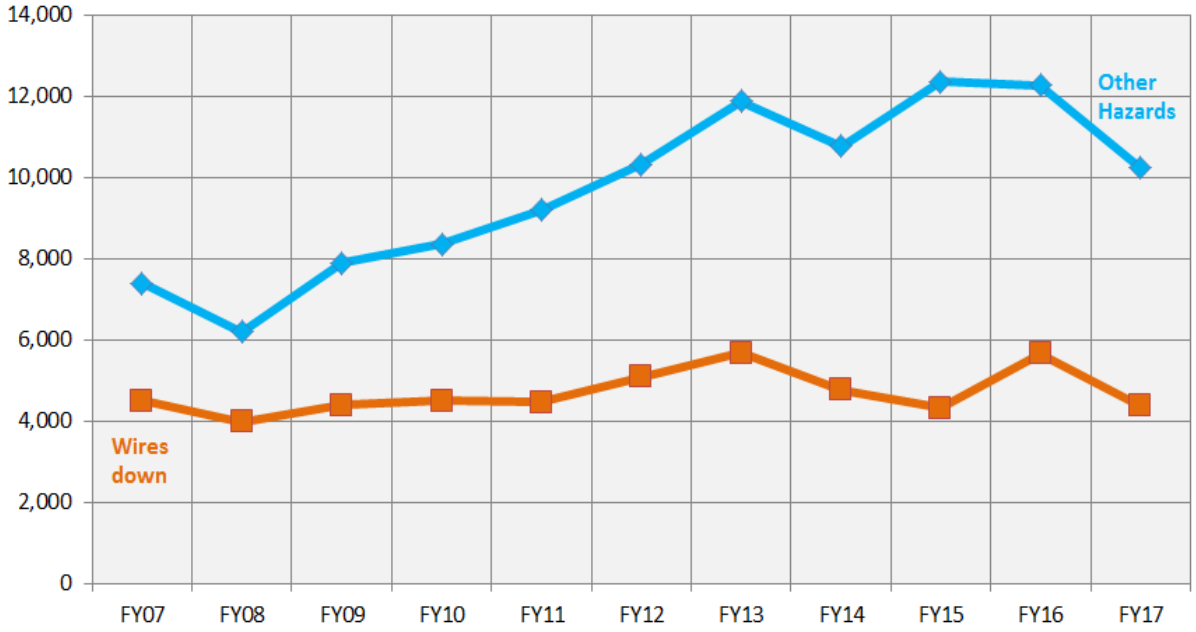


Customer Reported Mains Hazards
14,405 p.a. (Avg Last 5yr)



Network Supply Reliability

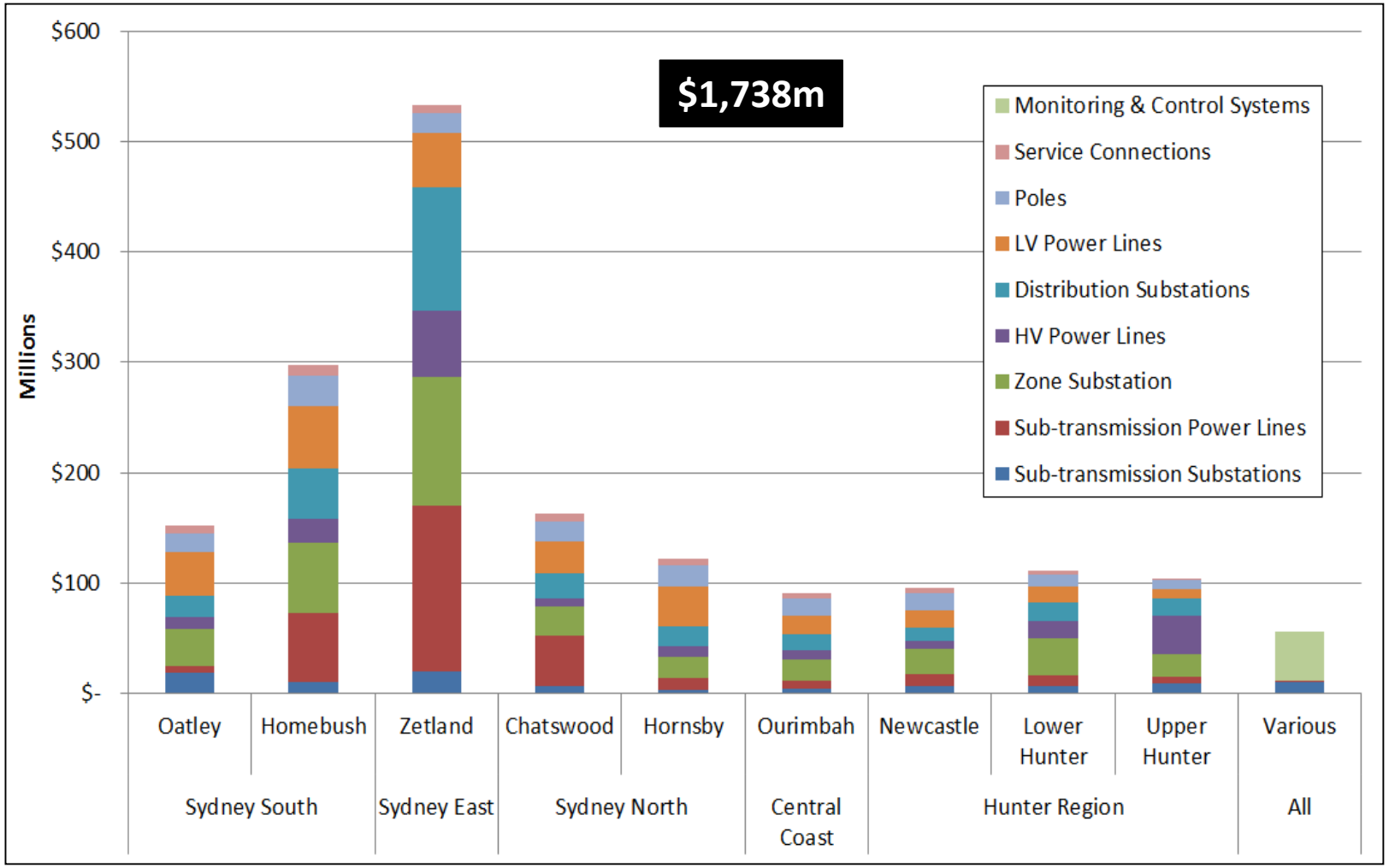
Ausgrid Overall Supply Reliability Performance

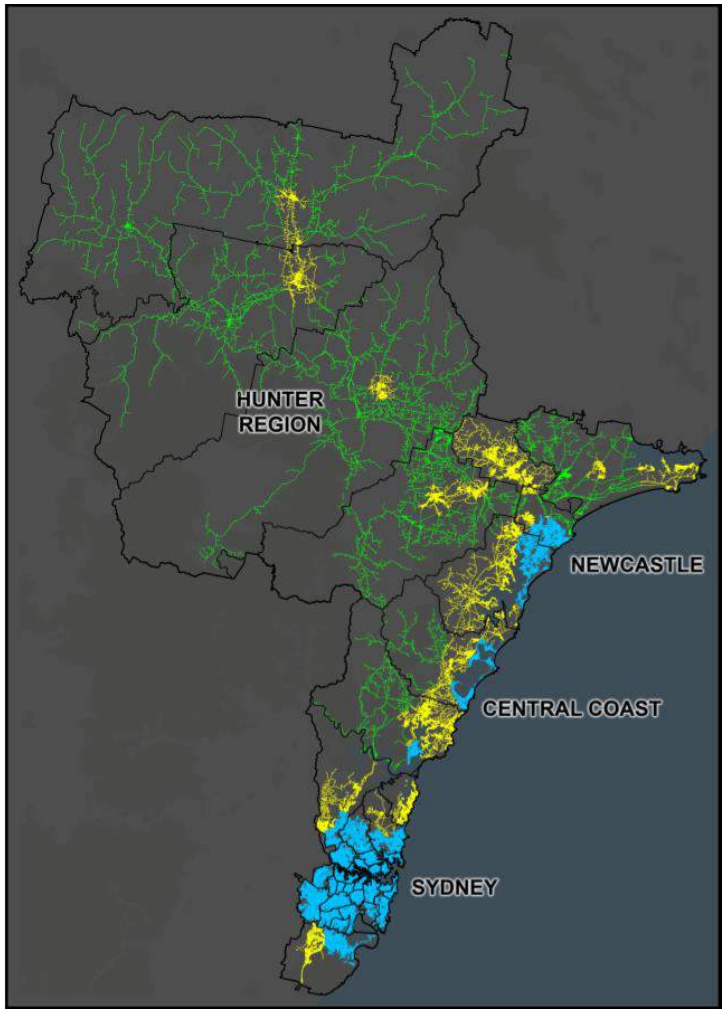


Customer Reported Fallen & Hazard Wires

Capital Program Overview

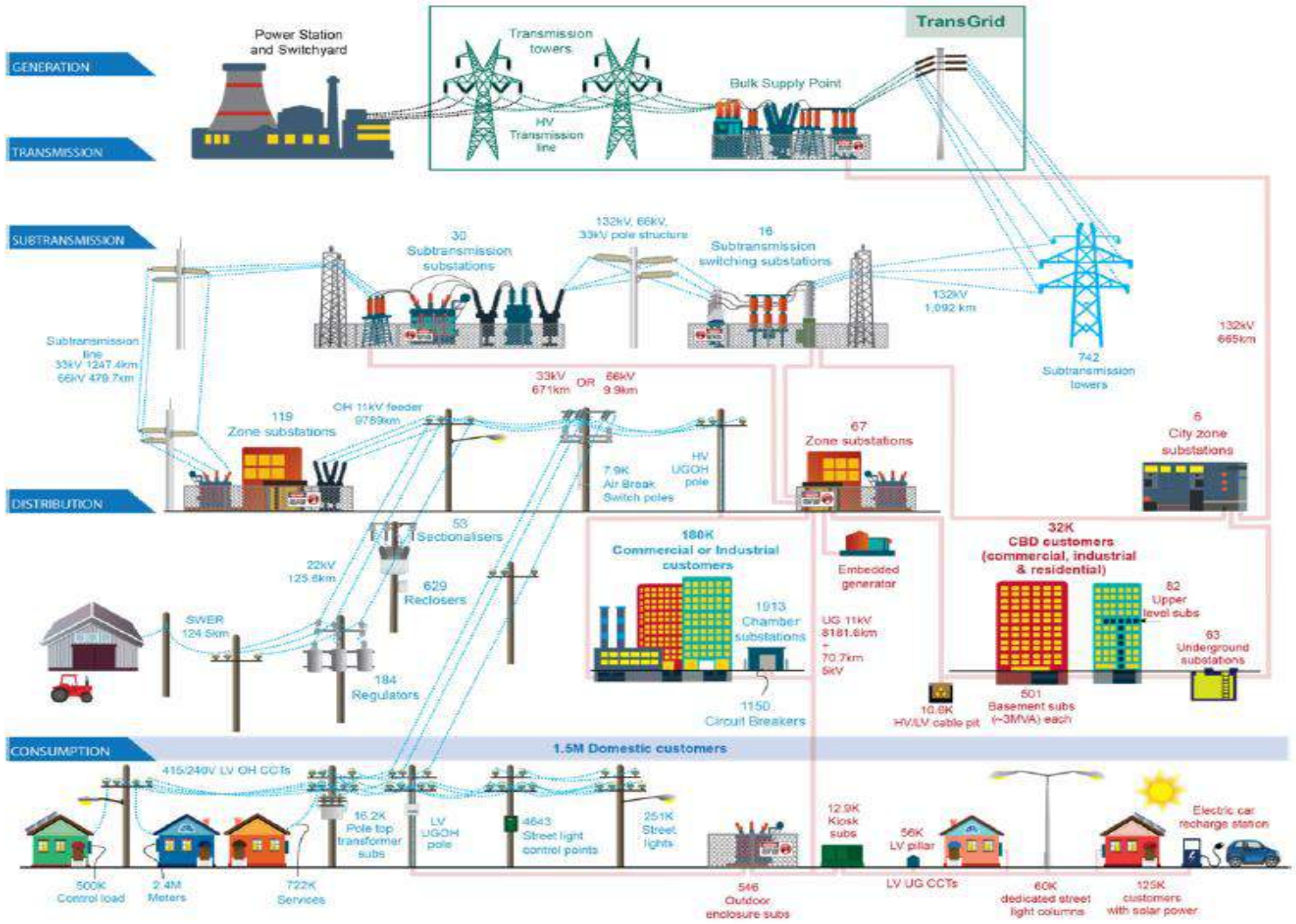
Network Geography, Density & Asset Group





State of the Network
February 2017

Ausgrid



Asset Category	Average Age	Std Life	Qty	Units of M	Bushfire %
Overhead					
132 kV OH ccts	36.44	45	1,092	km	64.8%
33 & 66 kV OH ccts	34.00	45	1,727	km	52.0%
11/22 kV OH ccts	34.83	45	10,039	km	49.9%
LV OH ccts	42.52	45	13,076	km	21.5%
LV OH dedicated cct - lighting	51.61	45	6,122	km	12.4%
Poles	34.54	45	509,918	No.	24.9%
Services Overhead	28.89	35	721,586	No.	15.4%
Underground					
132 kV UG cct - oil	48.68	45	369	km	5.6%
132 kV UG cct - other	7.8	45	296	km	4.6%
66 kV UG cct	4.21	45	9.9	km	55.8%
33 kV UG cct - gas	50.52	45	129	km	1.0%
33 kV UG cct - other	41.64	45	542	km	9.2%
5/11 kV UG cct	31.57	60	8,252.3	km	14.3%
LV UG cct	27.39	60	6,101	km	22.4%
LV UG dedicated cct - lighting	47.23	60	1,276	km	13.1%
LV pillars	23.09	60	56,162	No.	34.1%
Services Underground	32.76	60	230,768	No.	25.1%
Substations - ZN & TS					
Sub-transmission Substation	41.46	60	46	No.	35.3%
Zone (ZN) Substation	37.41	60	186	No.	29.6%
City Zone Substation	27.41	60	6	No.	0.0%
132 kV CBs ZN & TS	8.36	45	579	No.	21.5%
66 kV CBs ZN & TS	7.32	45	137	No.	28.4%
33 kV CBs ZN & TS	25.71	45	942	No.	29.3%
5/11 kV CBs ZN	18.19	45	3,923	No.	18.2%
5/11 kV Switchboards ZN	32.88	45	5,333	No.	18.4%
Sub-transmission Transformers	32.12	50	90	No.	20.90%
132 kV Zone Transformers	16.86	50	173	No.	17.00%
66/11 kV Zone Transformers	20.52	50	47	No.	32.7%
33/11 kV Zone Transformers	30.70	50	267	No.	24.80%
Other (Asset Intangibles)	-	-	-	-	-
Distribution Centres - DC					
- Pole Substation	30.36	40	16,240	No.	48.3%
- Kiosk Substation	22.12	40	12,884	No.	15.1%
- Outdoor Enclosure Substations	40.20	40	546	No.	6.9%
- Chamber Substations	35.13	40	2,559	No.	2.8%
5/11 kV CBs DC	30.81	45	2,561	No.	2.5%
5/11 kV Switchboards DC	54.80	45	930	No.	0.4%
Distribution Centre Transformers	24.37	45	33,807	No.	32.3%
Meters					
Three Phase Meters (Types 5 & 6)	10.86	25	220k	No.	-
Single Phase Meters (Types 5 & 6)	21.74	25	2,211k	No.	-
Streetlights					
Lights & Brackets	35.20	20	251,464	No.	16.30%

Indicative asset counts as recorded in corporate systems.
Not validated for external reporting purposes.

Approach to Decision Making & Program Overview

- Approach to replacement needs
- Asset lifecycle management
- Replacement expenditure overview
- Cost benefit analysis overview

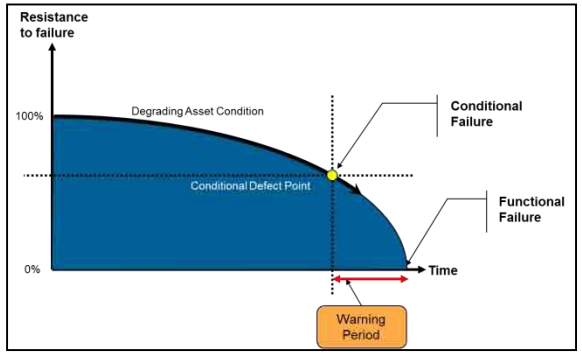
Approach to Decision Making

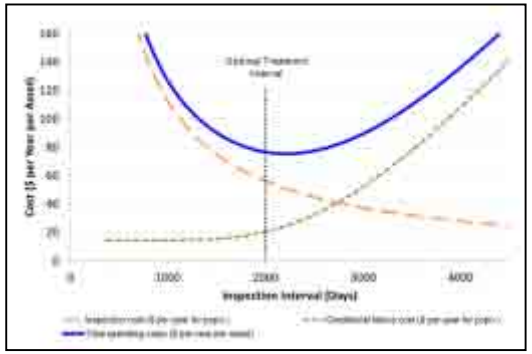
Maintenance & Life Cycle Analysis

- FMECA
- RCM
- Bow-tie
- Cost / Benefit

Maintenance

- Condition Monitoring → Defects
- Functional Testing → Defects
- Preventative Maintenance



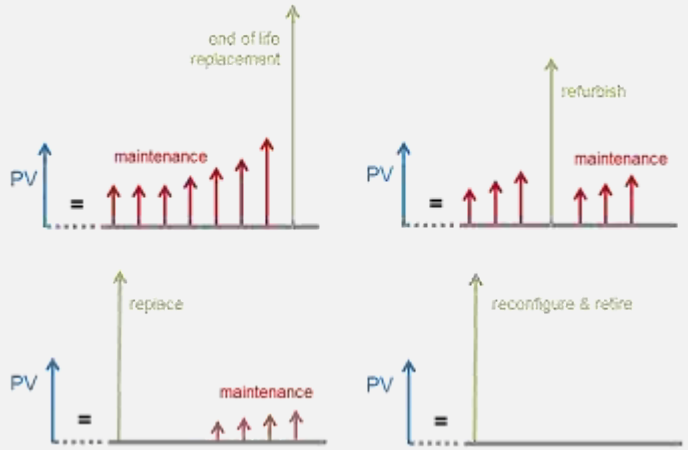


Treatment action

- Repairs
  - Corrective
  - Breakdown
- Capital Investment
  - REPEX*
    - Planned
    - Conditional
    - Reactive
    - Major Project

- Repair
- Refurbish
- Modify
- Replace
- Retire
- Alternative Supply

Discounted Cash Flow Analysis



- Area Plan Integration

Full Cost Benefit Analysis

* REPEX includes capital replacement, refurbishment or specific design modifications

Asset Condition – Tested by Asset Age

Asset condition is the key driver of replacement expenditure and includes the following components:

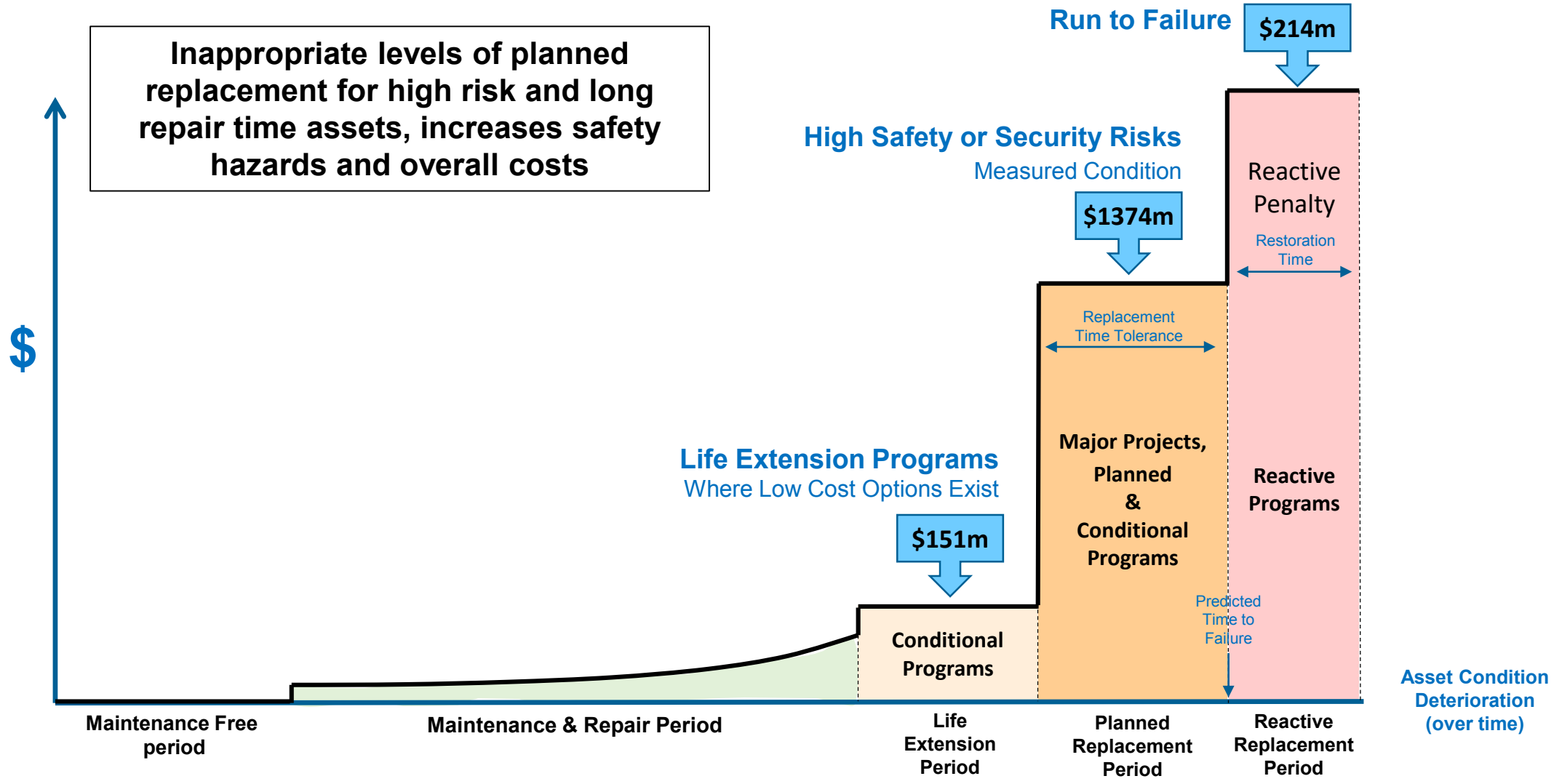
- Measured condition & forecast degradation based on observed trends
- Current asset failure rates and trends of particular asset sub-types
- Consequences of uncontrolled failures:
  - **Worker (Operator and Maintainer) Safety**
  - **Public Safety**
  - **Environmental Safety**
  - **Long Supply Interruptions**

All asset programs are validated by age modelling and trend analysis – similar to the replacement expenditure modelling

Age does not directly drive replacement

For example the residual strength of any pole is largely independent of the pole age

Approach to Asset Replacement Programs & Projects



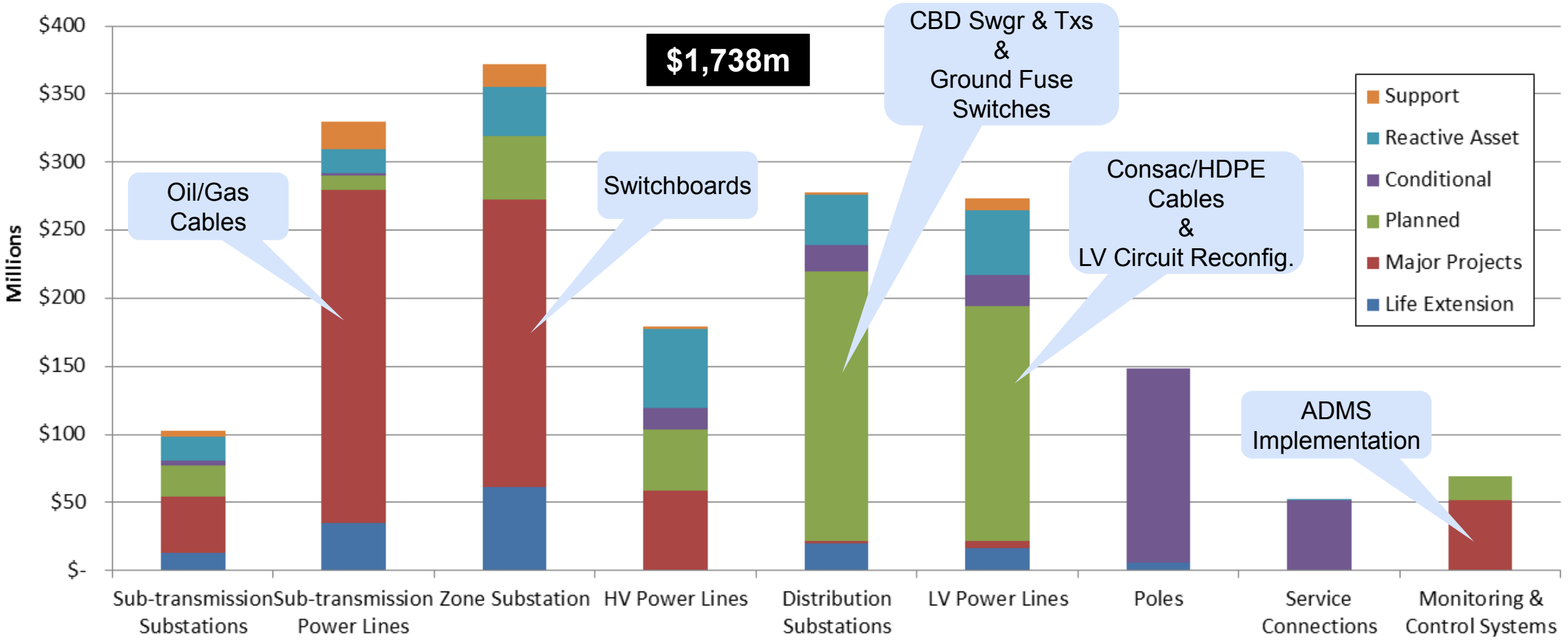
Capital Replacement Expenditure Overview*

Replacement Expenditure (FY20-24) in FY19 Real $	Asset Life Extension	Major Projects	Planned Programs	Conditional Programs	Reactive Programs	Total
Sub-transmission Substations	$13m	$41m	$23m	$3m	$17m	**$98m**
Sub-transmission Power Lines • UG Cables - Oil/Gas ($231m) – e.g. Castle Cove – Mosman Feeders ($34m)	$35m	$245m	$10m	$2m	$18m	**$310m**
Zone Substation • Switchboards ($185m) – e.g. Concord Zone ($18m)	$61m	$211m	$46m		$36m	**$355m**
HV Power Lines • OH Conductors – Steel/ACSR ($38m)		$59m	$45m	$16m	$58m	**$177m**
Distribution Substations • Fuse Switches & CBD Swgr & Txs ($102m)	$20m	$2m	$198m	$19m	$37m	**$276m**
LV Power Lines • UG Cables – Consac/HDPE ($111m) • OH Conductors – LV Reconfiguration ($43m)	$16m	$5m	$173m	$23m	$47m	**$264m**
Poles	$6m			$143m		**$149m**
Service Connections • OH Services – Bare/PVC ($52m)				$52m	$1m	**$53m**
Monitoring & Control Systems • ADMS Continued Implementation ($41m)		$47m	$10m			**$57m**
Total	**$151m**	**$611m**	**$505m**	**$258m**	**$214m**	**$1,738m**

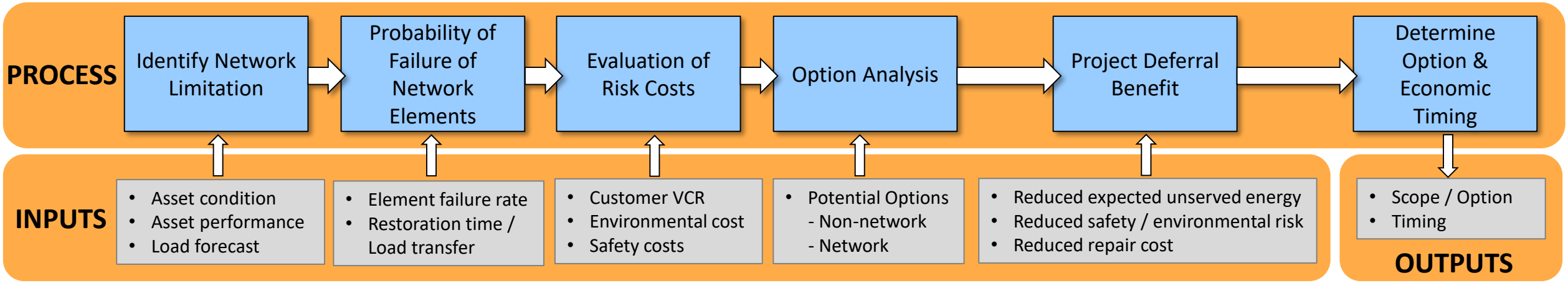
* - All numbers are draft and subject to validation

Capital Program Overview

Network Group & Replacement Approach



Approach to Decision Making for Major Projects



The cost benefit analysis (CBA) undertaken during the Area Plan review involves two stages, periodically reassessed with the latest available information:

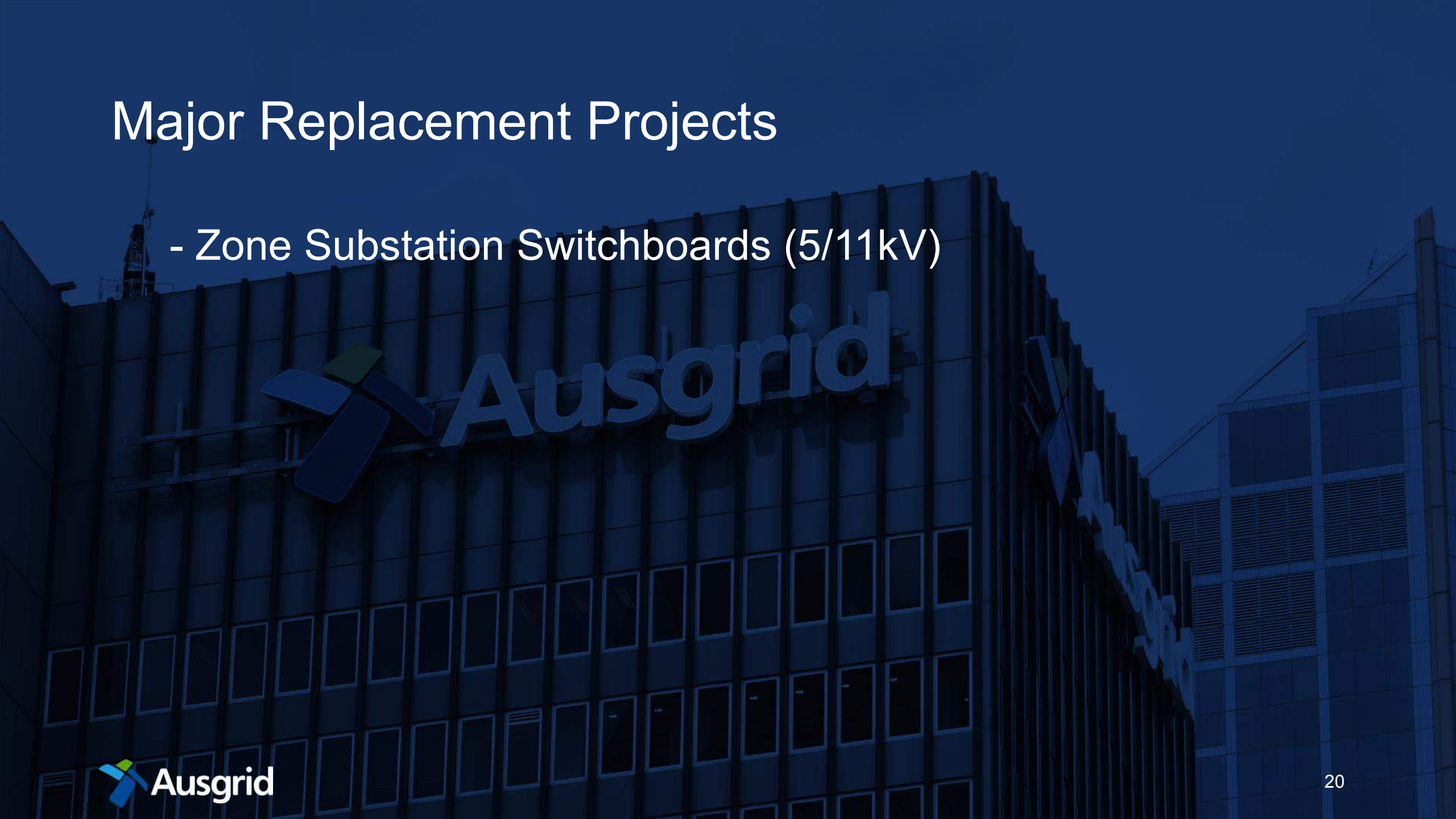
- Identification of **optimum timing** for all the credible options, and
- Calculation of **net present benefit** which determines the preferred option

Ausgrid has developed models to apply the CBA for the following scenarios:

- Substation switchgear **replacement**
- Subtransmission feeder **replacement**
- Substation capacity **augmentation**

Major Replacement Projects

- Zone Substation Switchboards (5/11kV)



Switchboard Replacement Projects

Proposal

We propose to invest $185 million on switchboard or related equipment replacement costs for the 2019-24 capital program (real $ FY19).

Counterfactual

If we do not invest in replacement of poor condition assets there is likely to be continued worker injuries and sustained long term outages are likely to experienced by portions of the customer base (including homes, businesses and community facilities)

Reasons for investment

The investment is needed to continue to ensure the safe and reliable operation of Ausgrid's assets in delivering energy to customers.

Impact on pricing

The total investment of $185 million will contribute around $10.4 million to annual revenue requirements by the end of the 2019-24 regulatory period or an average of $6 per customer per year. This represents 0.5% of the customers price.

Switchboard Replacement

5kV & 11kV Oil & Compound Switchboards

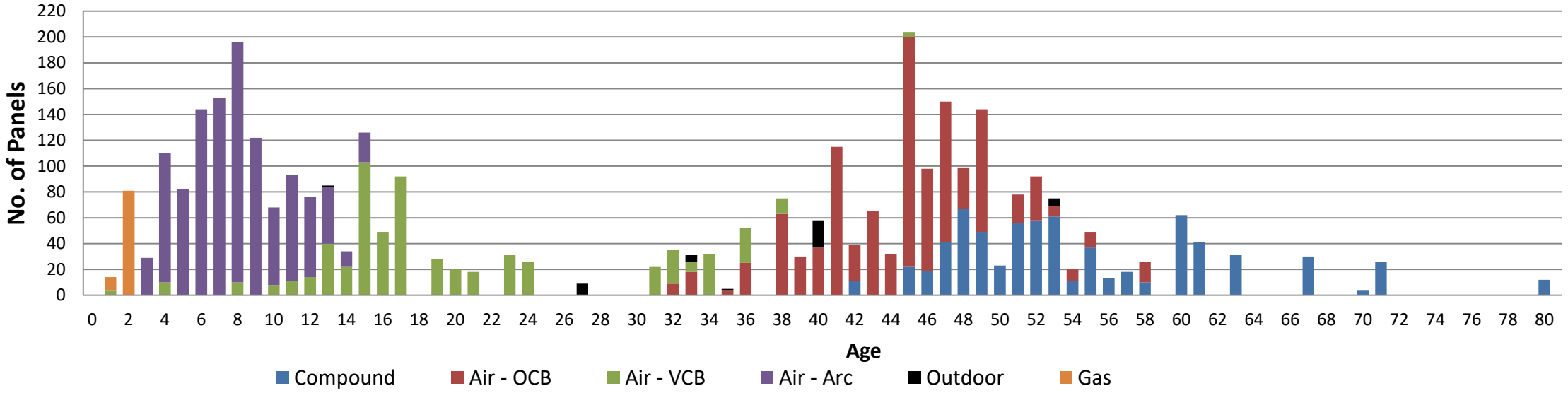
Over 400 switchboards (5kV/11kV) exist at more than 400 sites (over half in Distribution Substations).

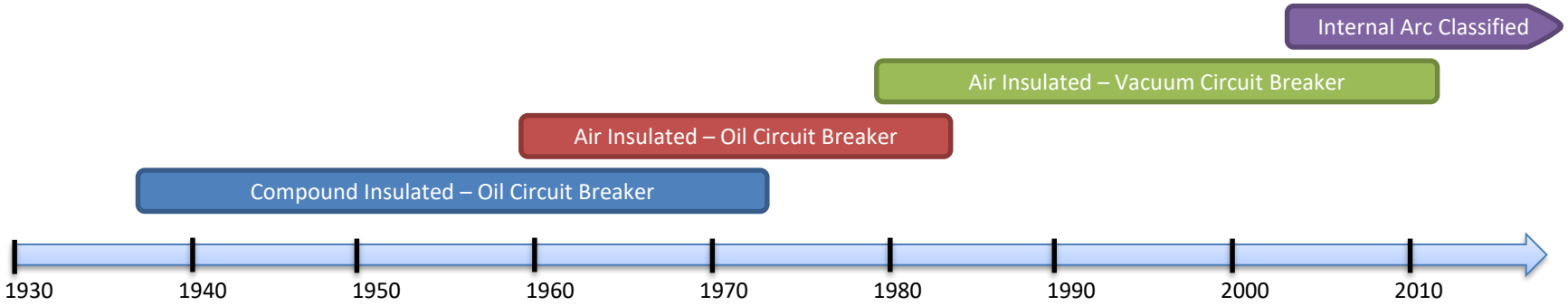
- Key purpose is the interconnection point for control and protection of all high voltage power lines
- 5 distinct generations of switchboard technology have been installed over the past 80 years
- Condition is assessed through extensive periodic testing of the switchboards
- Failure results in extended outages for between 5,000 and 40,000 customers
- Full recovery can take up to 12 months

Multiple replacement approaches are employed for managing risk (based on option analysis of existing switchboards)

Replacement Approach	Switchboard Management Approach	No. (FY20-24)
Reactive Replacement	Run to end of life approach. Applicable for most distribution substations	> 200
Replacement Deferral	Replace oil circuit breakers with vacuum technology, but not the switchboard.	5 finish
Partial Replacement	Replace part of the switchboard (compound insulation). Applicable where condition of the remaining section of switchboard is suitable to remain in service.	3 fin. + 1 start
Full Replacement / Retire	Applicable where no viable options can mitigate the inherent asset condition risks	6 fin. + 7 start

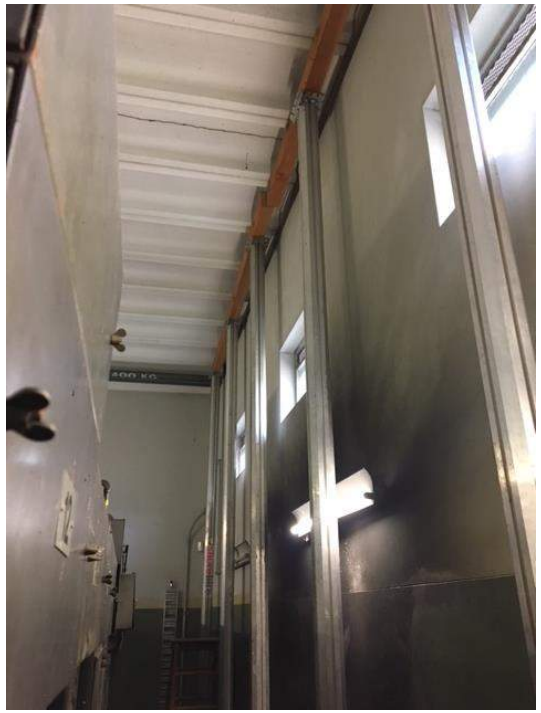
Switchboards – Age and technology





Switchboards – What can go wrong

Dulwich Hill switchboard partial failure in 2013



- Explosion of the switchboard caused by insulation failure created a build up of pressure within the building
- The concrete roof was lifted by the pressure, cracked and is currently temporarily supported, pending replacement

Switchboards – Portfolio of 11kV switchgear replacement projects

Project Name	Replacement type	Total Cost ($m)				Start Date	Finish Date
		2015-19	2020-24	2025-29	Total		
Mascot	New Zone	2.4	50.4	-	52.8	2018	2023
City East	Retire Zone	16.5	22.6	-	39.1	2017	2023
Concord	Full Board	2.7	22.6	-	25.3	2018	2022
Enfield	New Zone	18.0	15.1		33.1	2018	2022
Clovelly	Partial Board	-	14.1	0.6	14.7	2021	2025
Dalley St	Retire Zone	11.9	14.0	0.1	25.9	2017	2025
Darlinghurst	Retire Zone – Staged	0.03	3.7	9.1	17.3	2018	2031
Miranda	Full Board	-	12.3	1.4	13.6	2021	2025
Tarro	Full Board	1.9	8.2	-	10.1	2018	2022
Leightonfield	Full board	-	8.2	0.6	8.8	2021	2026
Flemington	Partial Board	1.4	5.9	-	7.2	2018	2021
Botany	Full Board	-	5.9	0.4	6.3	2022	2025
Lidcombe (Group 1 & 2)	Full Board – Staged	6.1	5.5	14.5	26.1	2017	2029
Denman	Full Board	0.8	3.6	-	4.4	2018	2021
Riverwood	Full Board	-	2.4	8.5	10.9	2023	2027
St Ives	Full Board	-	1.6	15.3	16.9	2023	2027
Milperra	Full Board	-	1.4	8.5	9.9	2023	2027
Pymble	Full Board	-	1.4	11.9	13.3	2023	2027

Case Study – Concord Zone Substation 11kV Replacement

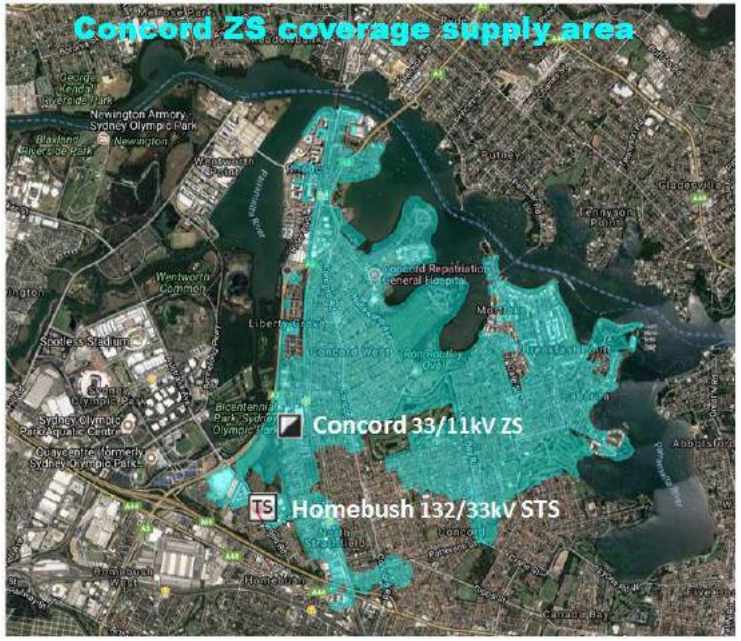
Proposal

To replace the existing oil circuit breaker compound filled 11kV switchboard at Concord with modern, vacuum insulated arc fault contained switchgear at a cost of $20.1 million (real $ FY19)

Counterfactual

If we do not carry out this work, approx. 11,000 homes and businesses, including key customers like Concord Hospital will continue to exposed to an elevated risk of outages at a scale which can not be readily addressed by switching the network, leading to extended outages.

The safety risk related to oil circuit breaker failure and the additional risk of fire due to the compound insulated switchboard will remain, exposing staff and the public to avoidable risks.



Reasons for investment

Existing switchgear has poor test results and an increasing risk of failure. Compound insulated switchboards with oil circuit breakers (CBs) have failed with consequences from localised loss of supply, to hot oil expulsion from CBs and major switchroom fires, with loss of supply to wide areas for extended periods.

Lack of manufacturer support and spares for this ageing and obsolete technology has resulted in difficulties making repairs when required

Impact on pricing

The total investment of $20.1 million will contribute around $1.1 million to annual revenue requirements by the end of the 2019-24 regulatory period or an average of $0.6 per customer per year. This represents 0.06% of the customers price.

Case Study – Concord Zone Substation 11kV Replacement

February 2018



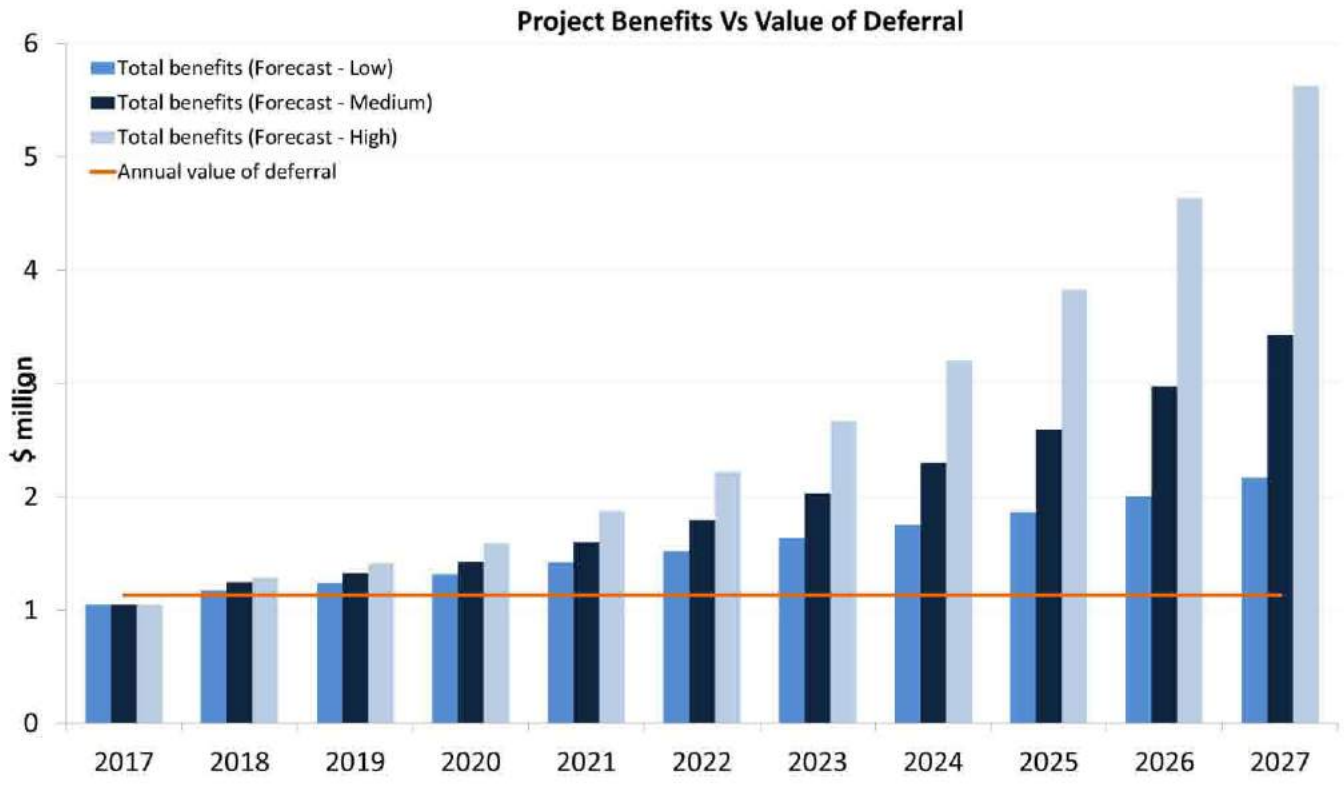


- Compound switchboard - Deferral of the switchboard replacement was attempted in 2014, however South Wales equipment does **not** have a suitable oil circuit breaker replacement option
- The switchboard was tested in 2015:
  - The insulation condition was poor, with no partial discharge evident at normal operating voltage
  - Significant partial discharge was found above service volts (7.5kV – 4,000pC on A-phase)
  - Retesting (two months later) reconfirmed the poor condition and could not assisting in locating the fault

Case Study – Concord Zone Substation 11kV Replacement

Concord Zone Substation is 62 years old and located in the Inner West area of Sydney.

- The 11kV switchboard is compound (pitch) insulated, with poor insulation condition identified by the testing program
- Ongoing testing is complex due to the need to remove the switchboard from service for the tests
- The circuit breakers are oil filled for insulation and not arc contained. Failure of a breaker can release hot oil and the arcing products can be hot enough to ignite the pitch insulation in the surrounding switchboard
- Spares and manufacturer support are no longer available
- Circuit breaker replacement has been considered but is not feasible



Cost Benefit Analysis (CBA) has indicated that the benefits of replacement, at a cost of $25.3 million exceed the benefits of deferral by 2018

Replacement Programs

- Low Voltage Underground Cables

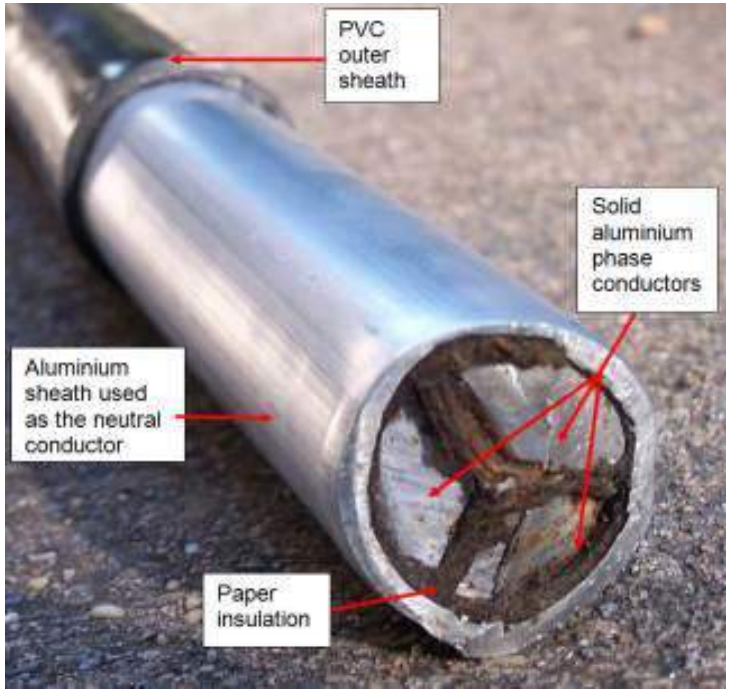
Low Voltage Cable Replacement Programs

Proposal

We propose to invest $111 million on Consac & HDPE type low voltage cable replacements for the 2019-24 capital program (real $ FY19).

Counterfactual

If we do not invest in replacement of these assets there is likely to be continued customer injuries and sustained long term outages are likely to be experienced by portions of the customer base (including homes, businesses and community facilities)



Reasons for investment

The investment is needed to continue to ensure the safe and reliable operation of Ausgrid's assets in delivering energy to customers.

Impact on pricing

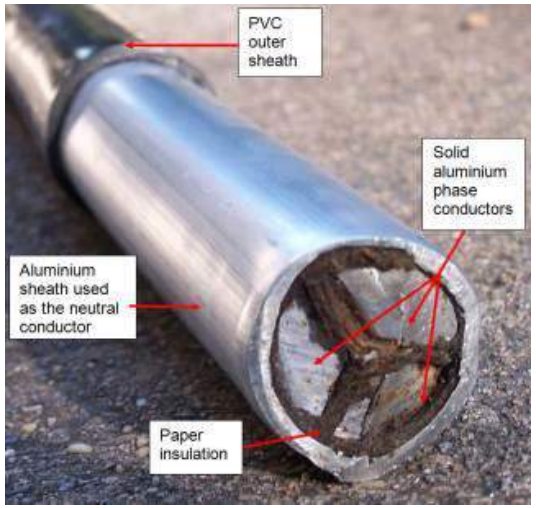
The total investment of $111 million will contribute around $6.2 million to annual revenue requirements by the end of the 2019-24 regulatory period or an average of $3.4 per customer per year. This represents 0.3% of the customers price.

Low Voltage Cable – Consac / HDPE Types (FY2020-24 – $111m)

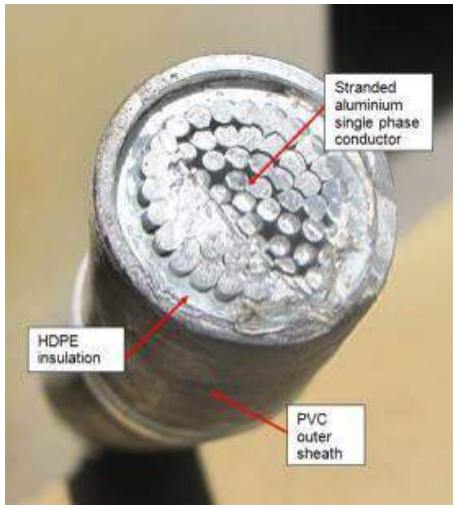
Ausgrid has 6,000km of low voltage (LV) cables including 823km (13%) of Consac or HDPE type (installed 1960-80's)

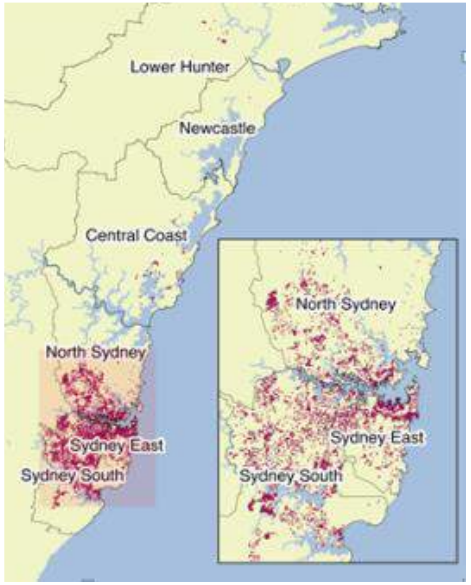
- Existing Consac - **709km**, average length of **100m**; HDPE - **114km**, Average length of **16m**
- Failure rate per km for these types is more than **7 times** higher than all other LV cable types.
  - Electric shocks to customers and workers prior to failure
  - Significant disruption to customers (particularly businesses) during repairs
  - Failure modes are consistent with those seen by DNSP's within Australia and ov

Consac Cable (76km @ $81m)



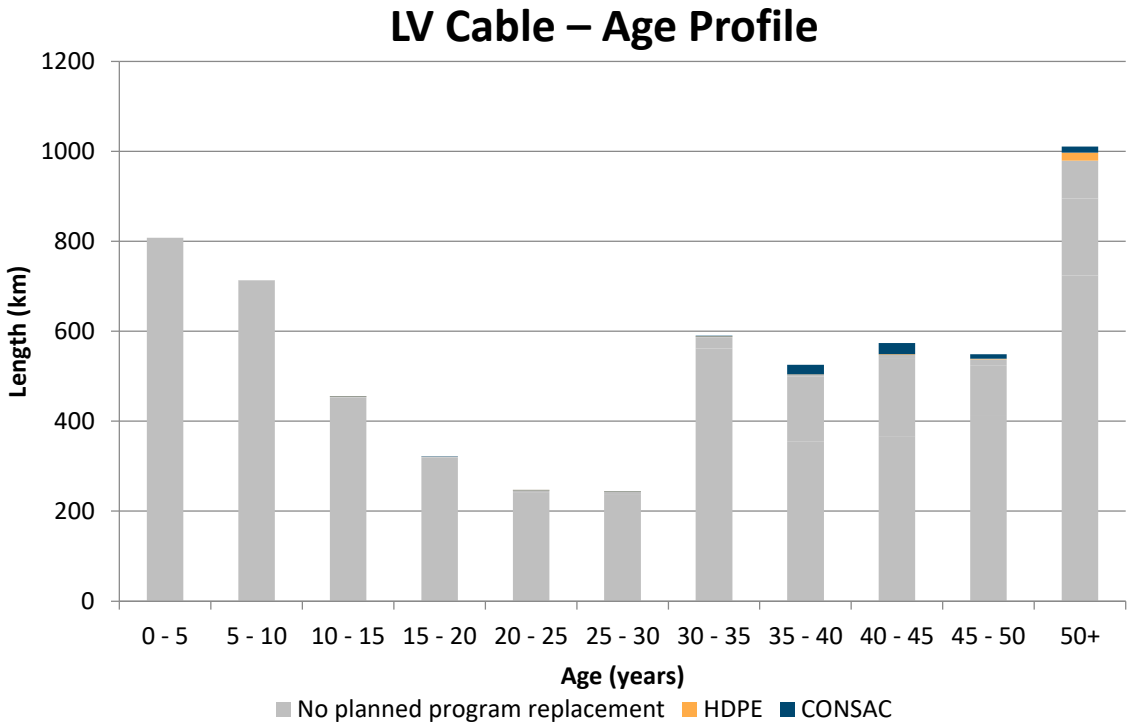
HDPE Cable (25km @ $30m)





Low Voltage Cable – Age and replacement volumes

- CONSAC:
  - Length: 76km
  - Forecasted FY20 - FY24
- HDPE
  - Length: 25km
  - Forecasted FY20 - FY24
- Higher failure rate than other types of LV cables on the network



- The replacement forecast is sized and prioritised to maintain current risk levels from cable failures
- Smart meter information will enable better prioritisation of highest risk cables

Low Voltage Cable – Consac / HDPE Types (Operating Contexts)

Low density suburban residential area

High density commercial area

High density pedestrian shopping area

Environmental conditions

High density suburban residential area

High traffic flow RMS Road

Low Voltage Cable – Replacement Delivery Approach & Costs (Consac)

The average length being replaced has reduced:

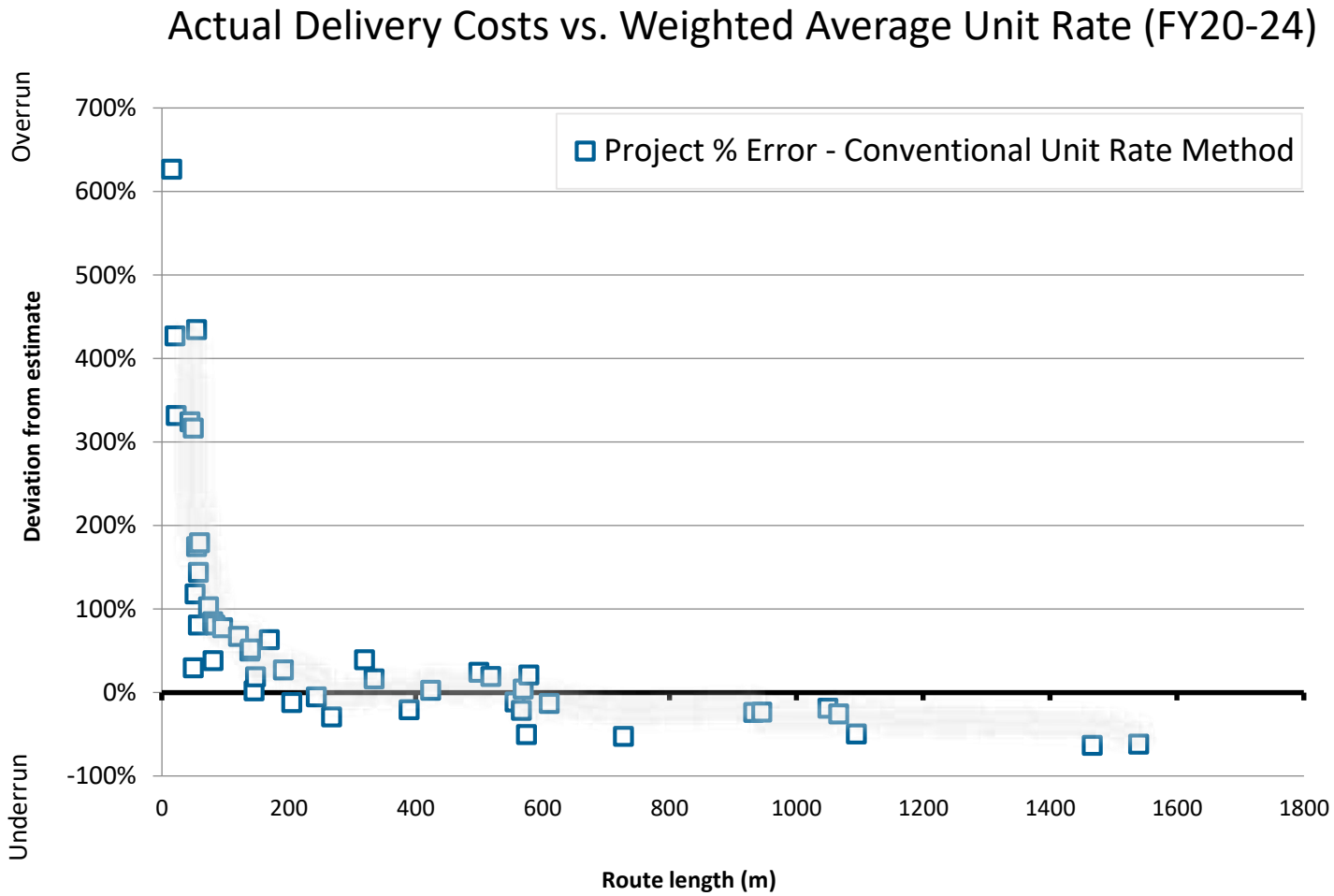
- FY15-19 – 190m
- FY20-24 – 140m

Proposed to be undertaken using a blended delivery approach:

- 50% of works externally delivered
- Majority of internally deliver works are still contractor costs

Unit rates depend on :

- cable length
- existing conduits
- urban density and context (residential vs commercial)
- traffic / pedestrian volumes



Major Replacement Projects

- Sub-transmission Fluid Filled / Gas Cables (33kV/132kV)

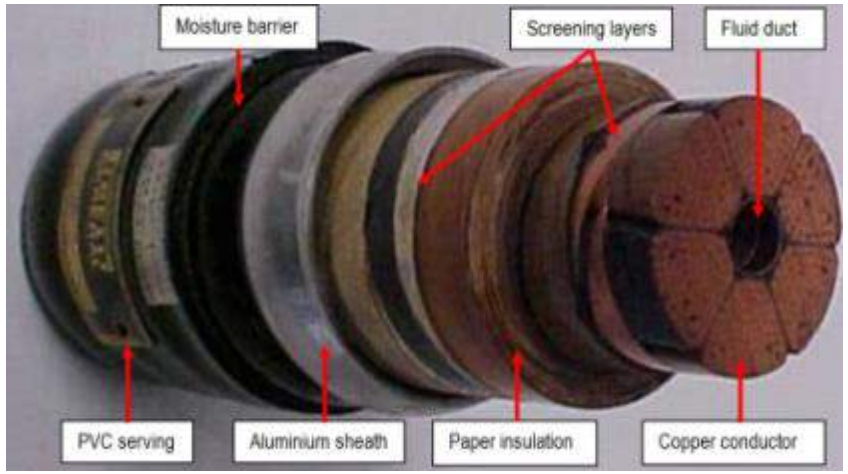
Fluid Filled / Gas Cable Replacement Projects

Proposal

We propose to invest $231 million on fluid (oil) filled cable and gas cable replacement costs for the 2019-24 capital program (real $ FY19).

Counterfactual

If we do not invest in replacement of poor condition assets there is likely to be increasing levels of environmental pollution, increasing safety risks to the public and workers, and sustained outages experienced by portions of the customer base (including homes, businesses and community facilities)



Reasons for investment

The investment is needed to continue to ensure the safe and reliable operation of Ausgrid's assets in delivering energy to customers. Safe operation includes protecting the environment.

Impact on pricing

The total investment of $231 million will contribute around $12.9 million to annual revenue requirements by the end of the 2019-24 regulatory period or an average of $7 per customer per year. This represents 0.7% of the customers price.

Underground Sub-transmission Cables

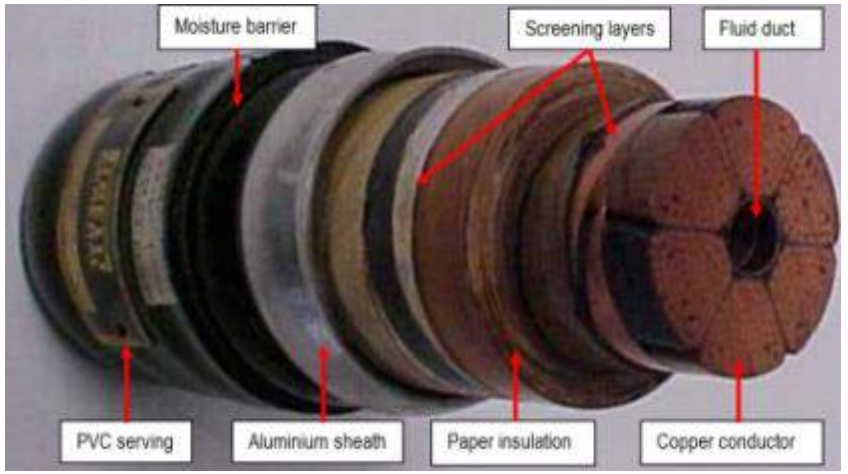
132kV Fluid Filled Cables / 33kV Gas Cables

Over 1,260km of sub-transmission underground cable exists on the Ausgrid network (474 Feeders). 458km (112 Feeders) consists of fluid filled cable (FFC) or gas cable installed from the 1950's to 1980's.

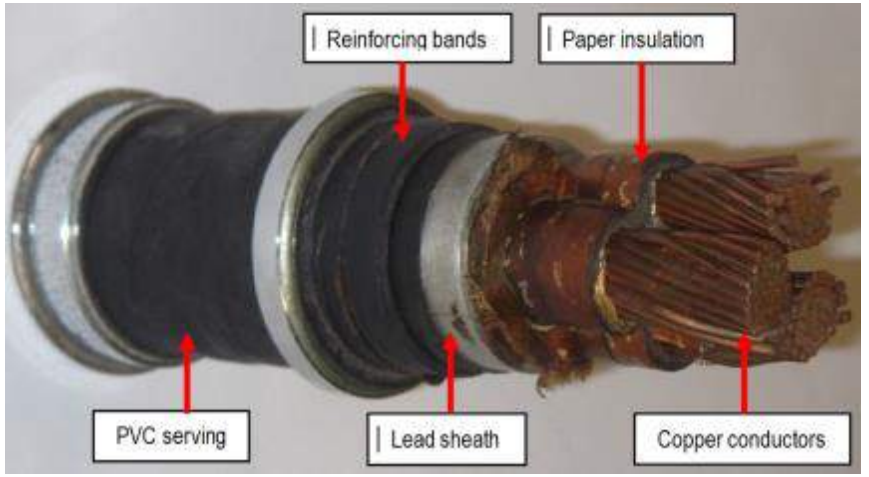
- These cables are pressurised so that they are able to operate at their higher voltages (33kV or 132kV). Modern cables use plastic insulation
- Include numerous components to continue to functions
  - cable, joints and substation terminations
  - Pressurised fluid or gas systems (tanks, gauges, pits, lines)
  - pressure alarm switches in pits and substations, pilot cables and alarm panels.
  - sheath earthing systems for safety and to maximise load capacity, link boxes in pits / substations, surge arrestors

Many cables provide support for the inner Sydney transmission supply

Fluid filled cable (single phase)



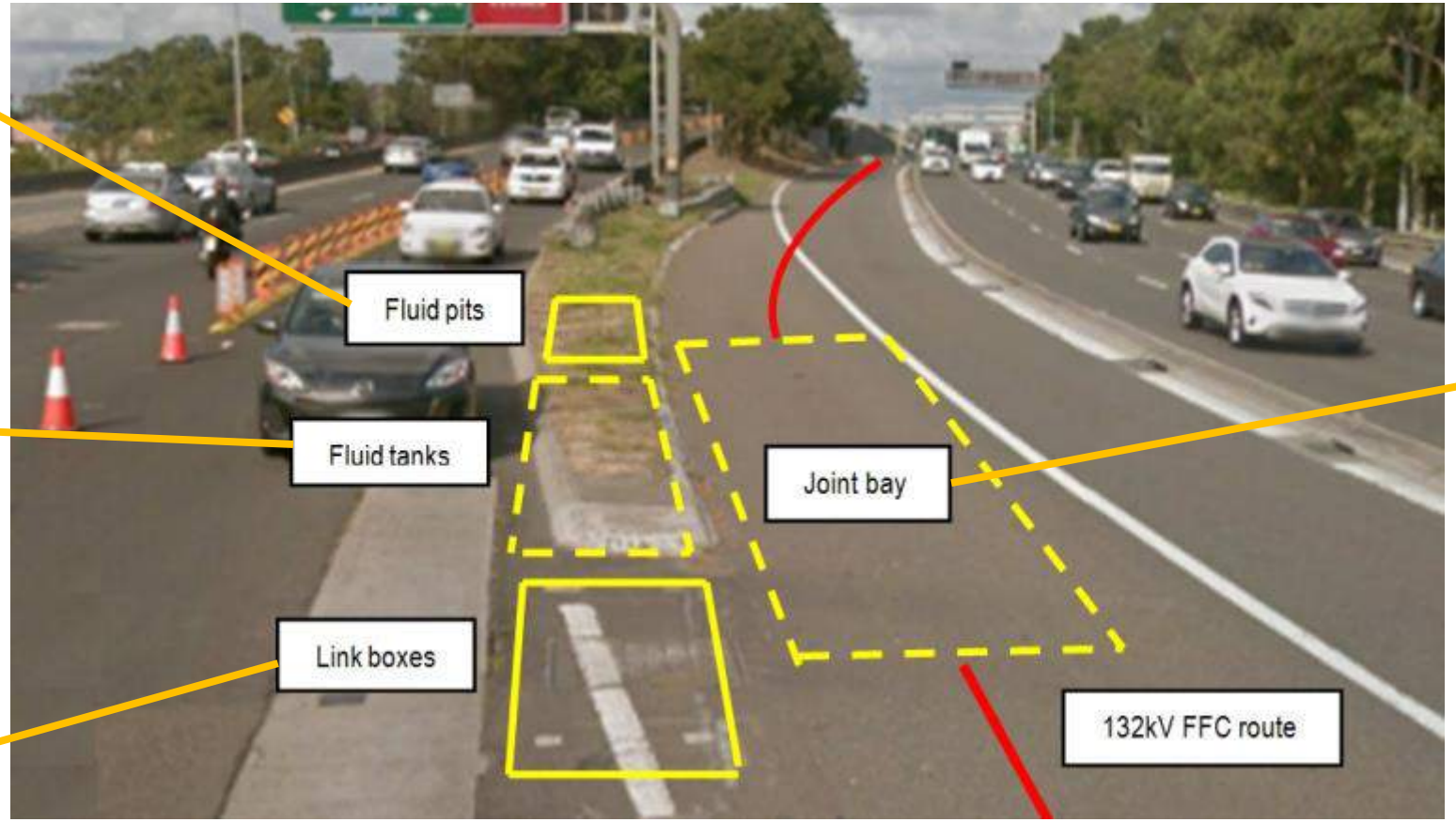
Gas cable (three phase)



Underground Sub-transmission Cables

132kV Fluid Filled Cables / 33kV Gas Cables

A FFC cable joint bay and its components along the cable route



Underground Sub-transmission Cables

132kV Fluid Filled Cables / 33kV Gas Cables

- These cables carry risks related to their **design**, **condition** and **secondary systems**.
  - **Gas cable condition** issues are generally caused by **leakage** due to age related degradation and their high operating pressure. Thermal cycling (heating and cooling due to loads) also causes mechanical stress to joints.
  - **FFC condition** issues are mainly related to **fluid leakage** from joints, degradation of the cable cover and protection
- The retirement strategy was developed in 2002 in association with NSW EPA after numerous pollution incidents.
- Long term retirement program for these cables – commenced 2009 and projects forecast to conclude in 2039
- CBA applied to each asset (with other Area Plan requirements) to determine timing of replacement or retirement.

Leaking Joints & Pipework

Corroded Sheath Leaking

Long Duration Repair

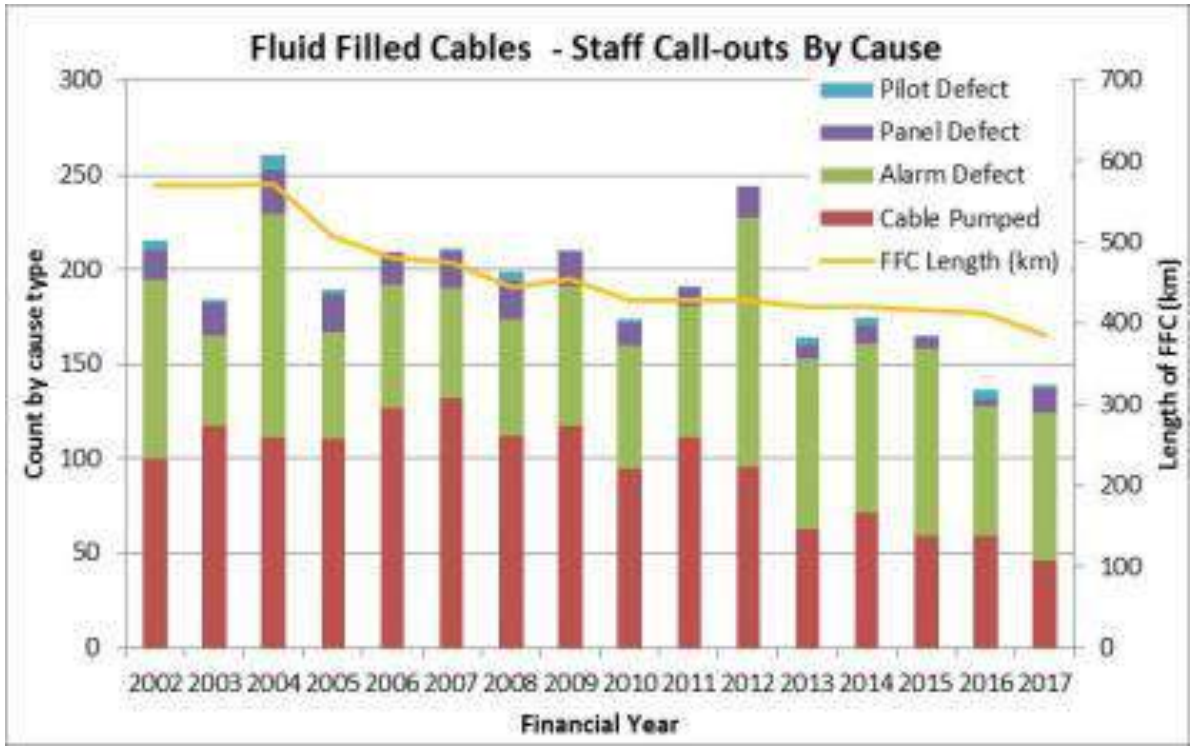
Excavation for Leak Repairs

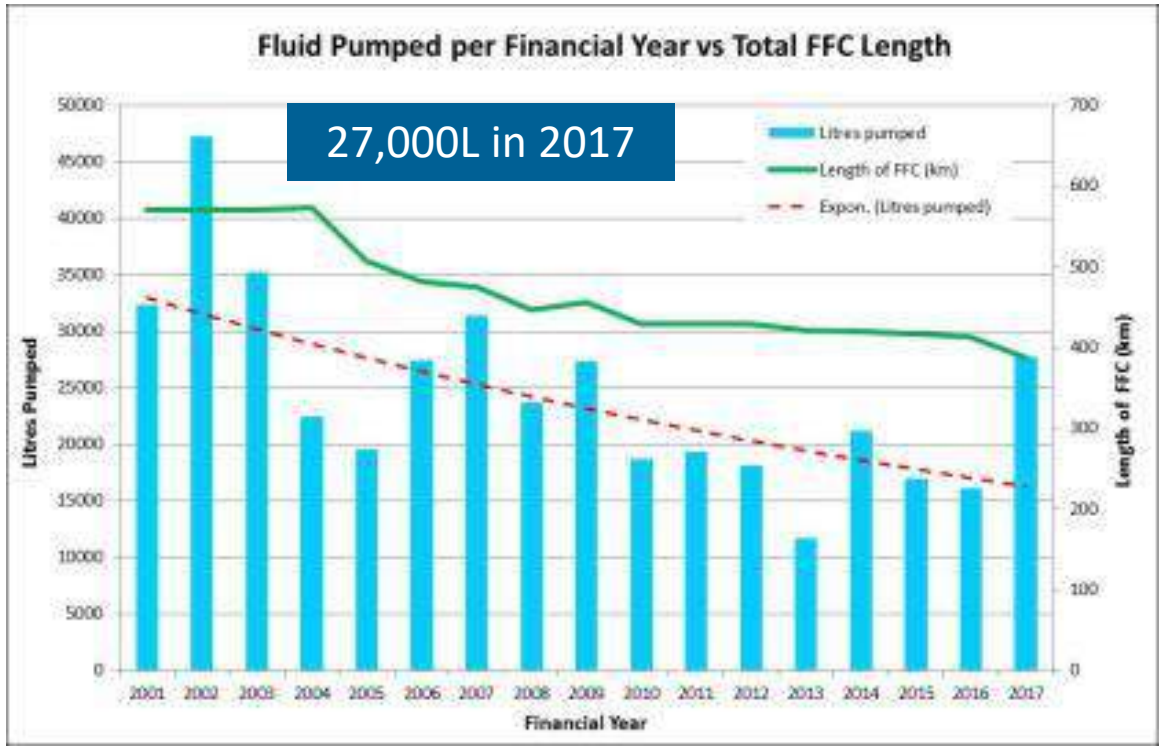
Continual 'Top-ups' (Gas)

Underground Sub-transmission Cables

132kV Fluid Filled Cables / 33kV Gas Cables

- Defects are actioned immediately when pressure monitoring warns of fluid leakage and risk of imminent failure
- Failure of a pressure monitoring systems are increasing and severe (including repairs of up to $1.2m to repair)
- As cables are retired the environmental risk are reducing, however major leakage events still occur

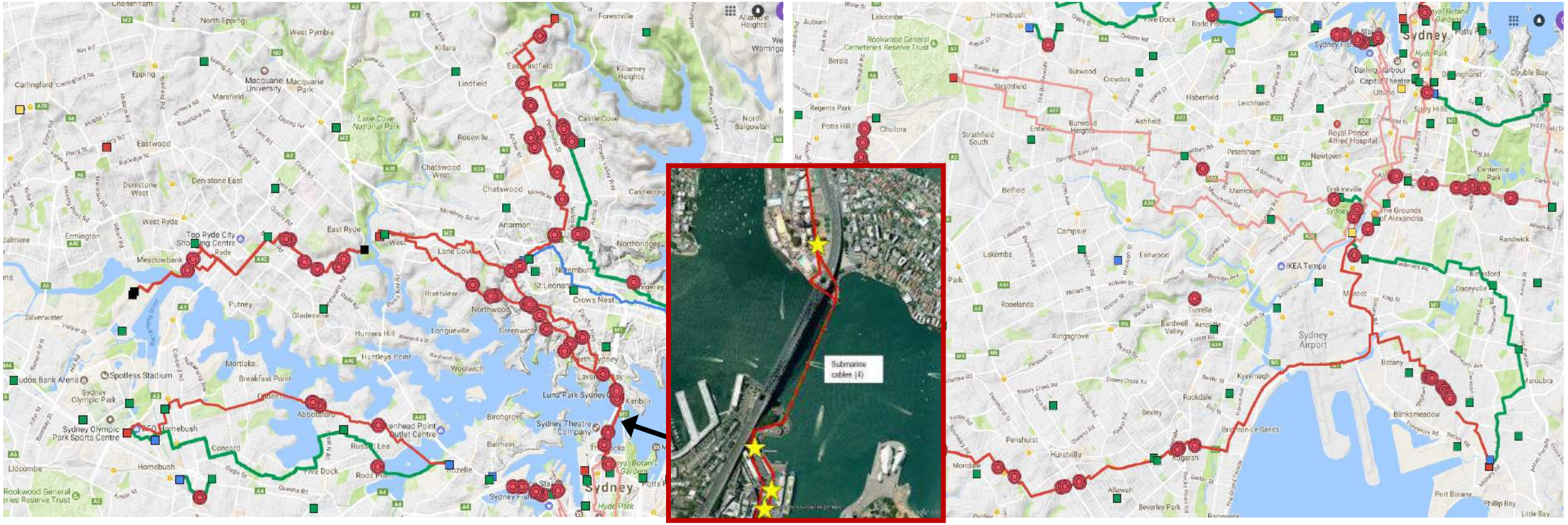




Underground Sub-transmission Cables

132kV Fluid Filled Cables / 33kV Gas Cables

- The location of reported leakage incidents (94) in the Sydney area from 2005 onwards are shown below
- NSW EPA has issued a ‘formal warning’ in 2014 and an ‘official caution’ in 2017 due to fluid leakage polluting waterways (breaches of the Protection of the Environment Operations Act)



Underground Sub-transmission Cables – Portfolio of capital projects

132kV Cable Replacements

Project Name	Total Cost ($m)				Start Date	Finish Date
	2015-19	2020-24	2025-29	Total		
Beaconsfield - Zetland	-	38.7	1.8	40.5	2019	2025
Castle Cove - Mosman	0.9	35.9	-	36.8	2019	2023
Beaconsfield - Campbell St - Belmore Park	5.1	21.7	-	27.8	2019	2024
Sydney South - Revesby	1.6	20.5	-	22.1	2018	2022
Zetland - Clovelly	1.4	19.7		21.1	2018	2022
Haymarket - Pyrmont	-	18.2	18.3	36.5	2022	2026
Bunnerong - Maroubra	-	17.5	2.4	19.9	2021	2025
Beaconsfield - Mill Pond	-	15.5	0.2	15.7	2019	2023
Mason Park – Burwood	-	9.2	-	9.2	2020	2024
Beaconsfield - Green Square	-	6.7	-	6.7	2020	2024
Beaconsfield - Kingsford	-	3.7	22.3	26.0	2022	2026
Mason park - Homebush	1.2	0.6	-	1.8	2017	2019
Mason Park – Drummoyne - Rozelle	-	0.5	46.7	47.2	2024	2028

33kV Cable Replacements

Project Name	Total Cost ($m)				Start Date	Finish Date
	2015-19	2020-24	2025-29	Total		
Homebush – Auburn - Lidcombe	16.5	13.4	-	29.9	2017	2020
Bunnerong – Sydney Airport	0.8	12.0	-	12.8	2017	2020
Surry Hills - Paddington	-	7.4	2.6	10.0	2022	2025
Bunnerong - Mascot	-	2.3	-	2.3	2018	2023

Case Study: 132kV Feeders Castle Cove - Mosman

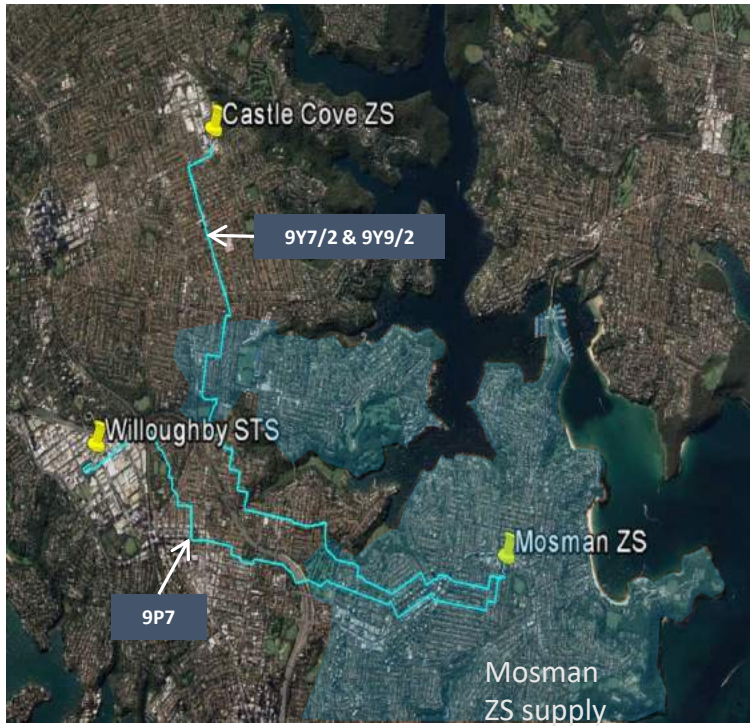
Proposal

To retire 24km of fluid filled 132kV cables between Castle Cove, Mosman and Willoughby and replace them with XLPE cable at a cost of $35.7 million (real $ FY19). A cost benefit analysis has indicated that the benefits exceed the value of deferral from 2018 onwards

Counterfactual

If we do not carry out this project approx. 50,000 customers in Mosman, Castle Cove and Northbridge will continue to face higher risks of extended outages due to cable failures, along with the potential for major traffic impacts, both due to faults and repairs

Monitoring and repair costs would remain well above those of newer equivalents



Reasons for investment

These fluid cables have a history of failure and ongoing leakage. They run close to waterways and have been the subject of a formal NSW EPA warning

Fluid filled cables have extended repair times due to the oil based technology increasing the risks of failure of backup cables during repairs. They are costly to repair and require much higher levels of monitoring and maintenance than newer technologies

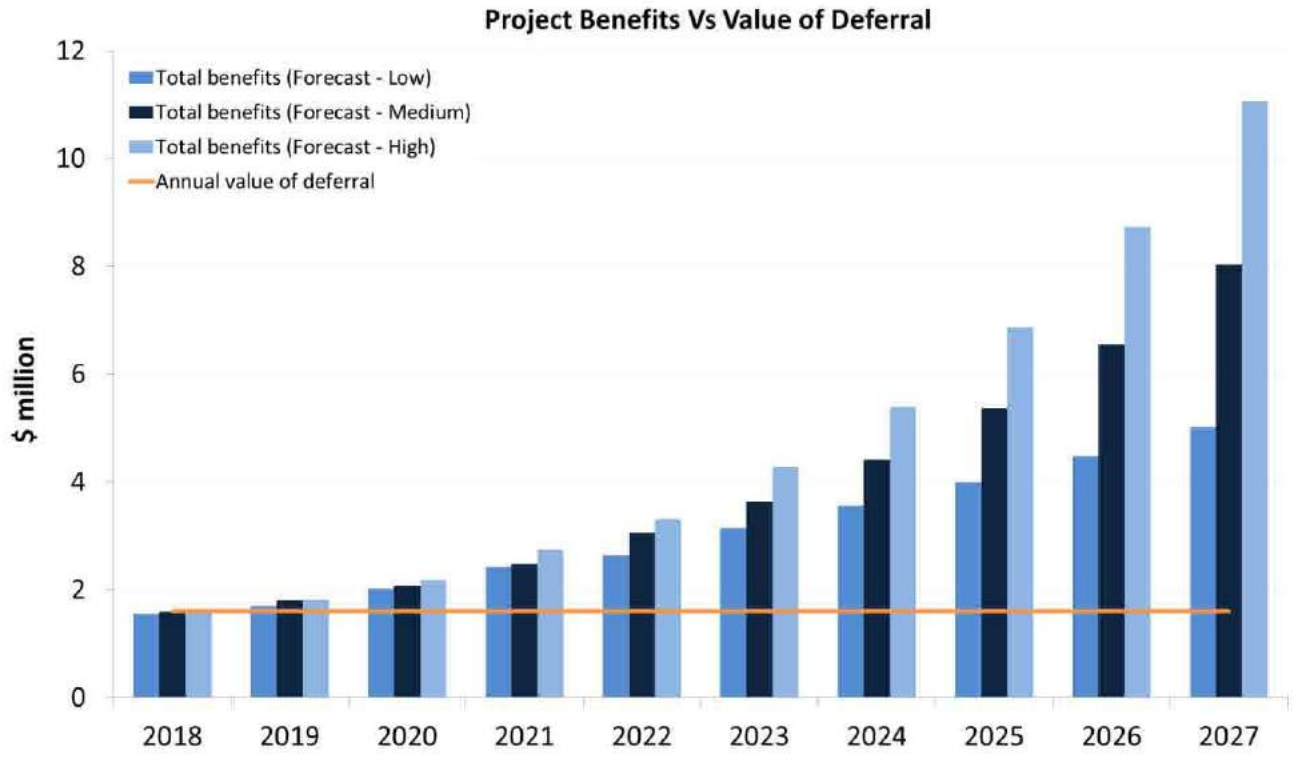
Impact on pricing

The total investment of $35.7 million will contribute around $2.0 million to annual revenue requirements by the end of the 2019-24 regulatory period or an average of $1.1 per customer per year. This represents 0.10%of the customers price.

Case Study: 132kV Feeders Castle Cove - Mosman replacement

Feeders 9Y7/2, 9Y9/2 and 9P7 are 47 year old 132kV fluid filled cables which supply Mosman and Castle Cove Zone Substations

- The feeders have a history of failure and leakage and have been the subject of a formal warning from the Environmental Protection Authority
- Extended repair times due to the oil based technology requires more complex repairs with oil to be pumped out before repairs and slowly pumped back in after repairs
- Ongoing monitoring and maintenance costs are significantly higher than contemporary XLPE cable technologies
- The project will retire the three feeders, with a total of 24km and replace them with 17km of XLPE cable

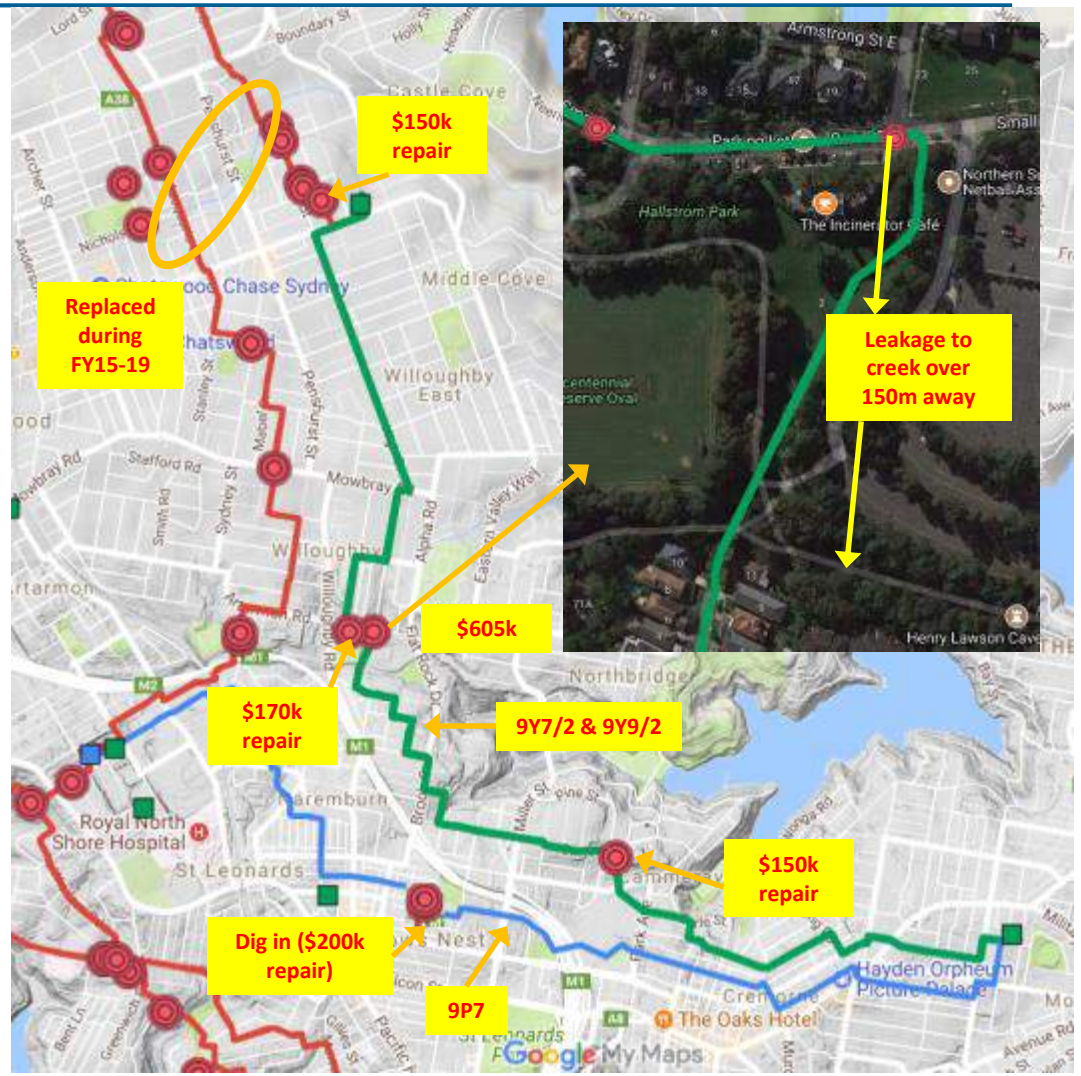


Cost Benefit Analysis (CBA) has indicated that the benefits of replacement, at a cost of $36.8 million exceed the benefits of deferral by 2019

Case Study: Castle Cove - Mosman 132kV Feeder replacement

Repairs and mandatory reporting to the EPA:

- Ausgrid has notified the EPA of leakage greater than 5L per day from these feeders on 4 occasions since FY09:
  - Fluid leakage from 9Y9/2 polluted a creek in 2014 and resulted in a ‘formal warning’ notice from the EPA
  - Cable repairs and soil clean-up cost $605,000



Advanced Distribution Management System (ADMS)

Advanced Distribution Management System (ADMS) Project

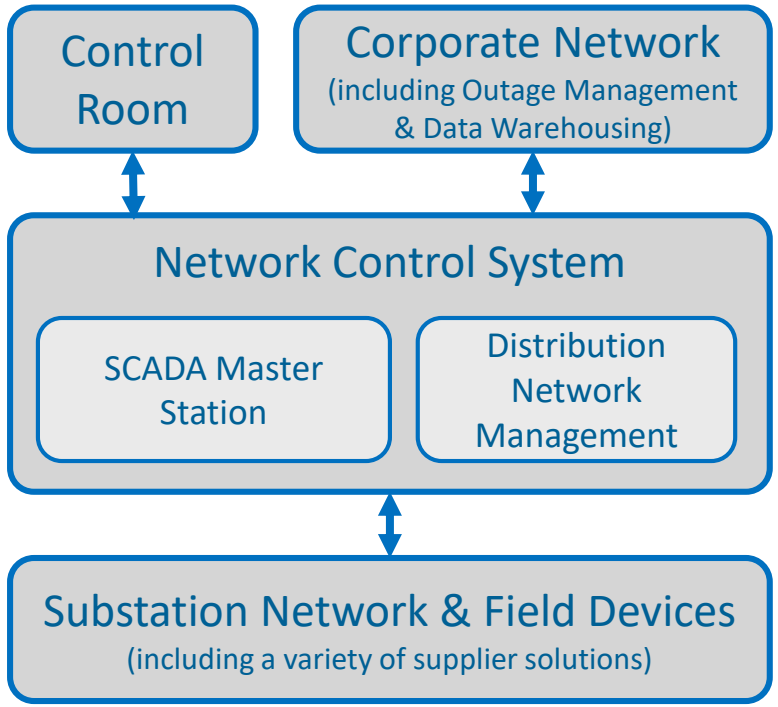
Ausgrid's current Distribution Network Management System (DNMS) requires replacement:

- The system is a bespoke control system which started development in the 1990's
- The current system has high costs to maintain the necessary contemporary cyber security protections (as required by our Licence Conditions for Critical Infrastructure)
- There is limited functionality that can not be easily developed or extended,
  - Inhibiting the connection of new types of network equipment,
  - Has high development and support costs, solely funded by Ausgrid, and
  - Difficult to integrate applications and technologies to support the evolving network and customer needs.

Why use an ADMS?

- Contemporary 'off the shelf' systems allow the use of developments that suppliers are continuously making and share the cost with all utilities using the product
- Customers needs are changing and expect more information regarding their supply interruptions
- An ADMS allows the efficient integration of customers distributed energy resources

$41.3m in FY20-24 to complete
(Depreciated over 7 years)



Advanced Distribution Management System (ADMS) Project

The project is to implement a contemporary ‘off the shelf’ ADMS to replace Ausgrid’s existing DNMS/SCADA systems

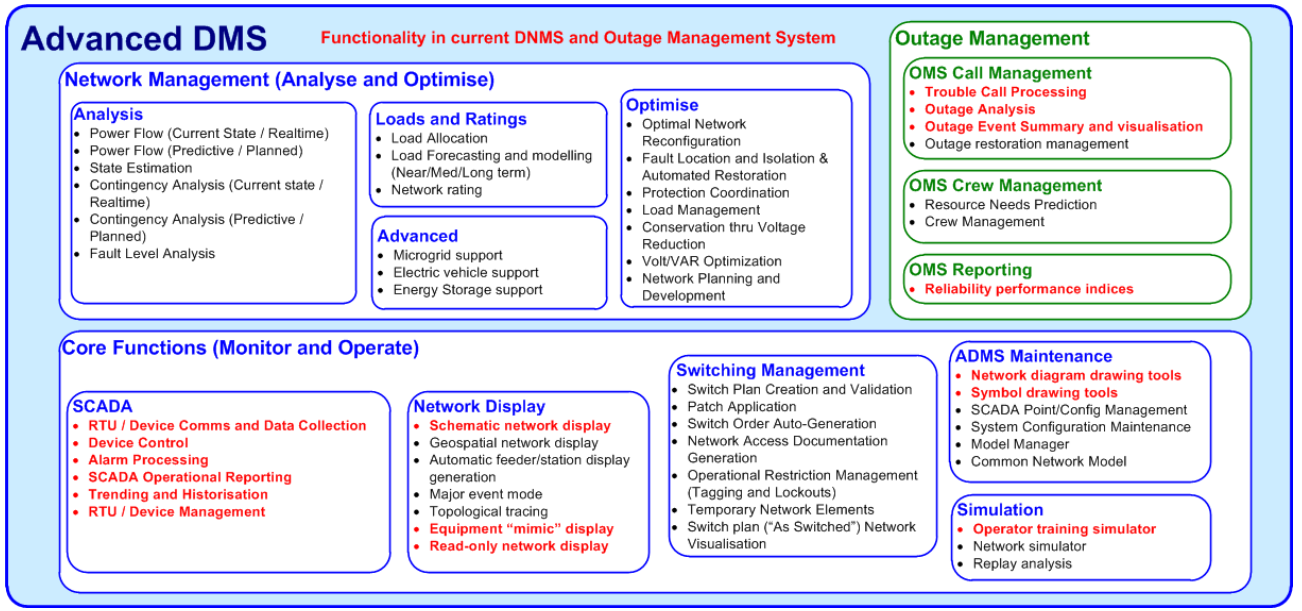
In FY20-24 the project will conclude with $41.3m required to complete the implementation.

Additional benefits for network operation include:

- Simplified control system environment, systems, processes and technology
- Enabling Ausgrid to continue to be reliable and reduce operational risk to an acceptable level
- Address emerging cyber security risks
- Align with industry and leverage learnings of other companies.

Additional benefits for customers include:

- Able to leverage new customer technologies such Internet of Things and Distributed Energy Resources.



Replacement Programs

- Poles

Pole Replacement Programs

Proposal

We propose to invest $149 million on pole replacement and reinforcement for the 2019-24 capital program (real $ FY19).

Counterfactual

If we do not invest in the replacement of poor condition poles, safety incidents are likely to increase significantly as a result of poles falling, interaction with live mains within clearance to the public or from a bushfire initiation.

Reasons for investment

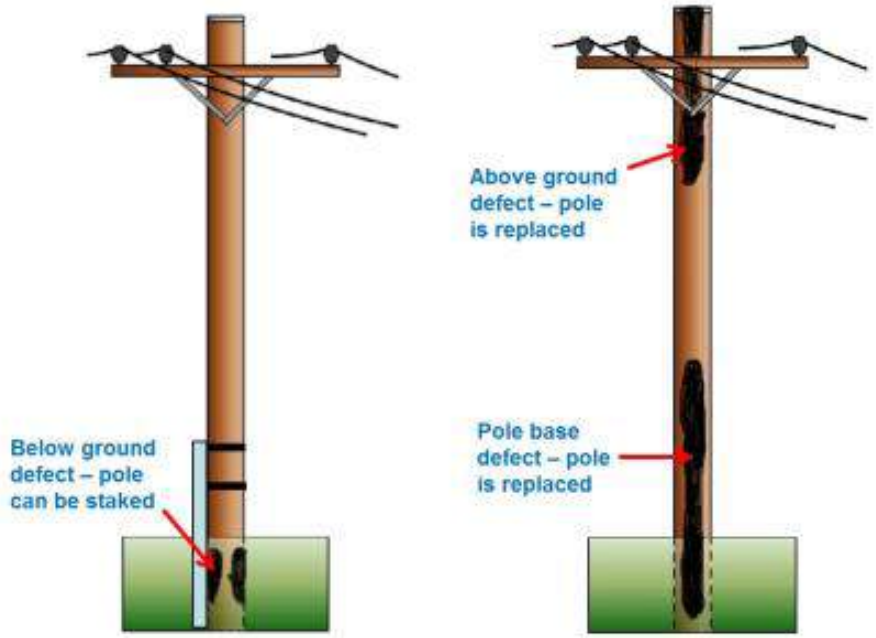
The investment is needed to continue to ensure the safe and reliable operation of Ausgrid's assets.

Poles are in the public domain and therefore carry a heightened public and community safety risk in the event of a pole failure.

Impact on pricing

The total investment of $149 million will contribute around $8.3 million to annual revenue requirements by the end of the 2019-24 regulatory period or an average of $4.6 per customer per year. This represents 0.4% of the customers price.

Poles (FY2020-24 – $149m)

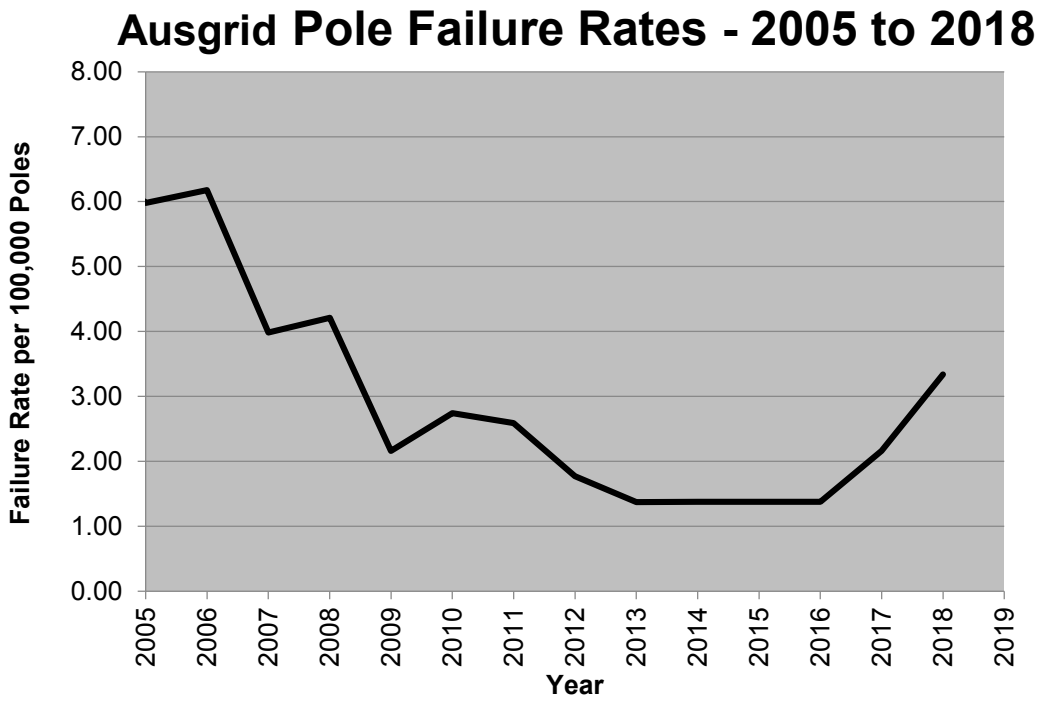


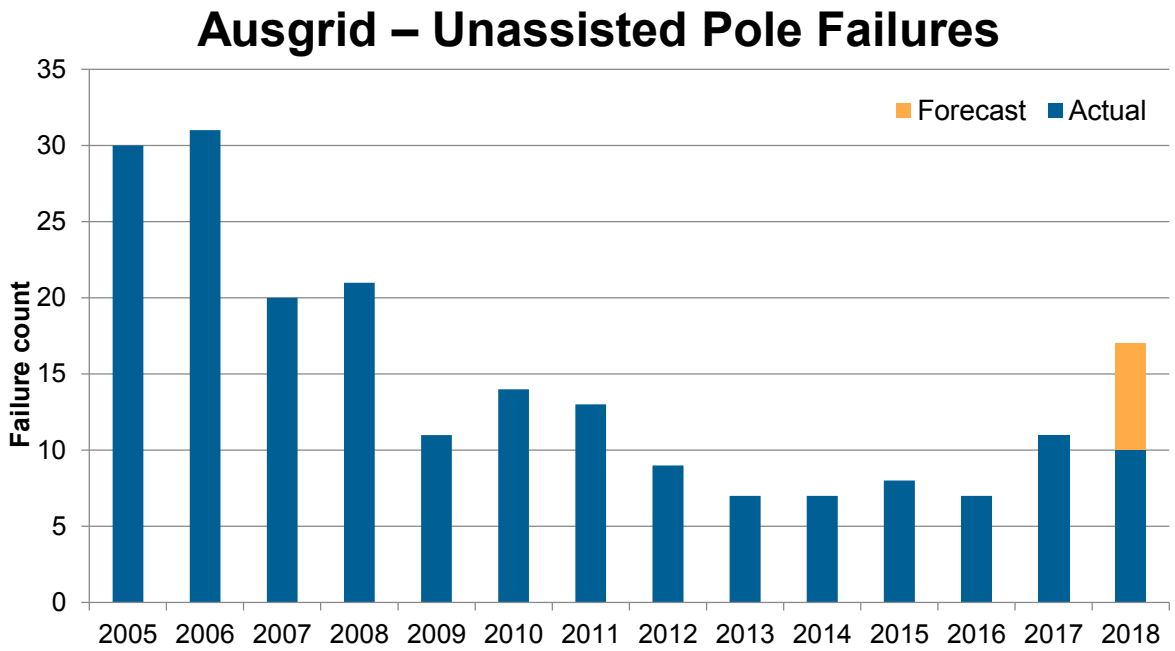
Pole condition is assessed every 5 years to prevent pole failures:

- Residual strength determined for wood poles > 15 years old
- Testing of poles reduces their strength
- Residual strength determines corrective action required
- Pole can remain in service, can be reinforced or is replaced
- Residual strength is largely not related to age

- Over 450,000 poles
- 96% are wood
- Pole average age is 35 years
- More than 40% are over 45 years.
- Each year >2% of the population turn 60 years old

Poles (FY2020-24 – $149m)

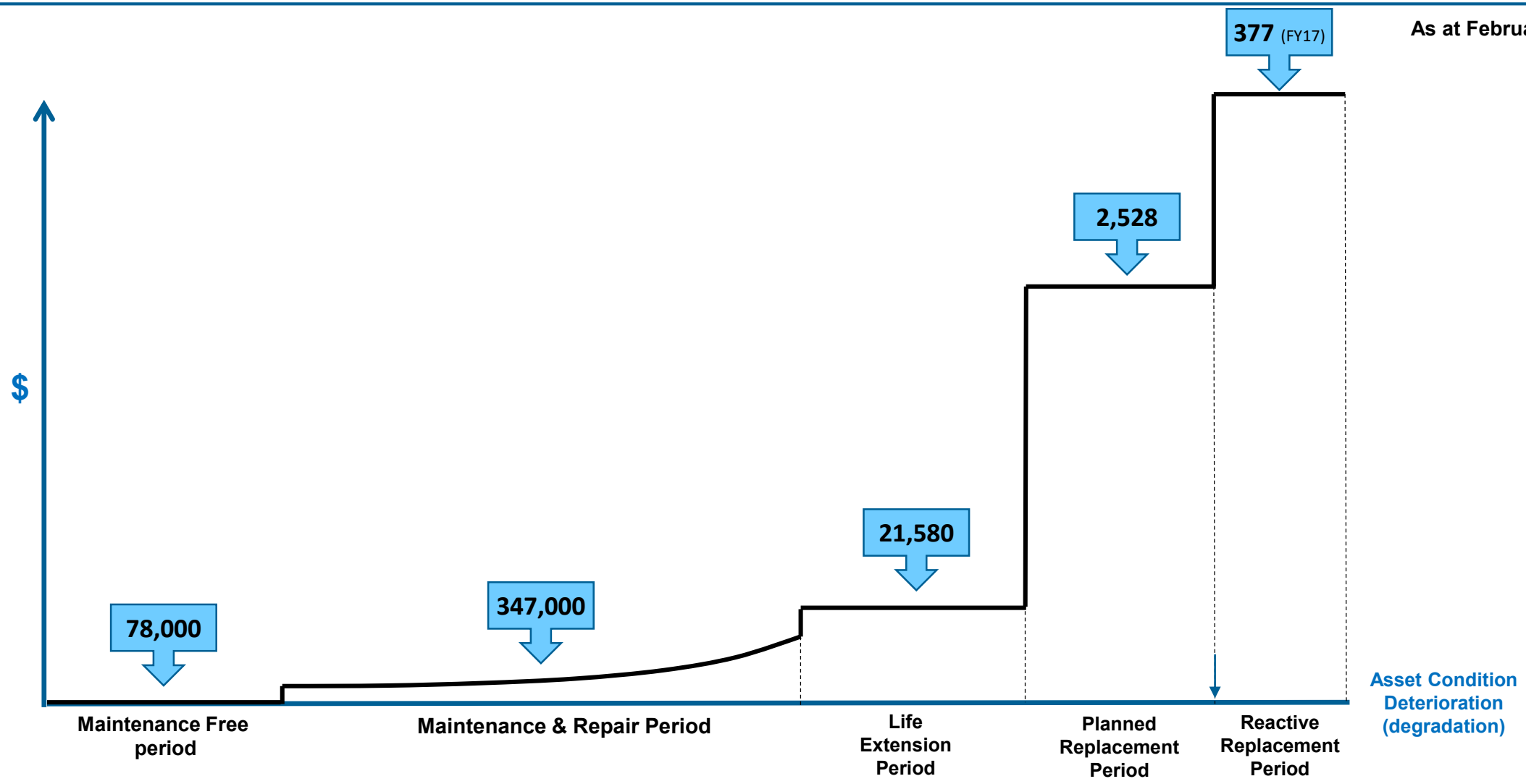




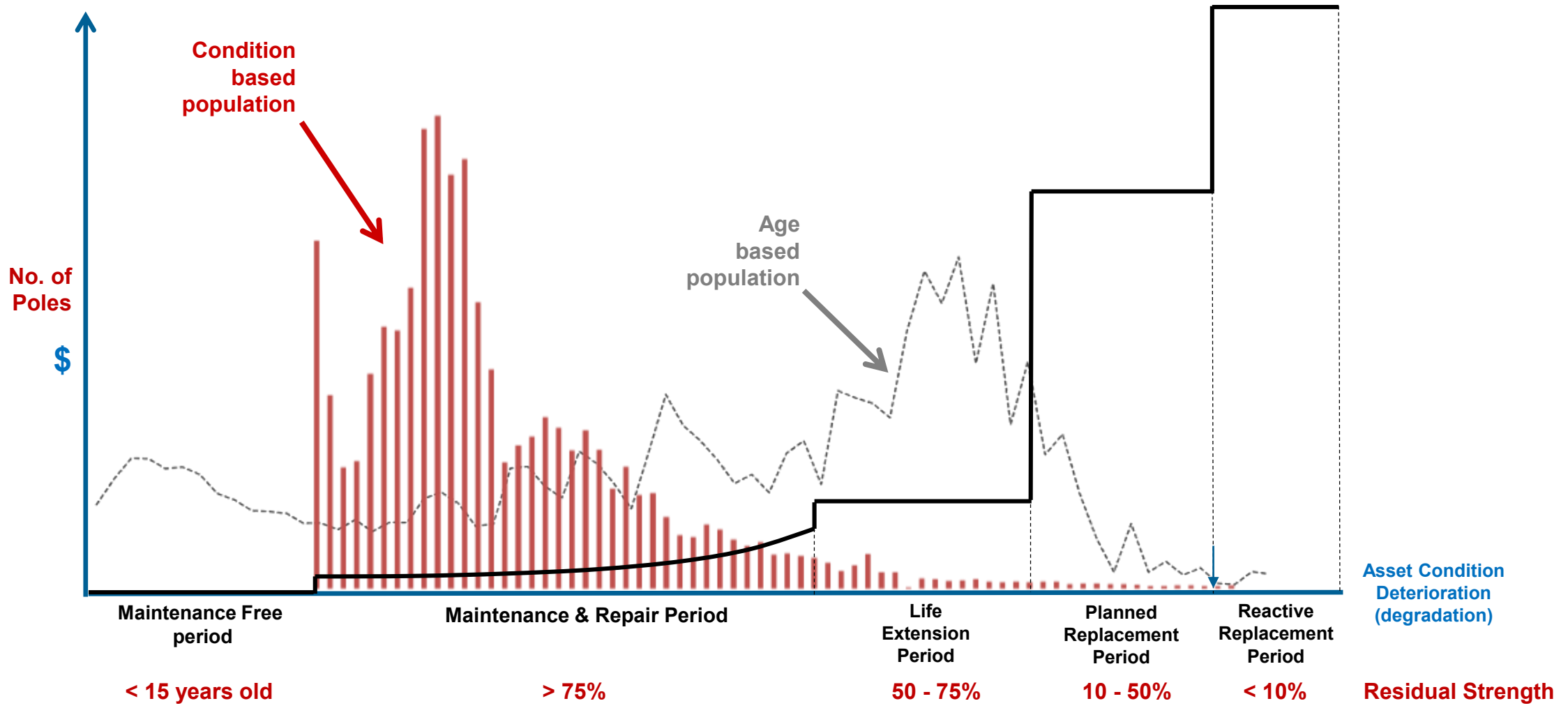
- 2015/2016 National average pole failure rate per 100,000 poles is 7.5 (including rural DNSPs)
- This is the most recent industry benchmarking undertaken
- Ausgrid pole failures are trending towards the industry average in the FY20-24 period
- Similar DNSPs have a lower unassisted pole failure rate

Poles – Approach to Asset Replacement Programs & Projects

As at February 2018

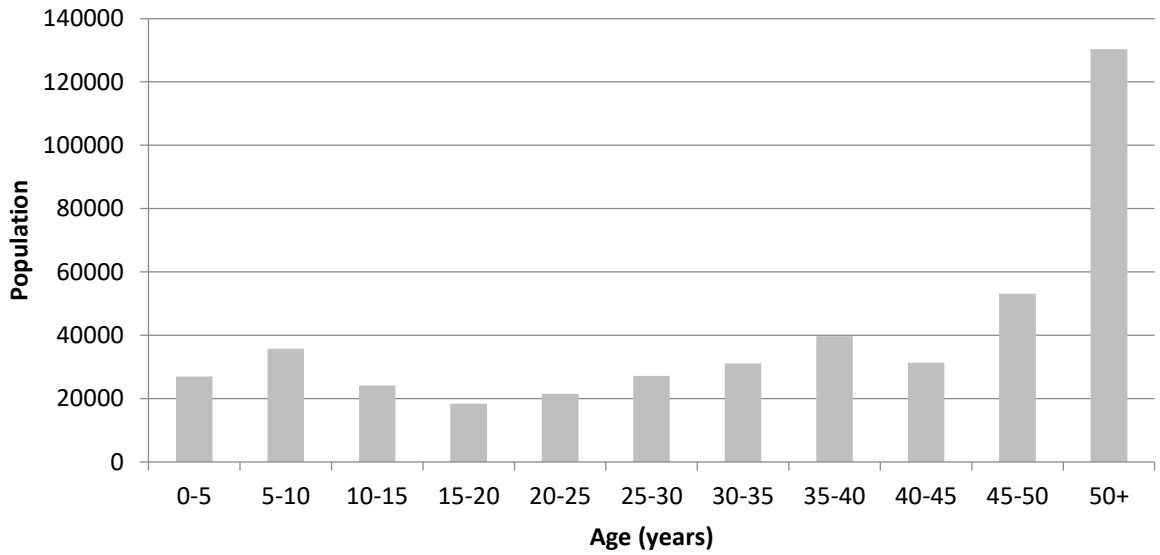


Poles – Approach to Asset Replacement Programs & Projects



Poles – Age profile and replacement volumes

- Average age: 35 years
- Replacement
  - Count: 18,242
  - Forecasted FY20 – FY24
- Reinforcement
  - Count: 5,533
  - Forecasted FY20 – FY24

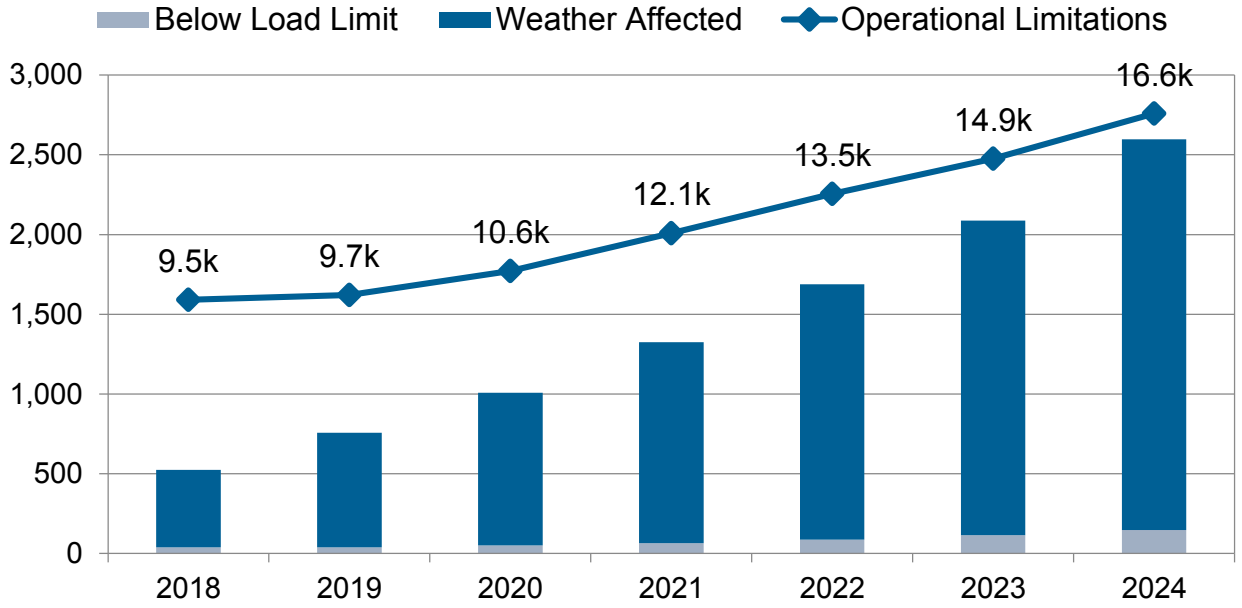


- Forecast volumes are from our pole predictive modelling. The following inputs are used:
  - the **measured residual strength** and **observed degradation rates** of all wood poles
  - **reinforcement** or **replacement criteria** defined in our standards
- Replacements are delivered using a blended delivery approach:
  - Our average direct cost per replacement is approximately **$7,500 per pole** and is comparable with DNSPs in similar environments and lower than our contracted service providers
- The condition-based forecast is **below** long term sustainable volumes and REPEX modelling outcome

Poles – Counterfactual Example (Do Nothing Scenario)

Wood pole predictive model example:

Strength Factor	Defect Priority	Replace Priority	Defect volume by 2024
Other defects below min std.	Operational Limitations	Up to 12 Months	16,552
1x – 2x	May fail in extreme weather	6 Months	2,451
< 1x	Not able to support load	48 Hours	147



- Poles are ideally installed with a Strength Factor of 4x expected load
- Residual Strength Factor is calculated based on actual pole measurements collected during maintenance (pole testing)
  - Poles with less than 1x Strength Factor are considered to not be able to support the wires at the top of the pole
  - Poles with 1x – 2x Strength Factor may fail in extreme weather

- Future defect volumes are based on actual test results with forecast degradation rates applied annually
- Working and loading constraints would exist on all poles in the table above

Discussion

8.4

Capex Wrap Session
21 February 2018

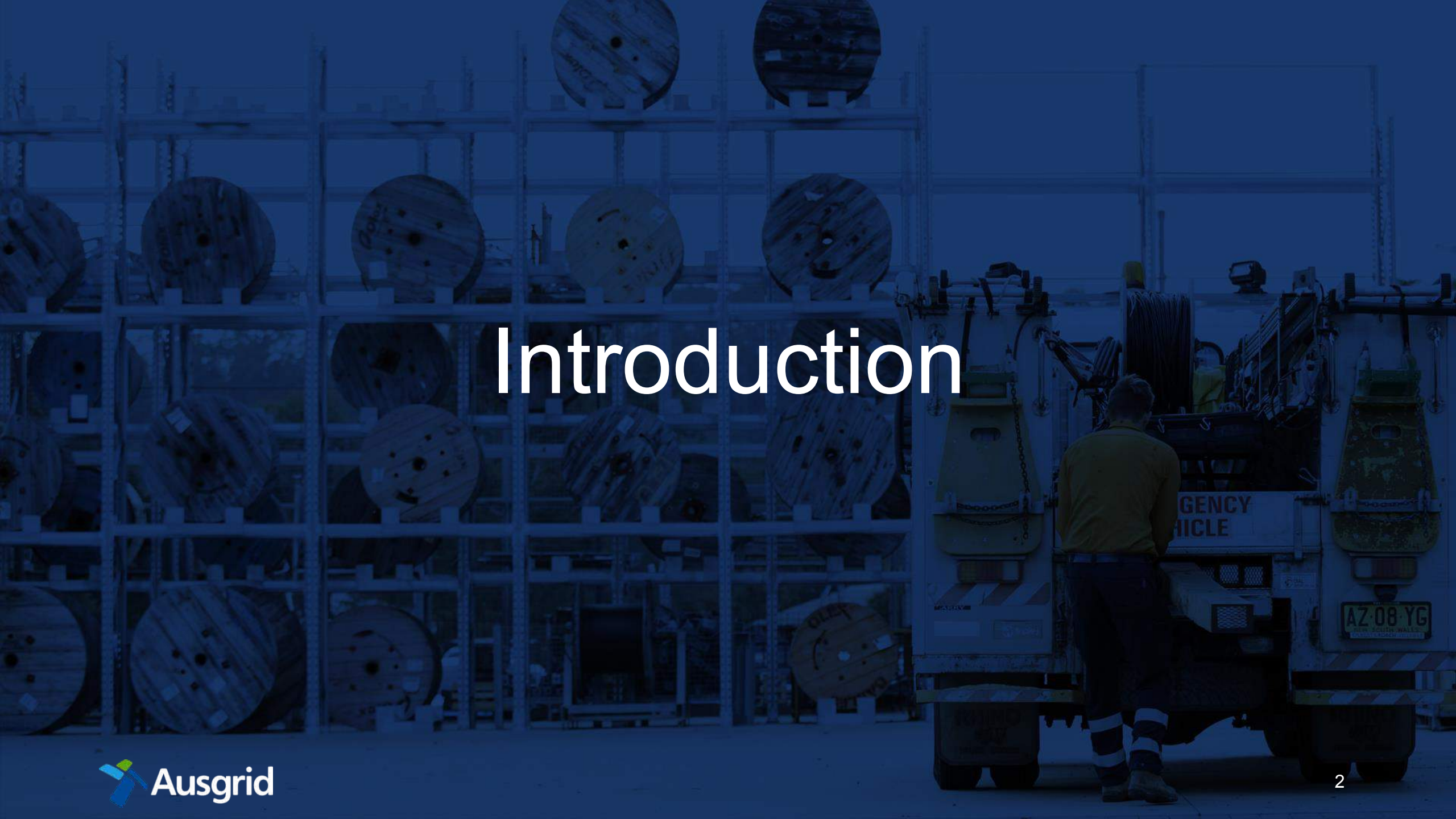
Capex Wrap-up

Workshop 4 – Stakeholder Engagement Deep Dive

Regulatory Proposal – FY2020-2024

Ausgrid

Introduction



Ausgrid

Our rationale for Capex

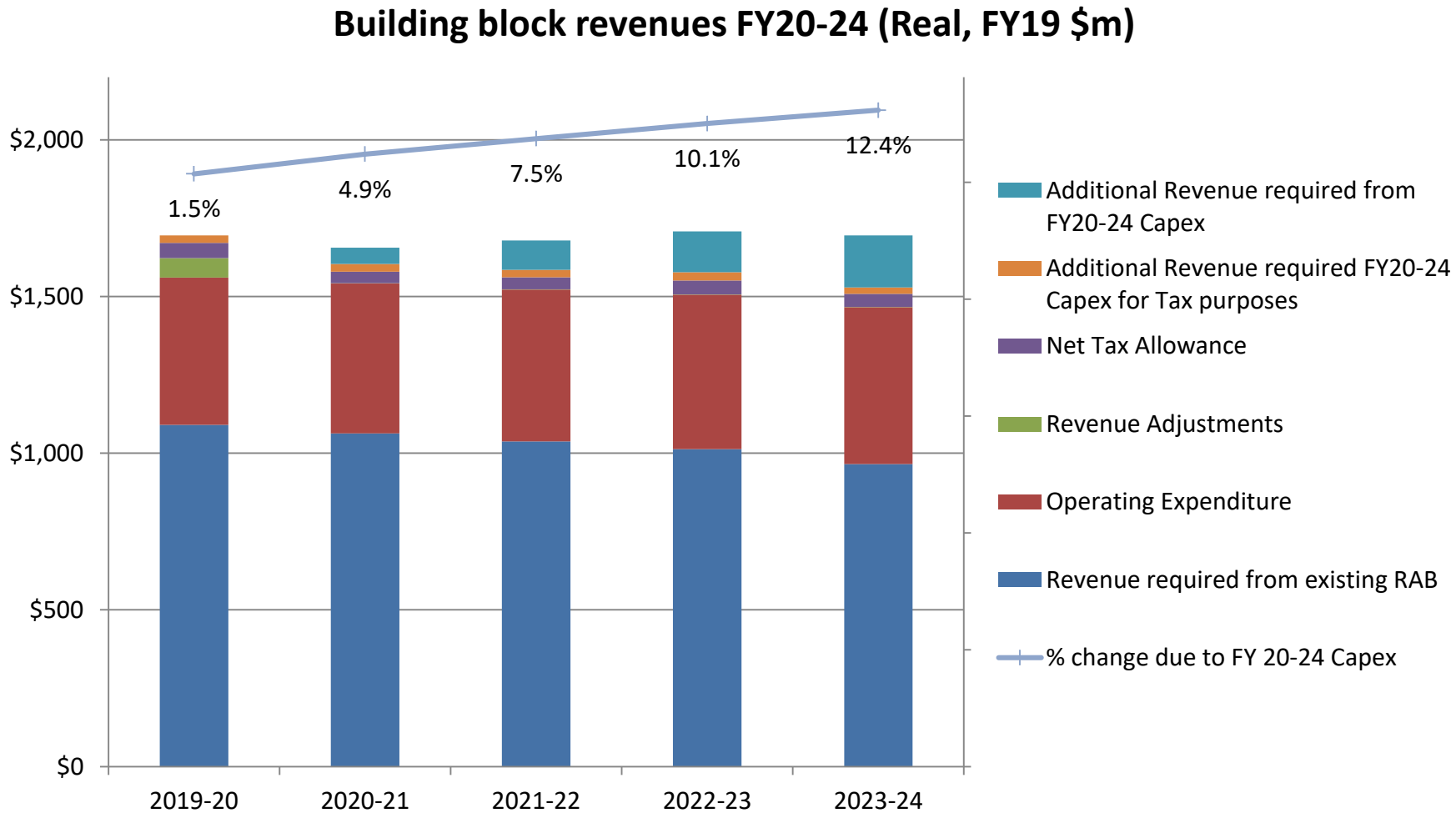
Ensuring the best outcomes for customers

1. We plan to invest **only when there is clear value to customers**. Our replacement programs carefully target expenditure on assets that ensure the safety of our staff/customers and mitigate significant reliability risks.

2. Rather than simply building more infrastructure, we are looking first at where **new technology, innovation and partnering** with other companies and our customers will **solve the problem at a lower cost.** This includes demand management solutions.

3. Keep our **revenues flat or declining** over the regulatory period to deliver lower prices for customers.

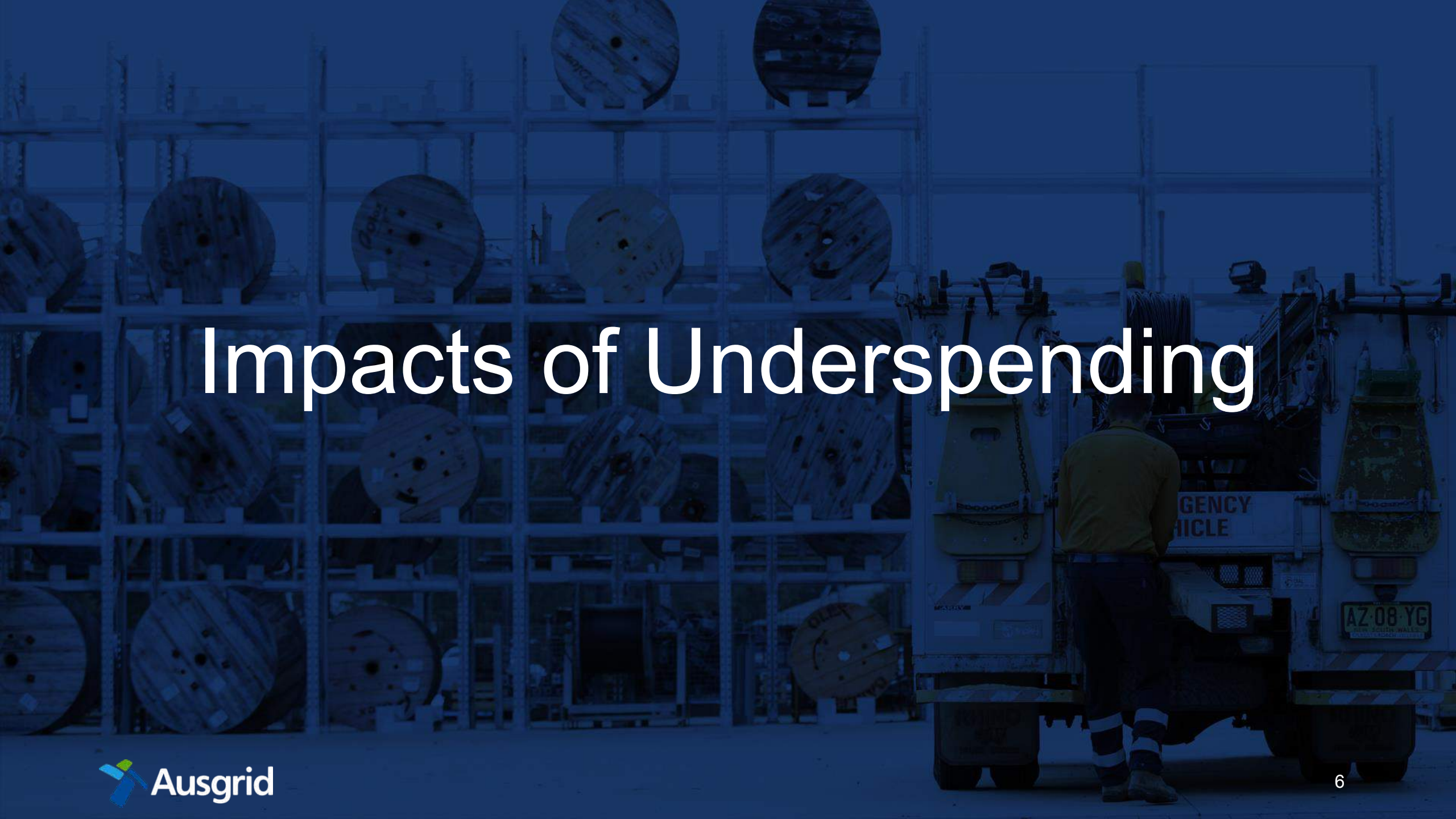
Relative Components of Revenue Requirements



Our capex forecast for 2019-24 is $3.2 (real, FY19)

($m Real 18/19)	2009 to 2014 Actual	2014 to 2019 Allowance	2014 to 2019 Actual / Forecast	2019 to 2024 Current Proposal	Sub Program Description	Sub Program Value	Deep Dive Discussions Examples
New Connections	342.1	234.4	96.3	52.3	Major Connections	10.2	
					HV & LV Connections	42.1	Combined HV/LV Augmentation & Connections Policy
Growth /Augmentation	2,242.7	353.8	163.7	258.7	Major Projects (Area Plan)	77.1	Rozelle STS Upgrade
					High Voltage Reinforcement	153.2	Combined HV/LV Augmentation & Connections Policy
					Distribution Centre and LV Reinforcement	12.0	
					Reliability	16.4	
Replacement	3,031.7	1,839.6	1,677.2	1,725.5	Major Projects (Area Plan)	593.1	Switchboards - Concord Zn Oil/Gas Cables - Castle Cove to Mosman ADMS
					Programs - Planned	599.5	Consac/HDPE LV Cable
					Programs - Condition Based	310.3	Poles (Sub-trans/HV/LV)
					Programs - Reactive	222.6	Distribution Txs / HV Cables
Other network	106.2	54.2	32.2	25.5	System Operational Technology Plan	25.5	
Total System Capital	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
IT	307.9	93.5	148.2	156.9	Maintain, Protect, Comply, Adapt	156.9	IT Program; Cyber Transformation Program; Data and Digital Enablement Program
Vehicles	142.8	41.5	54.7	98.6	Cars, vans, trucks	98.6	Fleet renewal and capability upgrades
Other Non-Network	357.8	196.5	198.1	233.7	Land & Buildings Furniture, Plant & Equipment	233.7	Zetland depot replacement; Homebush depot; Wallsend office replacement
Total Non-System Capital	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
Total Network Support Cost	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
Total Capital	7,597.5	3,522.9	3,069.7	3,186.7		3,186.7	

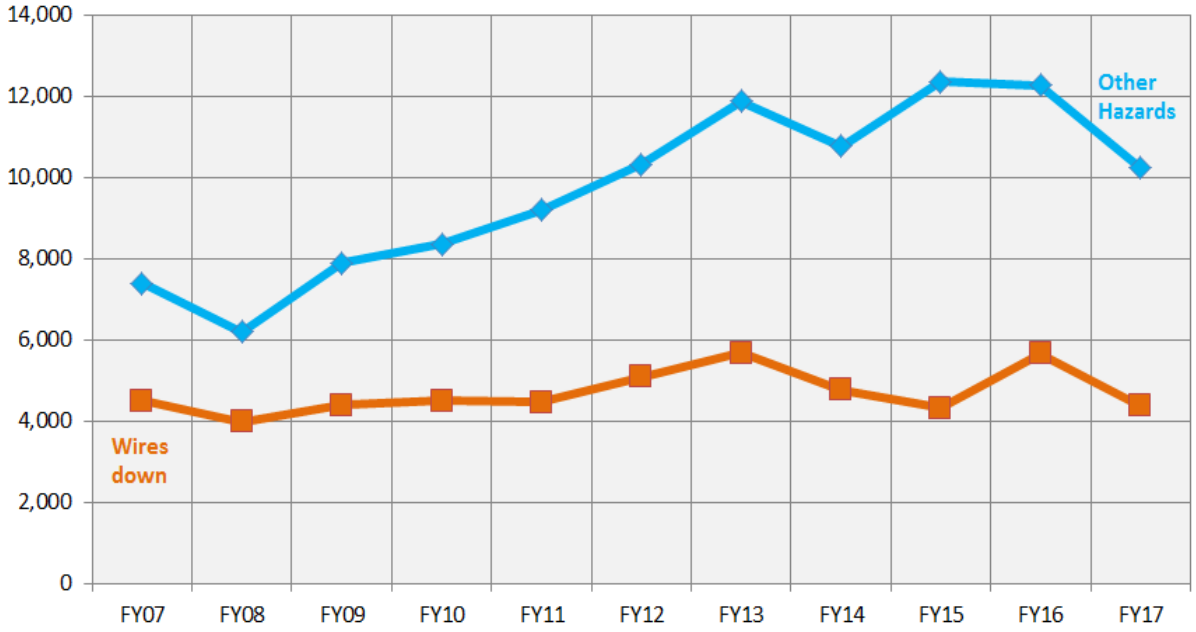
Impacts of Underspending



Ausgrid

Network Supply Reliability

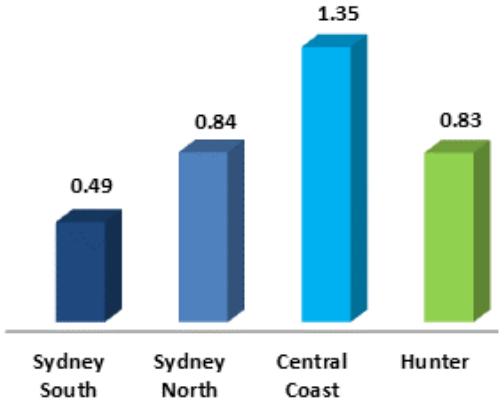
Ausgrid Overall Supply Reliability Performance



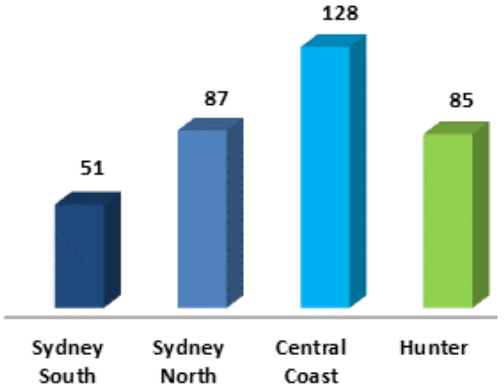
Customer Reported Fallen & Hazard Wires

Network Health / Customer Impacts – Key Replacement Program Impacts

Reliability (SAIFI)
Average annual customer outages

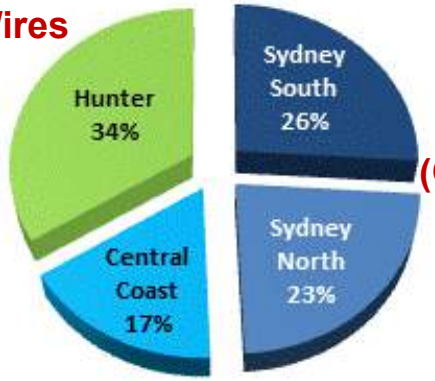


Reliability (SAIDI)
Average annual customer minutes without supply



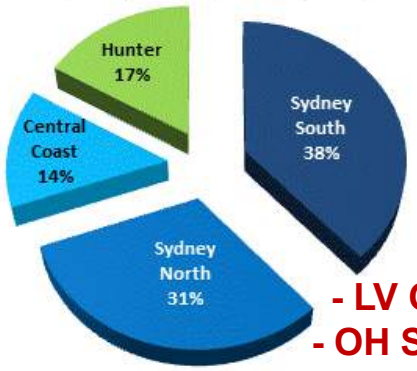
Domestic Electric Shocks
Due to Ausgrid network (68 p.a.)

- OH Service Wires



- LV UG Cable (Consac / HDPE)

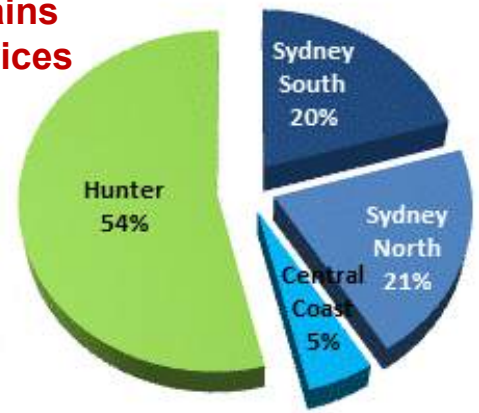
Customer Reported Fallen Wires
4,968 p.a. (Avg last 5 years)



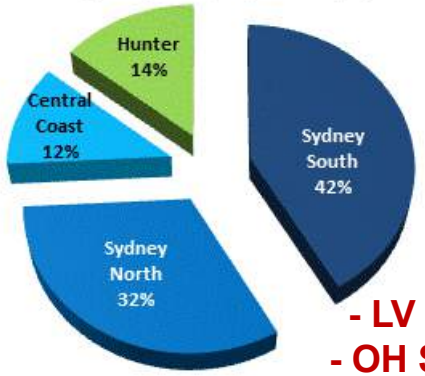
- LV OH Reconfig.
- OH Service Wires

Fire Starts
39 in 2017 (90 fire events)

- Steel Mains
- OH Services
- Poles

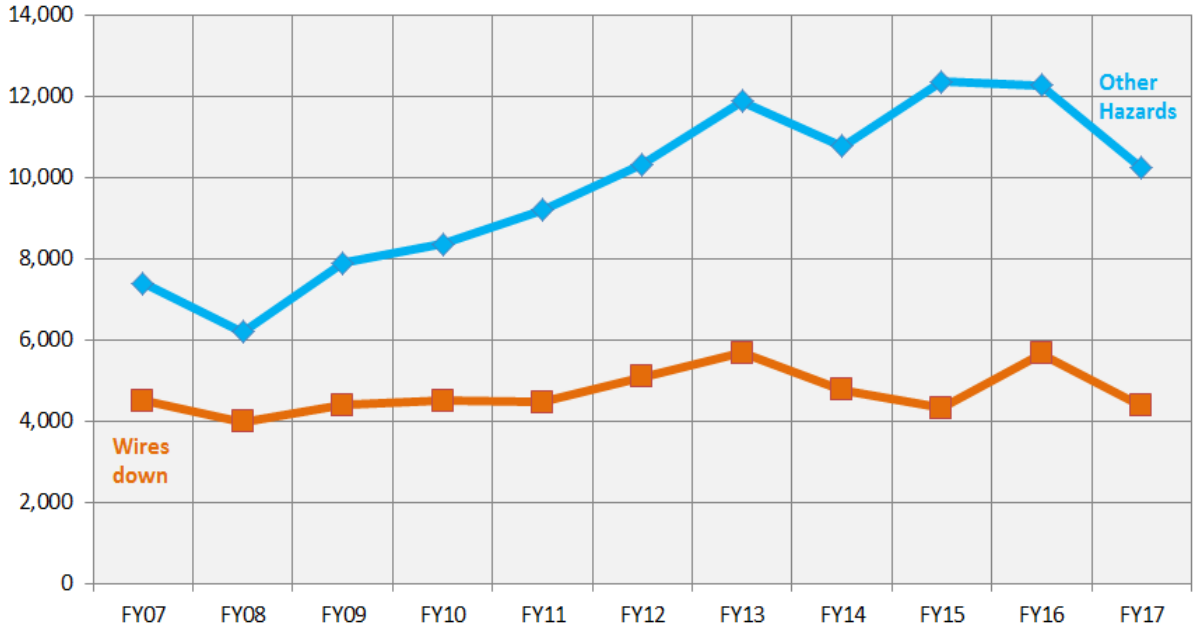


Customer Reported Mains Hazards
14,405 p.a. (Avg Last 5yr)

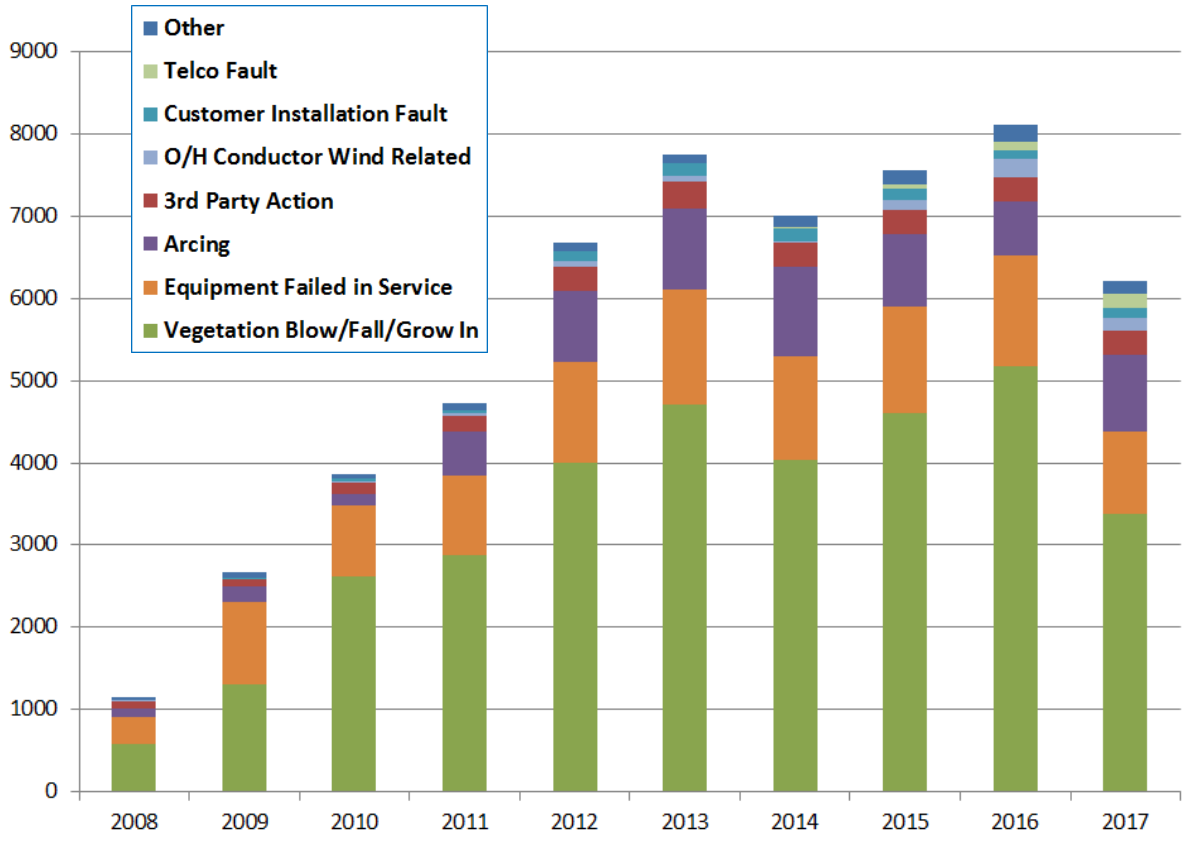


- LV OH Reconfig.
- OH Service Wires

Network Supply Reliability – Fallen and Hazard Wires



Customer Reported Fallen & Hazard Wires



Hazard Wires By Problem Where Cause Found

Network Supply Reliability – Fallen Wires

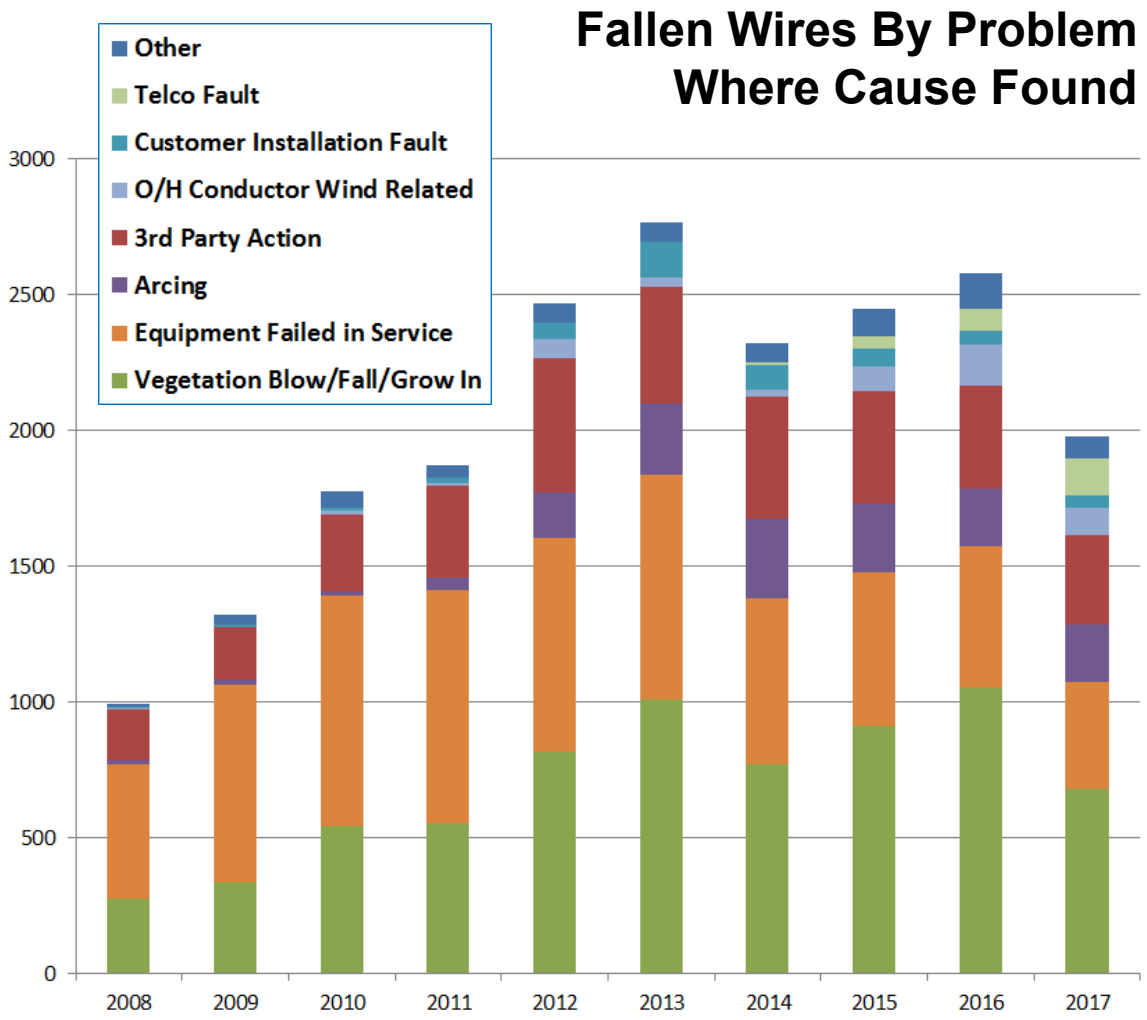
Particular asset replacement programs are driven by inherent failure characteristics and trends

These include fallen and hazard wires. The key related replacement programs are:

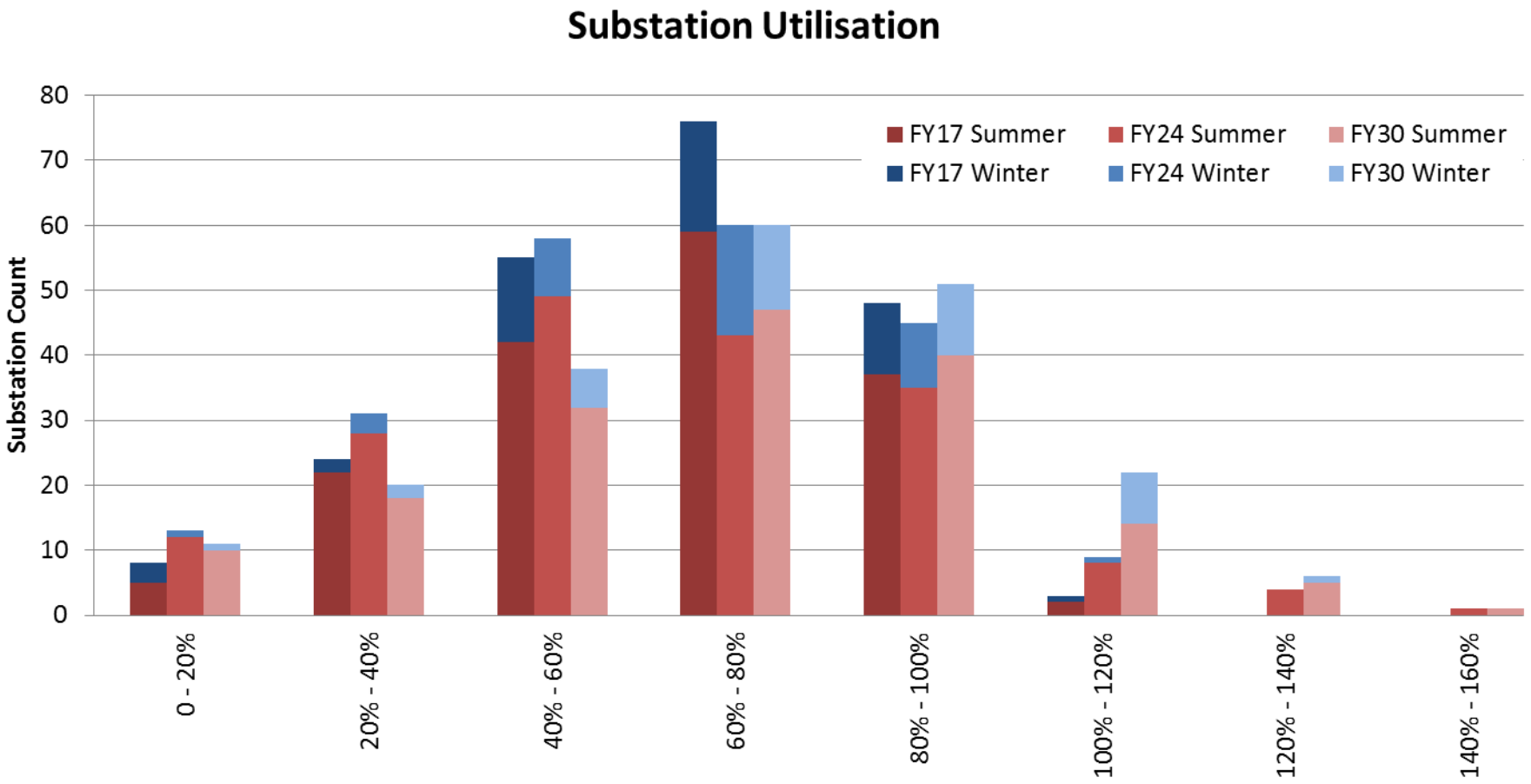
- Service wire replacement program
- LV dedicated circuit reconfiguration program

The service wire hazards and fallen wires have been increasing, particularly related to vegetation blow/fall-in and arcing. Service wires are replaced with new conductor types that have greater electrical and mechanical insulation strength

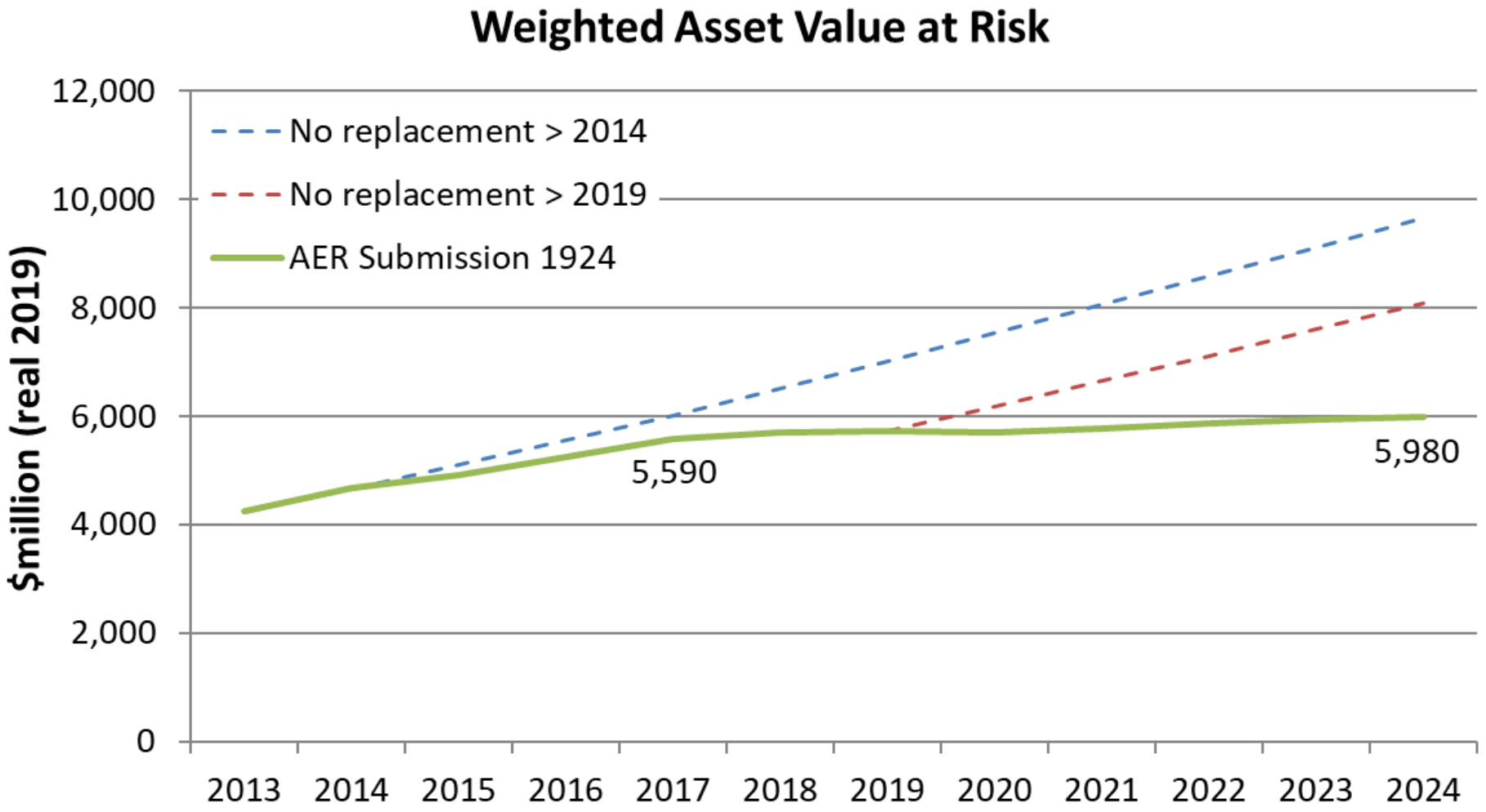
The LV circuit reconfiguration program addresses the weakest overhead conductors with the highest failure rate on the network by maximising the use of the main distribution network, removing the centralised control and improving failure detection after a failure



Zone Substation Utilisation

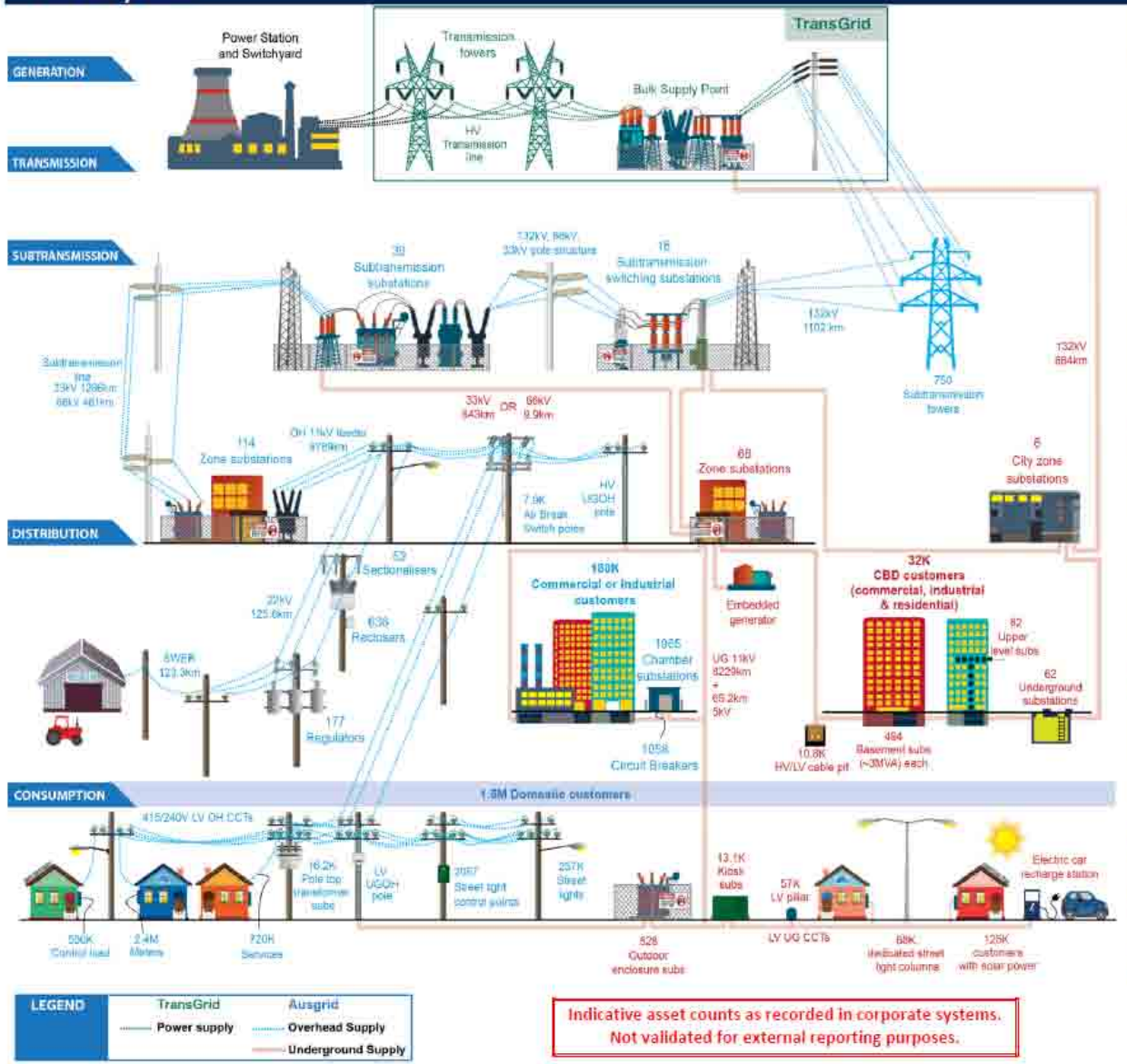


Replacement - Weighted Asset Value At Risk



State of the Network
February 2018

Ausgrid



Asset Category	Average Age	Std Life	% over Std Life	Qty	Units of M	Backfire %
Overhead						
132 kV OH cct	37.1	45	46.8%	1,102	km	69%
33 & 66 kV OH cct	34.4	45	43.7%	1,716	km	56%
11/22 kV OH cct	35.1	45	33.8%	10,038	km	61%
- Steel/ACSR/Quince	41.0	45	47.1%	2,211	km	73%
LV OH cct	43.4	45	59.0%	13,074	km	21%
LV OH dedicated cct - lighting	51.9	45	79.7%	6,081	km	11%
Poles	36.2	45	42.3%	446,505	No	27%
Services Overhead	28.4	35	40.2%	720,016	No	17%
Underground						
132 kV UG cct - oil	43.7	45	36.4%	359	km	5%
132 kV UG cct - other	7.7	45	3.7%	305	km	4%
66 kV UG cct	4.0	45	1.1%	10	km	57%
33 kV UG cct - gas	51.0	45	81.9%	108	km	1%
33 kV UG cct - other	40.9	45	53.1%	535	km	9%
5/11 kV UG cct	32.5	60	9.7%	8,294	km	14%
LV UG cct	27.6	60	4.6%	6,163	km	22%
- CONSAC	43.6	60	2.5%	712	km	10%
- HOPE	53.3	60	18.9%	138	km	4%
LV UG dedicated cct - lighting	47.5	60	57.9%	1,270	km	13%
LV pillars	23.4	60	0.0%	57,383	No	34%
Services Underground	29.2	60	5.7%	232,057	No	32%
Substations - ZN & TS						
Sub-transmission Substation	42.7	60	15.2%	46	No	33%
Zone(ZN) Substation	38.1	60	14.3%	182	No	30%
City ZN Substation	28.9	60	0.0%	6	No	0%
132 kV CBs ZN & TS	8.6	45	1.2%	603	No	19%
66 kV CBs ZN & TS	7.7	45	0.0%	139	No	32%
33 kV CBs ZN & TS	23.9	45	30.6%	924	No	24%
5/11 kV CBs ZN	15.5	45	11.1%	4,009	No	17%
5/11 kV Switchboards ZN	30.7	45	34.8%	5,425	No	17%
Sub-transmission Transformers	29.3	50	6.7%	85	No	21%
132/11 kV ZN Transformers	16.5	50	8.5%	180	No	17%
66/11 kV ZN Transformers	25.8	50	10.0%	44	No	32%
33/11 kV ZN Transformers	32.1	50	27.1%	260	No	26%
Other (incl. Asset intangibles)	0.0	-		-	-	0%
Distribution Centres - DC						
- Pole Substation	31.0	40	32.1%	16,222	No	56%
- Kiosk Substation	22.5	40	18.5%	13,128	No	15%
- Outdoor Enclosure Substations	40.9	40	54.1%	528	No	9%
- Chamber Substations	34.8	40	39.1%	2,603	No	3%
5/11 kV CBs DC	29.9	45	26.3%	2,460	No	3%
5/11 kV Switchboards DC	55.0	45	65.5%	847	No	0%
Distribution Centre Transformers	25.2	45	14.4%	34,110	No	32%
TOTAL SCS						
Meters						
Three Phase Meters (Types 5 & 6)	11.0	25	-	210,178	No	-
Single Phase Meters (Types 5 & 6)	26.5	25	-	2.123M	No	-
Streetlights						
Lights & Brackets (incl. Connections)	35.9	20	16.2%	257,678	No	16%
Light Poles & Columns	28.7	45	29.7%	65,225	No	22%
TOTAL ACS						
TOTAL SCS & ACS						

LEGEND
TransGrid — Power supply
Ausgrid — Overhead Supply
Ausgrid — Underground Supply

Indicative asset counts as recorded in corporate systems. Not validated for external reporting purposes.

Notes
1. Regulated Asset Base (RAB) as at 30th June 2017.
2. Capex and Opex is the annual average of the last 3 year actual expenditure.
3. Average Age from Asset Investment Outcomes (AIO) Dashboard and GIS extracts as at early February 2018.
4. Standard Life from NSW Treasury Guidelines 2002.
5. Distribution Substation numbers include control points.
6. Zone Substation supply is nominated as overhead if one or more supply feeders is overhead.
7. STS and ZN Transformers extract from AIO

Capex Spend Across Periods – Benefits/Costs of Underspends

Ausgrid does not get any benefit from capex underspend unless a true efficiency has been achieved.

The return of capital (depreciation) allowance from any unspent capex in 2014-19 is **removed** from future revenue allowances. This occurs within the RAB roll forward model.

The return on capital (WACC x RAB) from any unspent capex in 2014-19 is **removed** through the CESS. Within the CESS, this is referred to as the financing benefit adjustment.

The CESS financing benefit adjustment takes into account the timing of capex within the 2014-19 (eg. if capex was forecast in 2016-17 and instead spent in 2018-19, the 2 yrs return on capital earnt is removed (with interest) from future revenues.

Deferrals If capex is imprudently deferred from 2014-19 to 2019-24, then the CESS will adjust for that deferral. Ausgrid still loses the return of and on capital (with interest) related to the capex underspend, but does not get to keep the 30% share of the underspend. The AER will assess this as part of its 2019-24 determination.

Impact of Productivity

Strategies Reducing Unit Costs

Increased use of **blended delivery** across projects & programs (included in forecast)

Engagement with telco authorities to **streamline transfer of their** attachments on Ausgrid assets

Significant volume of works delivered through **competitively tendered contracts** (approximately 30%)

Streamlining & benchmarking of internal processes for high volume programs

Additional labour productivity improvements increasing to 10% have been included across the capital program – with improvements to be identified over time

Program Delivery – Sustainable & Efficient

- Contractors deliver a significant number of major projects and programs
- Internal core expert competencies have been retained for higher risk and complex projects
- Internal capabilities have been enhanced to better specify, procure, review designs and manage contracts
- Lessons learnt have also been applied to internally delivered projects achieving further cost savings
- The forward program includes these reduced costs to deliver projects either internally or with a contractor

Deliver Internally

- Complex brownfield projects requiring critical expertise and knowledge of our network.
- Work which is difficult to scope and is more suited to Ausgrid's expertise.

Deliver Externally

- Large greenfield projects which have peaks and troughs of demand which would adversely impact Ausgrid's ability to deliver its ongoing baseline program of works.
- Availability of skilled and experienced market to deliver these type of projects.

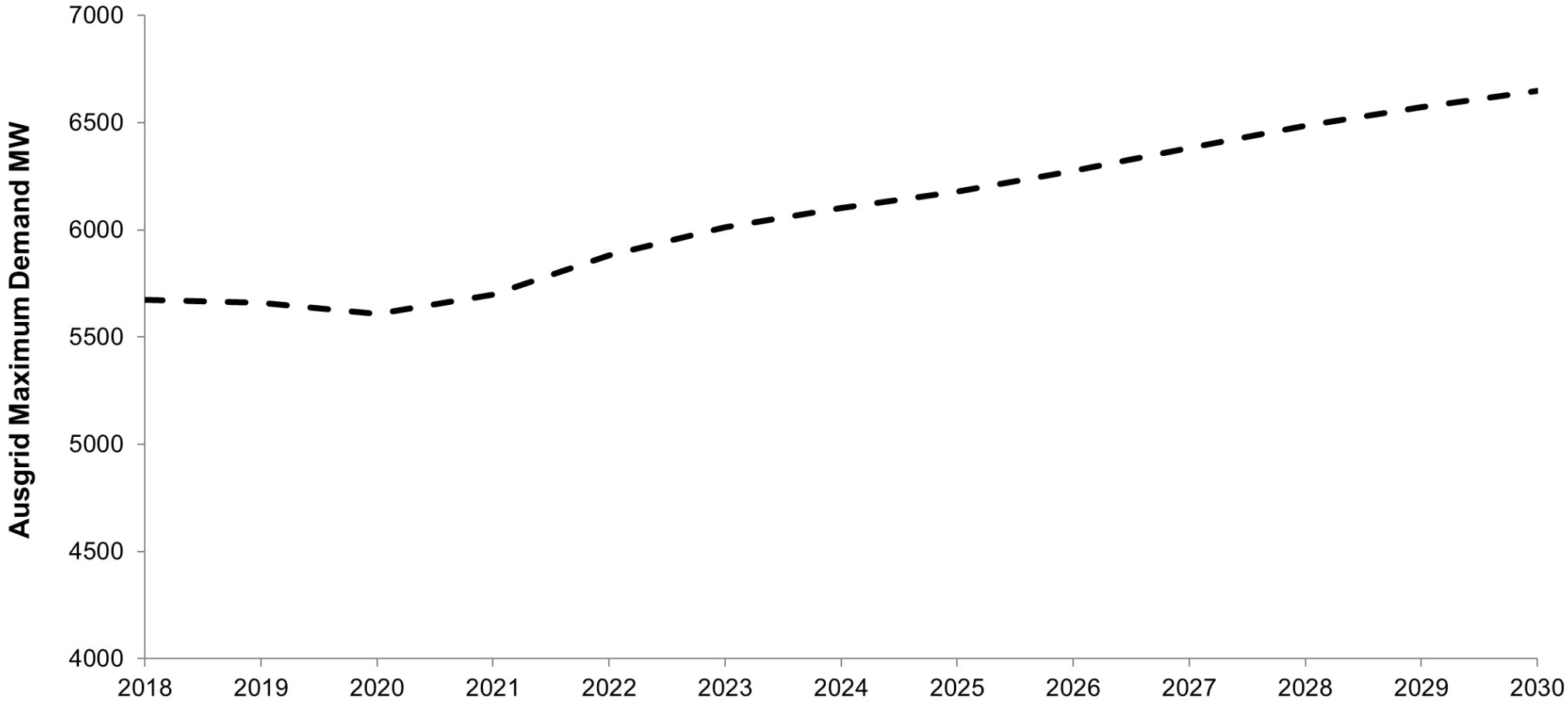
Major Substation Delivery Models	Specification & Concept	Design	Civil Construction	Electrical Equipping	Testing & Commissioning
Large/greenfield and complex greenfield sites	Internal	External D&C			External/Internal
Complex greenfield sites (interim phase)	Internal		External		External/Internal
Segregated scope within operational sites	Internal		External		External/Internal
Small/brownfield operational sites	Internal		External	Internal	Internal

Maximum Demand Sensitivity of Capex

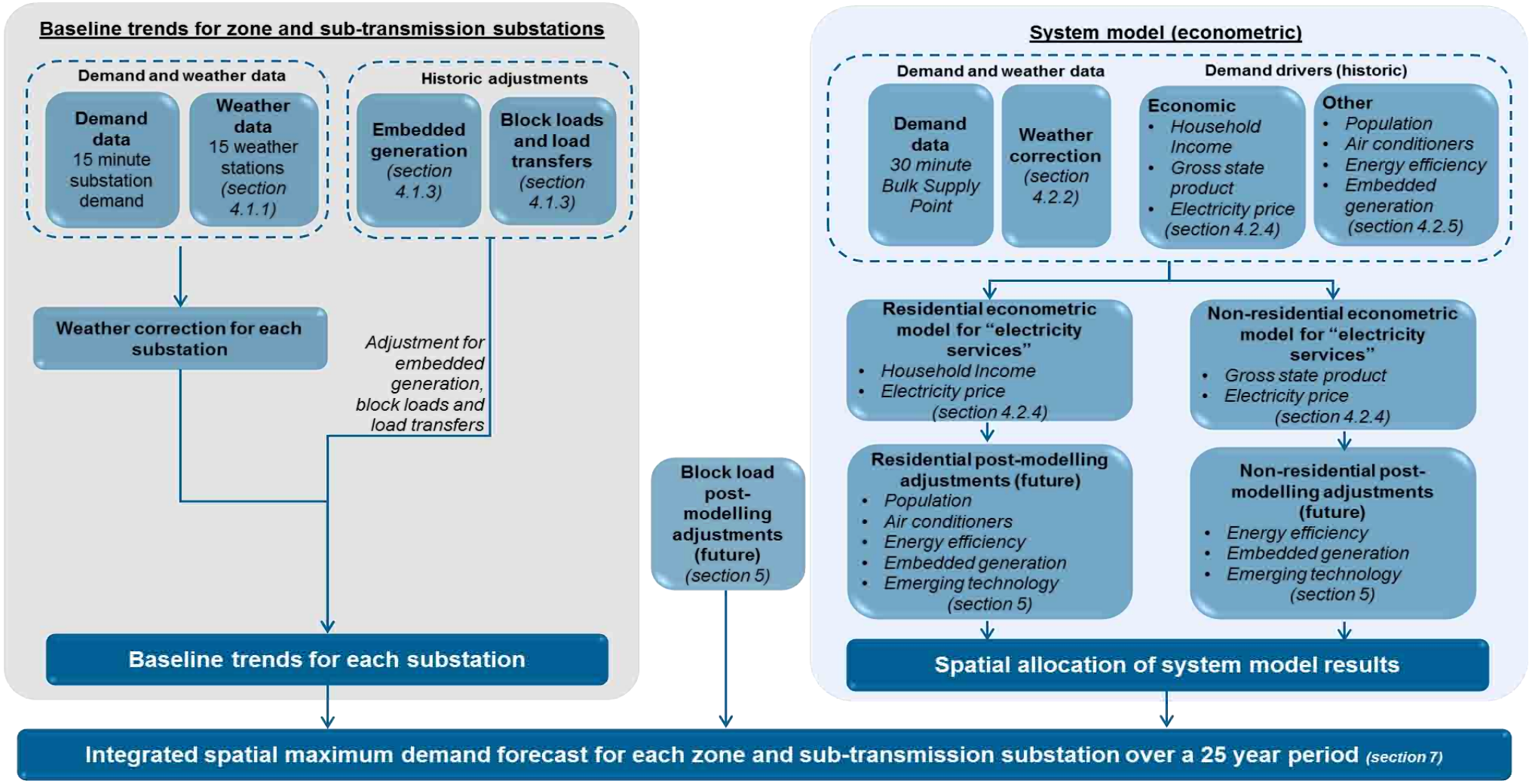
Capex Sensitivity to Maximum Demand Forecasts				
Capex Category	Sub Program	Sub Program Value ($m Real 18/19)	Maximum Demand Sensitivity	Comments
New Connections	Major Connections	10.2		Drives maximum demand forecast rather than driven by it
	HV & LV Connections	42.1		Drives maximum demand forecast rather than driven by it
Growth & Augmentation	Major Growth Projects (Area Plan)	77.1		Driven by forecast maximum demand assessed within CBA
	High Voltage Reinforcement	153.2		Mix of previously overloaded and projected in "n" network
	Distribution Centre & LV Reinforcement	12.0		Mix of previously overloaded and projected in "n" network
	Reliability	16.4		Not maximum demand sensitive
Replacement	Major Replacement Projects (Area Plan)	593.1		Partial sensitivity via growth in expected unserved nergy (EUE)
	Programs - Planned	599.5		Driven by safety and reliability in radial ("n") parts of network
	Programs - Condition Based	310.3		Driven by safety and reliability in radial ("n") parts of network
	Programs - Reactive	222.6		Driven by safety and reliability in radial ("n") parts of network
Other Network	System Operational Technology Plan	25.5		Driven by safety and reliability in radial ("n") parts of network
Total System Capex		2,061.9		
Information Technology		156.9		Not maximum demand sensitive
Vehicles and Fleet		98.6		Not maximum demand sensitive
Other Non-Network - Land, Buildings, Furniture, Plant & Equipment		233.7		Not maximum demand sensitive
Total Non-System Capex		489.2		
Total Network Support Cost		635.6		Not maximum demand sensitive
Total Capex		3,186.7		

Maximum Demand Forecast

Maximum Demand Forecast - overall

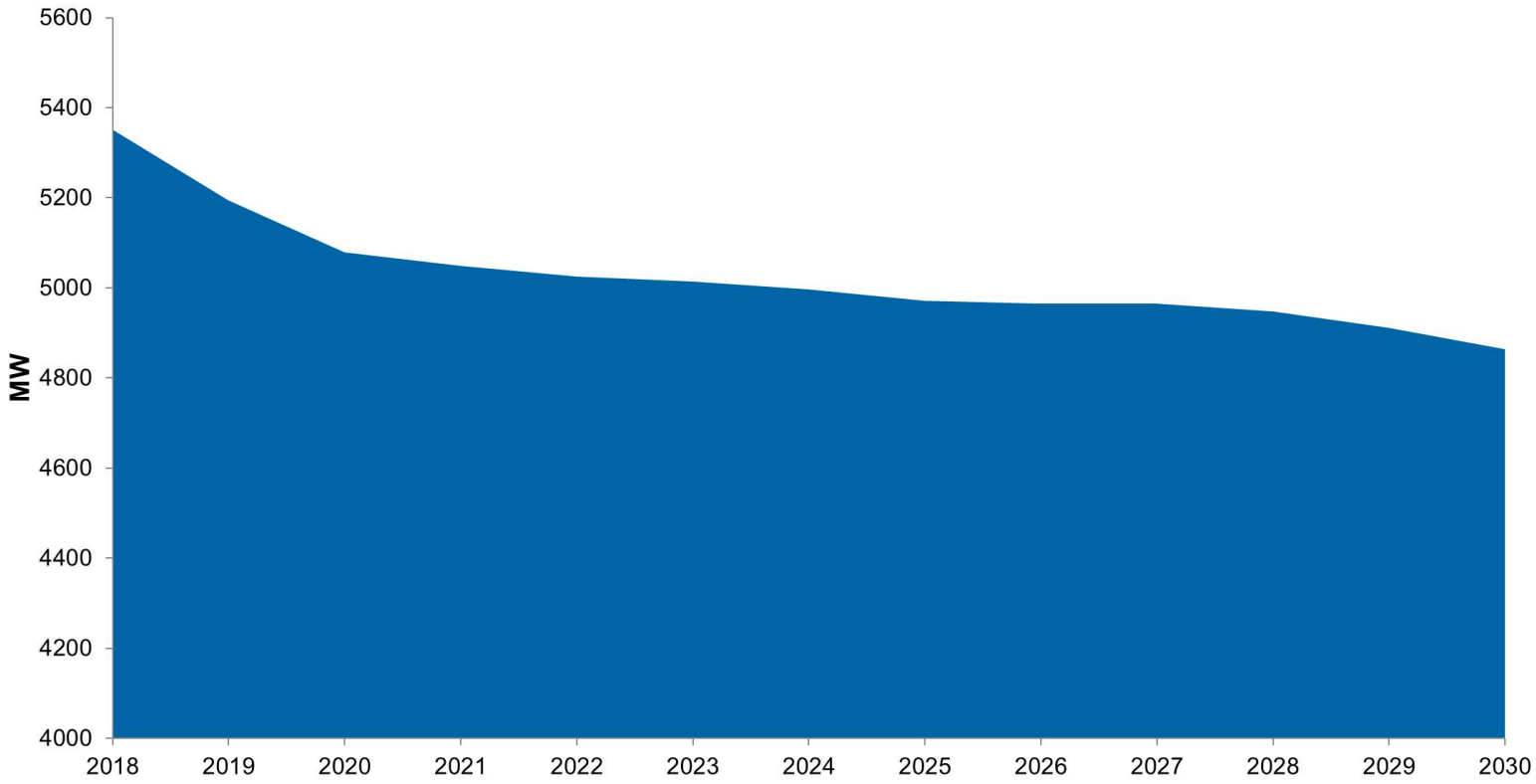


Maximum Demand Forecast - process



Maximum Demand Forecast - components

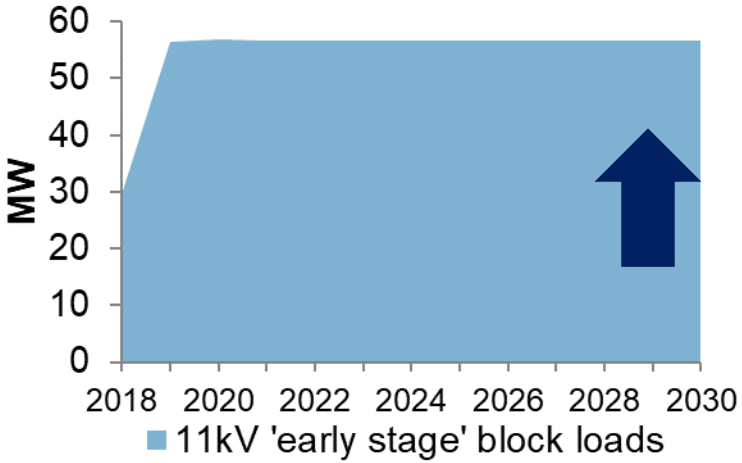
Underlying Load Trend



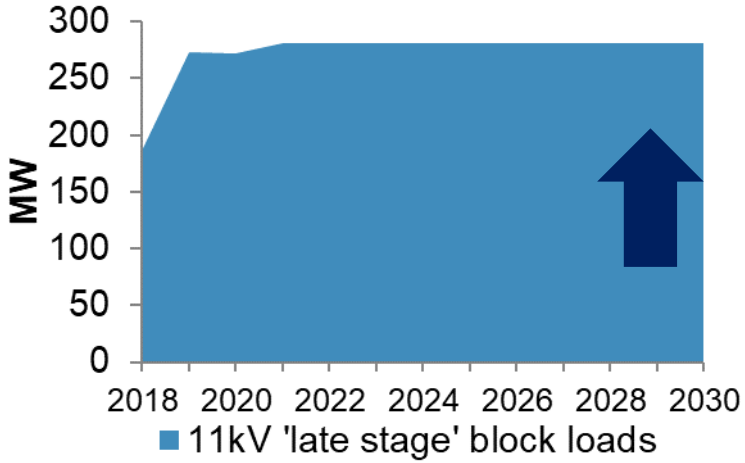
- This chart includes pre-existing block loads and PV at the time the forecast was prepared (2017)
- The charts on the following pages set out the adjustments made to the forecast from that point forward (2018 onwards)

Maximum Demand Forecast - components

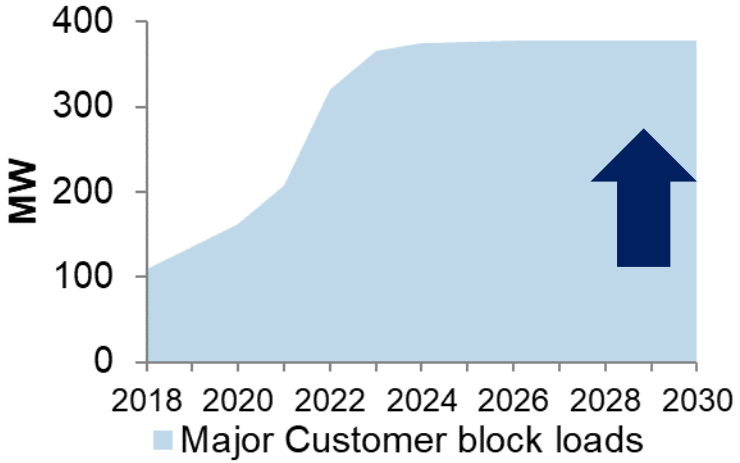
Block Loads



- Apply 33% multiplier (i.e. 67% discount based on actual conversion rate over 3 yr period
- Coincidence factor applied separately



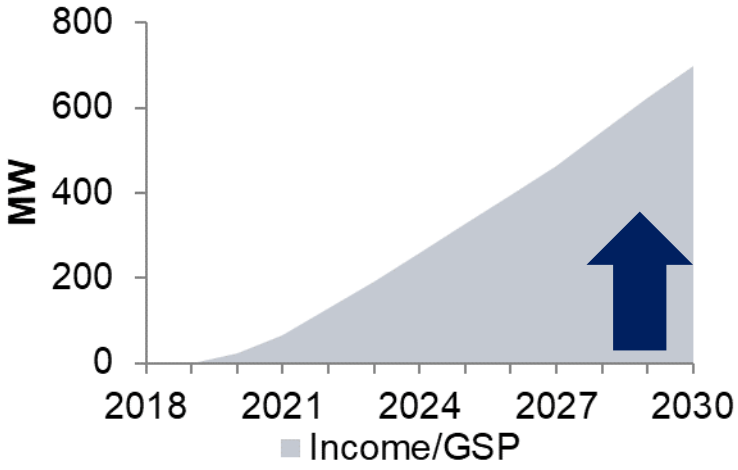
- Apply 78% multiplier (i.e. 22% discount based on actual conversion rate over 5 yr period
- Coincidence factor applied separately

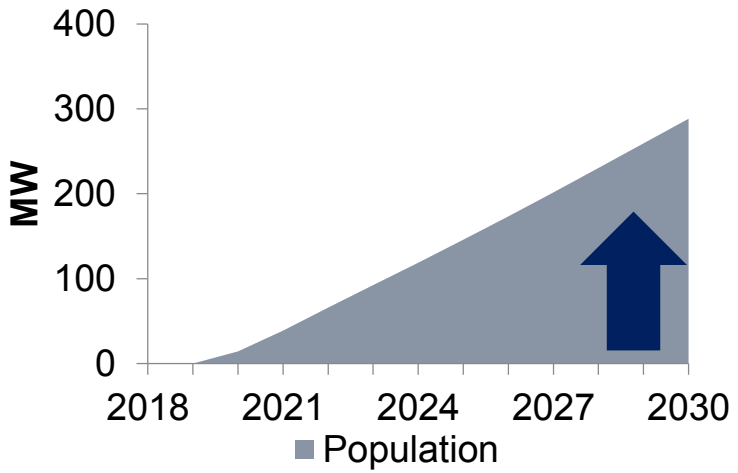


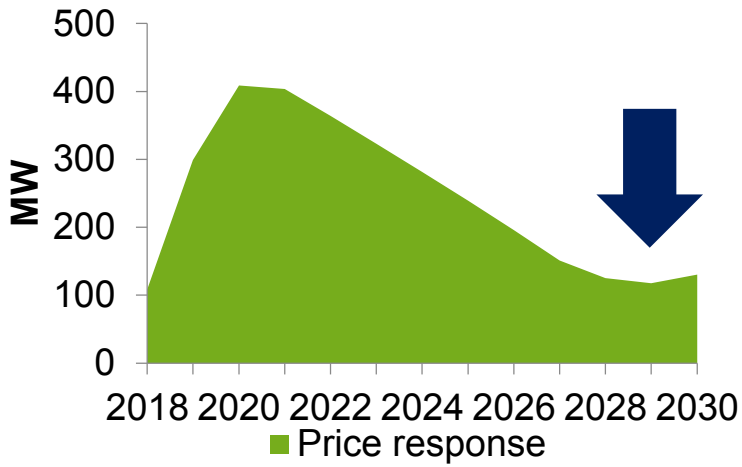
- Full load applied at appropriate timing based on detailed knowledge of customers plans and ongoing interaction
- Adjusted on case by case basis if required
- Coincidence factor applied separately

Maximum Demand Forecast - components

Econometric Factors





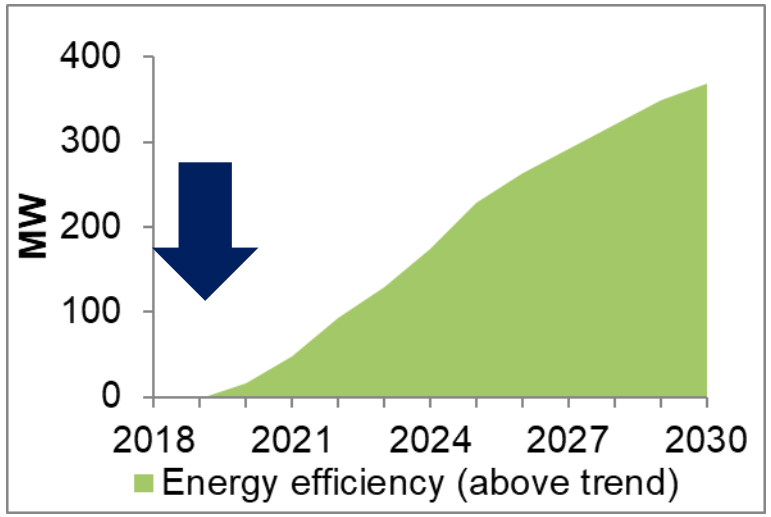


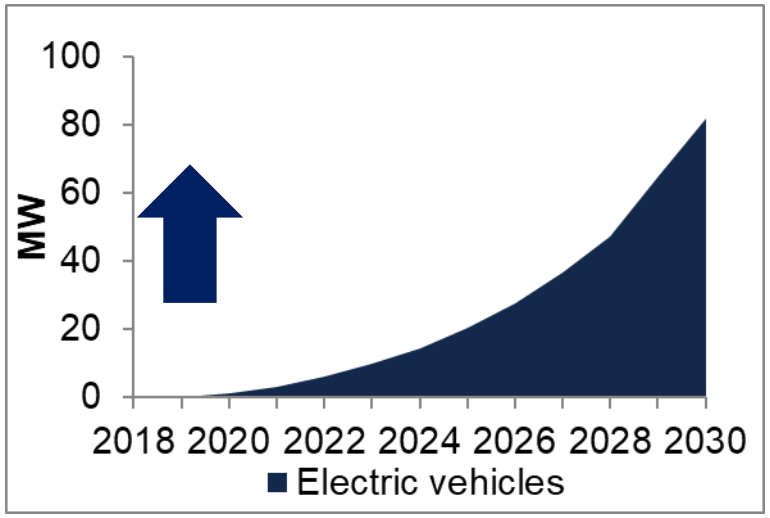
- Income, GSP and price projections from AEMO at NSW level, i.e.
  - NSW Real Household Disposable Income (RHDI), +1.3% pa 2018-24
  - NSW Gross State Product (GSP), +2.2 to +2.5% pa 2018-24
  - Retail residential and non residential electricity prices

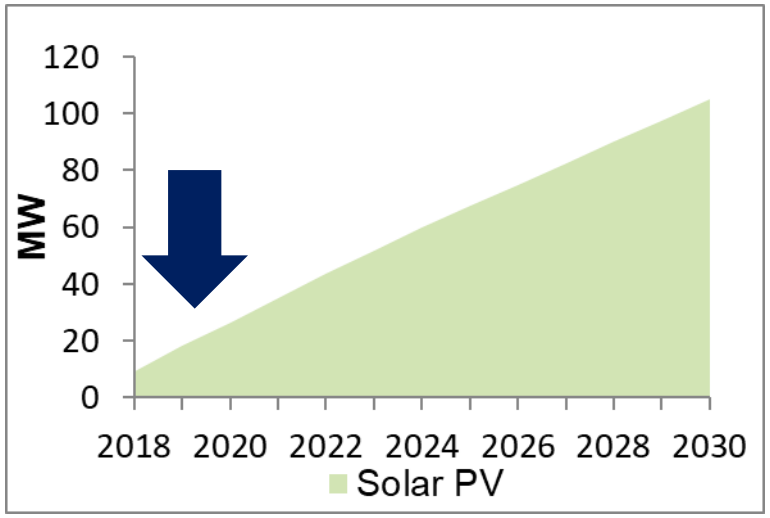
- Based on -0.42 elasticity for res and -0.39 for non-res customers
- Steep price rises for FY18 and FY19
- Decay in response due to projected decline in prices from FY20 onwards

Maximum Demand Forecast - components

Systemic Changes





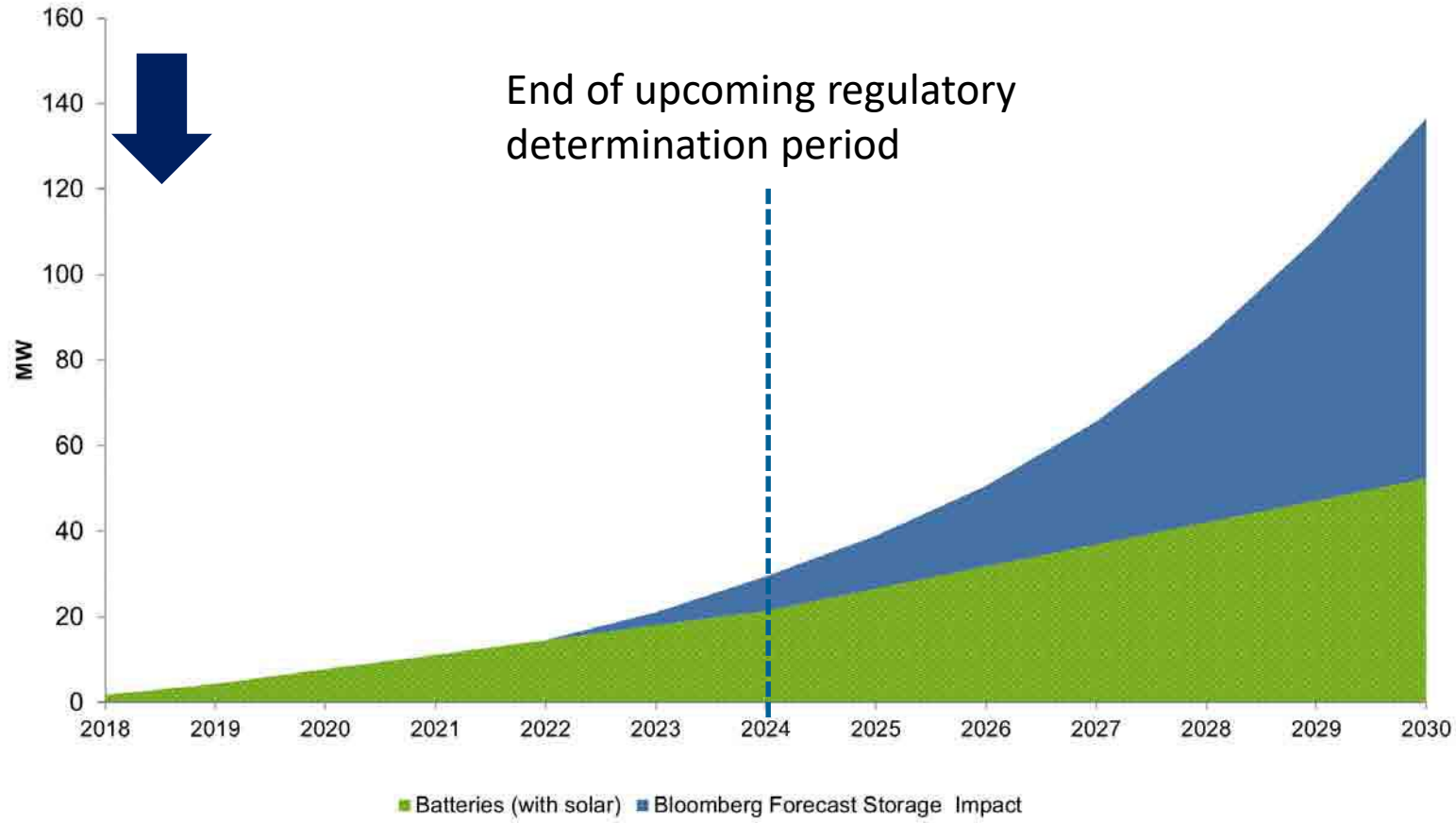


- 3 components:
- Equipment energy efficiency (E3) program – labelling and MEPS for res appliances
- BCA – buildings
- NSW Energy Saving Scheme
- Reduce MD by 175MW by 2024

- Uptake based on AEMO insights report, adjusted for actual Evs
- ~1000 EVs as at June 2017 based on RMS data
- +0.3kW per EV @ peak based on SGSC and US trials
- Negligible impact by 2024

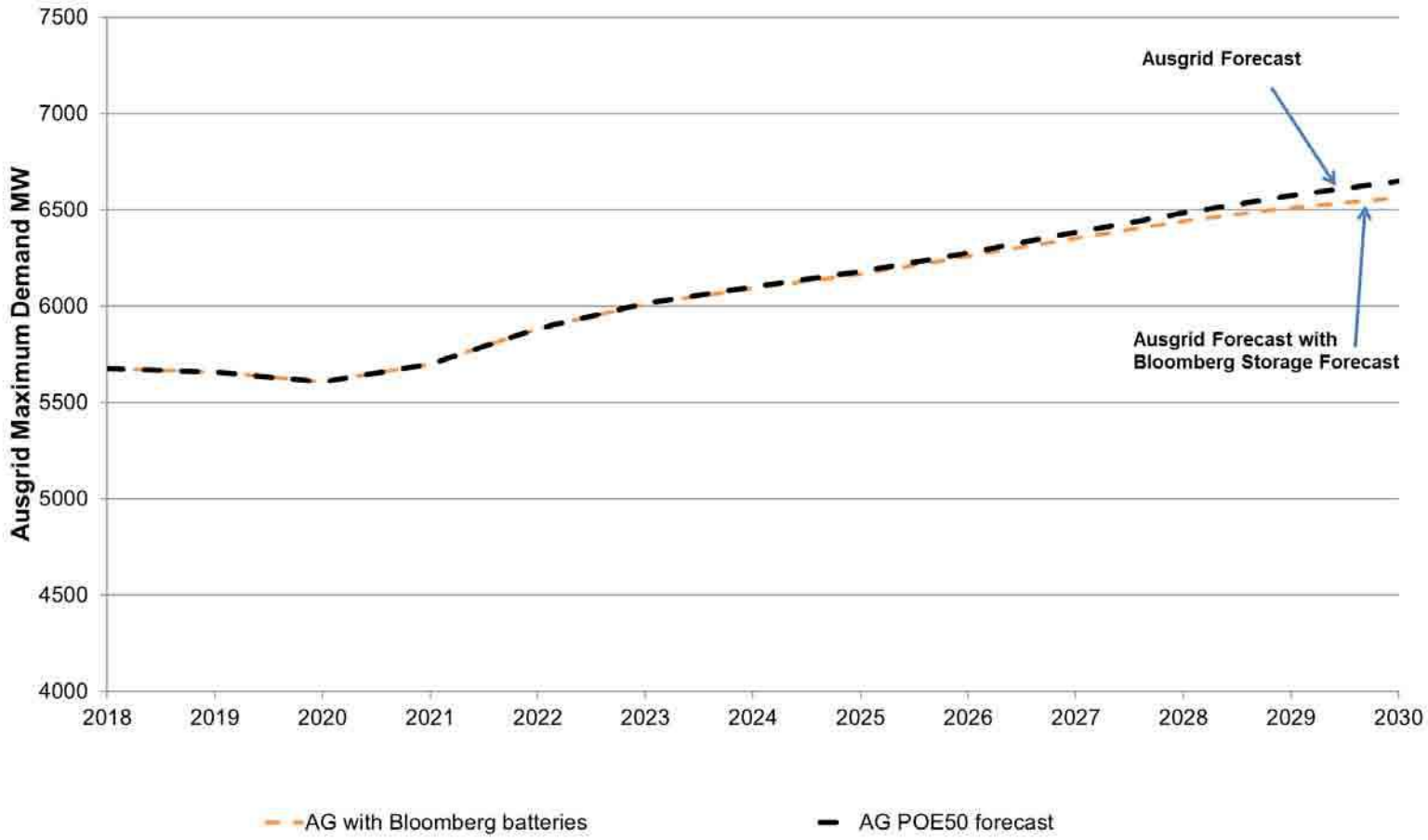
- Using CER postcode data, around just over 350 MW capacity as at June 2017
- Project ~690 MW capacity by 2024, around double
- Chart shows impact of additional rooftop solar PV on peak
- Impacts based on local zone substation time of peak

Impact of Solar & Storage – 2019-2030

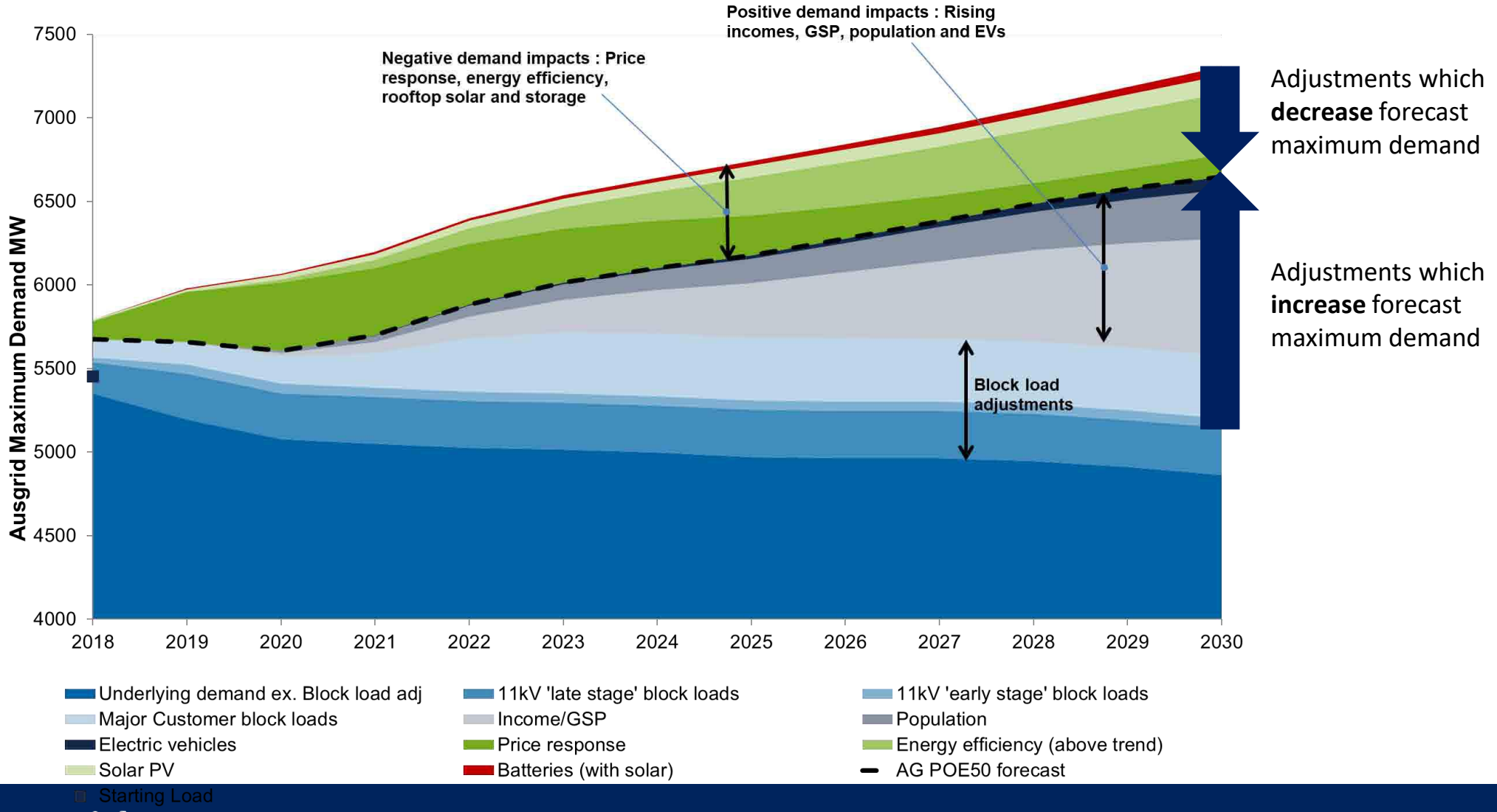


Application of Bloomberg Battery forecast reduces maximum demand only by approximately 9MW over Ausgrid forecast by the end of the 2024 regulatory period

Impact of Solar & Storage – 2019-2030



Maximum Demand Forecast - overall



Adjustments which **decrease** forecast maximum demand

Adjustments which **increase** forecast maximum demand

Demand Management

Demand Management

	Major Growth	Major Replacement	HV/LV Reinforcement	HV/LV Reinforcement	HV/LV Reinforcement
	• Overload shortfall only • Solutions well proven • Typ. $2-20+m network cost	• Large reductions required • Innovation trial underway • Typ. $2-20+m network cost	• 'Referral' solutions required • Innovation trials completed or in planning • Typ. $1-2m network cost	• Tariff or 'referral' type solutions • Typ. $0.1-1m network cost	• Network switching solution available • Typ. <$0.1m network cost
Scale of Demand Reductions Required					
Level of DM autonomy required					
Establishment funds available					

Demand Management

Major Growth:

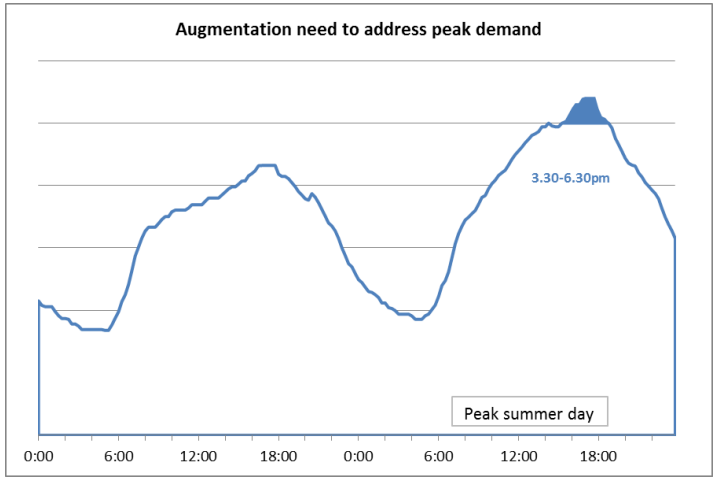
- Preliminary assessment only to date - awaiting customer commitment
- RIT-D process to be followed

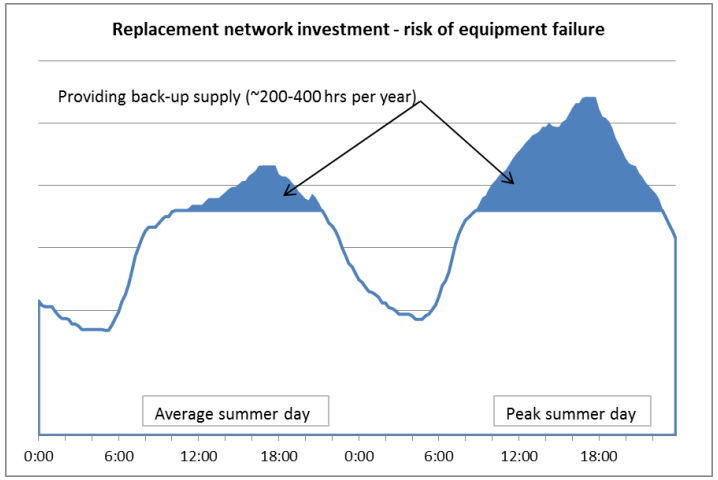
Major replacement

- 40 projects assessed totalling $540m in network investment
- Use same cost benefit assessment as per network investment decision – reduction in EUE
- Four projects totalling $97m in 10 year planning horizon selected to proceed
- RIT-D process to be followed

HV/LV Reinforcement

- Projects >$1m assessed as identified
- Cherrybrook 11kV project shows can be cost effective but none recently
- Development of DR marketplace via IoT, Reposit etc. required
- RIT-D or similar consultation to be used to signal market



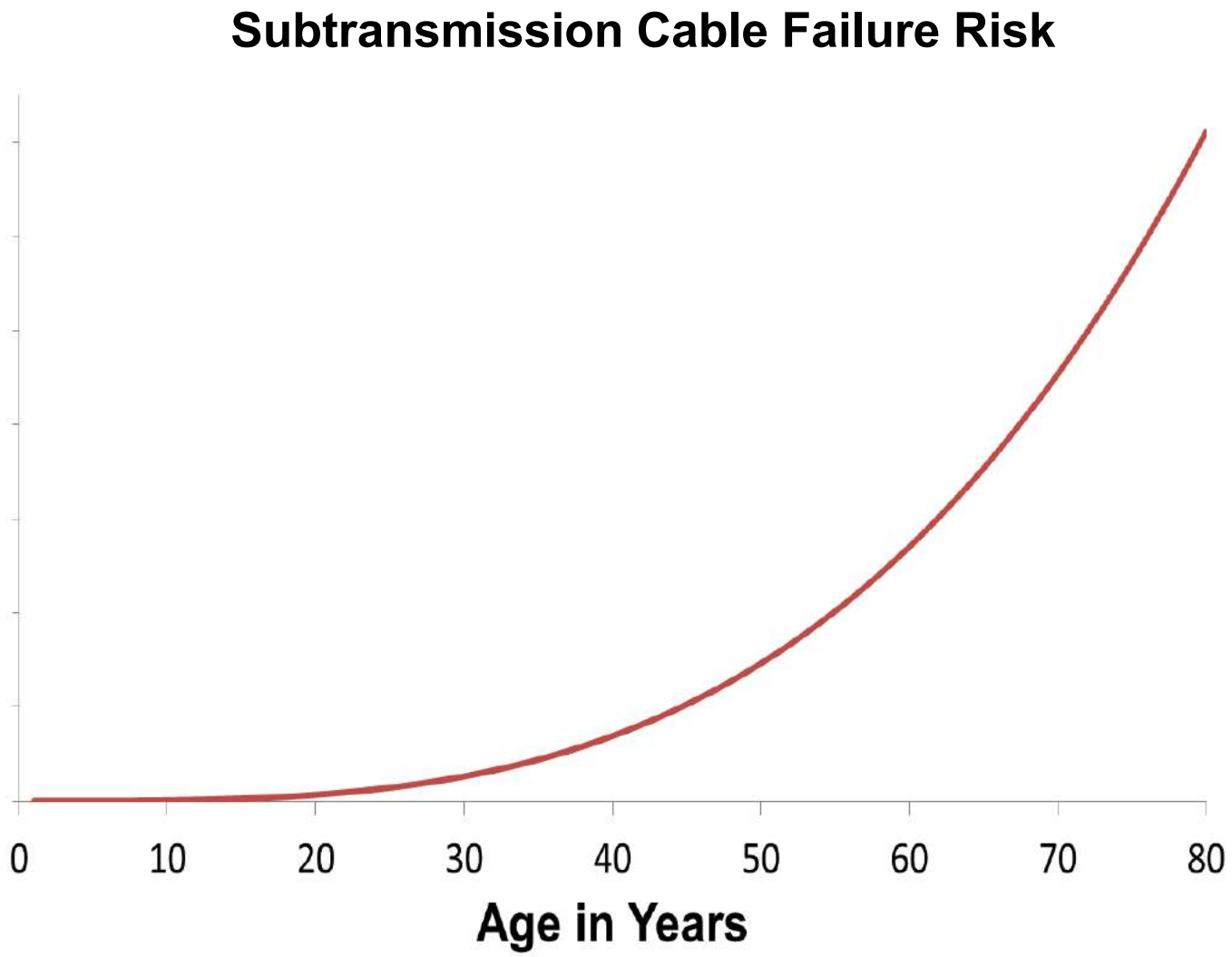


Network Capex

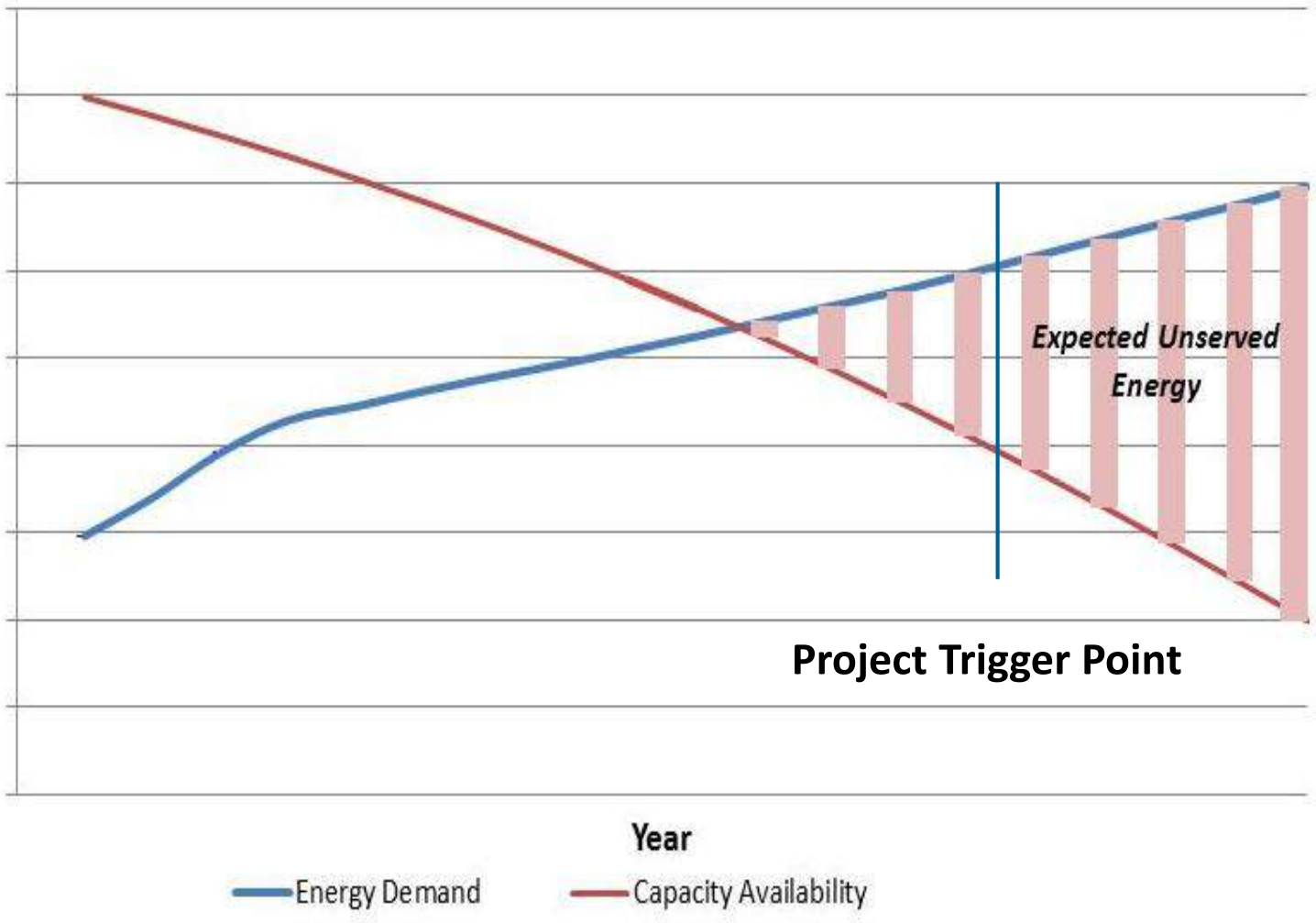
Major Projects

Including Maximum Demand Sensitivity

Impact of Probabilistic Approach on Timing



Impact of Probabilistic Approach on Timing



Replacement Approach

- Network energy delivery capacity declines with availability
- Demand for energy and demand served by the equipment increases
- Shortfall is expected unserved energy (EUE)
- Other risks and cost also increase with likelihood of failure
- Trigger point - where value of EUE plus other risks/cost is greater than cost of project

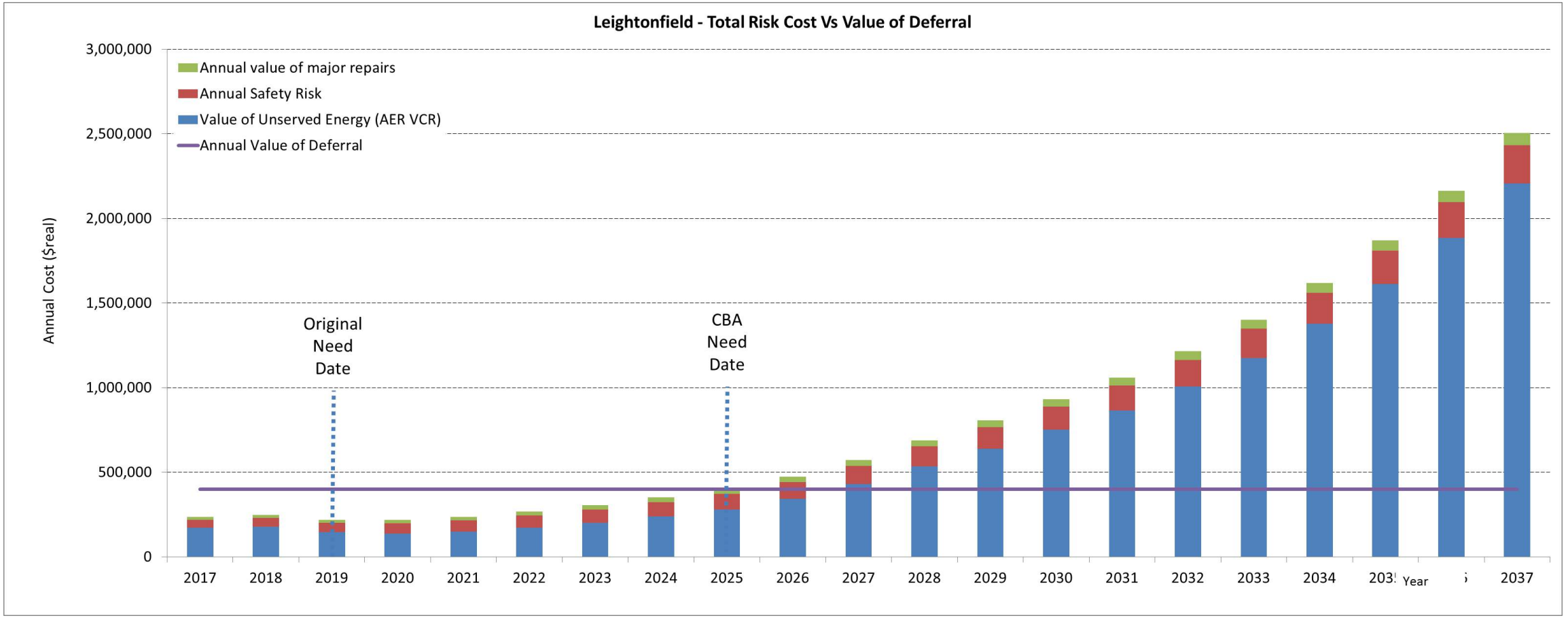
Impact of Probabilistic Approach on Timing

The following inputs are considered in the cost benefit analysis (CBA) undertaken during the Area Plan review:

- Safety costs – Value of a Saved Life,
  - Values are sourced from the Department of Finance and Deregulation: Office of Best Practice Regulation (Best Practice Regulation Guidance Note: Value of statistical life, Australian Government, 2014)
  - Calculations prioritise resources such that the most effective treatments are applied to the most critical risks
  - A grossly disproportionate test is also applied. I.e. whether cost is grossly disproportionate to the benefits.
- Customer Value of Customer Reliability (VCR) – AEMO values used excepting inner CBD areas,
- Environmental Costs – Value of avoided environmental impact,
  - Significant oil cable failure and leakages are used as the proxy for establishing the Environmental consequence scale for assessing asset environmental risk. Protection of the Environment Operations Act Tier 2 Offence is considered as representative of these events
- Available non-network solutions – Demand Management Options
  - All cost benefit analysis considers available demand management options
  - Limited availability of appropriately priced, significant duration demand management (many hours/day for several months/year)
- Replacement activities consider future demand forecasts and any known adjacent augmentation needs through the area planning process

Impact of Probabilistic Approach on Timing

When probabilistic CBA is applied to a retirement/replacement projects, on average the deferral benefits for subtransmission cable projects is approx. 2 years and for 11kV switchboard projects approx. 5 years.



Switchboards – Portfolio of 11kV switchgear replacement projects

Project Name	Replacement type	Total Cost ($m)				Start Date	Finish Date	Asset Age		Total Switchboards
		2015-19	2020-24	2025-29	Total			Substation & Building	Switchboard (Oldest)	No. of Panels in Zone
Mascot	New Zone	2.4	50.4	-	52.8	2018	2023	72	72	39
City East	Retire Zone	16.5	22.6	-	39.1	2017	2023	54	54	48
Concord	Full Board	2.7	22.6	-	25.3	2018	2022	63	63	26
Enfield	New Zone	18	15.1		33.1	2018	2022	56	56	22
Clovelly	Partial Board	-	14.1	0.6	14.7	2021	2025	48	48	41
Dalley St	Retire Zone	11.9	14	0.1	25.9	2017	2025	49	49	84
Darlinghurst	Retire Zone – Staged	0.03	3.7	9.1	17.3	2018	2031	52	52	31
Miranda	Full Board	-	12.3	1.4	13.6	2021	2025	61	61	16
Tarro	Full Board	1.9	8.2	-	10.1	2018	2022	61	61	12
Leightonfield	Full board	-	8.2	0.6	8.8	2021	2026	56	56	13
Flemington	Partial Board	1.4	5.9	-	7.2	2018	2021	45	45	45
Botany	Full Board	-	5.9	0.4	6.3	2022	2025	87	47	28
Lidcombe (Group 1 & 2)	Full Board – Staged	6.1	5.5	14.5	26.1	2017	2029	65	52	19
Denman	Full Board	0.8	3.6	-	4.4	2018	2021	33	33	9
Riverwood	Full Board	-	2.4	8.5	10.9	2023	2027	52	52	13
St Ives	Full Board	-	1.6	15.3	16.9	2023	2027	49	49	26
Milperra	Full Board	-	1.4	8.5	9.9	2023	2027	52	52	29
Pymble	Full Board	-	1.4	11.9	13.3	2023	2027	54	54	20
Other Switchboards Substantially Completed FY 2015-19		367.6	20.4					Average Age Now 56yrs	Average Age Now 53yrs	Total Panels in Zone 521
Total Expenditure		429.3	219.3							
Allowance		506.1								

Underground Sub-transmission Cables – Portfolio of capital projects

132kV Cable Replacements

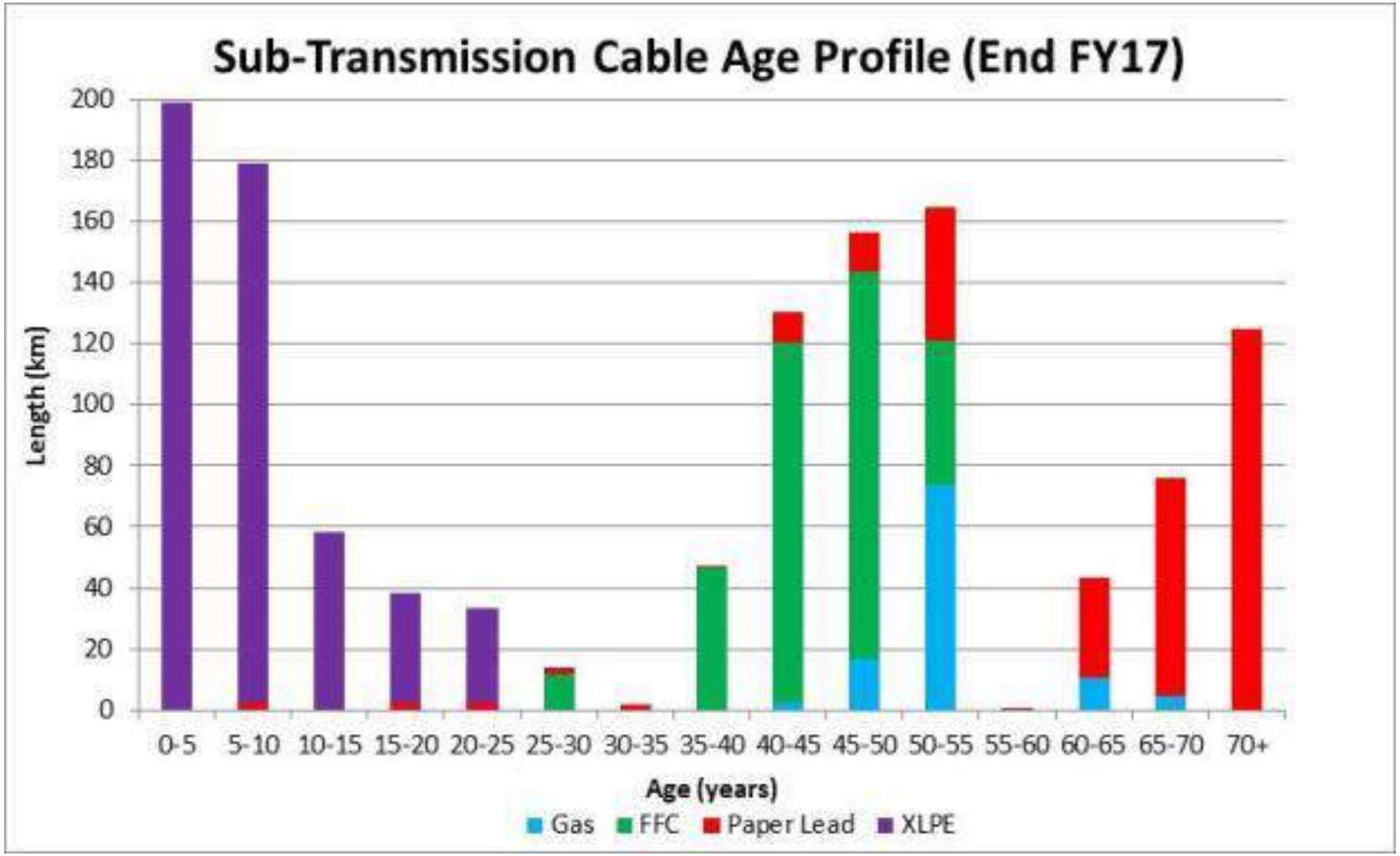
Project Name	Total Cost ($m)				Start Date	Finish Date
	2015-19	2020-24	2025-29	Total		
Beaconsfield - Zetland	-	38.2	1.8	40.0	2019	2025
Castle Cove - Mosman	0.9	35.4	-	36.3	2019	2023
Beaconsfield - Campbell St - Belmore	5.1	21.4	0.9	27.4	2019	2024
Sydney South - Revesby	1.6	20.3	-	21.8	2018	2022
Zetland - Clovelly	1.4	19.4		20.8	2018	2022
Haymarket - Pyrmont	-	18.0	18.1	36.1	2022	2026
Bunnerong - Maroubra	-	17.3	2.3	19.7	2021	2025
Beaconsfield - Mill Pond	0.0	15.4	0.2	15.6	2019	2023
Mason Park – Burwood	-	9.1	-	9.1	2020	2024
Beaconsfield - Green Square	-	6.6	-	6.6	2020	2024
Beaconsfield - Kingsford	-	3.7	22.1	25.8	2022	2026
Mason park - Homebush	1.7	0.7	-	2.4	2017	2019
Mason Park – Drummoyne - Rozelle	-	0.5	46.1	46.6	2024	2028
Other cable replacements substantially completed FY2015-19	155.0	11.9				
Total	165.6	217.9				
Allowance	176.9					

33kV Cable Replacements

Project Name	Total Cost ($m)				Start Date	Finish Date
	2015-19	2020-24	2025-29	Total		
Homebush – Auburn - Lidcombe	16.3	13.3	-	29.6	2017	2020
Bunnerong – Sydney Airport	0.8	11.9	-	12.7	2017	2020
Surry Hills - Paddington	-	7.3	2.6	9.9	2022	2025
Other cable replacements substantially completed FY2015-19	84.8	11.9				
Total	101.9	44.4				
Allowance	162.5					

Underground Sub-transmission Cables

132kV Fluid Filled Cables / 33kV Gas Cables



Four key generations of sub-transmission cable technology

Long repairs times and high failure rates of gas / oil pressure cables

Failure of oil cables as they age and degrade has a significant environmental impact fluid leakage

Typical repair times are measured in weeks and months

The majority of paper insulated lead sheath cables are performing well and do not require replacement

Underground Sub-transmission Cables

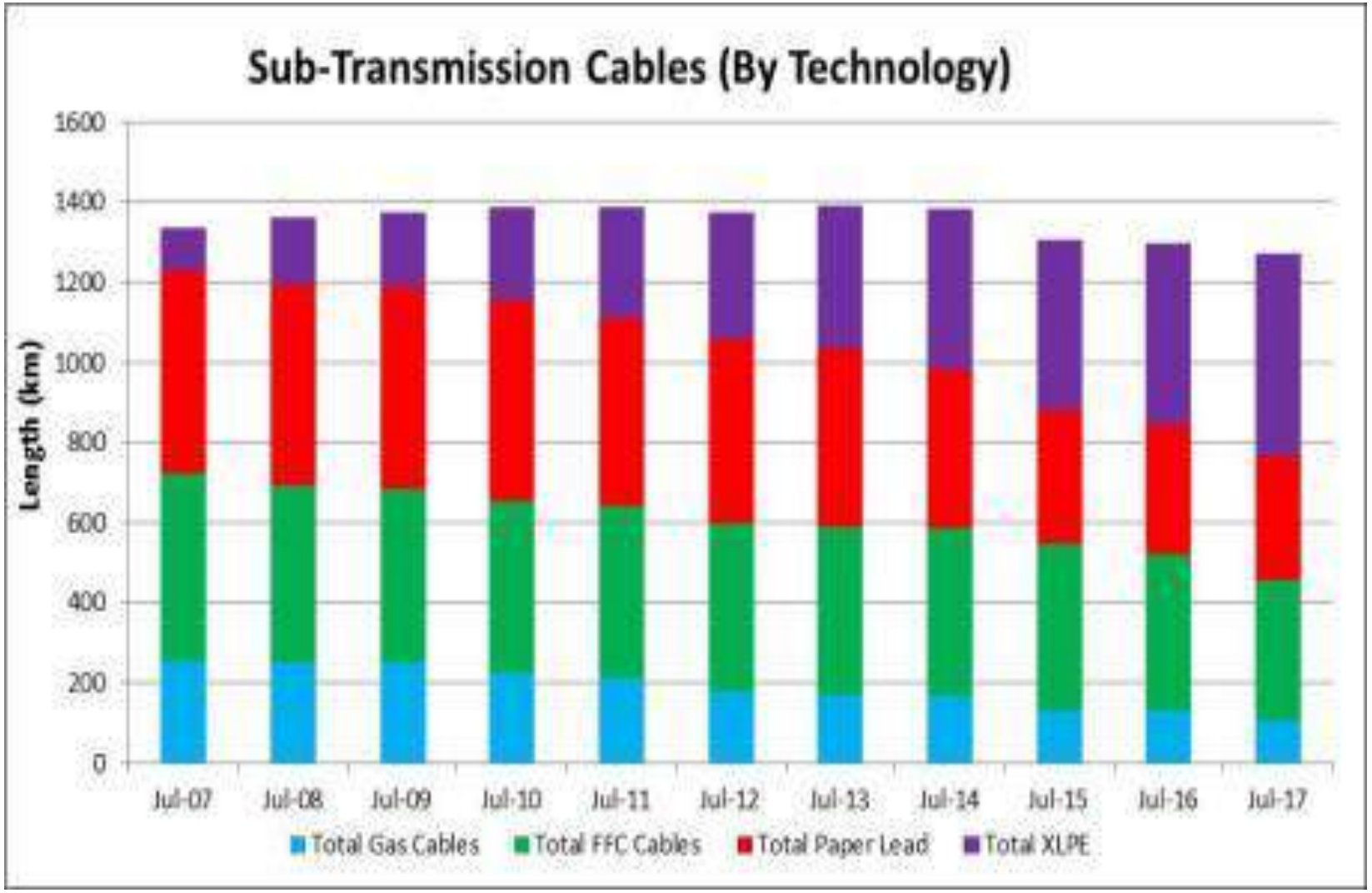
132kV Fluid Filled Cables / 33kV Gas Cables

Increased focus on gas / oil pressure cable replacement since start of 2009-14 period due to increasing leakage and long repair times.

Transformation of the network from a 33kV to 132kV system (reducing transformation steps and assets required)

Increase in new cost benefit analysis driven 132kV cable replacement has enabled retirement of 33kV gas or paper lead cables

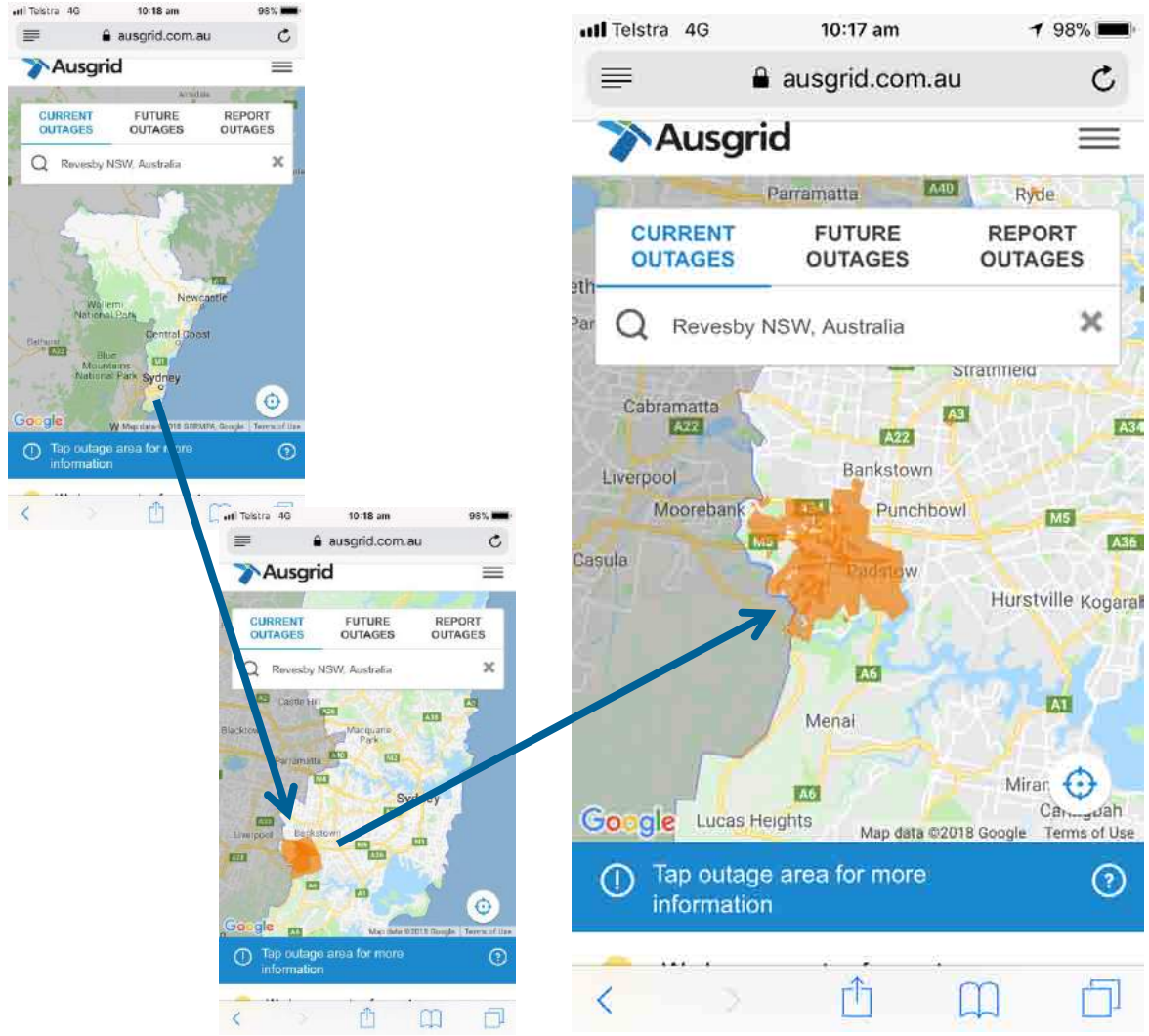
Demand enabled greater cable retirement with replacement in the 2015-19 period.



Impacts of 132kV Fluid Filled Sub-transmission Cable Failure

The most recent fluid filled 132kV cable failure, operating under N-1 circumstances was:

- Feeder 283 (Sydney South / Revesby / Milperra)
- Failed at 10am on 15 February 2018
- Control and protection systems operated automatically to isolate the fault
- Over 25,000 customers interrupted for 1 hour 20 mins
- Restoration was made via switching after confirmation of the fault
- The 132kV oil cable remains out of service with ongoing repairs of up to 8 weeks or more
- Contingency management for summer network loads remain an issue



Connections Policy

Ausgrid's proposed Connection Policy for 2019-24

Connection Policy

- When and how customer's pay for connection services
- Recovered as upfront charge

Augmentation Allowance (AUGEX)

- Amount that Ausgrid can spend on shared network development
- Recovered via tariffs

Equitable allocation of costs

- Connecting customer's still fund dedicated assets
- Similar customers pay similar costs

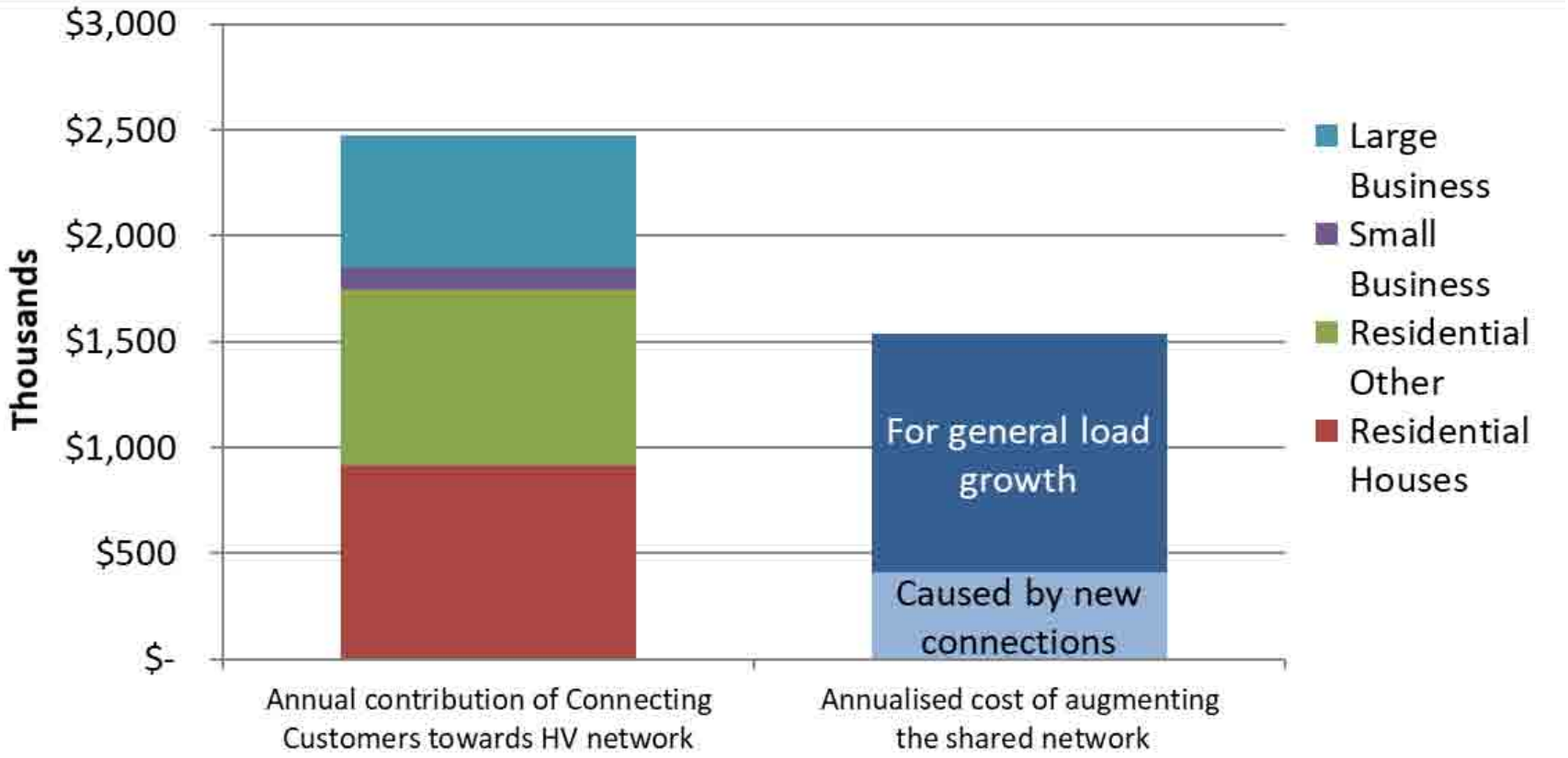
Efficient network development

- Holistic consideration of network needs to access economies of scale
- Greater opportunity for demand management
- Reduced design and administration costs

Connections Policy – Small – Medium Customers

- Noted stakeholder concerns and reviewed
- Proposed changes do not result in existing customer base subsidising new connections
- Additional revenue from the new customers is adequate to cover these costs
- This is consistent with the application of AER Guidelines relating to additional revenue and marginal cost of augmenting shared assets

Revenue Contribution from Connecting Customers vs Augex for the HV network

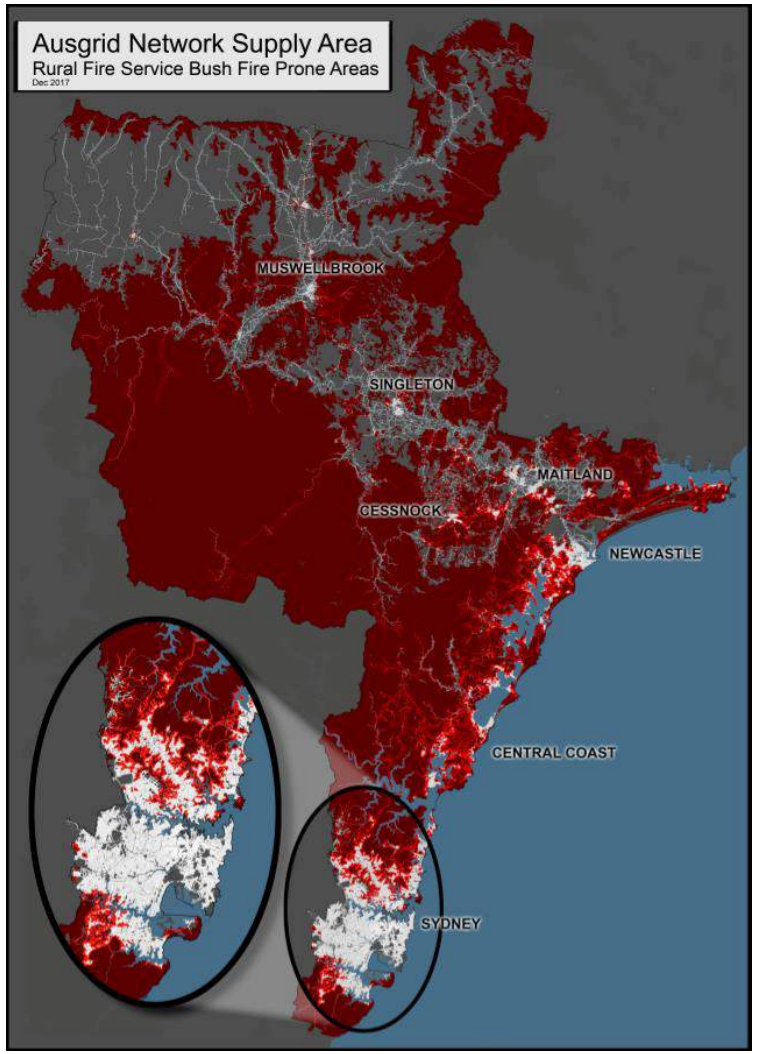


Connections Policy – Very Large (Subtransmission) Customers

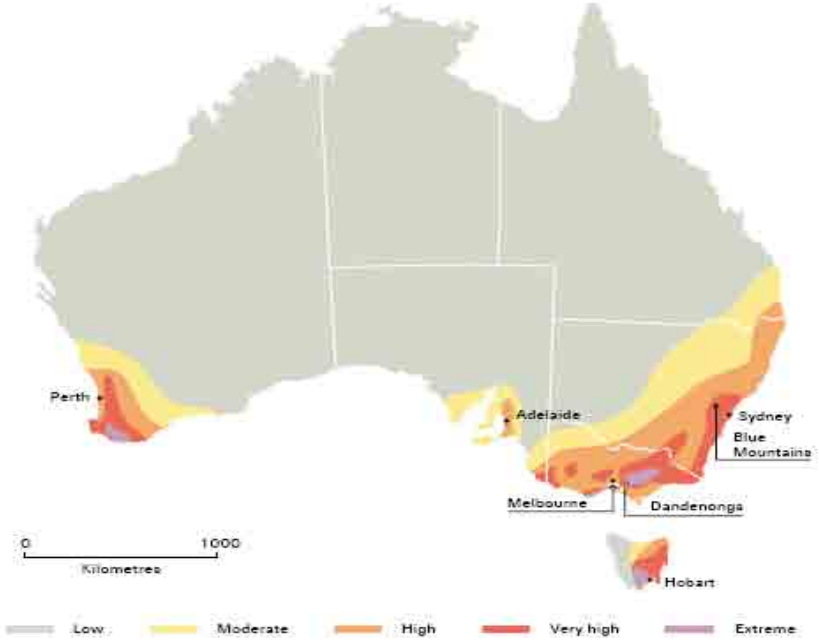
- Note stakeholder concerns about the basis for recovery of shared capex for larger customers
- We use and will continue to use Cost Reflective Network Prices (CRNP) for these very large customers. These can include a range of alternatives including fixed charges demand charges and guarantee of revenue arrangements
- We will use these mechanisms to ensure these customers not being materially underwritten by other customers / sectors
- For the cases discussed we have not reached the point of finalisation of arrangements, including tariffs, so it is too early to confirm specific arrangements
- We will continue to discuss our approach with key stakeholders during the revenue and tariff setting stages of the reset process

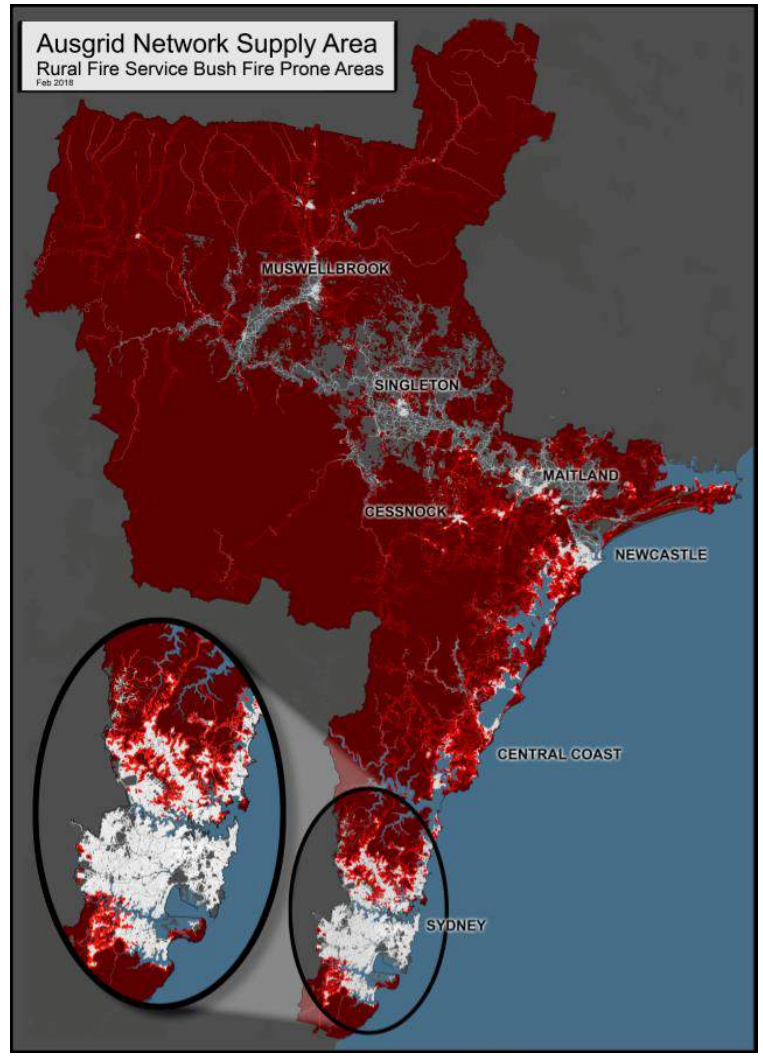
Ausgrid Network Overview

Bushfire Areas (Changes in 2018)



RFS Bushfire Area Changes 2017 - 2018	
Additional Assets Impacted	
~ 16,000	Spans
~ 2,050	Route km
~ 8,700	Poles
~ 2,146	km^2



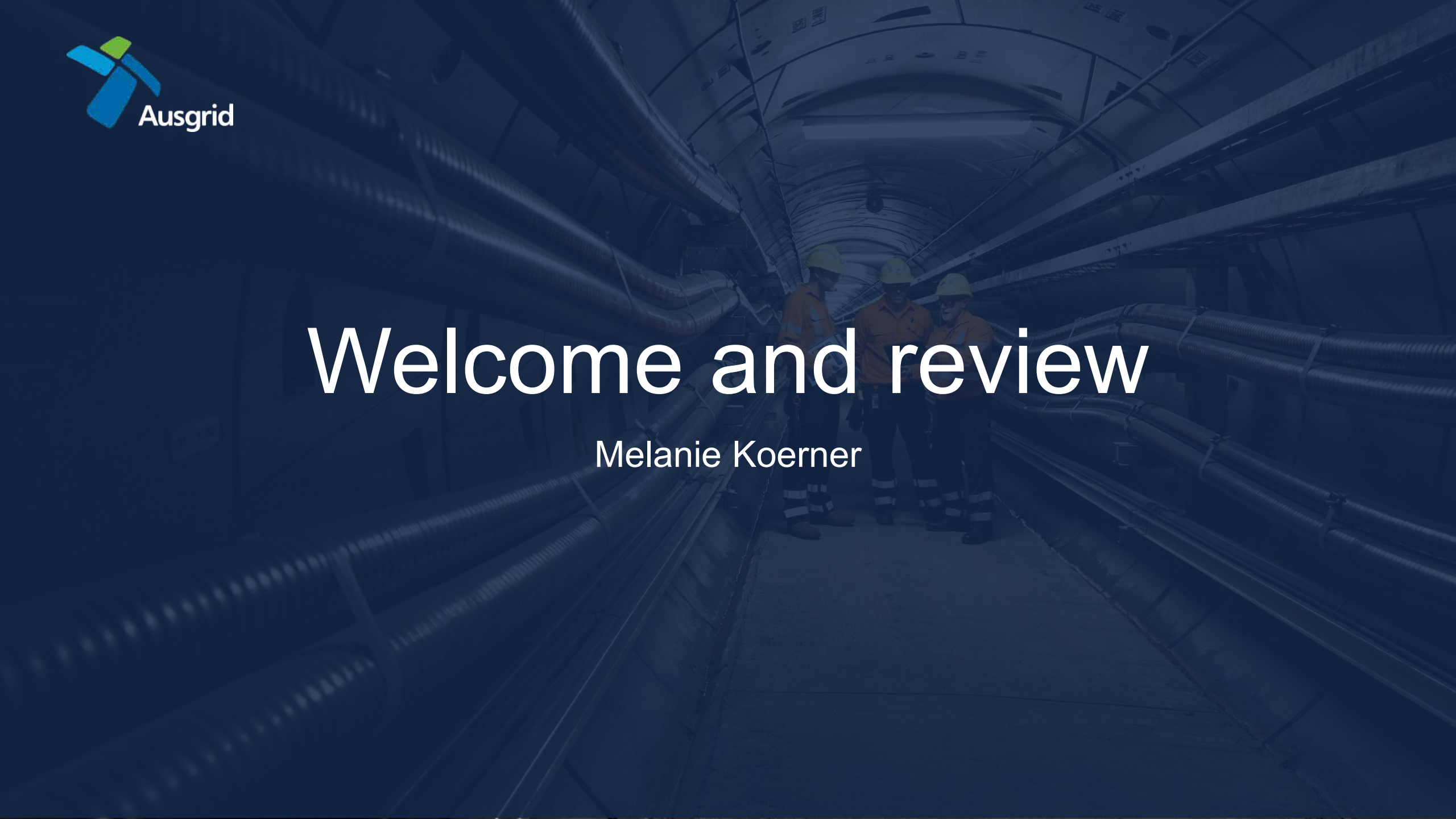


Discussion

Next Steps

8.5

Pricing Deep Dive
22 February 2018



Welcome and review

Melanie Koerner

Purpose

1. To **empower** you to collaborate with us and challenge our regulatory proposal

2. To **hear** your views and feedback

Guidelines

1. Tell us where you need more information

2. Where you have enough information, provide us your feedback/views

3. We acknowledge that your views do not, at this stage, represent those of your organisation

Questions/issues raised to date

- In total, 184 questions/issues have been captured across 18 themes covering all aspects of submission
- For pricing, 19 questions captured across five key themes:
  - Approach to provision of information
  - Structure of cost reflective pricing
  - Uptake of cost reflective pricing
  - Customer impacts
  - Future proofing

Tariff Deep Dive

Workshop 1B – Stakeholder Engagement Deep Dive
Regulatory Proposal – FY2020-2024

22 February 2018

Ausgrid

Tariff - Agenda

1. Welcome and introduction
2. Session guidelines
3. Current and potential future challenges
4. Stakeholder pricing principles
5. Ausgrid's proposed pricing methodology in light of stakeholder pricing principles
6. Where to from here…
7. A collaborative research plan
8. Next steps/ Issues outstanding

Welcome and session guidelines

1. Session starts at 9:30 am, finishes at 4:30 pm with a lunch break (30 minutes) and two other 15-min-breaks

2. Guided by the **principles of the Ausgrid Reset Engagement & Empowerment framework** (i.e. “Accountable and transparent”, “Fair and reasonable”, “Respectful and Collaborative”)

3. We encourage you to **participate** within the sessions by:
   - Asking any questions of **clarification** to help inform your view
   - Telling us where **information is missing** or where you require more detail to inform your views
   - Providing **your views** on the questions posed
   - Providing your feedback with respect to any **other matters**

Current and potential future challenges

Rob Amphlett Lewis

Ausgrid

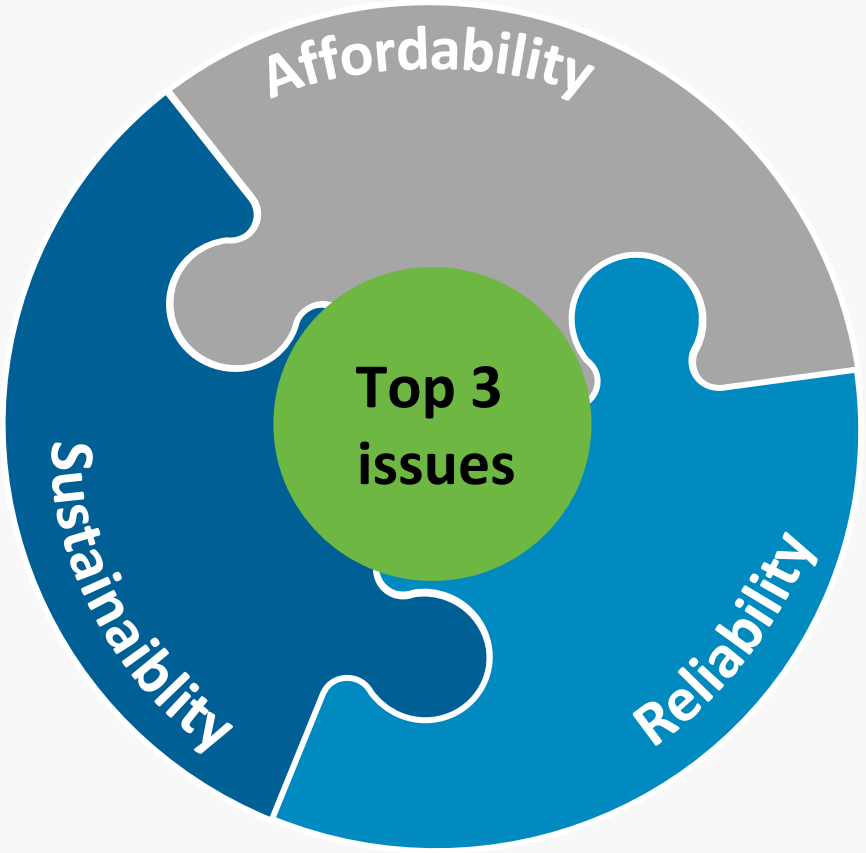
Affordability is the number one concern identified by customers and stakeholders

Affordability

Customers are dissatisfied with rising prices, with many experiencing “bill shock”. Customers want energy prices to stabilise or decrease.

Ausgrid’s focus to address affordability concerns

- Customer engagement
- Pricing reform
- Research program.



Reliability

Customers highly value stable reliability and secure electricity supply, even though outages are rare.

Sustainability

Customers and stakeholders support solar and renewables.

The requirements of the rules

The **network pricing objective** is that: *"… the tariffs that a Distribution Network Service Provider charges in respect of its provision of direct control services to a retail customer should reflect the Distribution Network Service Provider's efficient costs of providing those services to the retail customer"*

The AEMC explains that the focus of the network pricing objective is 'cost reflectivity' and that cost reflectivity for network tariffs has three components:

1. Sending efficient price signals as to future network costs.
2. Allowing a DNSP to recover its efficient costs.
3. Ensuring each consumer pays for the costs arising from its use of the network.

Network Pricing Principle 1	**Establish bounds** within which the revenue expected to be derived from each tariff class must fall. The lower and upper bound are, respectively, the avoidable cost and standalone cost of providing the relevant network service.
Network Pricing Principle 2	Mandate that **each tariff must be based on the LRMC** of providing the relevant service to customers and provide guidance as to the approach to calculating LRMC.
Network Pricing Principle 3	Require the revenue expected to be recovered from each tariff class to reflect the **DNSP's total efficient cost** of providing the relevant services in a manner that minimises distortions to price signals for efficient usage of network services.
Network Pricing Principle 4	Require a DNSP to consider the **impact on customers** of changes in tariffs from year to year and prescribe circumstances in which a DNSP may not be required to comply with particular pricing principles.
Network Pricing Principle 5	Ensure that tariffs are designed such that they can be **understood by customers.**

Key pricing reforms over 2017 to 2019

Phase out the declining block tariff

Seasonal TOU pricing from 1 July 2018

Removing the peak price for 4 months of the year

Assigning all new customers to a TOU tariff

Benefits of seasonal TOU pricing are:

- Cheaper price in the 4 months where the peak has been changed to shoulder
- Further movement across the scale to cost reflectivity

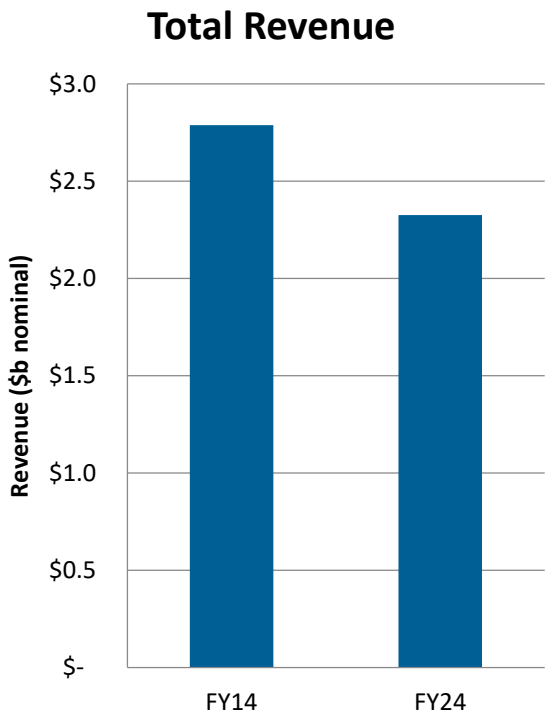
Insights from customer research

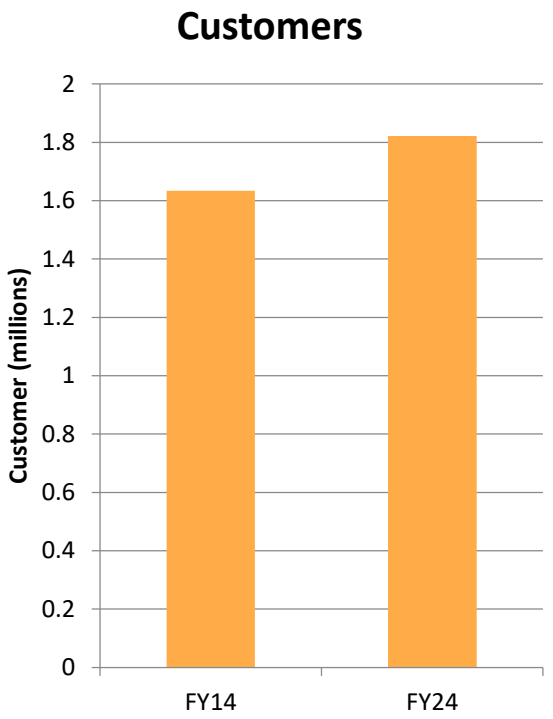
Higher fixed charges – most customer accepted this option as long as the usage charge was reduced commensurately and adequate safeguards put in place for low energy users and vulnerable customers.

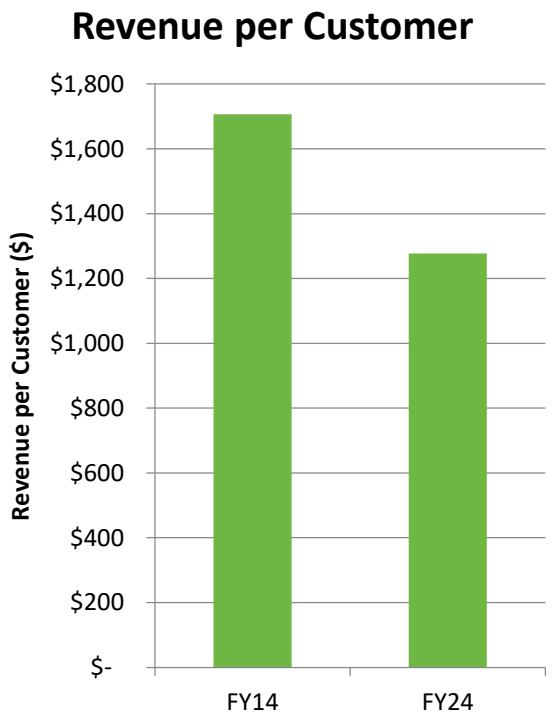
Locational pricing – This was found to be unacceptable to customers at the focus groups and deliberative forums.

Capacity pricing – These options tested poorly with customers as customers found it difficult to understand and were suspicious that it could cause bill shock.

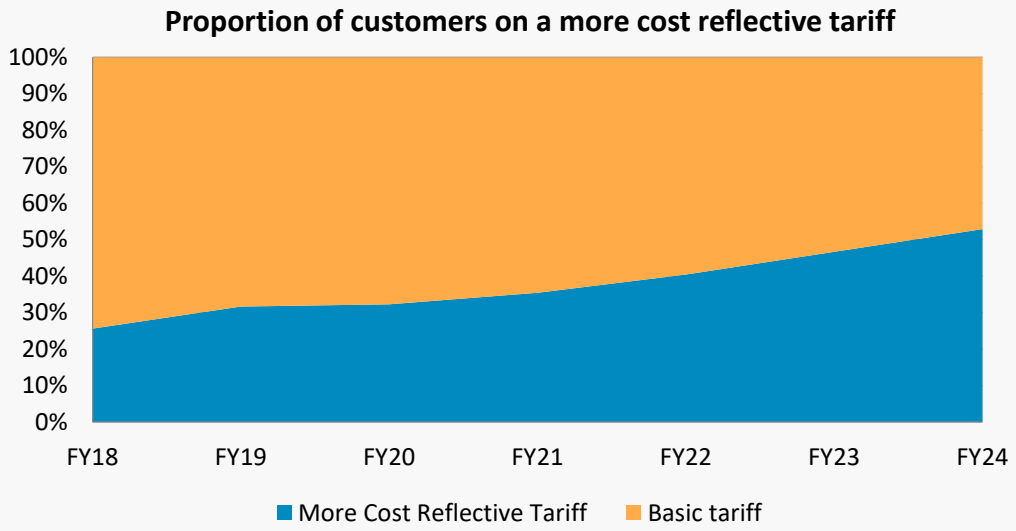
We are committed to keeping revenues flat or declining in real terms over the 2019-24 period

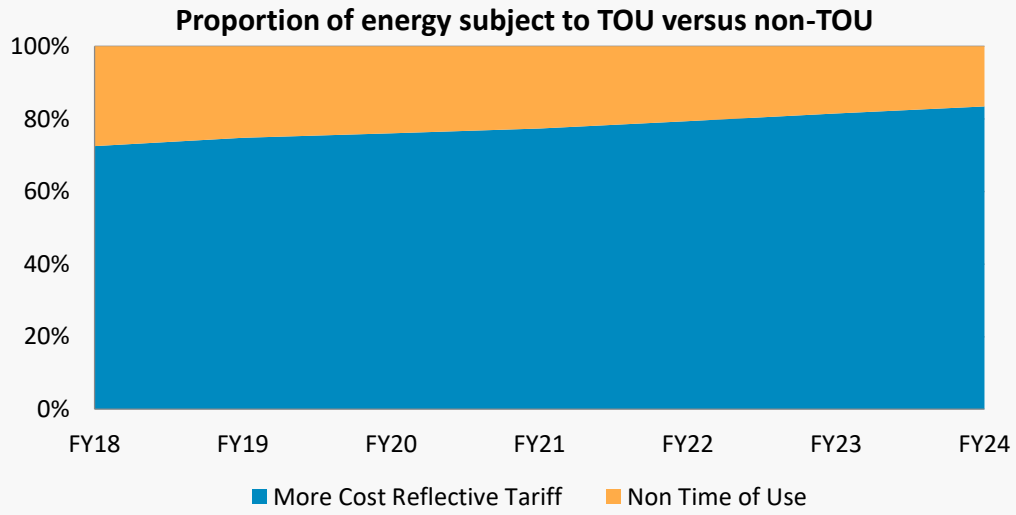






Growth in the penetration of advanced meters





The penetration of network TOU pricing is expected to increase from 350,000 customers in FY18 to around 900,000 in FY24, reflecting:

- Meter replacements
- Meter upgrades – Solar PV, three phase and retailer roll-out of smart meters
- New connections

Increased penetration of distributed generation resources

Home energy solution

Solar energy

Provide “solar-as-a-service”, owning, operating and maintaining PVC systems, offering customers a “guarantee” of supply

Consumption management application

Application optimizes the energy source, dynamically deciding between direct use of PV, primary storage or secondary storage (EV)

Residential storage

Provide “storage-as-a-service,” potentially bundled with a PVC contract, offering a “guarantee” of supply

Connected home

Energy efficiency services

Smart sensors and smart chip for usage control
and monitoring
Energy management services and products

Electric vehicle charging

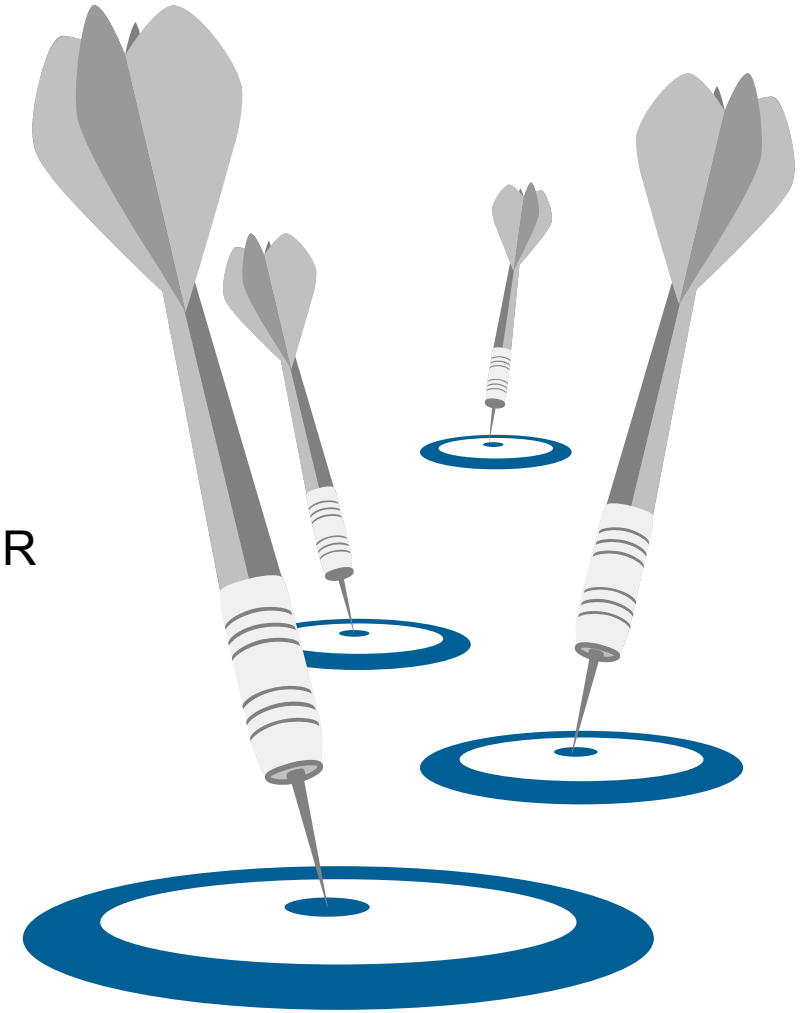
Charging point could use the EV battery as “backup storage” to maintain supply; bundled solar rooftop plus EV charging packages

Backup storage

Distributed charging points

The relevance of pricing reform

1. Safeguarding the provision of the services our customers want and are willing to pay for
2. Encourage efficient investment in DER
3. Promote equity between adopters and non-adopters of DER
4. Avoid inefficient disconnection



A few points on convention for the day

EXPRESSION	PROPOSED CONVENTION
Forward-looking (future) costs and residual (historical) costs	When talking about prices reflecting costs, we will clarify whether we are referring to: • Forward looking costs (future costs that may be avoided); or • Residual costs (i.e., charges aimed at recovering the historical costs of the network)
Energy (kWh), demand (kW) and capacity charges (connection size)	Energy charges are kWh charges. Demand charge is levied on kW and a capacity charge is based on the size of a customers connection.
Cross-subsidy and equity	A cross-subsidy occurs when the revenue recovered from a customer is less than the avoidable costs and greater than the standalone cost of providing services. Where the level of revenue falls between these two bounds is a matter of equity (and we explain this

Stakeholder Pricing Principles

- Promote consumer behaviours and decisions that support efficient means of meeting demand for energy services
- Reflect consumers' preferences
- Transition to a 'causer pays/benefits' model of recovering energy supply costs
- Mid-point reviews of elements of the TSS are essential to build in adaptability in pricing strategies

A key point for discussion:
Are fixed charges or demand/capacity charges less distortionary

Stakeholder pricing principles

Eric Groom (Consumer Challenge Panel)

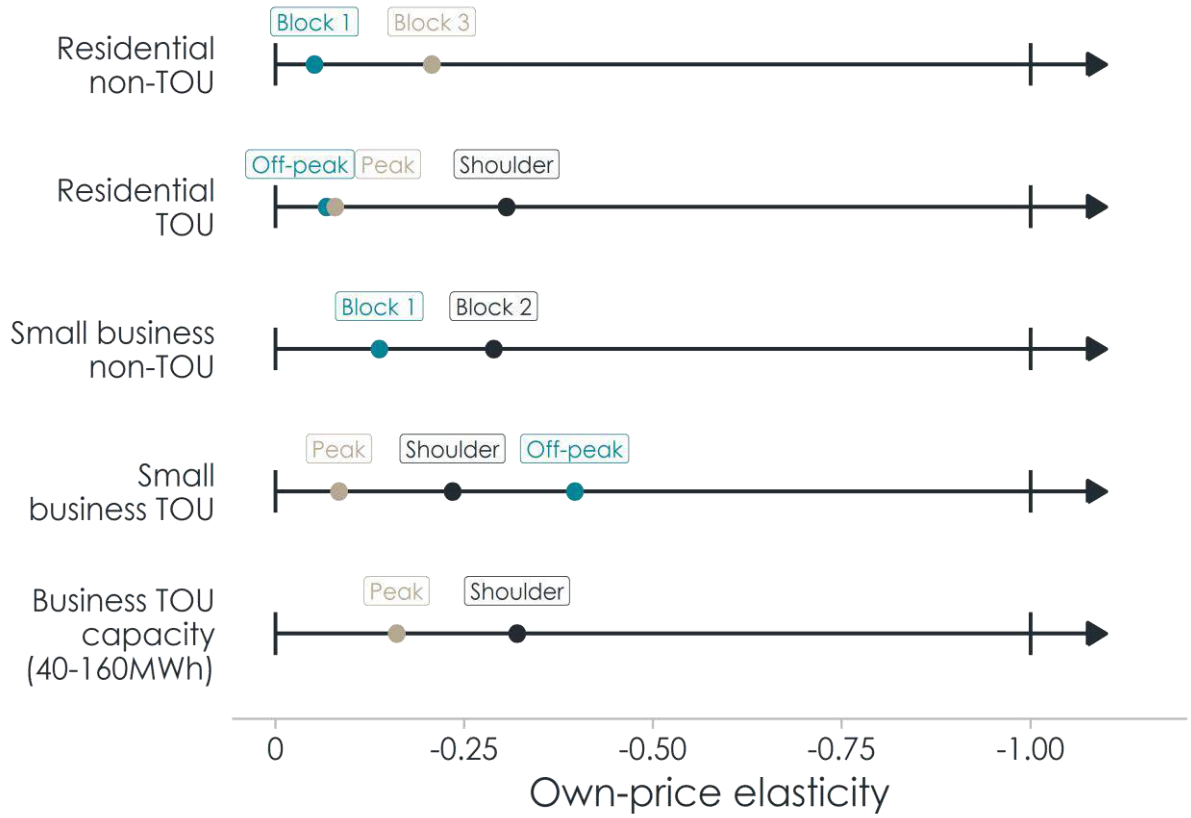
Ausgrid's proposed pricing methodology in light of stakeholder pricing principles

Jonothan Clarke and Dale Yeats

Ausgrid

Allocating residual costs between charging parameters

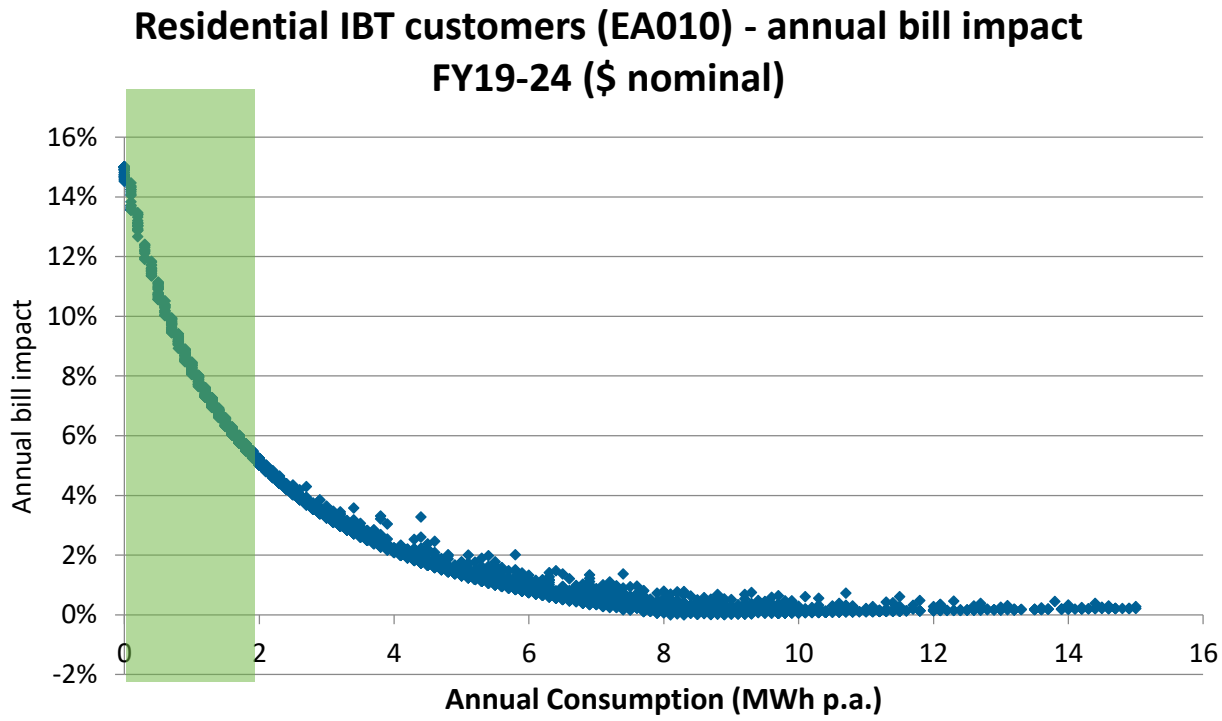
Empirical evidence on the price elasticity of demand



- Responsiveness increases with consumption
- Least responsive to changes in price in the peak period
- Most responsive to changes in price during the shoulder and off-peak period
- What else can we learn from behavioural economics?

An inclining block tariff for residential customers

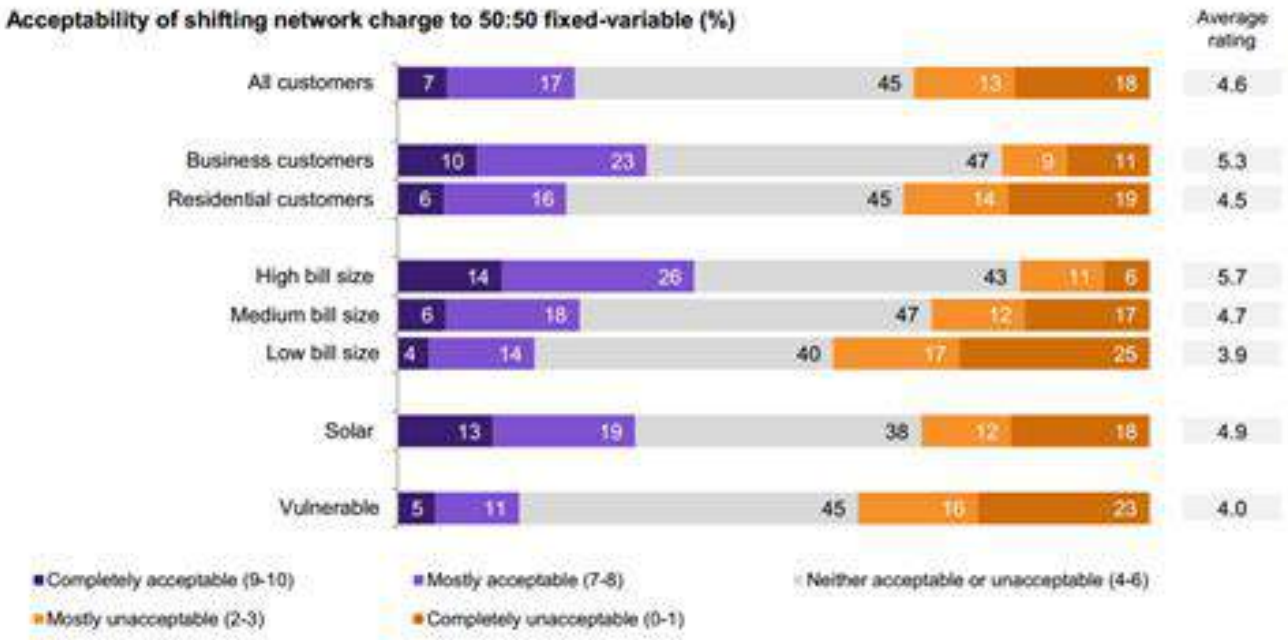
- Incentives for larger users to switch to a more cost reflective tariff
- Mitigates customer bill impacts for low energy users
- Customer Bill impacts



Customer feedback on rebalancing for TOU tariffs

Acceptability of a 50:50 fixed : Usage pricing structure with modest support for vulnerable customers

- Customers are most likely to be ambivalent to this proposal
- 31% find it unacceptable (including 42% with low bills).



Increasing the fixed proportion of distribution tariffs

- Most people are unconcerned with an increased fixed daily charge unless it has a noticeable impact on their overall bill
- The proposed change was most unpopular with early adopters who have already been hit with reduced feed-in tariff charges

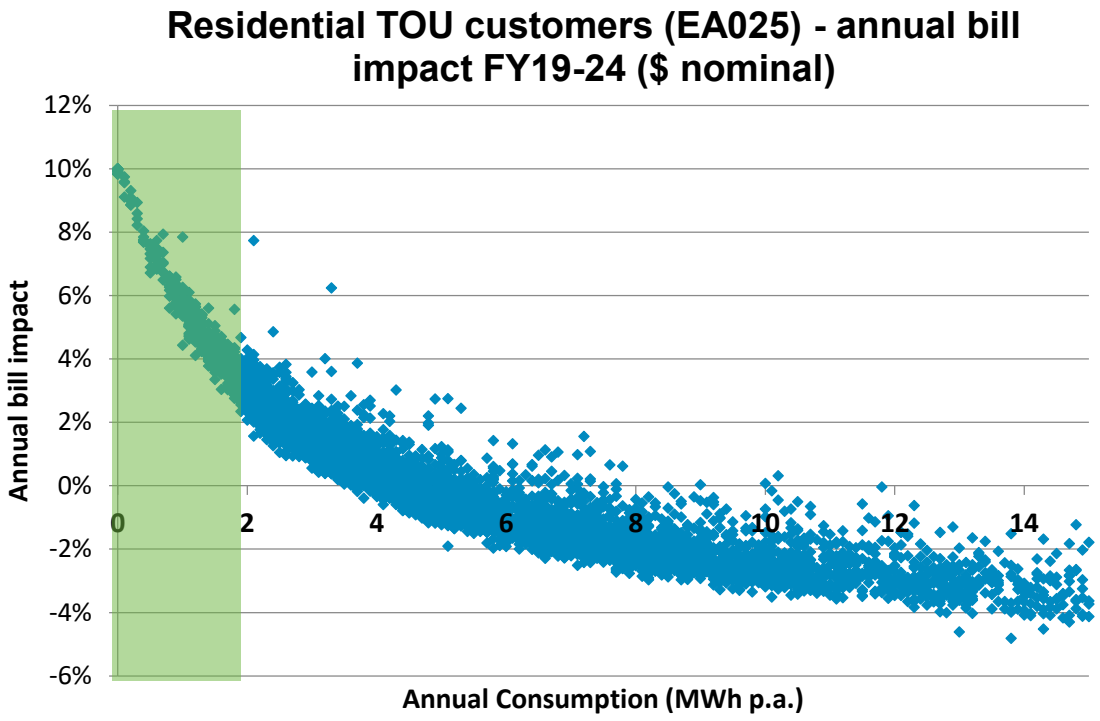
"It's fine as long as the price goes down."

"Solar and battery consumers should pay their "fair share" for network access

"A higher fixed component of the distribution charge makes some sense in principle (...)"

"It could impact on vulnerable customers ."

Rebalancing for TOU tariffs



	Fixed Charge	Peak	Shoulder	Off Peak
Annual change (FY19-24)	10%	-4%	-11%	2%

- Rebalance away from shoulder and off-peak charges with commensurate increase in fixed charges
- Better signal cost of providing services in non-peak times
- Promote efficient investment in DER and avoid inequalities

Avoiding or mitigating unacceptable customer bill impacts

Safeguard and Transitional tariffs

Avoiding unacceptable customer bill impacts for:

- Customers with a concession card – safeguard tariff
- Customers consuming below 2MWh – transitional tariff
- Further research on eligibility criteria for safeguard tariff.

An equitable distribution of residual costs between customers

Cross subsidy and equity

Figure 1

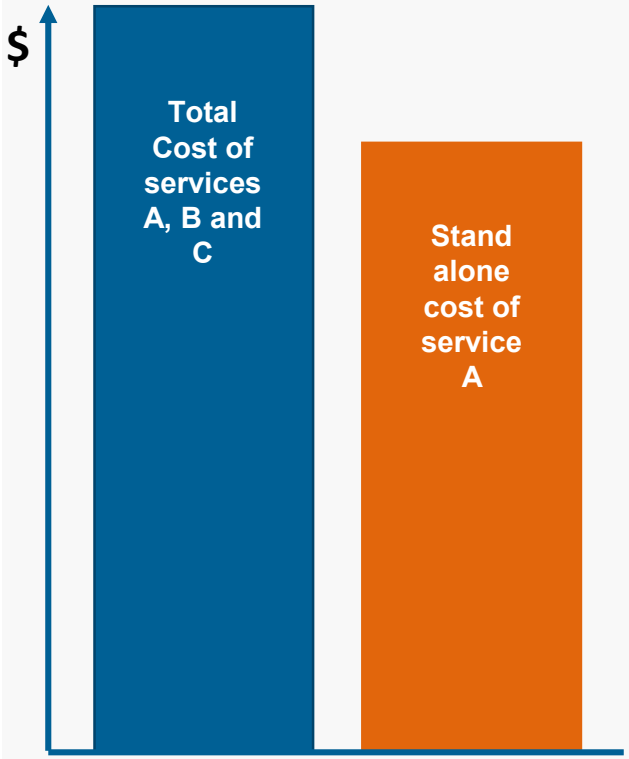


Figure 2

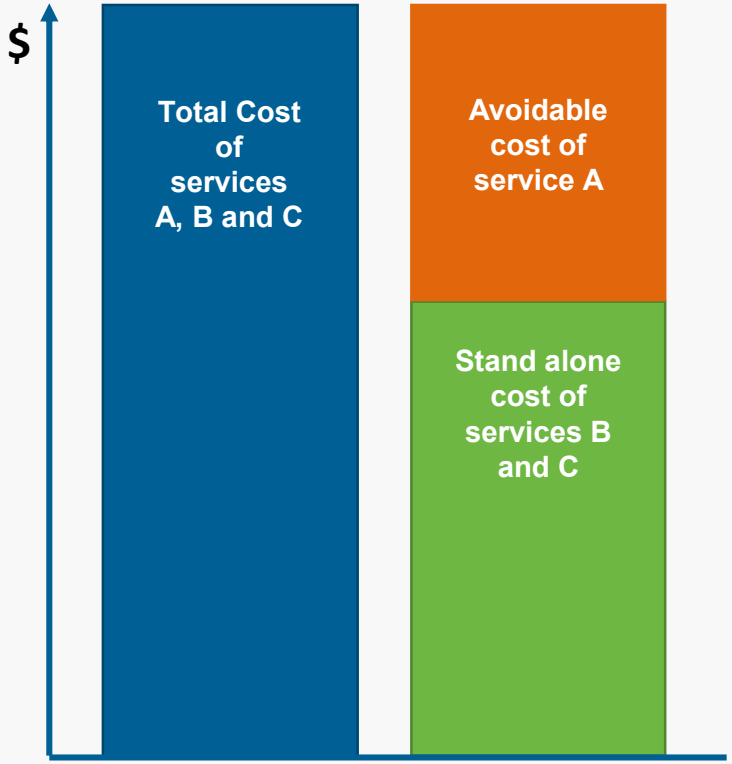
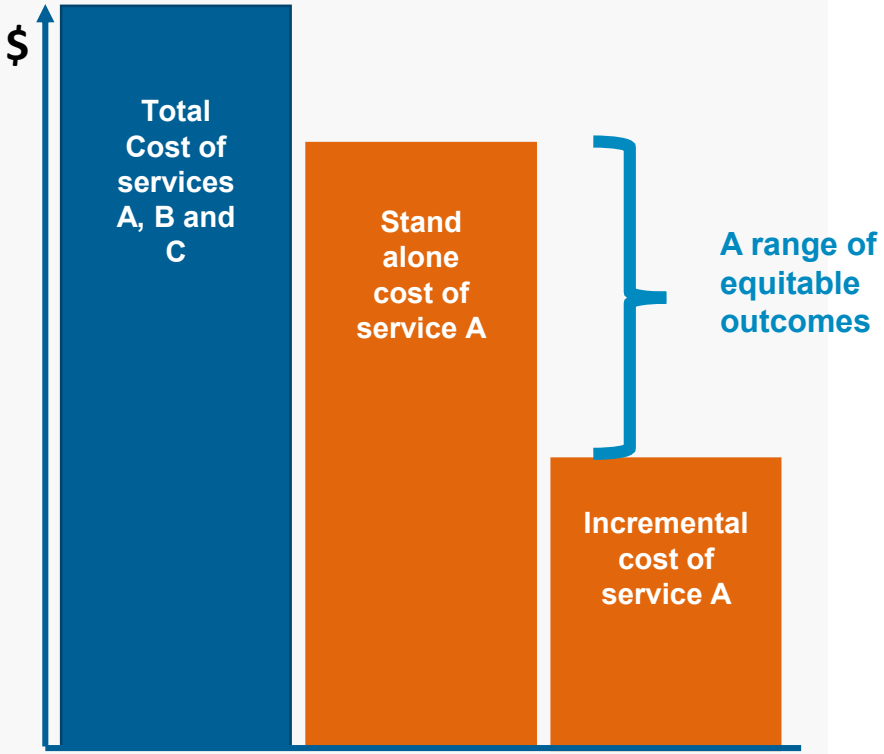
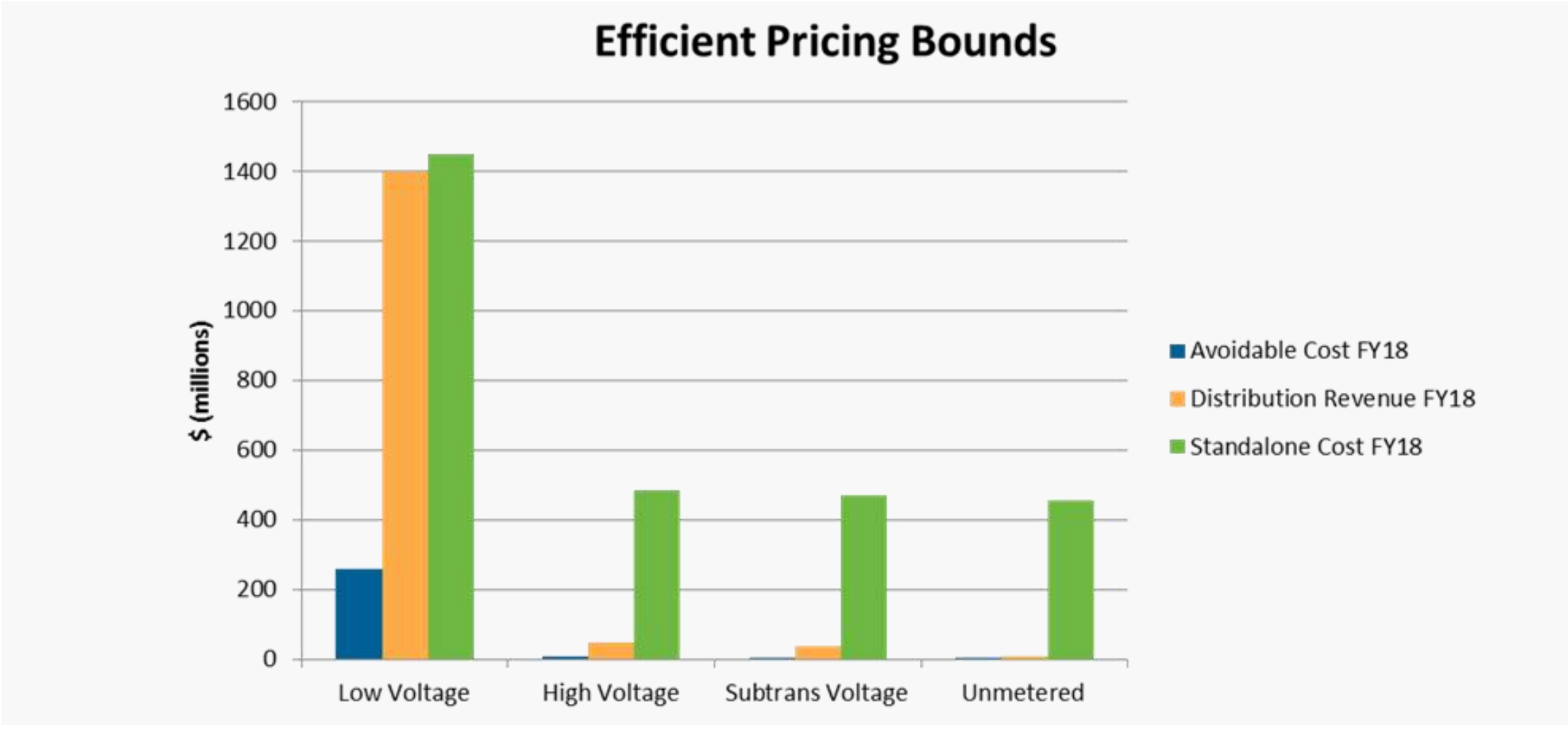


Figure 3

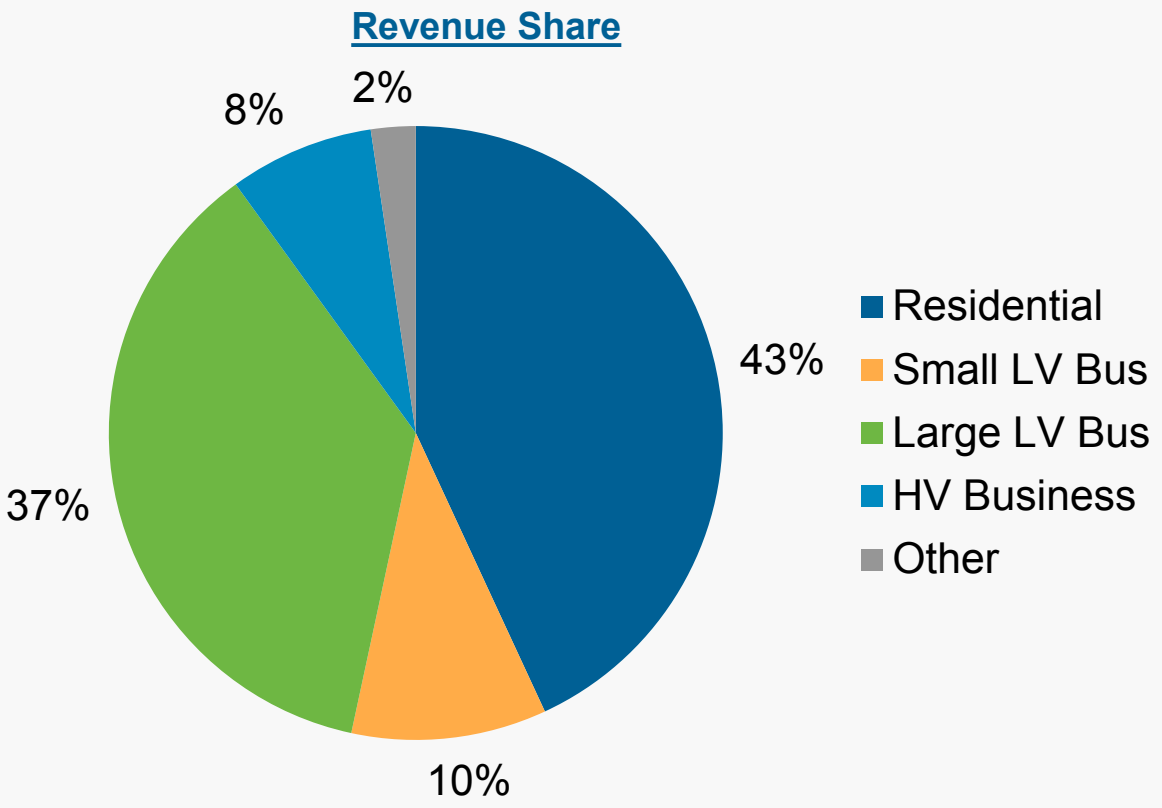


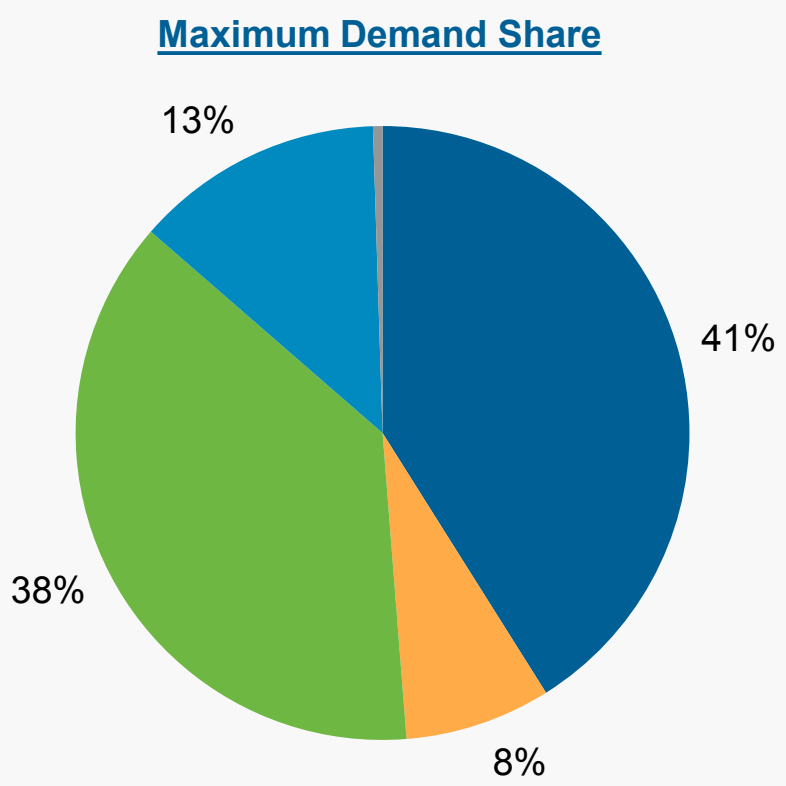
Standalone and avoidable costs in FY18



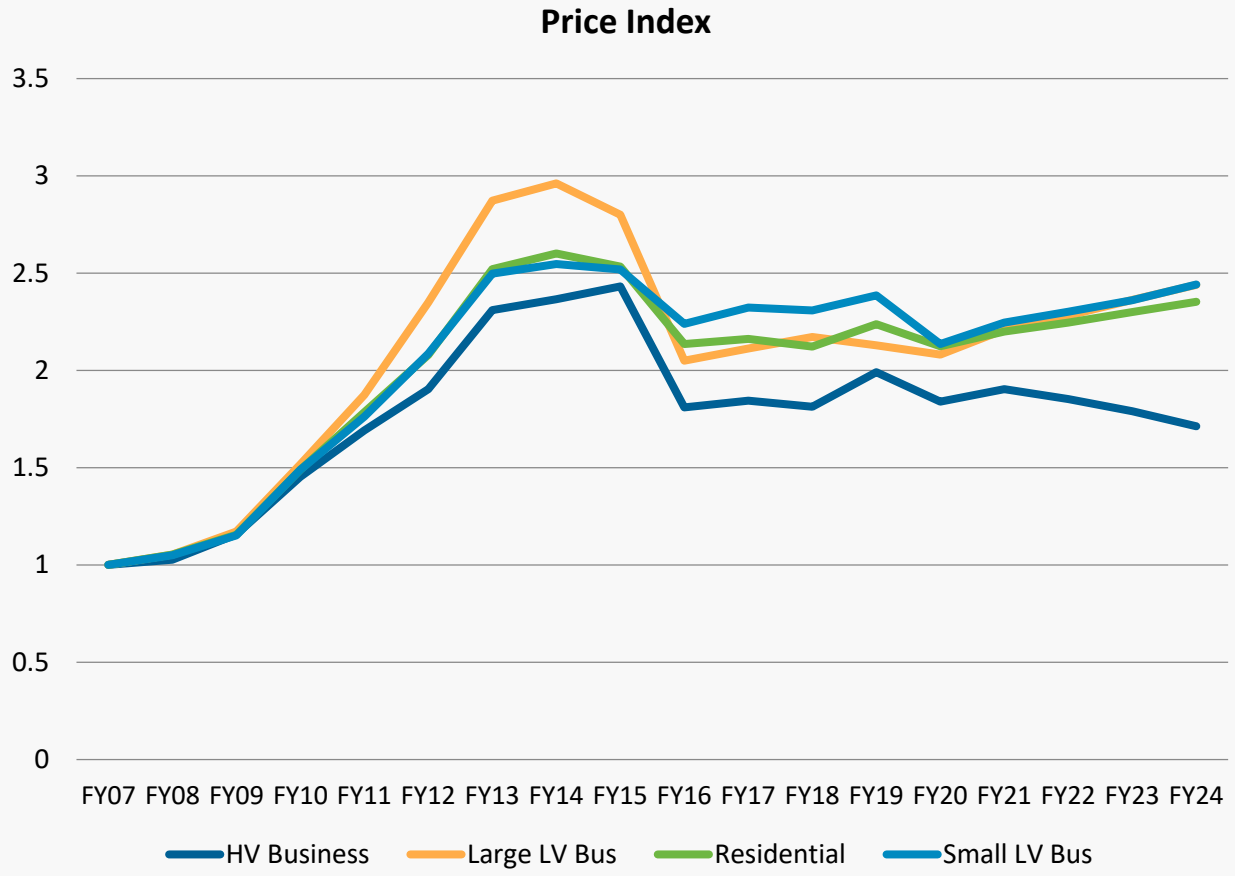
Ausgrid's approach to allocating residual costs

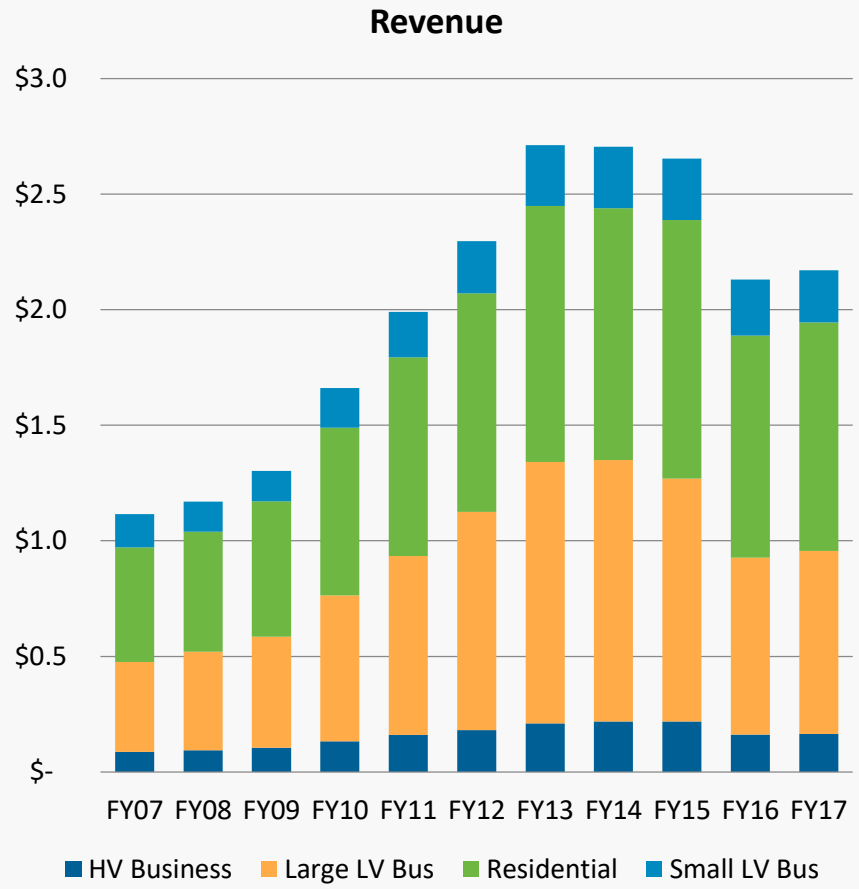
Recovery of costs and demand





Weighted Price Index by Customer Type





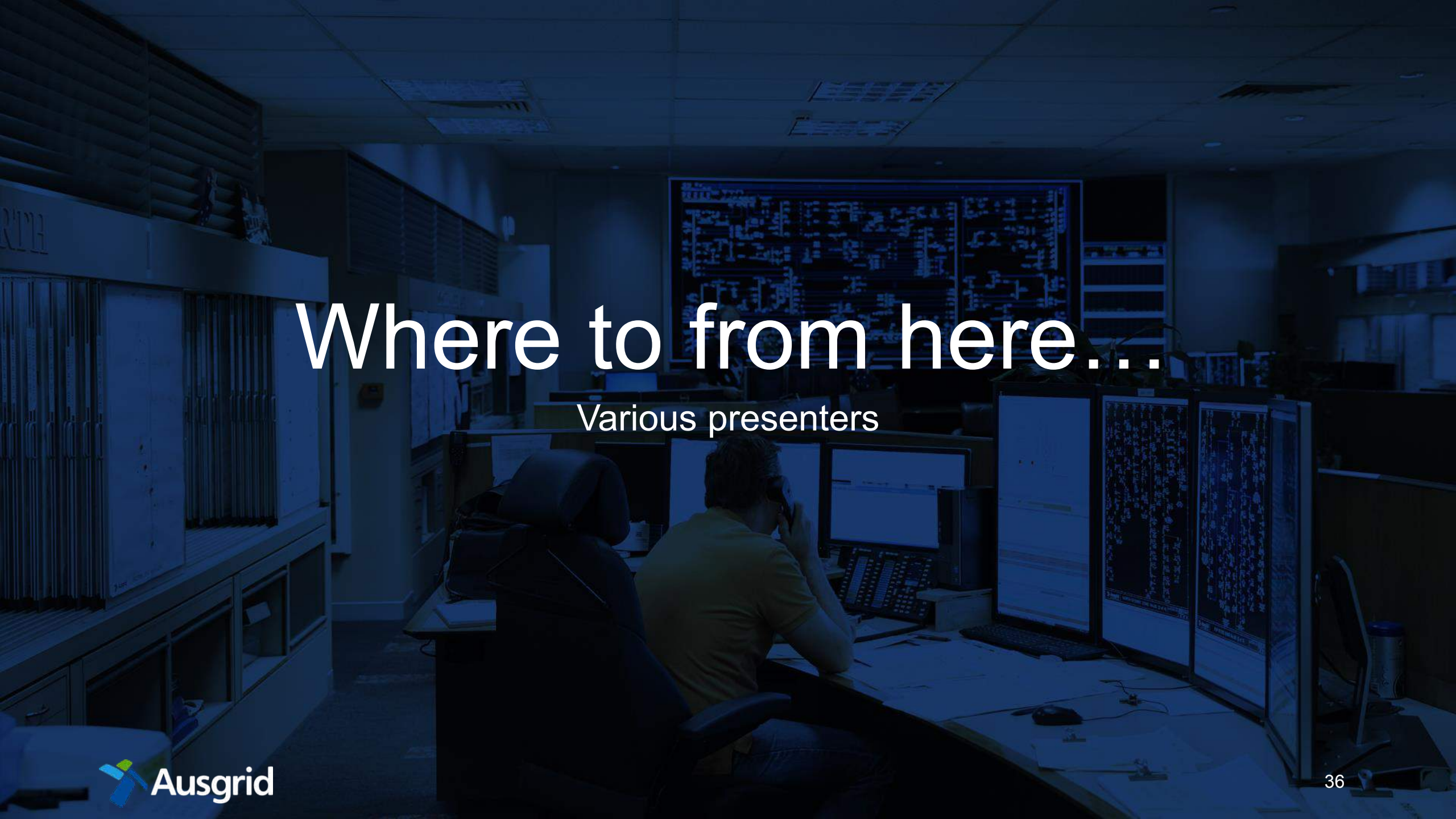
Other notable proposed reforms

1

A new TOU capacity tariff for residential and small business customers (15-40MWh)

2

Locational pricing for large business customers (CBD versus non-CBD)



Where to from here…

Various presenters

Ausgrid

Matters to be addressed

Our future focus

- Signalling forward looking costs
- Recovering residual costs
- Encouraging efficient investment in DER
- The speed of transition and end-point
- Customer trials, demand management and retailer collaboration, and Customer Education

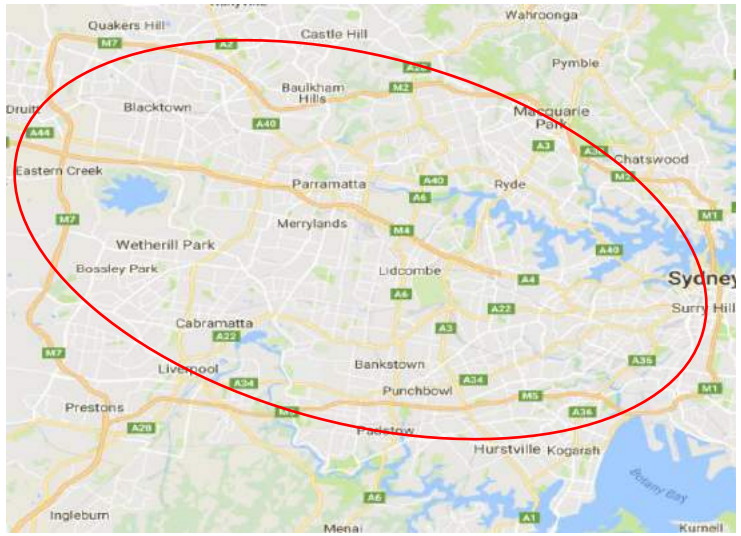
Forward looking costs

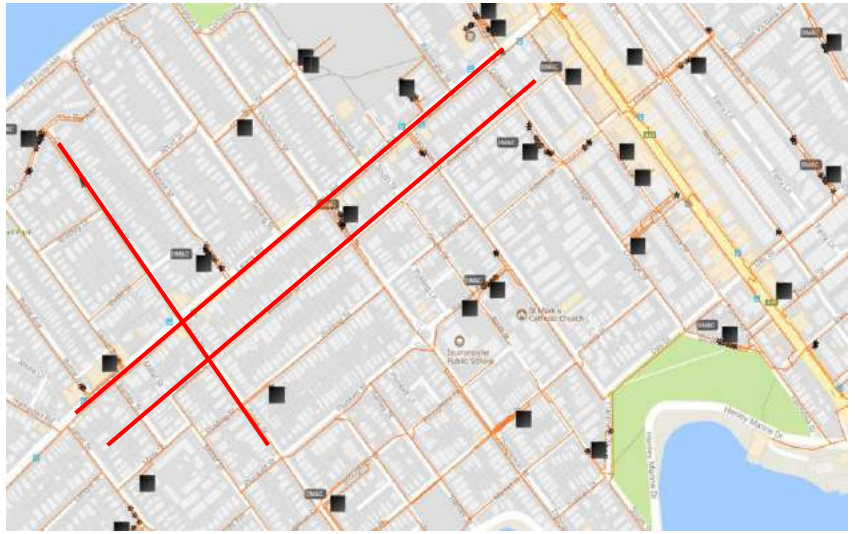
Infrastructure Analogies

Subtransmission Network

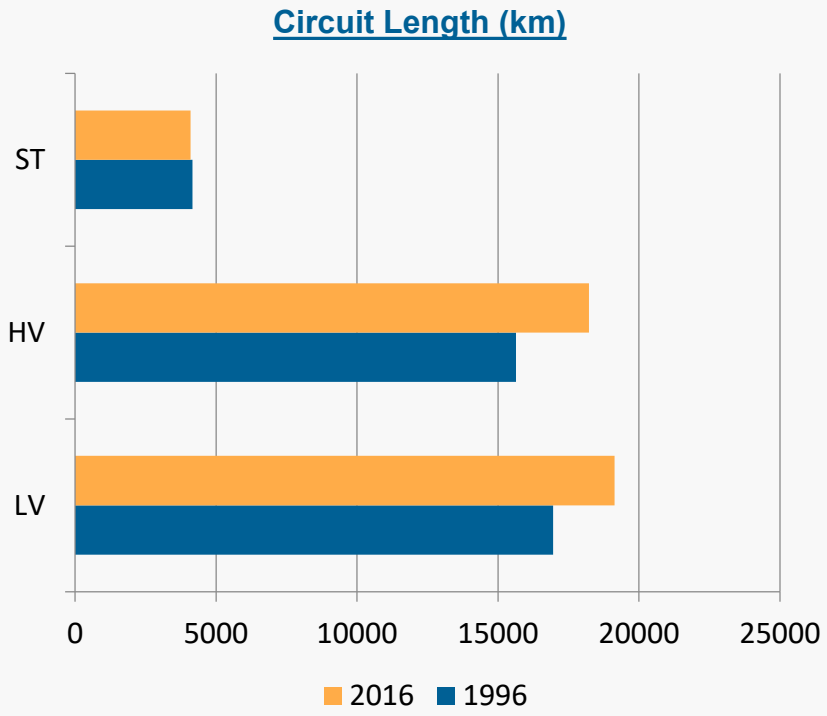
High Voltage Network

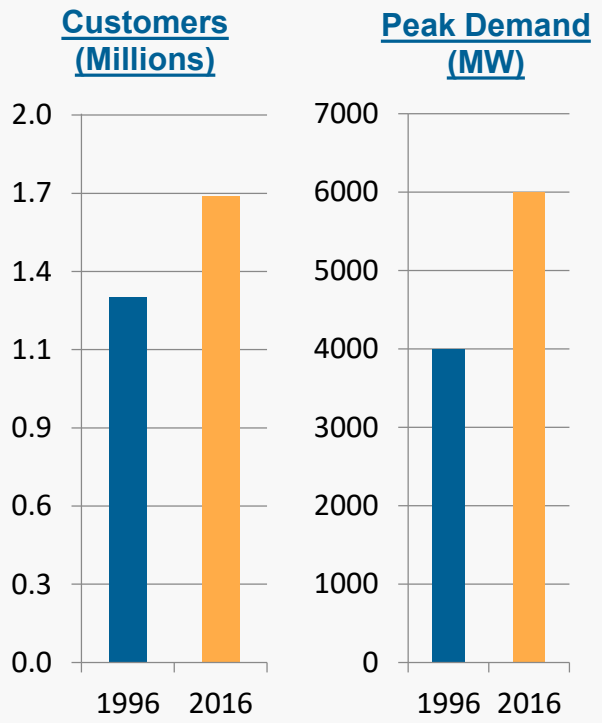
Low Voltage Network

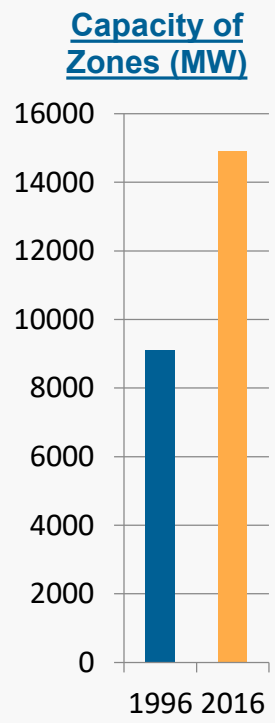


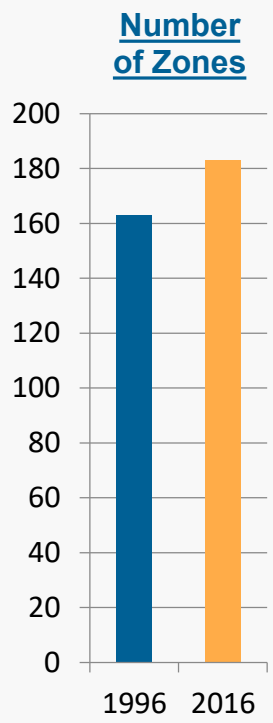


Evolution of the Ausgrid Network 1996 - 2016

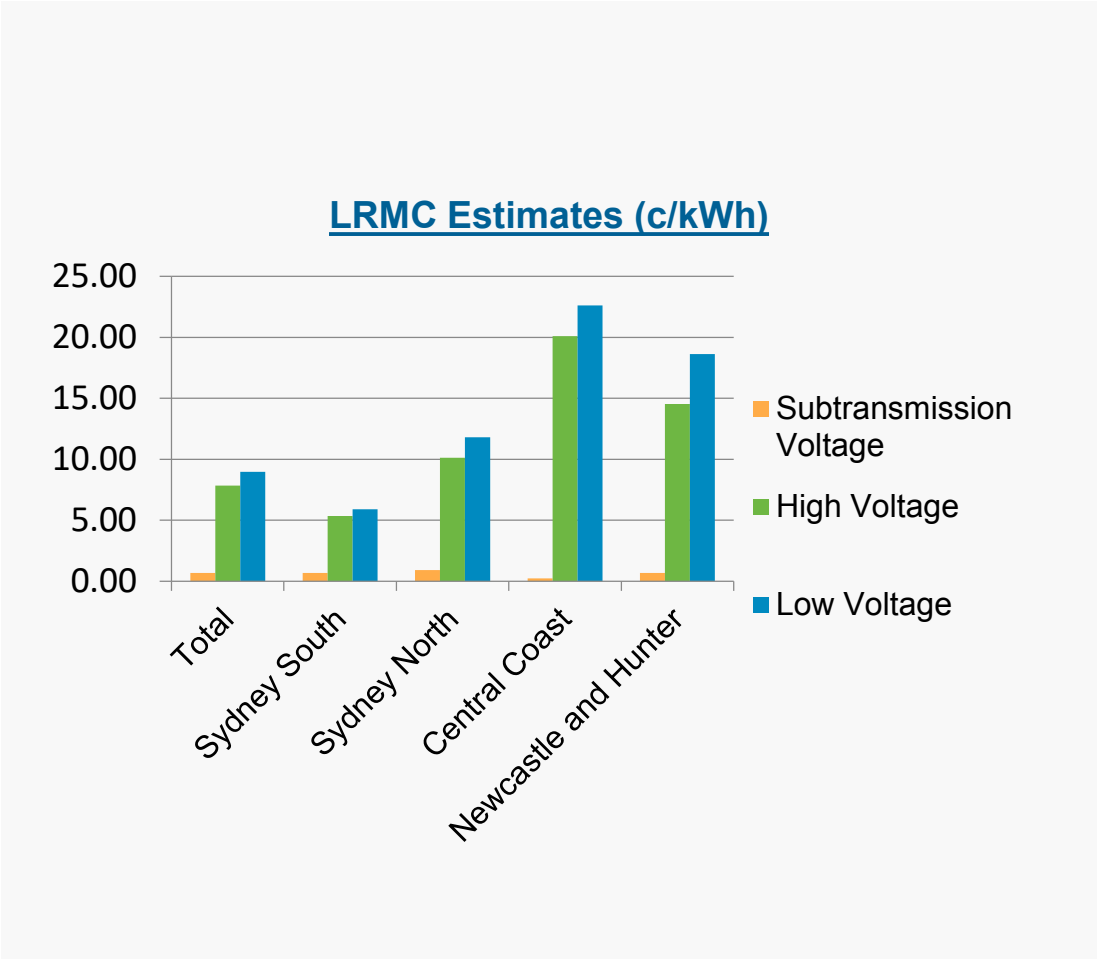


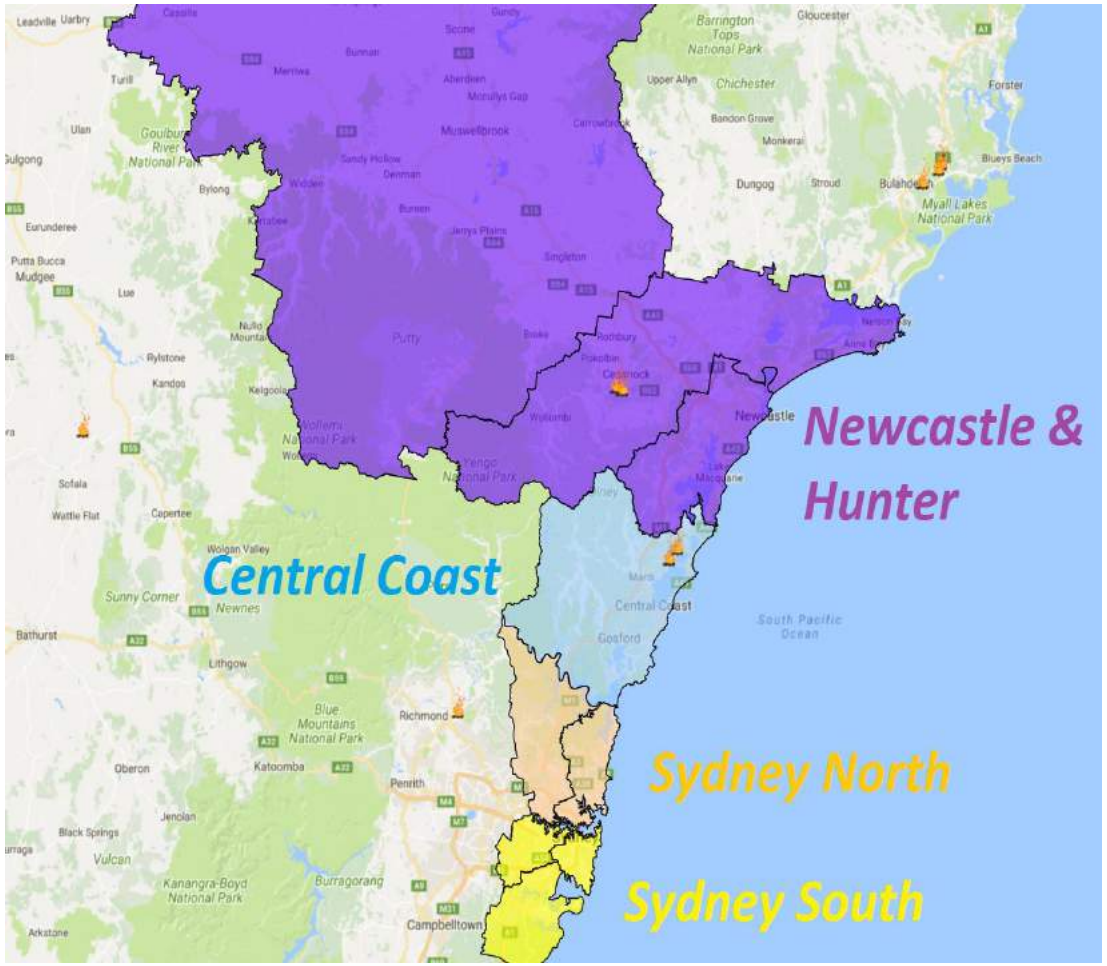






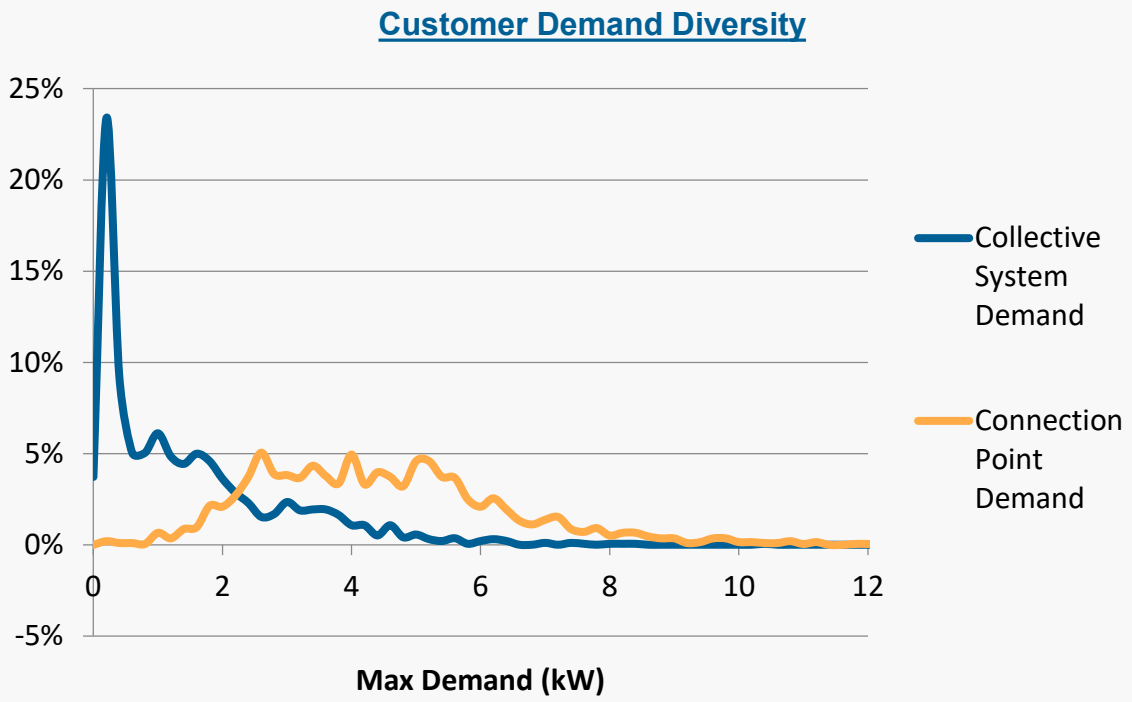
Regional LRMC Estimates





The appropriate price signal

Customer Demand Diversity



- Average Customer Max Demand at System Peak - 1.4kW
- Average Individual Customer Max Demand - 4.4kW
- Average Diversity ~ 0.3
- If this effect did not exist, i.e. all customers individual peak demands were coincident, the capacity of the grid would need to be x 3

$$Diversity = \frac{Individual\ Demand\ at\ System\ Peak}{Anytime\ Max\ Demand}$$

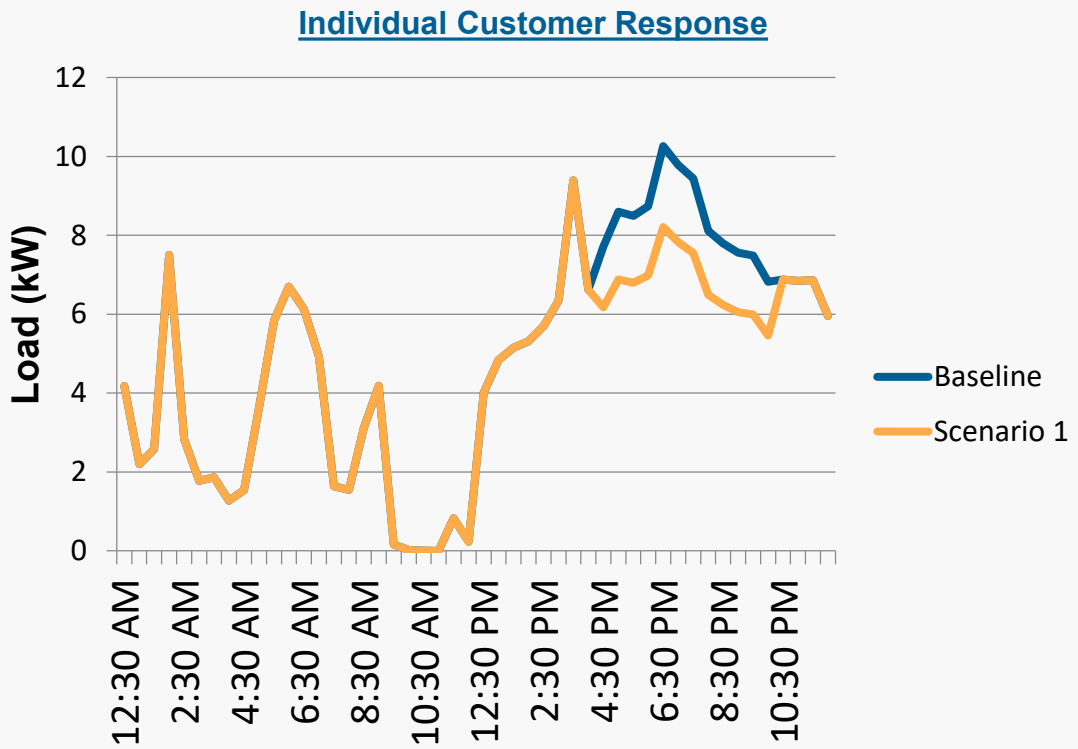
Demand Charge Scenarios

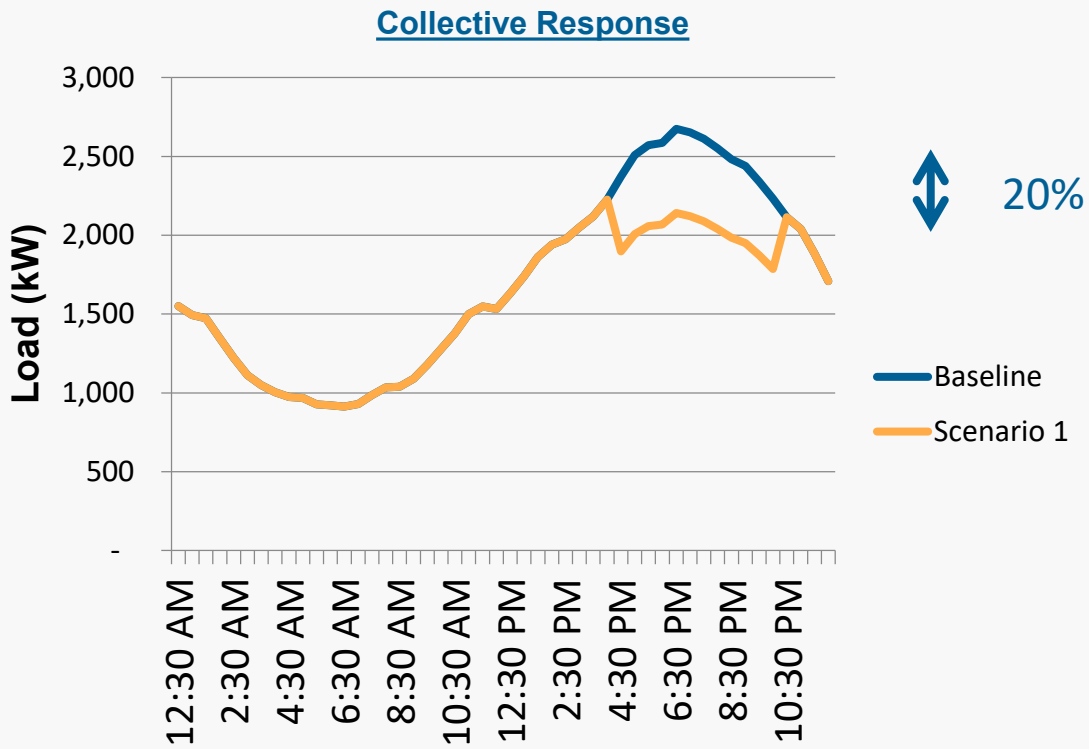
- 2000 residential customers (some with solar)
- Using 3 years of interval data
- Collective peak demand occurs on 11-Feb-2017
- Critical peak demand hours between 4:30PM and 10PM

Scenario 1	Scenario 2	Scenario 3
Each customer reduces critical peak energy by 20%.	Each customer reduces critical peak demand by 20%.	Each customer smooths critical peak demand.

Scenario 1: What if each customer reduces peak energy ?

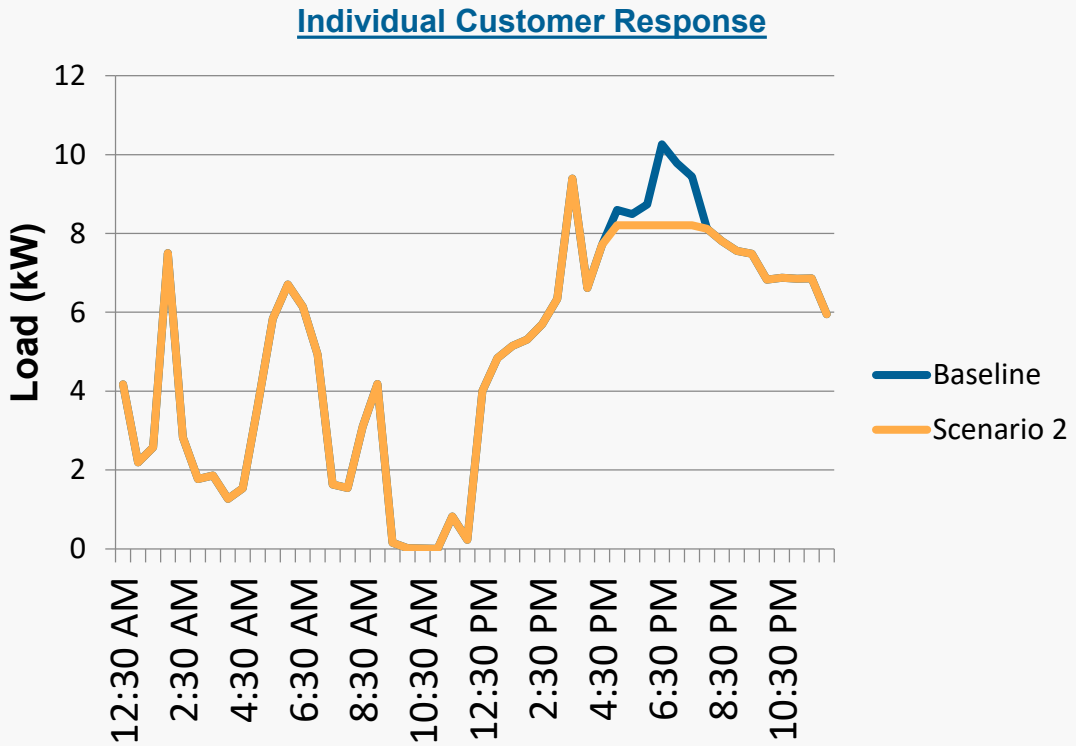
Scenario 1: Each customer reduces critical peak energy by 20%.

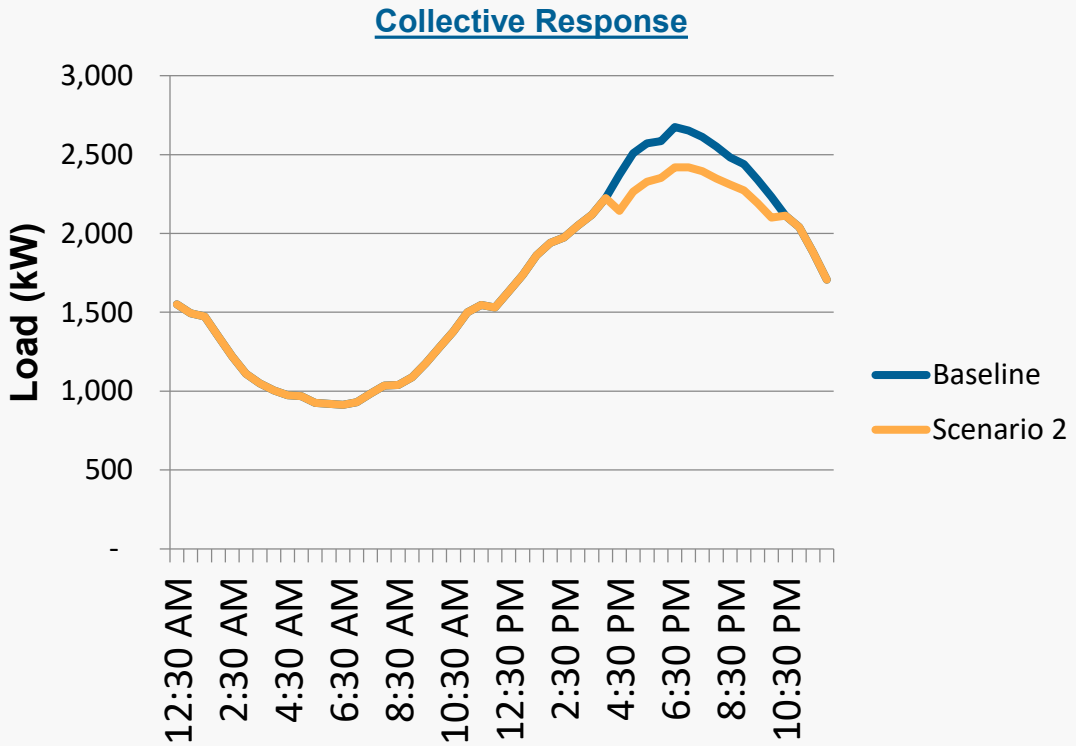




Scenario 2: What if each customer reduces peak demand ?

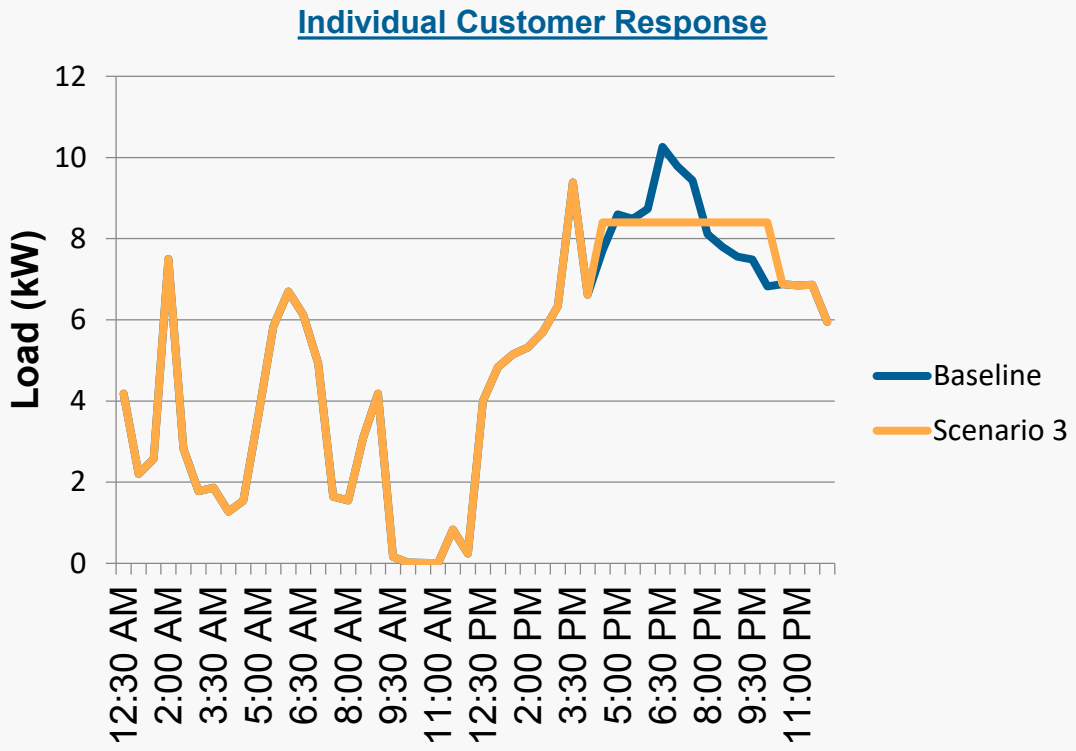
Scenario 2: Each customer reduces critical peak demand by 20%.

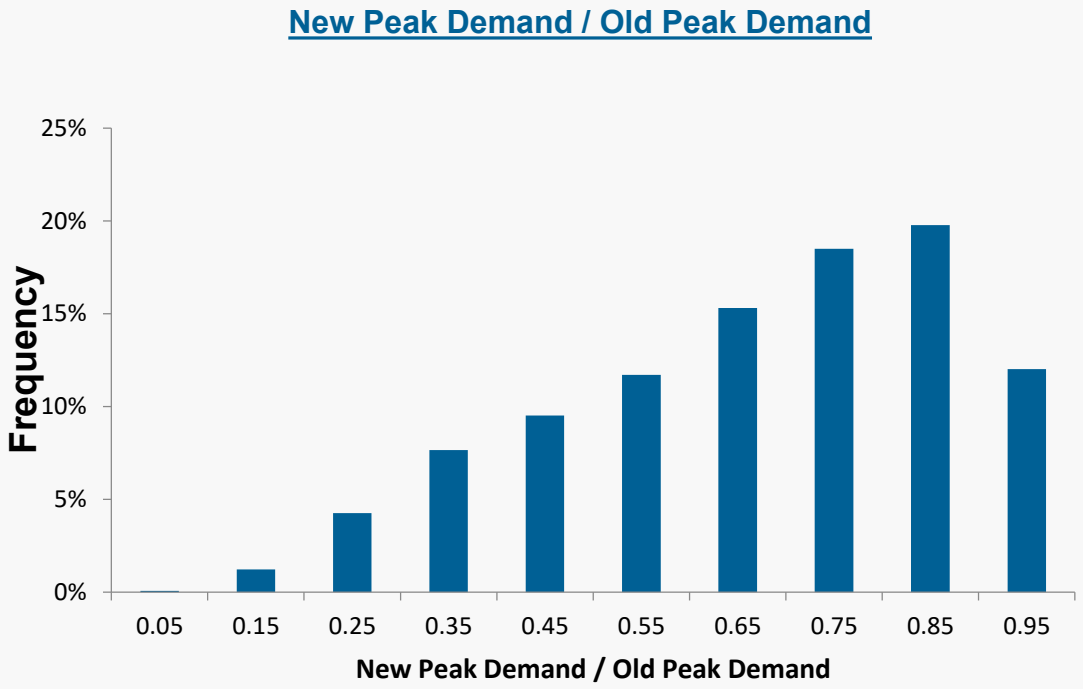




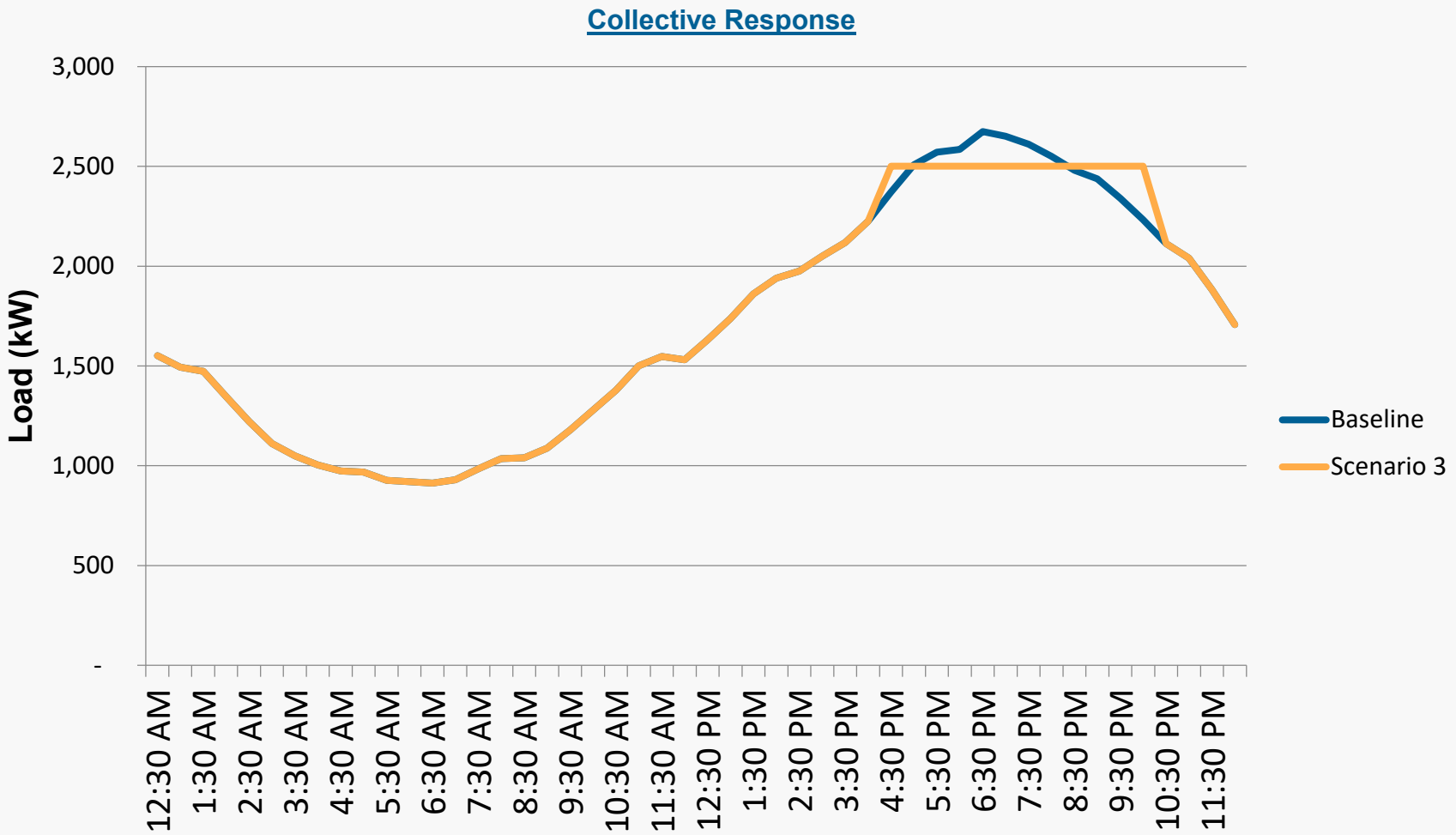
Scenario 3: What if each customer smooths peak demand ? (1/2)

Scenario 3: Each customer smooths critical peak demand.





Scenario 3: What if each customer smooths peak demand ? (2/2)

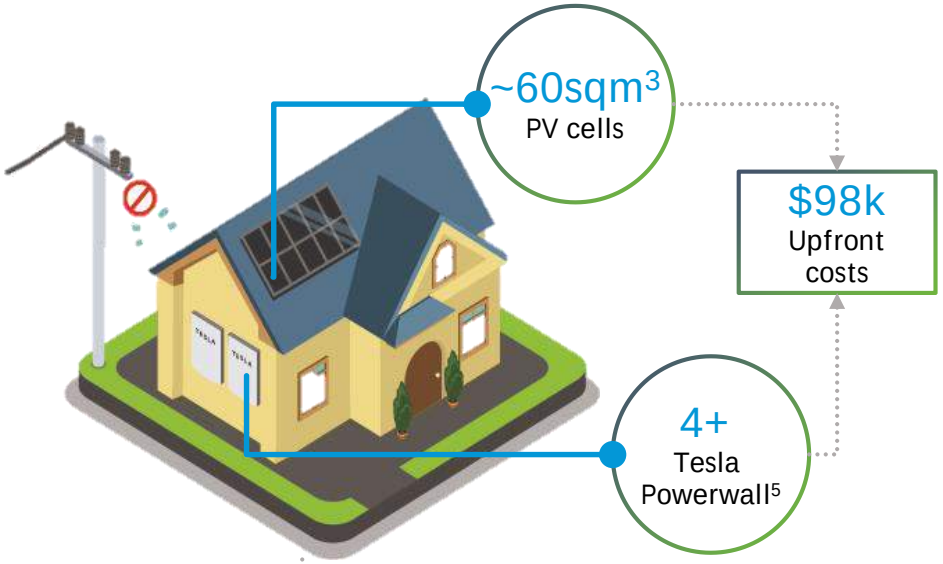


The recovery of residual costs

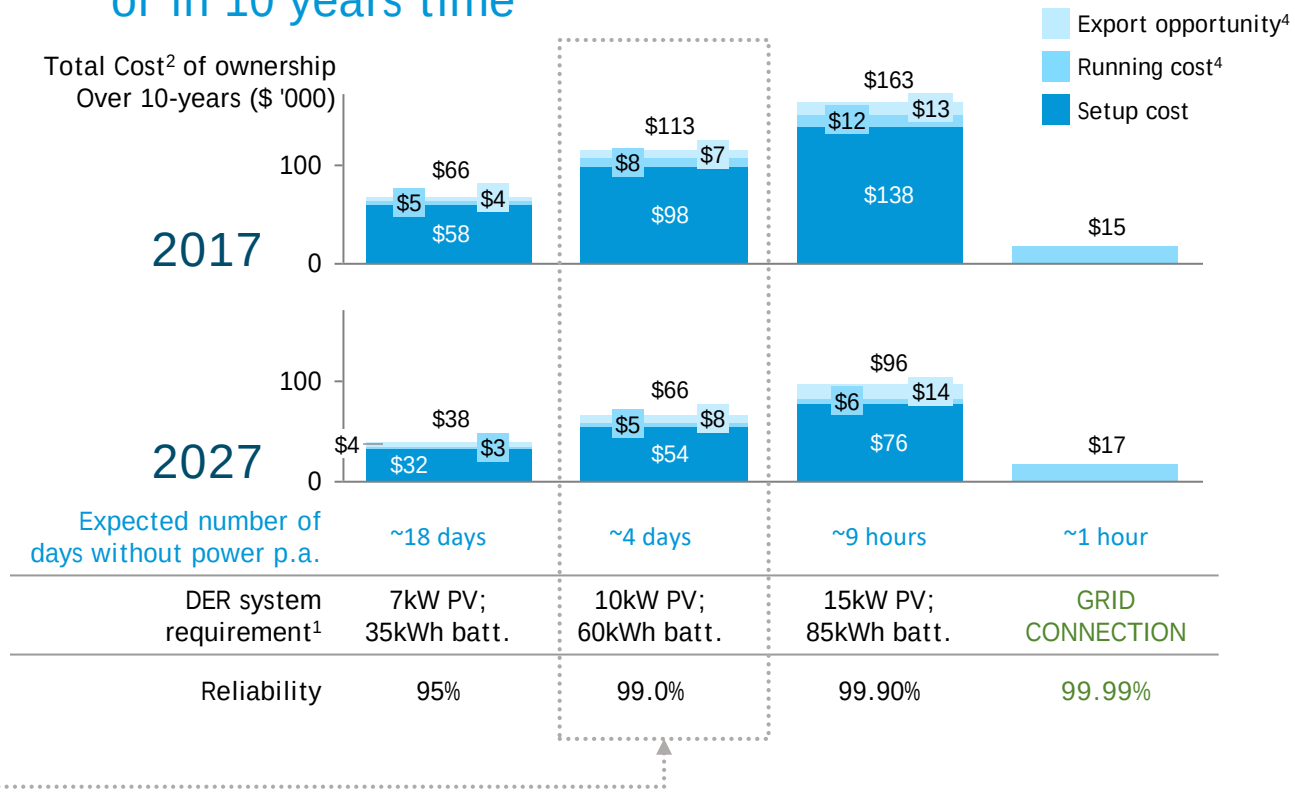
Encouraging efficient investment in DER

Lazard Report (1/3)

To go 'off-grid' without diesel backup requires significant upfront investment and roof space



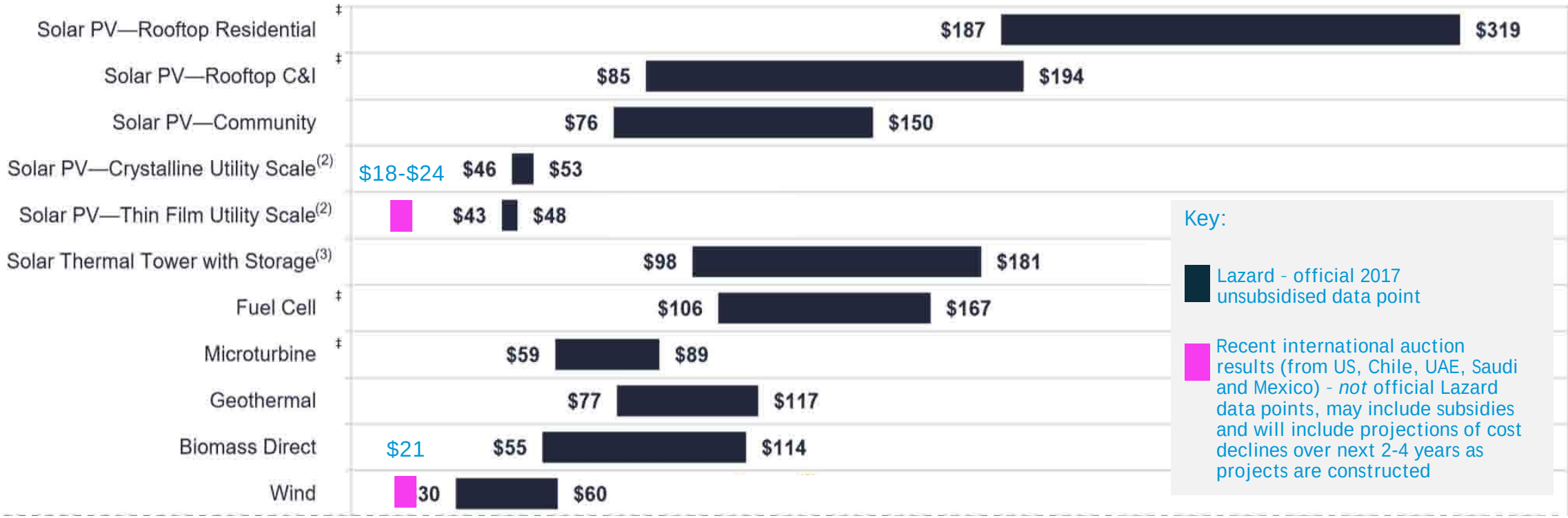
This does not stack up against grid supply, now or in 10 years time



1. Based on Grattan Institute's : System size "Sundown, Sunrise" report (Grattan Institute, May 2015) 2. Assumes $17k costs for 10kW PV and $1.4k/kWh battery based on SolarChoice Dec 2017 price indices 3. Assumes 6m^2 solar panel required for each kW of PV and 13kWh capacity assumed for Tesla Powerwall. 4. 10-years running cost and missed export opportunity discounted to present value at 4% discount rate. Note: Modelled data assumes 15.7kWh average daily household consumption. Source: Grattan Institute; Tesla; SolarChoice; Ausgrid data

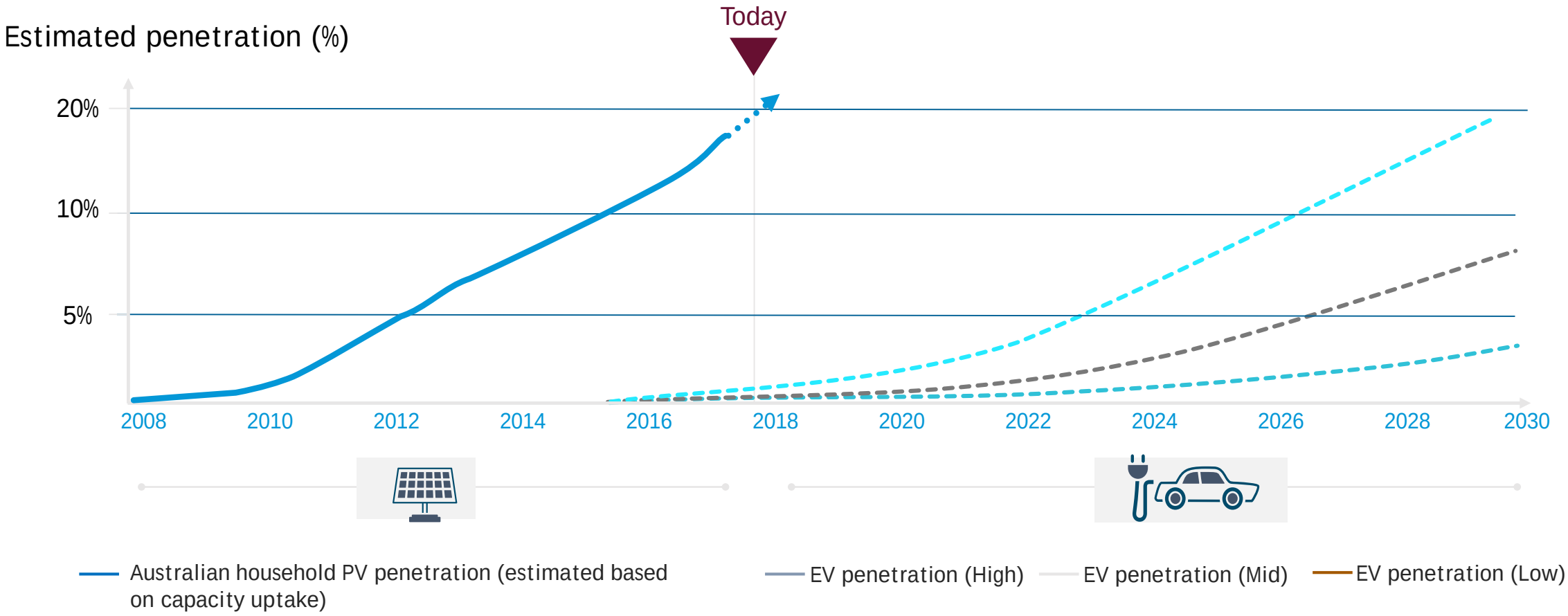
Lazard Report (2/3)

Unsubsidized Levelized Cost of Energy Comparison (2017, USD $/MWh)



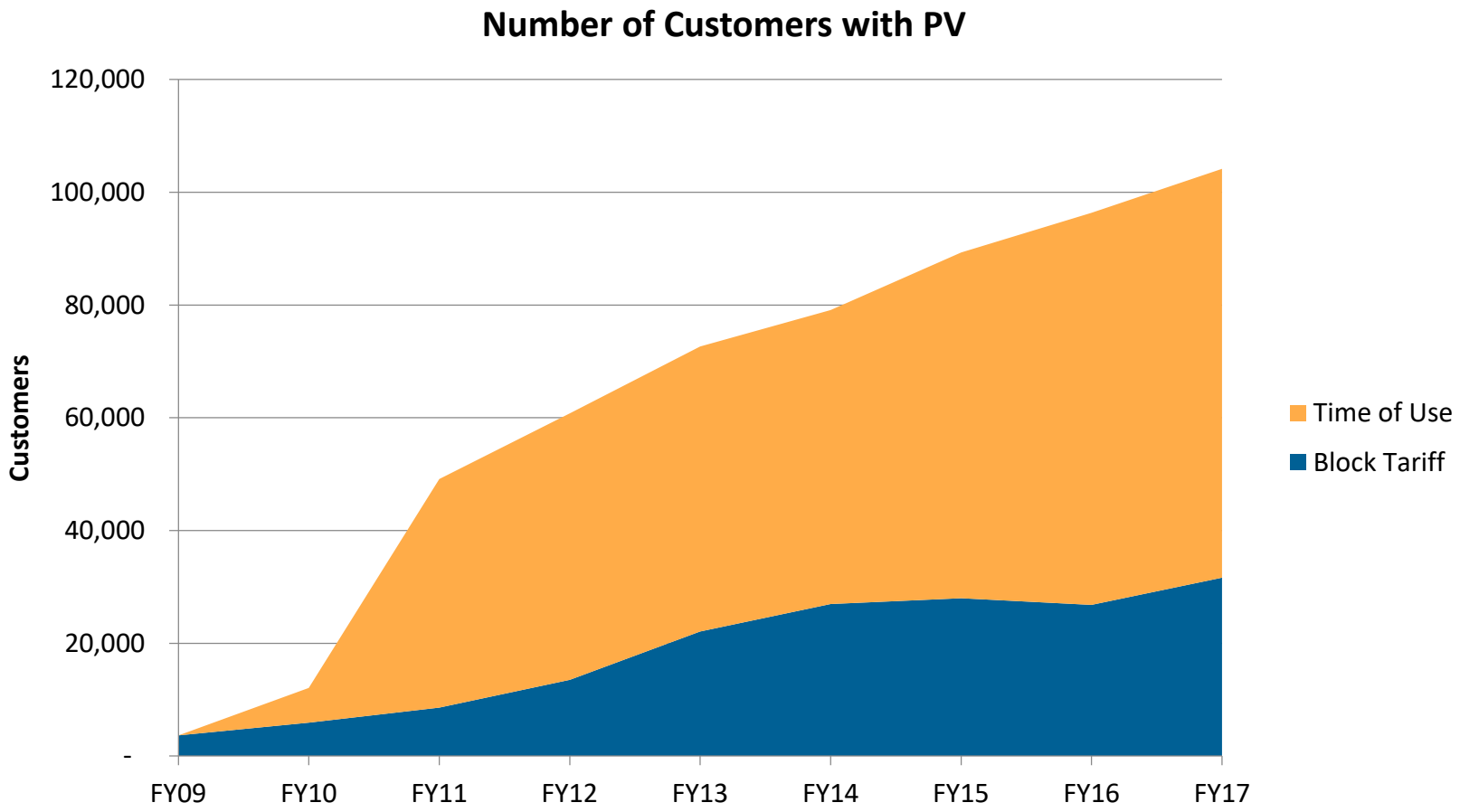
1. Source: Lazard - https://www.lazard.com/media/450337/lazard-levelized-cost-of-energy-version-110.pdf

Lazard Report (3/3)

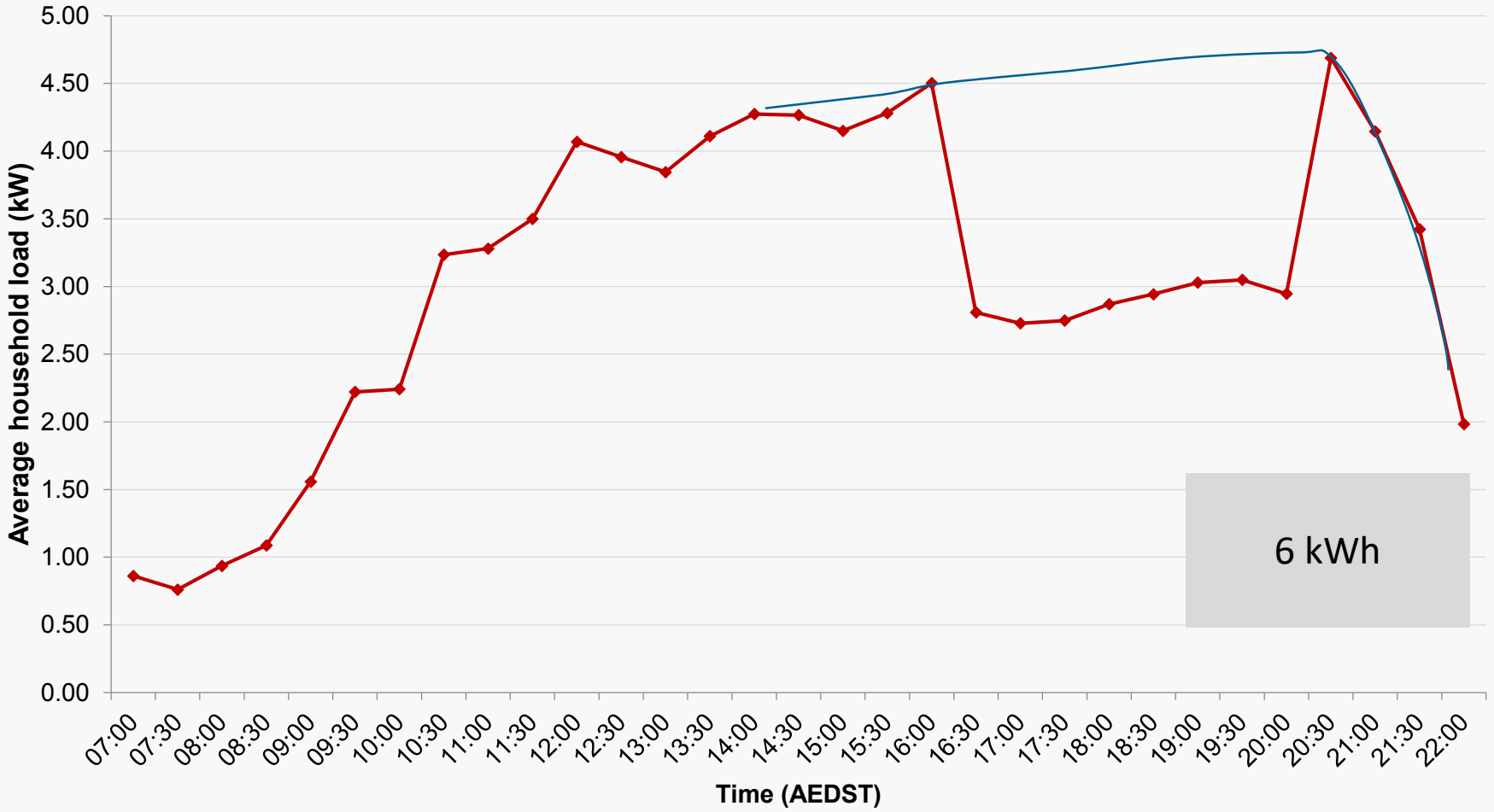


Source: APVI, AEMO Insights - Electric Vehicles, Aug 2016 (# vehicles), team analysis

Assignment and re-assignment of customers

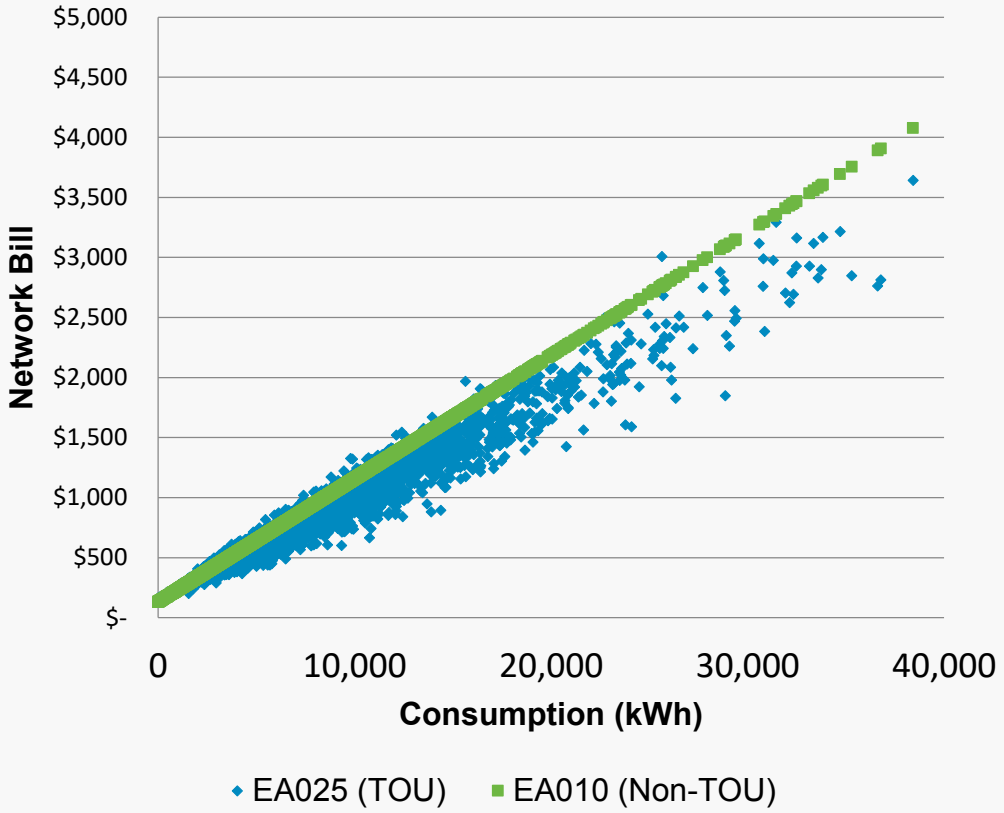


Customer trials and demand management

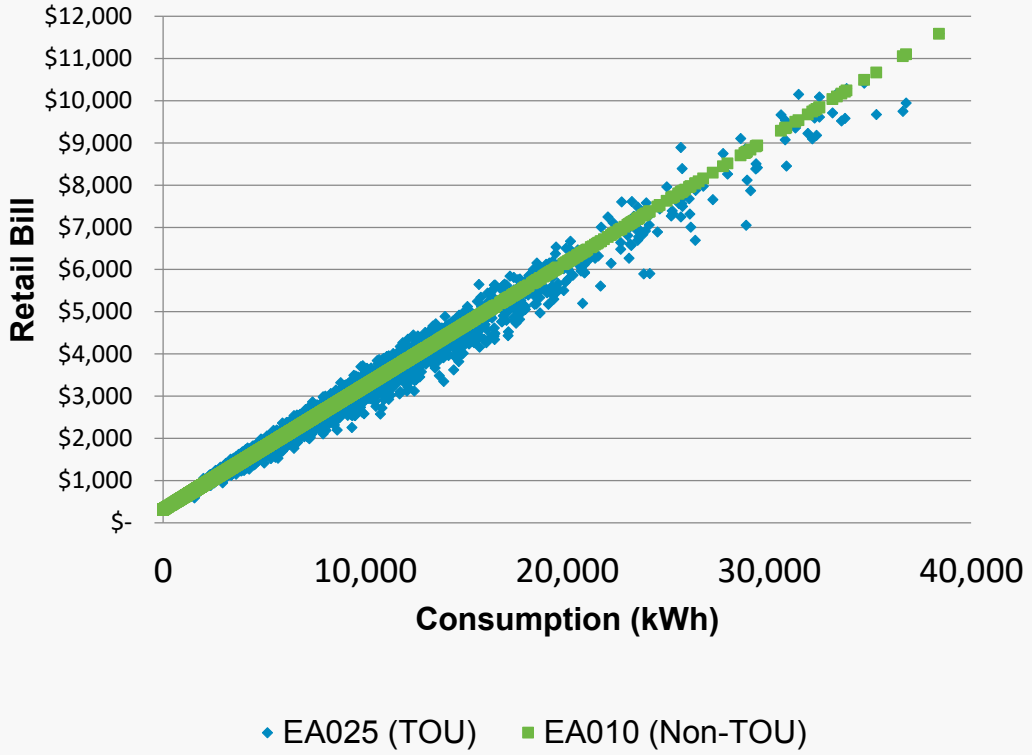


The need to work with retailers

Annual Network Bill Impact for Residential Customers (FY18)



Annual Retail Bill Impact for Residential Customers (FY18)



The end-point and the speed of transition

A collaborative research plan and customer engagement

Robert Amphlett-Lewis

Ausgrid

Thank you

8.8

Opex Deep Dive
23 February 2018

Opex

Stakeholder Engagement Deep Dive
Regulatory Proposal – 2019-2024

23 February 2018

Ausgrid

Opex - Agenda

1. **Our opex forecast**
   a. The objective of our opex strategy is to deliver an efficient opex program, keeping network bills affordable without compromising safety or reliability
   b. We are embedding $100M p.a. of operating cost savings, benefiting each customers by an average of $79 a year

2. **Overview of our opex proposal**
   a. Performance from 2014-2019 and projection to 2024
   b. Outcomes we will deliver in 2019-24

3. **Our approach to forecast opex**
   a. Base - Step - Trend approach
   b. Components of our opex forecast
   c. Our base year opex
   d. Our proposed step changes
   e. Trend adjustments

Opex questions captured from earlier consultation

The following points were made at the opening stakeholder consultation session:

1. More detail is required on the revealed cost model. Specifically, Ausgrid needs to explain anything over and above the opex revealed cost model

2. Why is Ausgrid's opex increasing?

3. How does Ausgrid's approach to opex compare to Endeavour and Essential's approaches?

4. The AER's labour productivity number – used by Ausgrid – needs to be further investigated

5. Data appears to indicate that the Ausgrid 'efficiency journey' is over – is there an end point? What is driving net CPI increases over the period?

6. It appears that the preference is for EBSS rather than driving efficiency in the regulatory proposal – is this correct?

Our opex forecast

The objective of our opex strategy is to keep network bills affordable without compromising safety or reliability

Proposal

- **Base year opex of $440.2m** forecast in FY19, in line with industry best practice
- $100m lower than baseline opex in FY13, **benefits each customer by an average of $79 a year**
- Forecast opex for 2019-24 is **$2.4 billion** (real, FY19), **$0.5 billion less** than we expected to spend in the 2014-19 period

Reasons for expenditure

- Inspect and maintain our network to ensure it is **safe** in line with our safety and reliability obligations
- **Respond** to emergencies and **restore** power as soon as possible
- Deliver corporate support which includes keeping business systems and IT running smoothly

Counterfactual

If we do not spend on operating expenditure, the risk increases that:

- We cannot meet our safety and reliability obligations
- Delays occur in responding to emergencies and restoring power to customers after outages

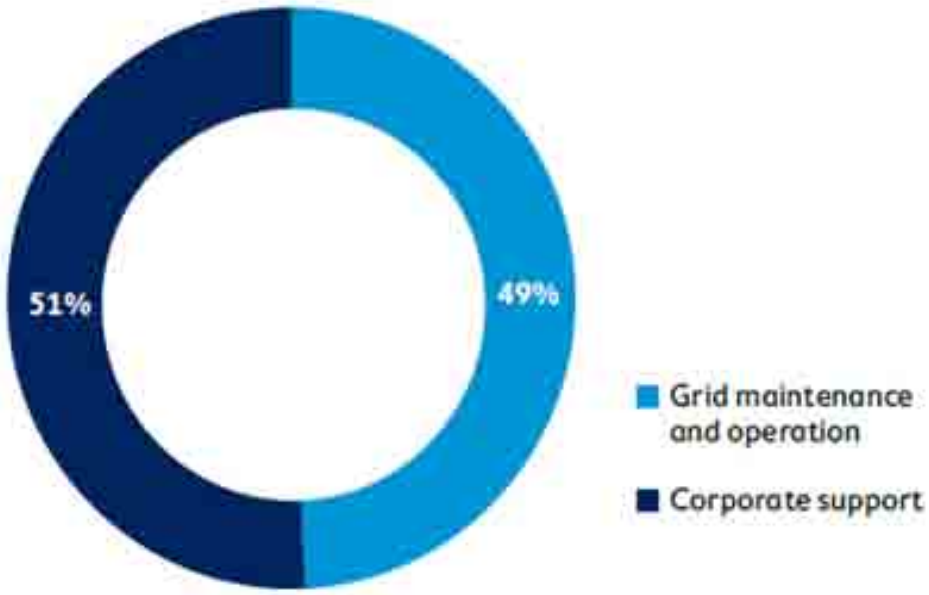
Impact on pricing

- Opex has a direct impact on our prices. It makes up around a third of the annual revenue we recover from customers.
- Our proposed opex represents an average of $267 per customer per year.

Our base year opex is $440.2 million (real, FY19)

Embedding $100M p.a. of operating cost savings in our forecasts, benefiting each customers by $79 a year

Forecast opex by program ($m, real 2019)



Grid Maintenance and operation	
Maintenance	Inspecting our networks to ensure consumers, the public and our employees are safe
Network Support	Running the network control centre, planning, talking to customers and responding to emergencies
Corporate Support	
ICT	Running the many IT and telecommunication technologies and systems required to manage our large network
Corporate support	Covering management, human resources, finance, our fleet of vehicles, insurance etc.
Property	Including land tax and building maintenance

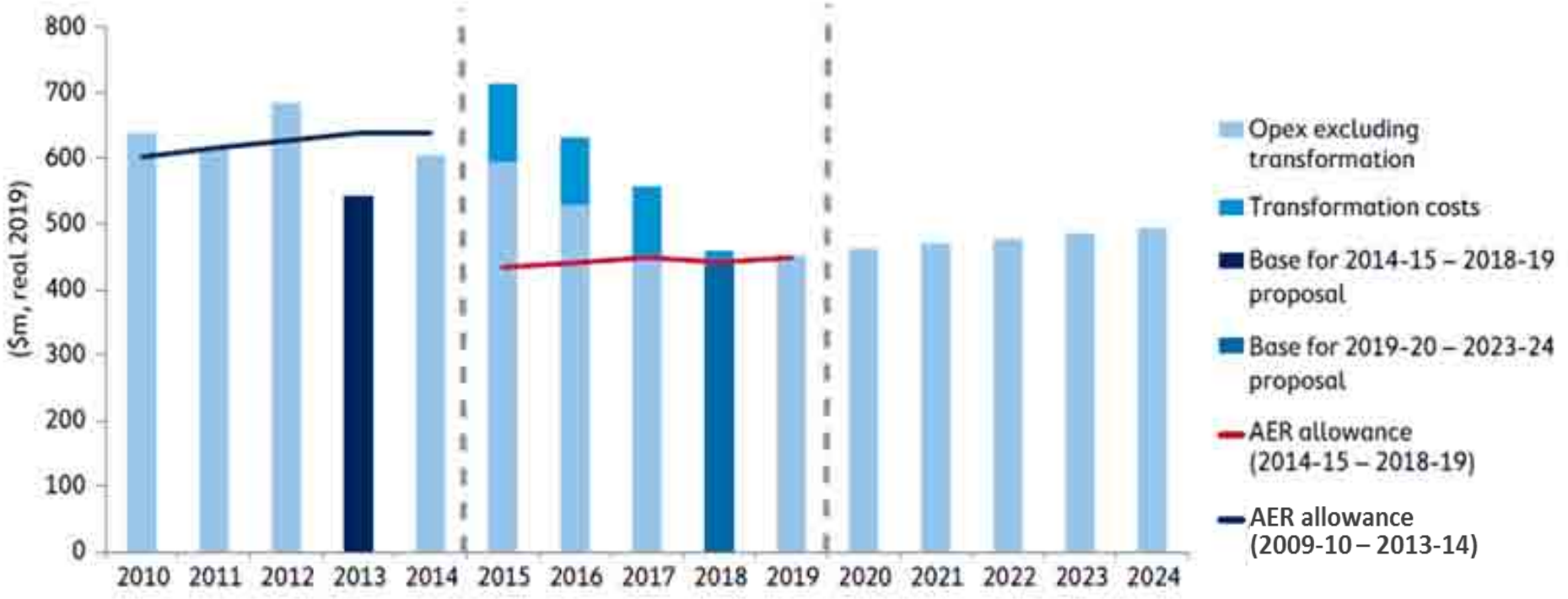
We are proposing a base year of **$440.2 million** ($2018/19).

This figure is in line with the AER's allowance for 2017/18, and industry best practice.

Our opex performance from 2014-2019 and projection to 2024

Affordability is a key issue for our customers and a key focus for Ausgrid

Actual and expected opex 2009-10 to 2023-24 (in real FY19 terms)



We have invested **$330m in right-sizing our operations.**

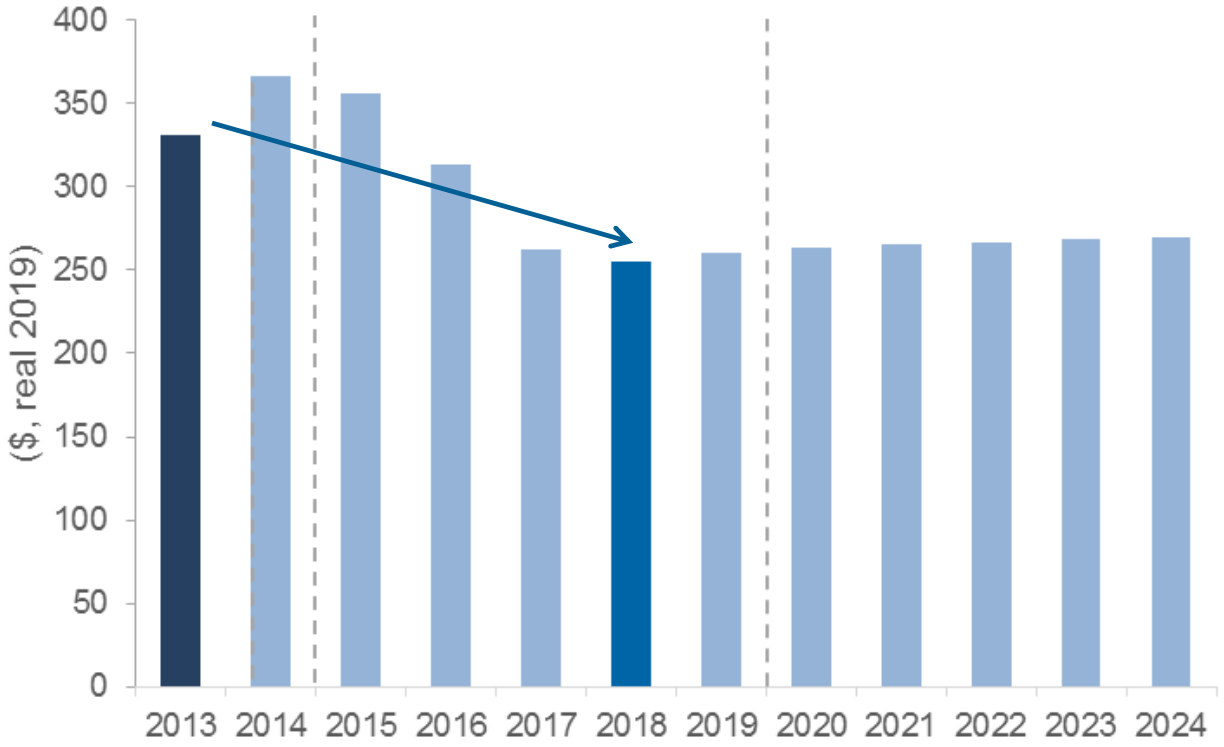
Compared to our last proposal, we have **reduced our operating cost base by over $100m or 19%**.

Every dollar spent on our transformation program will deliver 5 dollars of opex savings to customers.

Customer outcomes

Our reduction in our operating cost base has delivered an average $79 saving a year to each customer

Actual and expected opex per customer (excluding transformation costs) 2012-13 to 2023-24 (in real FY19 terms)



In addition to focusing on affordability and sustainability **we are taking initiatives to deliver improved customer value** within our opex allowance:

- We have changed our working practices for vegetation management in response to customer feedback. Our new approach of more frequent, less severe tree trimming will not cost more in opex, but it delivers increased customer value through increased aesthetics in suburban areas.
- We are implementing an advanced data analytics system (ADMS) to enable Ausgrid to take advantage of future industry and technological developments to better serve our customers by enabling the modern grid and improving real-time identification of outages
- We are increasing our focus on education, developing a strategy to better engage with our CALD customers and revamping our Energy Literacy material to identify and address any gaps and to make information easier to access and understand. We will do this without seeking an addition to our opex allowance to recover the extra costs.

Opex overview

Outcomes we will deliver in 2019-24

1

Affordable

- We have significantly changed our business during the last regulatory period
- Our proposed opex locks in the **ongoing saving of $100 million a year** we have made
- We will maintain our new lower operating cost base to lock in the savings we have made going forward

2

Efficient

- Our transformation program during the current regulatory program has created **a sustainable future operating cost base**
- Our current opex is **consistent with best practice within our industry**, and is in line with the AER's allowance for 2017/18
- Customer affordability concerns and the strength of the AER's incentive framework give us **strong financial incentives to continually improve to provide greater customer value**

3

Reliable

- Although we plan to spend significantly less than historic levels, **we will not compromise safety or reliability**
- We will maintain reliability and improve safety performance where we are able to do so.

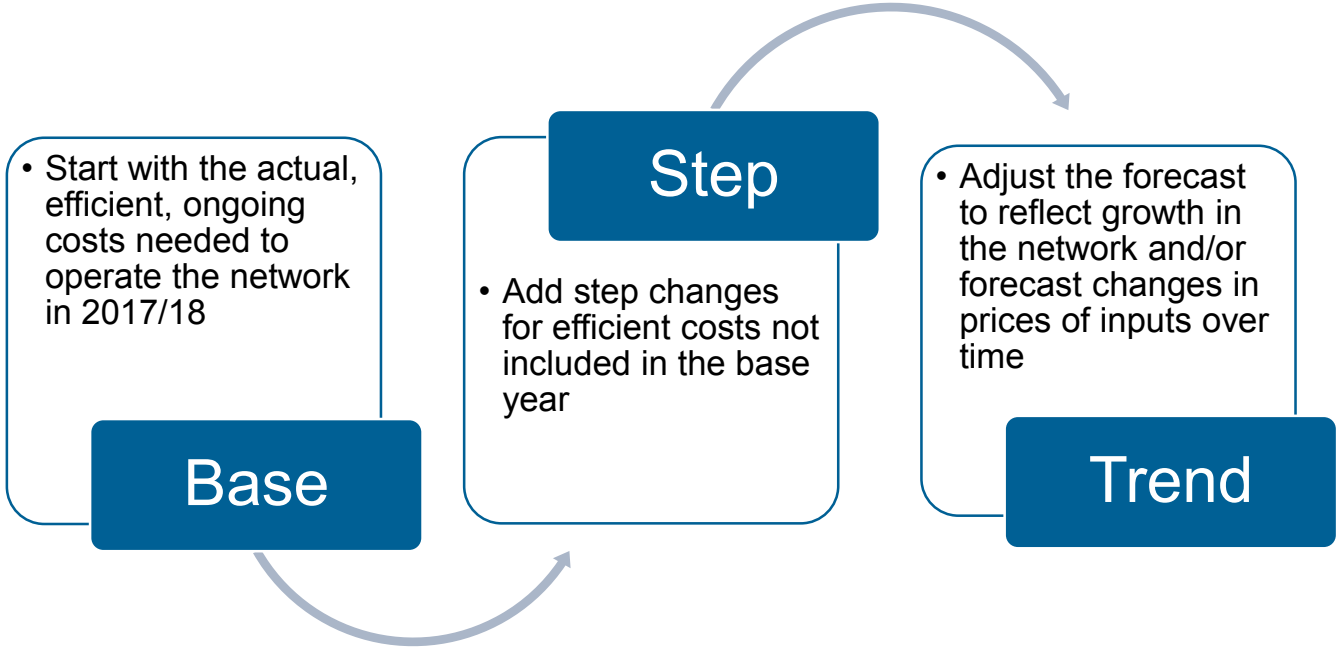
We forecast our opex using the base-step-trend approach

Opex funds the day-to-day operations needed to keep power flowing to our 1.7 million customers

Our opex forecast:

- Is calculated using the **AER's preferred base-step-trend methodology**.
- Determines the total opex allowance, rather than forecasting an amount for each category of operating expenditure.
- Embeds the **significant and sustainable cost decreases** achieved through our transformation program in the base year.
- **Reflects changes in opex over time** from growth in the size of our network, customer numbers and forecast price increases for wages, materials and suppliers.
- Supports a **return to using past expenditure (revealed costs) to help inform forecast opex**, and the application of the AER's Efficiency Benefit Sharing Scheme (EBSS) in the next period.

We follow a Base/Step/Trend forecasting approach



The EBSS will give us the incentive to pursue further efficiency gains in opex and to share any efficiency gains with our customers.

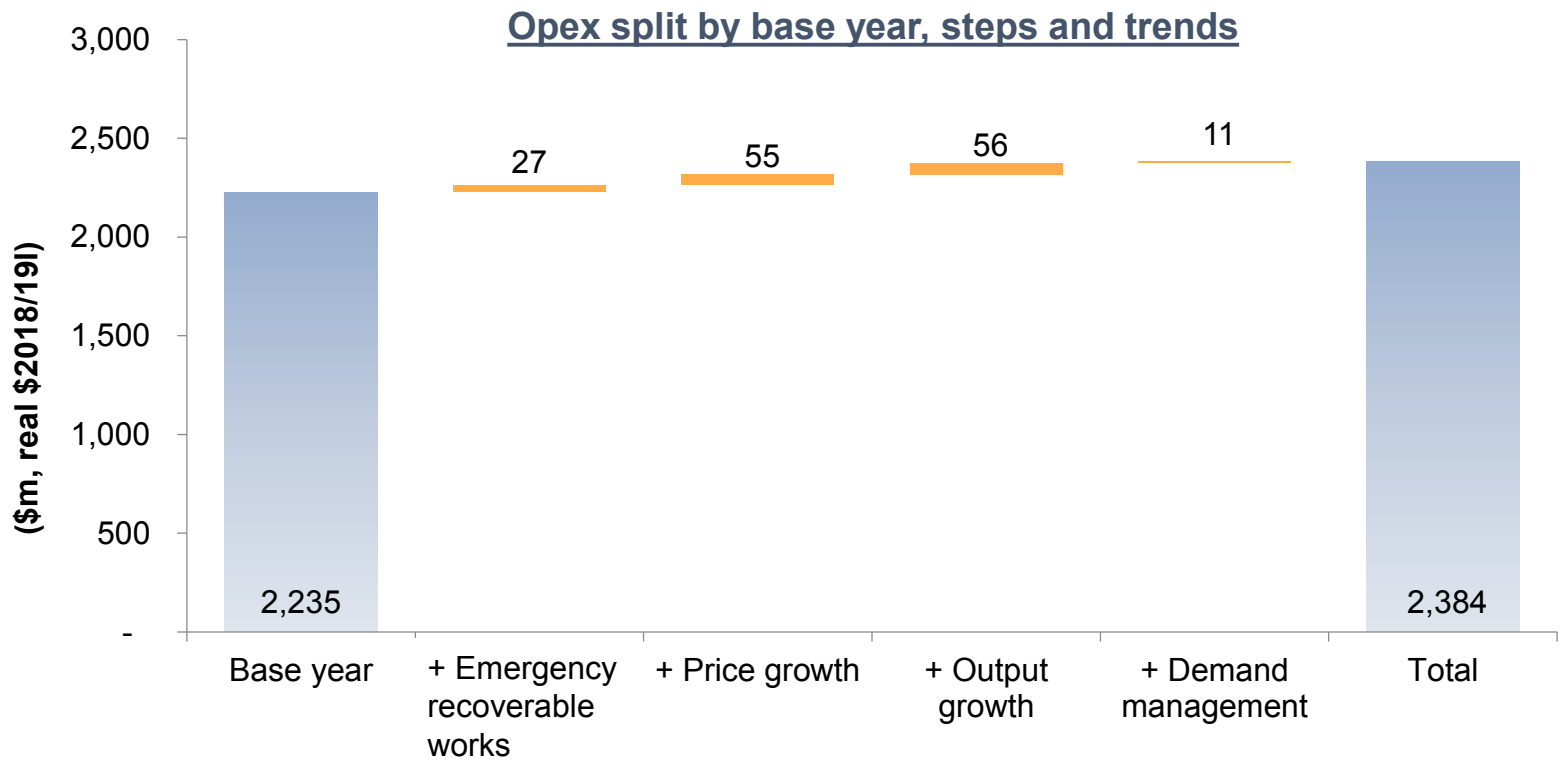
Breakdown of our opex forecast

Details of the Ausgrid opex framework

Opex component	Amount	Forecast Approach
Base year opex	$440.2 million ($2018/19)	This is in line with the AER's allowance for 2017/18 and represents a $100m savings from base year opex in 2012/13.
Step change: Emergency recoverable works	$5.4 million p.a. ($2018/19)	Aligns with the 'change in regulatory obligation' category in the AER's expenditure forecasting guideline for step changes. This cost was previously recovered as an unregulated service. The change in classification increases our allowance, but does not materially affect the amount paid by customers.
Step change: Demand management	$2 million p.a. ($2018/19)	Aligns with the 'capex-opex' trade-off category in the AER's expenditure forecasting guideline for step changes.
Trend: Real price growth	Confidential until EBA negotiations are finalised	Applied labour real price growth as estimated by BIS Oxford Economics Applied no non-labour real price growth, which is consistent with the approach used previously by the AER.
Trend: Output growth	Between 0.74% and 0.87% p.a.	Approach is consistent with the approach used previously by the AER. It accounts for the change in opex due to changes in cost drivers such as customer numbers, the size of the network, and the maximum demand served.
Trend: Productivity growth	0% p.a.	Applied zero adjustment for productivity growth, consistent with previous AER decisions.

Decomposition of proposed opex

The most significant component of our opex forecast is the base year.



- Our proposed step changes will impact prices by an average of **0.17% or $1.04 each year**
- Our proposed trend adjustments will impact prices by an average of **0.51% or $3.12 each year**

The price and output growth are 'standard' trend adjustments in the base-step-trend approach to reflect the changes in the next period.

The emergency recoverable works step change is a cost reclassification.

Demand management will reduce capex and is therefore delivering net savings to customers.

Our base year opex forecast is $440.2 million (real, FY19)

We have transitioned to a more sustainable, efficient level of opex, in line with best practice within our industry

In the past, we operated with a higher cost base.

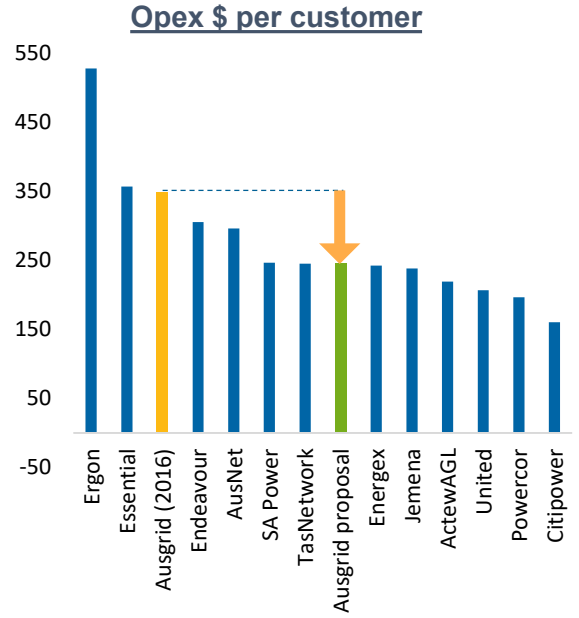
We have made a concerted effort over the last few years to **transition to a more sustainable, efficient level of opex**, through an ambitious program of transformation designed to 'right-size' our workforce, improve our efficiency and reset our cost base.

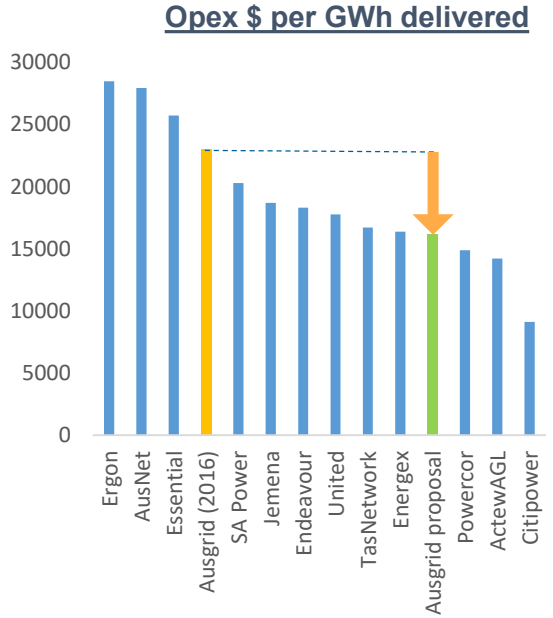
Compared to our last proposal, we have **reduced our operating cost base by over $100m or 19%**.

This is in line with the AER's allowance for 2017/18, set by benchmarking.

Benchmarking base year opex

We regularly measure ourselves against our peers – other Australian distribution businesses. These comparisons show that we have made significant progress over a range of measures, **bringing our performance into line with best practice within our industry**.





Performance under AER's 2017 Benchmarking Report

Historical opex compares poorly, however our proposed base year benchmarks well

Factors affecting benchmarking results

- The AER's 2017 Benchmarking Report uses data up to 2015/16 – our opex in 2015/16 is still relatively high and includes transformation costs
- Some techniques, including the econometric models, estimate an average result over the period – it will take some time before the significant and sustainable cost decreases achieved through our transformation program flow through under these approaches

Figure 15 MTFP by individual DNSP, 2006–16

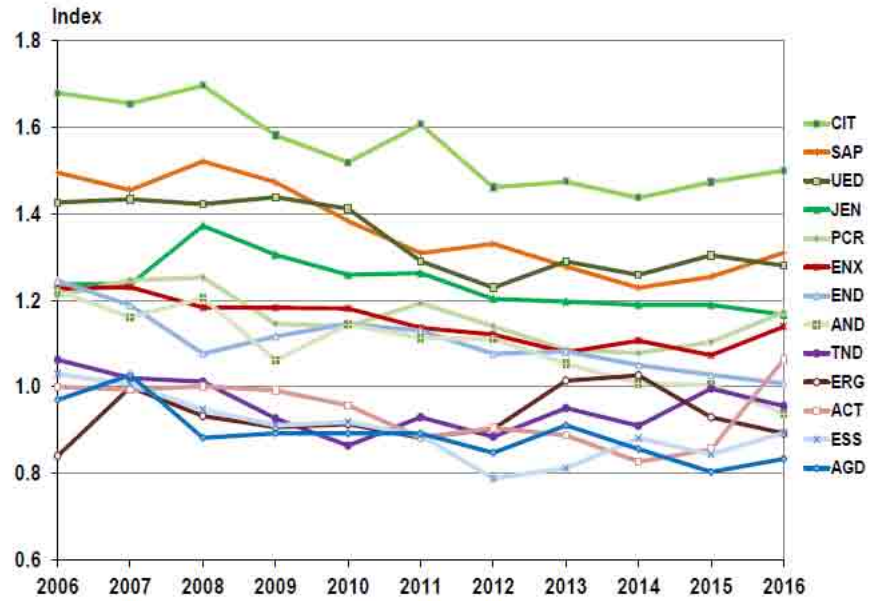
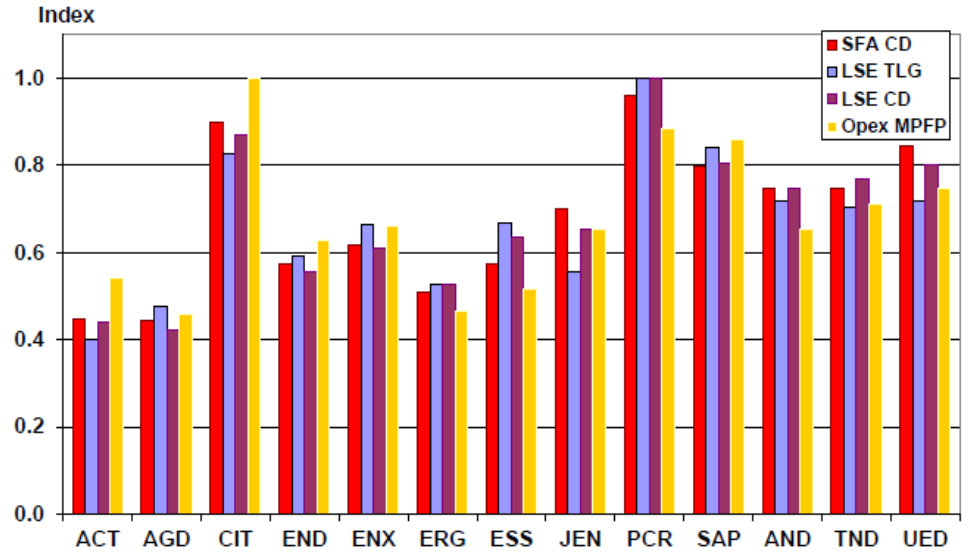


Figure 18 DNSP opex cost efficiency scores, (2006–16 average)



Our proposed step changes

We added two step changes to our base year forecasts for efficient costs not included in our base year

1 Emergency recoverable works

- This covers funding to repair the network when it is damaged by third parties who cannot be identified.
- These costs were not originally included in the base year and reflect a change in the scope of our standard control services from 1 July 2019.
- Historically these costs have been around **$5.4 million per year** ($2018/19). In line with the Final F&A Paper these are net costs, i.e. total costs less receipts from third parties.
- Applied as an adjustment to the base year.
- **The change in classification increases our allowance, but does not materially affect the amount paid by customers.**

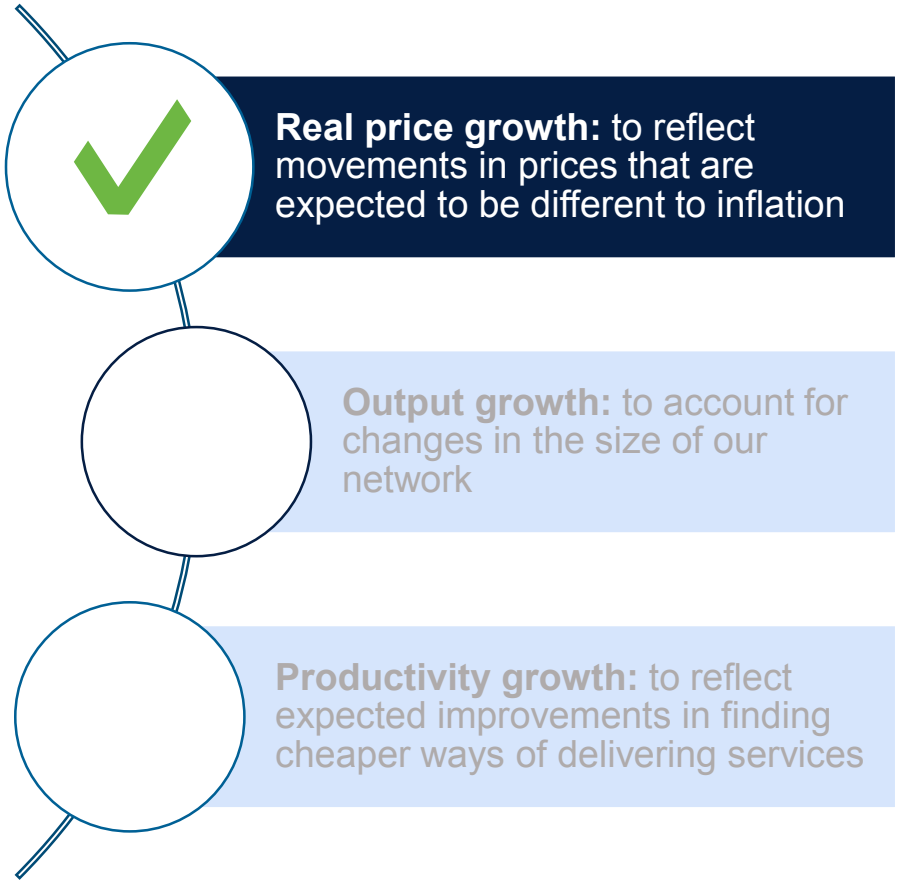
2 Demand Management projects

- We are proposing demand management costs of around $2 million per year ($2018/19), which will **deliver capex savings**. Total proposed expenditure is $10.9 million over the 2019-24 period ($2018/19).
- This funding is based on choosing demand management solutions where the benefits (from avoiding or deferring capex) outweigh the costs of the project.
- **This proposed expenditure delivers an overall saving to customers, as we are proposing lower capex as a result of the DM initiative.**

Trend adjustments (1/3)

In general, we have adopted methods previously used by the AER to make these adjustments

Trend Adjustments to the base year opex:



As labour makes up the majority of our operating costs we have adjusted our base year to reflect forecast changes in wages. For all other costs we have kept it simple and applied the consumer price index.

- Applied labour real price growth as estimated by BIS Oxford Economics. Final escalators will reflect Ausgrid's EBA negotiations. This is comparable to other long-term real labour price forecasts.
- Non-labour real price growth: zero
- We have applied expected labour growth to 59.7% of our opex. This is based on the AER's estimate of labour across all distribution businesses

Trend adjustments (2/3)

In general, we have adopted methods previously used by the AER to make these adjustments

Trend Adjustments to the base year opex:

Real price growth: to reflect movements in prices that are expected to be different to inflation

Output growth: to account for changes in the size of our network

Productivity growth: to reflect expected improvements in finding cheaper ways of delivering services

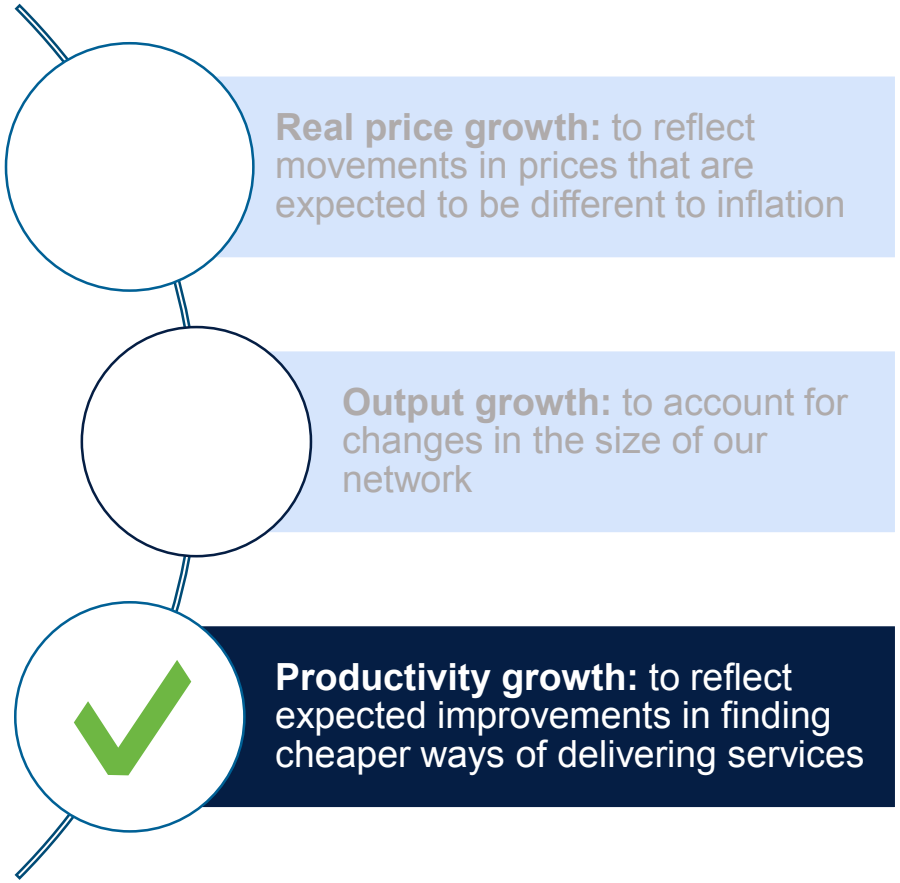
- As we provide more output – for example by adding customers to our network or operating and maintaining more lines – the costs of operating our network increase. Accordingly, we have applied an output growth factor to reflect how our costs change as we deliver more.
- We have applied the AER's current two-step approach:
  - Forecast the expected growth in customer numbers, circuit length and maximum demand; and
  - Estimate how much our opex changes for a 1% increase in each of these outputs. To do this, we used Economic Insights' Cobb-Douglas SFA econometric model as preferred by the AER.

Forecast output growth	2019/20	2020/21	2021/22	2022/23	2023/24
Customer numbers	0.91%	1.05%	1.03%	1.02%	1.01%
Circuit length	0.32%	0.52%	0.57%	0.58%	0.41%
Ratcheted maximum demand	0%	0%	0%	0%	0.38%

Trend adjustments (3/3)

In general, we have adopted methods previously used by the AER to make these adjustments

Trend Adjustments to the base year opex:



Applied zero adjustment for productivity growth:

- We used Economic Insights' econometric model to forecast productivity growth, consistent with the AER's forecast expenditure assessment guideline.
- Using data from 2006–16, Economic Insights' analysis indicates that productivity has declined in the electricity distribution industry. This is consistent with estimates by the ABS for the electricity, gas, water and wastewater sectors over the same period.
- Agree productivity should be measured over the long term.
- **Applying negative productivity growth would increase our opex forecast and we have decided not to do this. Instead we have applied a zero adjustment for productivity growth**.

11. Opex: drivers, justification and approach (1/3)

Question ID	Question	Proposed answer	Question status
11.1	Can we add to the OPEX deep dive how much OPEX is increasing due to RFS increasing bush fire zones?	Opex associated with bushfire zones will ultimately be reflected in our actual opex (revealed costs) over the course of the regulatory control period. Notwithstanding, changes in opex associated with changes in bushfire prevention is not explicitly reflected in our opex forecasts. This is because our opex forecast uses a base-step-trend approach, which is a top-down forecasting methodology and AER's preferred methodology for opex. Under this forecasting approach individual components of opex are not forecast on a bottom-up basis with the exception of a small number of step-changes. No step-change has been included for increased opex for bushfire prevention.	
11.2	Need to explain anything over and above opex revealed cost model	To be discussed in opex deep dive (see slides 9 – 17). Further detail will be included in the Regulatory Proposal.	
11.3	Would like a discussion on AER productivity number	To be discussed in opex deep dive (see slide 17 for our proposed approach to productivity).	
11.4	Appears "the efficiency journey is over" - is there an end point? What is driving net CPI?	To be discussed in opex deep dive (see sides 15 – 17 for our proposed approach to escalation).	
11.5	Appears the preference is for EBSS rather than drive efficiency in reg proposal?	To be discussed in opex deep dive (see slides 8-9).	

11. Opex: drivers, justification and approach (2/3)

Question ID	Question	Proposed answer	Question status
11.6	Require more detail on the revealed cost model?	To be discussed in opex deep dive (see slides 9 – 17).	
11.7	Why is Ausgrid Opex increasing?	To be discussed in opex deep dive (see slides 9 – 17).	
11.8	How does Ausgrid approach to Opex compare to Endeavour and Essential?	Ausgrid's approach to forecasting opex is largely consistent with the AER's preferred approach, and the approach used by other NSPs. NSPs have taken different approach to how they have applied individual components of the base-step-trend methodology as noted below: • Endeavour has applied a base-step trend approach to forecasting opex. They have applied trend adjustments using labour price growth from the Powerlink decision, internal forecasts of output factors and AER weightings and zero productivity growth. Step changes are being assessed. Total opex is flat across the last three regulatory periods (no annual figures provided in their directions paper) • Essential has forecast opex using a detailed ('bottom-up') process combined with a top-down' revealed costs' method. Their forecast includes real opex decreases of 4.4% to 6.2% p.a. between FY20 and FY24. These decreases appear to be largely driven by a significant change in the approach to vegetation management which is not compatible with the preferences expressed by our customers. • TasNetworks applied a base-step-trend approach to forecasting opex. Forecast opex increased through step changes and trend adjustments for output growth and real cost escalation. Imposed a 'top-down' stretch target of real opex reductions of 0.5% in FY21 and 1% p.a. in FY22 to FY24. • TransGrid applied a base-step-trend approach to forecasting opex in their revised proposal. Applied real labour cost increases reflecting an average of BIS & DAE price forecasts and AER labour split; partial use of AER approach to output growth. Assumed zero industry productivity (but included a real efficiency saving target of 3% for FY18 – different to AER approach). Also included 2 step changes.	

11. Opex: drivers, justification and approach (3/3)

Question ID	Question	Proposed answer	Question status
11.9	Request for the AER opex person to be in the room for deep dive		Resolved
11.10	Opex story is good headline story		Resolved

Labour price forecasts

Publicly available estimates of wage increases

Measure	Source & date	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Real Labour price change NSW EGWWS WPI	BIS/TransGrid (10/17)	0.8%	1.0%	1.4%	1.8%	1.8%	
Real Labour price change NSW EGWWS WPI	DAE/AER (2/17)	0.9%	1.0%	1.0%	1.1%	1.2%	
NSW wage price index (assumed nominal)	NSW Treasury (12/17)	2.5%	2.75%	3.0%			

Thank you

8.9

Closing Extended Consultation Session 23 March 2018

Welcome and Introductions

Rob Amphlett Lewis

Ausgrid

Richard Gross

Ausgrid

Have we achieved stakeholder expectations ?

To provide stakeholders a detailed overview	7 sessions, 11 presentations, 30 hrs, 270 questions captured
No surprises / let's have the hard conversations now	Ausgrid presented key drivers to our proposal and had robust discussions. Today we present changes proposed and hear your responses.
Reach agreement (or agree to disagree)	Goal is to clarify the areas of the proposal are supported and areas where we hold a different view. Report to Board and AER
To understand how costs translate into fees / charges / prices /consumer bills	Incorporated of customer outcomes throughout presentations
To feedback consumer priorities to Ausgrid	Stakeholder contributions during sessions
To tell Ausgrid the information stakeholders require	Ausgrid has listened and provided information requested
To link with previous engagement/build on what was already done	Reflected in our submission documents
To make the best use of the extension	Stakeholders will see feedback reflected in our adjusted proposal
To understand how stakeholder feedback will be incorporated (decision making timeline)	To be presented today
To understand each other	We have found the contributions valuable


How our proposal will meet customers' needs
AFFORDABLE
Lower prices
4% (subject to change)
in 2020 and then stable in real terms
Fairer
Updated tariff structures
More efficient
Operating cost savings (p.a.)
$100m
Benefit per customer
$76 a year
RELIABLE
Replacing aging assets
$1.7b
of investment renewing the grid
+
Investing in IT
$157m
including cyber security
SUSTAINABLE
Flexible network
$35m
in trials to deliver the 'future grid' sooner
Solar, Batteries, Smart grid
Smart
$41m
additional investment in an Advanced Distribution Management System following an initial investment of $35m in the current period

Ausgrid's response to consultation feedback

"Ausgrid should focus on non-network solutions……."

We have…
identified an additional capex deferral of

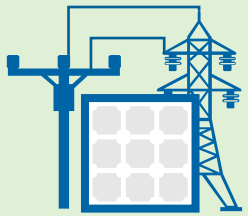
$60m

through $15 m in new demand management initiatives totaling $22 m

"Ausgrid should be more innovative in our approach……"

We have…
committed **$35m**

to deliver the 'future grid' sooner via additional smart grid trials.



Ausgrid's response to consultation feedback

"Ausgrid should further improve affordability…

Reduced network depreciation by

$100m

as a result of applying a different depreciation method.

Reduced metering depreciation by

$37m

by withdrawing our proposal to accelerate depreciation.

Reduced connection related capex by

$25m

by deferring the proposed changes in our policy.

Enabled our customers to make savings through the introduction of a time of use (TOU) price with a 'placeholder' demand based charge.

Impact of changes

2.5%

price reduction

Extended Consultation Program Overview

Selina O’Connor
Melanie Koerner

Ausgrid

Extended Consultation Program – Overview, Timeline and Key Stakeholders

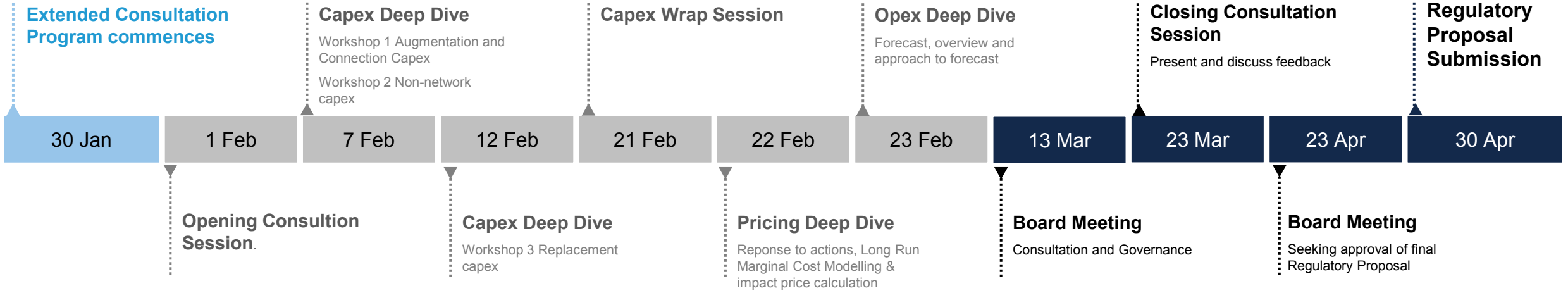
Extended Consultation Program Overview

- The extended stakeholder consultation program began with the release of the Stakeholder Consultation Document on 30 January 2018
- Between 1 February 2018 and 27 February Ausgrid delivered a series of consultation sessions
- A total of xx hours of consultation was undertaken with a total of 25 customer representatives participating across the various sessions.

Stakeholders Consulted

- AER Consumer Challenge Panel (CCP)
- AER representatives
- Councils on the Ageing NSW (COTA)
- Energy Consumers Australia (ECA)
- Energy Users Association Australia (EUAA)
- Energy Water Ombudsman NSW (EWON) Ethnic Communities Council of NSW (ECCNSW)
- NSW Council of Social Services (NCOSS)
- Public Interest Advocacy Centre (PIAC)
- Retailer representatives
- South Sydney Regional Organisation of Councils (SSROC)
- Total Environment Centre (TEC)
- Urban Development Institute of Australia (UDIA)

Extended Consultation Program Timeline and Milestones



15 Key themes raised by stakeholders during sessions

Proposal related

01 Capex sustainability

02 Previous capex underspend

03 Counterfactual for replacement expenditure

04 Demand forecasts

05 Demand management

06 Connections policy

07 Efficiency and productivity improvements

Pricing strategy related

01 Price structures (fixed charge component)

02 Transition to cost reflective prices

03 Equity considerations in prices

04 Regional pricing

05 Transformation to a decarbonised economy

06 Retailer pass through of transitional time of use prices

07 Voluntary cost reflective prices

08 Long term pricing strategy

A Affordability

R Reliability

S Sustainability

Our response to feedback on Pricing Proposal

Melanie Koerner
Rob Amphlett Lewis

Ausgrid

Price structure (fixed charge component)

Theme	Stakeholder views	Ausgrid response	Outcome
01 **Price structures (fixed charge component)** A	In our Customer at the Centre survey, 50% of our customers agreed that rebalancing away from non-peak variable charges towards fixed charges is important in preparing for the future. During the Extended Stakeholder Consultation, some stakeholders indicated an in-principle objection to increases in fixed charges due to the inability of customers to actively respond to a fixed charge to manage their bill, and the challenges for retailers to pass through the safeguard mechanism. Stakeholders requested that Ausgrid consider alternative structures.	The proposed increase in fixed charges and reduction in variable charges promotes efficient investment in distributed energy resources, avoids inequities between adopters and non-adopters of distributed energy resources, encourages use of the network when renewable generation is prevalent (outside of peak times) and better reflects the nature of the connection service Ausgrid provides. We have considered additional options for both our legacy and default price, including those suggested by stakeholders.	**Subject to Board confirmation** Ausgrid will continue to explore price rebalancing options towards fixed charges, including ensuring that adverse implications of such a transition are mitigated. Ausgrid is evaluating alternative prices to assist in managing the potential effects of the network bill of lower energy users.

Transition to cost reflective prices

Theme	Stakeholder views	Ausgrid response	Outcome
02 **Transition to cost reflective prices** A	Ausgrid's proposed prices and price assignment strategy does not give rise to a fast enough transition to cost reflective prices and the associated economic benefits.	Ausgrid's proposed transition pathway to cost reflective prices is based on balancing the benefits to customers of pricing reform (lower network costs) with customer bill outcomes. At this stage, we do not have sufficient data and information to assess impacts for specific socio-demographic customer categories. We are accordingly exercising caution in rolling out any fast tracked transition until this is better understood.	**Subject to Board confirmation** We propose to assign all new customers to a seasonal time of use price. The opt-out price for time of use customers will become a time of use price as well (it is currently a flat price). Ausgrid proposes to include a placeholder demand price in its price Structure Statement (TSS) to provide flexibility to fast-track its transition (subject to the findings of our research plan and agreement with the AER and stakeholders as to the specific details of that price and the assignment criteria).

Equity considerations in prices

Theme	Stakeholder views	Ausgrid response	Outcome
03 **Equity considerations in prices** A S	Stakeholders requested greater clarity with respect to Ausgrid's equity considerations in revenue allocation to price classes and price components. Stakeholders also requested that Ausgrid provide clear messaging with respect to the current costs and benefits that solar PV customers impart on the network and how this has been considered within the price design process.	In the Pricing Deep Dive session, Ausgrid presented the way in which revenue is for the most part allocated to price classes based on demand on the network. Larger customers connect at high voltages and therefore do not use the low voltage network. It therefore costs less per MVA to service these customers compared to residential customers. Rebalancing away from non-peak variable charges will promote equity between adopters and non-adopters of DER.	We do not propose any change in our approach to the allocation of revenue between price classes. We will undertake further research with respect to DER customer costs and benefits to inform our ongoing price design process.

Regional pricing

Theme	Stakeholder views	Ausgrid response	Outcome
04 **Regional pricing** A	In our Customer at the Centre survey, customers generally did not support regional pricing. In the Extended Stakeholder Consultation, customer advocates did not support mandatory regional prices which discriminate on the basis of region. However, some customer advocates supported regional pricing so long as this was voluntary (opt-in) and offered in a way to incentivise rather than penalise customers to change their behaviour to address regional constraints.	Ausgrid does not support mandatory regional pricing due to the potential customer impacts. We agree that regional pricing has the potential to provide more cost reflective signals to customers and potentially improve economic outcomes.	We are not proposing to introduce regional pricing in the next regulatory control period. We will undertake additional research to better understand how we can deliver more sophisticated network pricing solutions.

Transformation to a decarbonised economy

Theme	Stakeholder views	Ausgrid response	Outcome
05 **Transformation to a decarbonised economy** S	In our Customer at the Centre survey, some customers believed our pricing strategy should support the broader transformation towards a de-carbonised economy. Some customer advocates also supported this view.	We understand pricing arrangements are important to the transition to a lower carbon economy. Our pricing strategy is about slowly transitioning to arrangements which support a decarbonised economy with decentralised generation.	Our price structure, slowly restructures our pricing arrangements to prepare for an environment of two way energy flows and, when technology allows, to implement new pricing in the form of demand and capacity charging, improve. This will support demand response and efficient investment in and operation of DER.

Retailer pass through of transitional time of use prices

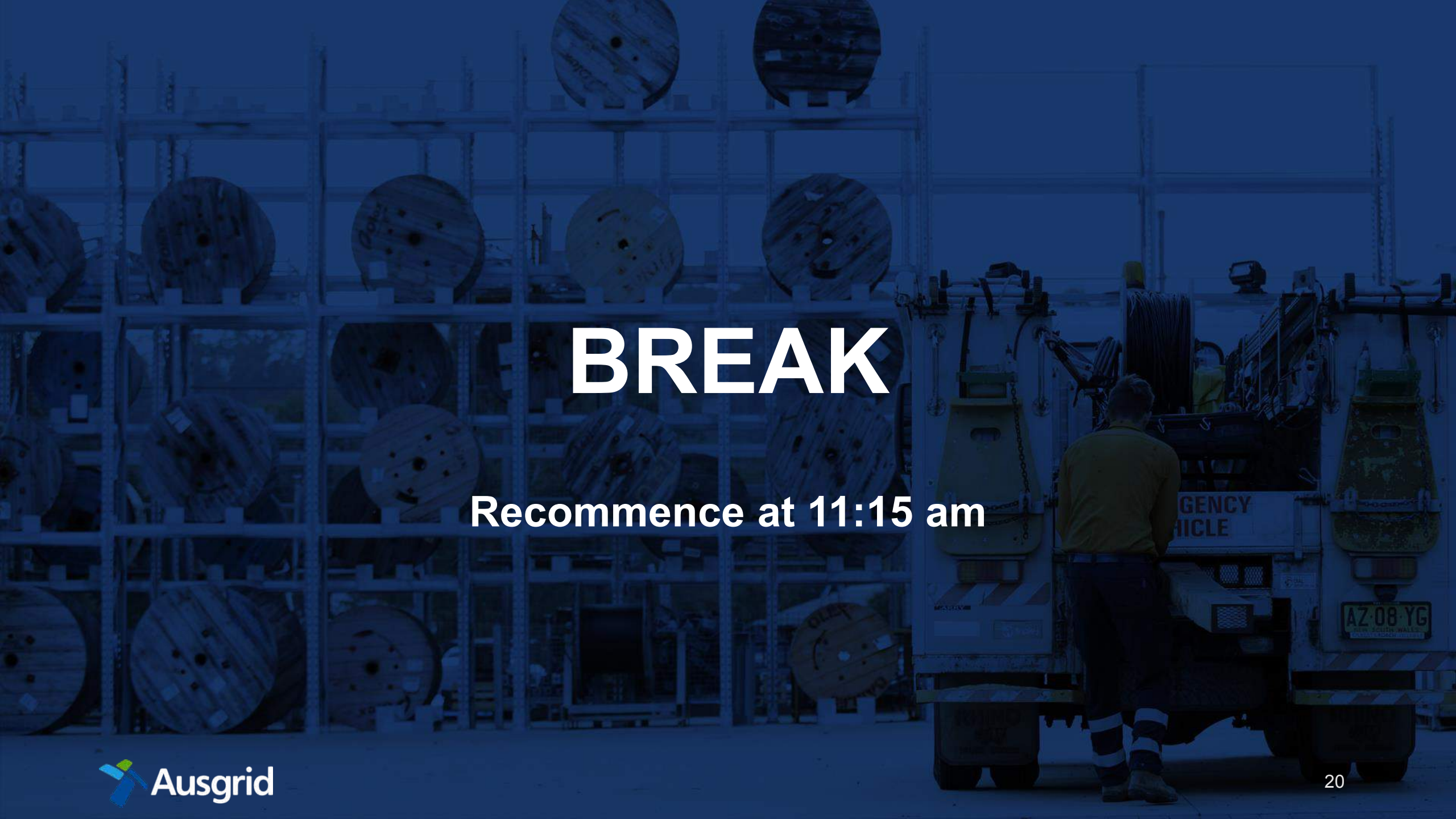
Theme	Stakeholder views	Ausgrid response	Outcome
06 **Retailer pass through of transitional time of use prices** A	Retailers were concerned customers may be confused if their prices changed when receiving a new meter and again on 1 July with general price changes. Retailers were also concerned with the complexity of the proposed transitional price including the safeguard mechanism and the changes required to their billing systems.	We want to support the efforts of retailers to roll out smart meters and cost reflective prices and will endeavour to work with retailers to make the transition as smooth as possible.	**Subject to Board Confirmation** We are considering the proposal by retailers to delay any price change resulting from the installation of a new meter for existing customers until 1 July each year. We are considering the use of rebates in light of retailer feedback on the complexity of additional safeguard and transitional prices. Ausgrid is also considering the use of different prices as alternative ways to address potential bill impacts for low energy users (instead of the safeguard mechanism).

Voluntary cost reflective prices

Theme	Stakeholder views	Ausgrid response	Outcome
07 **Voluntary cost reflective prices** S	Stakeholders encouraged Ausgrid to offer voluntary cost reflective prices. Although the major retailers may not support this, innovative smaller retailers may choose to offer these products to niche markets. In this way, Ausgrid can gain experience in different price structures and customer response.	Customers with high peaks in demand are unlikely to voluntarily opt-in to a more cost reflective price. Therefore, the benefit for network costs of opt-in prices is limited. Rather, Ausgrid's research plan will provide the foundation for large scale assignment of customers to more cost reflective prices. We are also considering introducing voluntary cost reflective prices over time.	We are not proposing to introduce voluntary opt-in prices as part of this TSS. Our research plan will investigate, among other things, the design and merits of demand prices.

Long term pricing strategy

Theme	Stakeholder views	Ausgrid response	Outcome
08 **Long term pricing strategy** A	Stakeholders requested that Ausgrid develop a long term pricing strategy to provide an “end point”. Some stakeholders held a view that the end point must include a demand component. Other stakeholders noted that the “end point” may change and that the TSS needs to be flexible (including triggers) to accommodate changes.	As noted in the stakeholder directions, the end point is likely to be ever-changing. There also exists present uncertainty as to the merits and shortcomings of demand charges, in relation to both signalling forward looking costs and the recovery of historical costs. Absent a fully informed view of the appropriate end-point and optimal transition path, Ausgrid considers that the large-scale assignment of customers to demand prices is not in the best interests of customers at this time.	**Subject to Board confirmation** We are launching a comprehensive research plan to inform our views of the end point (which is likely to change through time) and the optimal approach to expediting our transition to that end-point. In recognition of customer feedback, we are proposing to include in the TSS a placeholder demand price that could be implemented during the 2019-24 period, subject to the outcomes of the research plan.



BREAK

Recommence at 11:15 am

Ausgrid

Innovation program

Junayd Hollis

Ausgrid

Key customer messages

- Our customers have made clear their expectation that we provide ‘active leadership’ in the in the transition to cleaner energy sources[1]
- Customers have specifically told us they expect us to:
  - *Invest more in renewables and support stakeholder efforts in this regard*
  - *Show strategic leadership in terms of market adaptation to disruption*
  - *Engage with stakeholders who can assist and support innovation efforts*
  - *Provide unbiased information to help people take control of their energy costs*
  - *Monitor technologies and approaches used overseas to understand their application here*

1. Newgate research

Why are we investing?

1. Enable our customers to unlock addition value from their DER and smart appliances (e.g. by providing access to LV network data and platforms to enable coordination)
2. Build the knowledge base to deliver lower cost services (e.g. fringe of grid optimisation) in future regulatory periods.
3. Develop additional use cases for new technologies, e.g. bushfire mitigation, community / virtual partition batteries
4. Inform policy and regulatory development to ensure the most cost effective decarbonisation models are not inadvertently swept off the table
5. Prepare for the adoption of EVs and autonomous vehicles to avoid adverse cost impacts
6. Accelerate the transition to fairer, technology agnostic, tariffs

International Innovation Investment Levels

UK

- LCNF represents 3% totex, split 30% to NIA 70% to NIC
  - *Example projects: competitive markets for local demand side flexibility, solid state transformer trials, LV automation, TSO-DSO interface trials, 'open LV' data sharing, etc.*

North America & EU

- Analysis of investment portfolios for 16 large listed regulated (network) utilities – Innovation investment[1] averages 2.5% of totex
  - *Example projects: self healing networks, DSO trials, large scale innovative tariff trials, IoT enabled DM, intelligent EV charging, Hydrogen conversion etc.*

1, analysis excluded investments in unregulated businesses

Proposed innovation funding

Program:	Amount:	Type:	
• ADMS (Incl. DSO capabilities trial)	$50m	Capex	
• Network Innovation Program	$53m	Capex	$78m (equivalent scope to international innovation spend comparisons) ~1.4% totex
• Planning Data and Technology	$14m	Capex	
• DMIA	$8m	DMIA	
• ‘Fast Track’ Tariff Reform Research	$3m	Opex	

Partnerships and R&D funding

- Many of the investments within our innovation portfolio (e.g. community battery) don't have a financial return sufficient to justify the expenditure if the benefits are limited to what can be accessed by the network business.
- Partnerships are key to unlocking the full value stack. Currently in discussion with potential partners for specific trials, and building commercial cases for others to understand which partners will be required to unlock full value
- Also seeking partnerships with academic institutions to maximise value in terms of shared learnings, and getting access to R&D funding to subsidise up front costs.
- The costs outlined here are those costs we expect to contribute in any such partnership

Delivering key ENTR milestones

CUSTOMER ORIENTED ELECTRICITY	**CUSTOMER ENGAGEMENT & CUSTOMISED ENERGY SOLUTIONS**				
	Milestone 1 By 2018, network customer engagement and collaboration	Milestone 2 By 2021, investments are based on customer value; improving service performance	Milestone 3 By 2024, active enablers of expanding products and services	Milestone 4 By 2027, provide a platform for stimulating customised energy options	
	CUSTOMER SAFETY NET				
	Milestone 1 By 2018, universal authorisations and exemptions framework for the provision of new energy services	Milestone 2 By 2018, code of practice to ensure consumers receive appropriate information	Milestone 3 By 2019, rights and responsibilities of small consumers regarding the provision of electricity	Milestone 4 By 2020, nationally consistent framework for energy concessions and emergency assistance	
CARBON ABATEMENT	**CARBON AND RENEWABLE POLICY OPTIONS**				
	Milestone 1 By 2017, agree an enduring, stable and nationally integrated carbon policy framework	Milestone 2 By 2020, emission intensity baseline and credit scheme	Milestone 3 By 2026, introduce an economy wide carbon pricing mechanism	Milestone 4 By 2022 and 2027, adjust Australia's nationally determined contributions	Milestone 5 By 2017, independent agency to complete an assessment of nationalenergy market implications
	EFFICIENT CAPACITY UTILISATION				
	Milestone 1 By 2018, light vehicle emissions standard policy	Milestone 2 By 2020, national approach to electric vehicle charging			
INCENTIVES & NETWORK REGULATION	**PRICING & INCENTIVES**				
	Milestone 1 By 2021, residential and small business customers are assigned to a new range of cost reflective electricity tariffs	Milestone 2 From 2021, new prices are introduced to reflect new and differentiated services	Milestone 3 From 2021, networks deploy or procure micro-grids or standalone power systems as a substitute for traditional delivery models	Milestone 4 By 2027, customers selling their DER services to networks on a dynamic, locational basis	
	REGULATORY AND POLICY FRAMEWORKS				
	Milestone 1 By 2018, customers' role is central to regulatory processes	Milestone 2 By 2018, structured trialling of alternative regulatory approaches is well advanced	Milestone 3 By 2019, regulatory frameworks that are more adaptive		
POWER SYSTEM SECURITY	**POWER SYSTEM SECURITY**				
	Milestone 1 By 2018, central and transformed role for the transmission system	Milestone 2 By 2018, market based approaches for providing efficient capacity, and balancing and ancillary services	Milestone 3 By 2019, coordinating and optimising decisions across the power system as a whole	Milestone 4 By 2020, forecasting to better anticipate where environmental and system constraints could lead to system security issues	Milestone 5 By 2022, advanced protection mechanisms
INTELLIGENT NETWORKS & MARKETS	**GRID TRANSFORMATION**				
	Milestone 1 By 2018, approach & protocols to address the management and exchange of information	Milestone 2 By 2019, integrated suite of advanced network planning models, techniques and DER-services valuation methods	Milestone 3 By 2019, suite of distributed grid intelligence and control architectures and tools	Milestone 4 By 2020, advanced network operation mechanisms and tools	Milestone 5 By 2022, Advanced Network Optimisation (ANO) tools
	NETWORK OPTIMISATION & MARKETS				
	Milestone 1 By 2018, basic Network Optimisation Market (NOM) functions	Milestone 2 By 2019, Advanced Network Optimisation (ANO) functions	Milestone 3 By 2020, Integration of Advanced Network Optimisation (ANO) functions and NOM procurements	Milestone 4 By 2023, integrated set of Advanced Network Optimisation (ANO) functions and NOM procurements	Milestone 5 By 2027, conceptual design of a digital Network Optimisation Market (dNOM) platform

How have we prioritised the investments?

Enable customers to adopt onsite resources and provide concessions to those who need it most

Encourage cost effective decarbonisation

Avoid network investment and reduce overall bills

Improve safety, stability and reliability outcomes

Avoid cross subsides and pay for DER services where they deliver value

Network Innovation Program ($53m)

- Advanced Voltage Regulation STATCOM Trial
- Network Insight Program (rollout)
- Fringe of Grid Optimisation Pilot
- HV Microgrid Trial
- Advanced EV Charging Platform Trial
- Grid Battery Trials
- Portable All-in-One Off-Grid Supply Units
- Self-Healing Networks / FDIR Trials
- Dynamic Load Control Trials
- Asset Condition Monitoring Trials
- Line Fault Indicator (LFI) Trials / Development

Planning & Technology Data Usage ($14m)

- Customer DER Investment Evaluation Tool / Portal
- Continuous VCR (Value of Customer Reliability)
- Network Digitisation
- Smart Metering Benefits Realisation
- Electric Vehicle Charging Capacity Information

Demand Management

- Demand Management for Replacement Needs
- Future Trends Research
- Distributed Storage Demand Response
- Emerging Technology Research
- CoolSaver IoT
- Behavioural Demand Response
- Residential Peak Time Rebate
- Electric Vehicle Dynamic Charging

Accelerated Tariff Reform Research

Objectives:

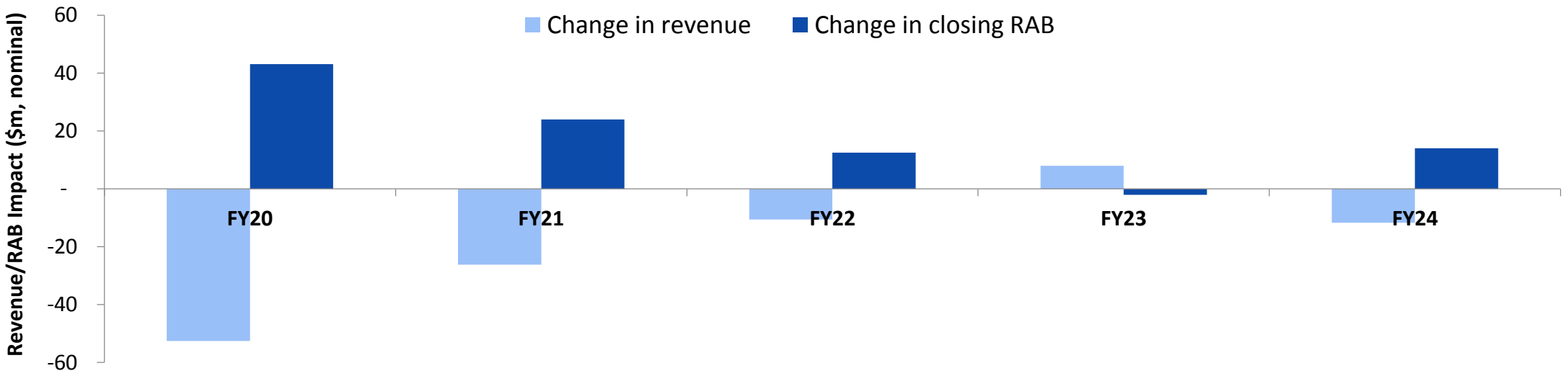
- Design and trial alternative cost reflective tariffs to identify those most appropriate for different customer groups
- Design and test alternative adoption models
- Work with retailers and aggregators to design tariffs they can use to improve customer outcomes

Depreciation

Iftekhar Omar

Ausgrid

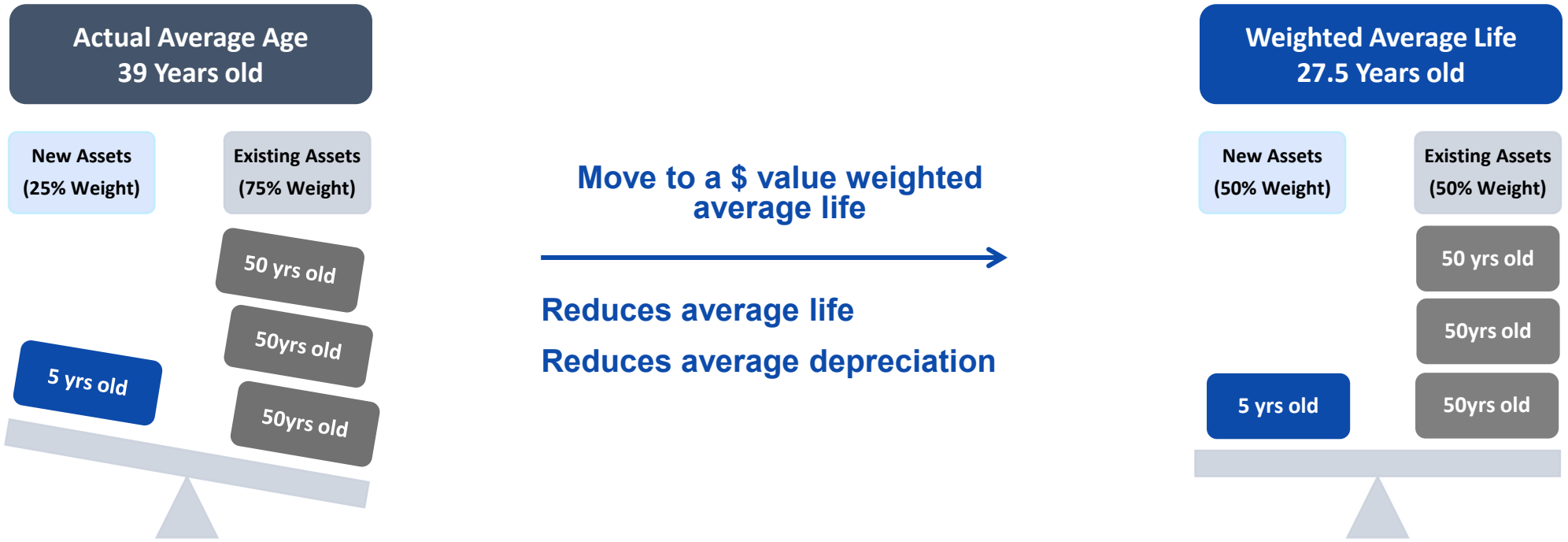
Depreciation – Impact of changing

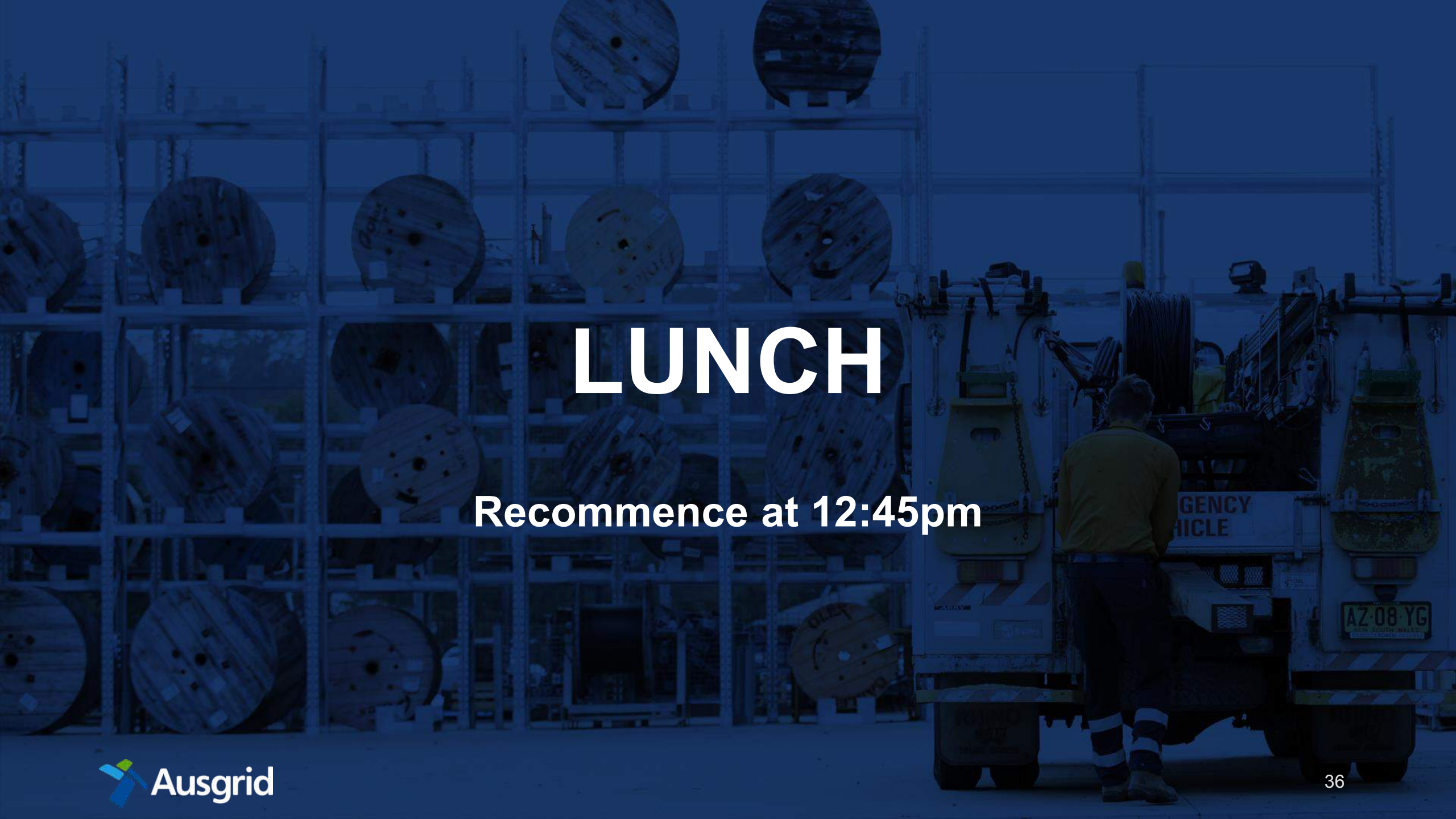


($m, nominal)	2014-15	2015-16	2016-17	2017-18	2018-19	Total 2014-19
Change in Building Block Revenues	-53	-26	-11	8	-12	-$93m
Increase in FY24 Closing RAB	43	24	12	-2	14	+$92

Depreciation – Detailed Explanation

- The **year-by-year tracking** approach maintains the straight line depreciation profile for all assets, but is onerous from a modelling perspective
- The **weighted average remaining life** approach resets the depreciation profile each regulatory period, but is simpler from a modelling perspective





LUNCH

Recommence at 12:45pm

Our response to feedback on Regulatory Proposal

Melanie Koerner
Trevor Armstrong

Capex Sustainability

Theme	Stakeholder views	Ausgrid response	Outcome
01 **Capex sustainability** A R	Stakeholders a sustainable level of capital expenditure going forward to avoid future peaks and troughs. Stakeholders required further evidence to that the proposed $3.1B in capex is sustainable.	Capex is based on replacing only those assets which must be replaced this period Repex is lower than what would otherwise be to achieve a sustainable level of replacement. However, given future uncertainty, we believe this approach is prudent.	We have provided analysis to 2050 to demonstrate why we believe our proposed capex for the forthcoming regulatory control period is prudent, given future uncertainty.

Previous Capex Underspend

Theme	Stakeholder views	Ausgrid response	Outcome
02 **Previous capex underspend** A	Stakeholders requested greater clarity and transparency for capex underspend and the impact on capex for 2019 to 2024.	Our capex in FY16 and FY17 was below AER allowances and below what Ausgrid considers to be sustainable levels, driven in part by resource constraints during the transaction process. Ausgrid worked hard to ensure only those projects that could efficiently be avoided or deferred were impacted. Even minor resource constraints can strengthen the prioritisation and decision making process. Ausgrid expects to restore its capex program in FY18 and FY19, and we have also implemented efficiencies in delivering the program from FY18 forward, such as identifying prudent deferrals, more rigorous cost-benefit analysis, avoiding like-for-like replacement where there is a more cost effective alternative internal labour productivity improvements and negotiating better prices from suppliers. Overall we expect to underspend against AER allowances for the regulatory control period by $395m (compared to our allowance determined by the AER in April 2015).	**Subject to Board confirmation** The AER will assess our CESS calculation as part of its 2019-24 determination.

Counterfactual for replacement

Theme	Stakeholder views	Ausgrid response	Outcome
03 **Counterfactual for replacement expenditure** A R	Stakeholders requested greater clarity (and quantification where possible) on a ‘do nothing’ approach for replacement expenditure projects and programs.	For major replacement projects, we quantify the risk based cost of ‘do nothing’ by monetising the probability weighted risks associated with safety, reliability and environmental impacts. Our replacement programs are developed on a bottom up basis by our asset managers based on mitigating the risk of ‘do nothing’.	**Subject to Board confirmation** We have reviewed replacement expenditure programs and the acceptability of risks associated with the 'do nothing' option. We have assessed the opportunities for demand management and, as a result, incorporated adjustments in the timing of our switchboard replacement program.

Demand forecast

Theme	Stakeholder views	Ausgrid response	Outcome
04 **Demand forecasts** A S	Stakeholders questioned Ausgrid's demand forecasts and underpinning assumptions, particularly as they related to battery storage uptake. Stakeholders are concerned that future customers will be paying for assets they no longer require as a result of capital investments to address short term demand increases	Our demand forecasting approach has been independently reviewed and compared favourably to our peers and international best practice. We agree that our battery storage uptake in the medium term diverges from forecasts prepared by other parties. Independent forecasts suggest that our demand forecasts could be reduced by 1.3% by 2030. Our overall capex proposal has limited sensitivity to changes in broad base demand, with the majority of the projects driven by condition based replacement and/or major new customer growth.	We have engaged independent consultants to provide revised DER forecasts to reflect a broader range of price scenarios and the full value stack for battery storage. We do not envisage that the revised forecasts will result in any change to our capex proposal.

Demand management

Theme	Stakeholder views	Ausgrid response	Outcome
05 **Demand management** A S	Ausgrid has not fully explored the potential for demand management to defer or avoid capital expenditure. It was unclear as to extent to which Ausgrid has considered these characteristics, and the associated real options value, of demand management solutions.	There is no industry agreed approach to the evaluation of real options, and in particular the quantification of demand uncertainty. Notwithstanding, Ausgrid is actively investigating how the real options value of demand management and the ongoing development of the market for demand management services can be further leveraged in our planning approach.	**Subject to Board confirmation** We have revisited the potential for Ausgrid has allocated an additional $3m per annum over the period to demand management. If supported by the AER, this will deliver the deferral of up to $60m of capex beyond the period. We would value stakeholder advocacy to support any enablers within the AER demand management review process

Connections Policy

Theme	Stakeholder views	Ausgrid response	Outcome
06 **Connections policy** A	Stakeholders broadly did not support Ausgrid's proposed change in connection policy. Ausgrid should avoid any change in connections policy which results in an increase in the regulatory asset base	Ausgrid is of the view that our revised connections policy improves the equity of our approach to allocation of shared connection costs. We appreciate there is a strong aversion by stakeholders to any policy which increases capital expenditure going into the regulatory asset base.	**Subject to Board confirmation** As a result of stakeholder feedback, we have decided NOT to change our connections policy. Retaining existing policies of funding connections via capital contributions reduces the projected regulated asset base at the end of the regulatory period by approximately $25-30 million.

Efficiency and productivity improvements

Theme	Stakeholder views	Ausgrid response	Outcome
07 **Efficiency and productivity improvements** A	Ausgrid often justified its capital investments based on improved efficiency and productivity outcomes. Concern that the base-step- trend approach proposed for opex does not adequately capture these improvements, especially under the assumption (adopted by AER) of zero productivity improvement.	Any capital expenditure which improves the labour productivity of our capital program results in a net reduction in our total capex. Any capital expenditure which reduces our operational expenditure will ultimately be shared with customers via the Efficiency Benefits Sharing Scheme.	Our proposal provides a more detailed explanation of the nature of the efficiencies that we expect to achieve from different capital expenditure initiatives. Our operating expenditure proposal also highlights how efficiency savings or productivity improvements have been factored into our forecasts.

Clarification Q&A

Panel: Trevor Armstrong
Matt Webb
Murray Chandler
Jonothan Clark

Ausgrid

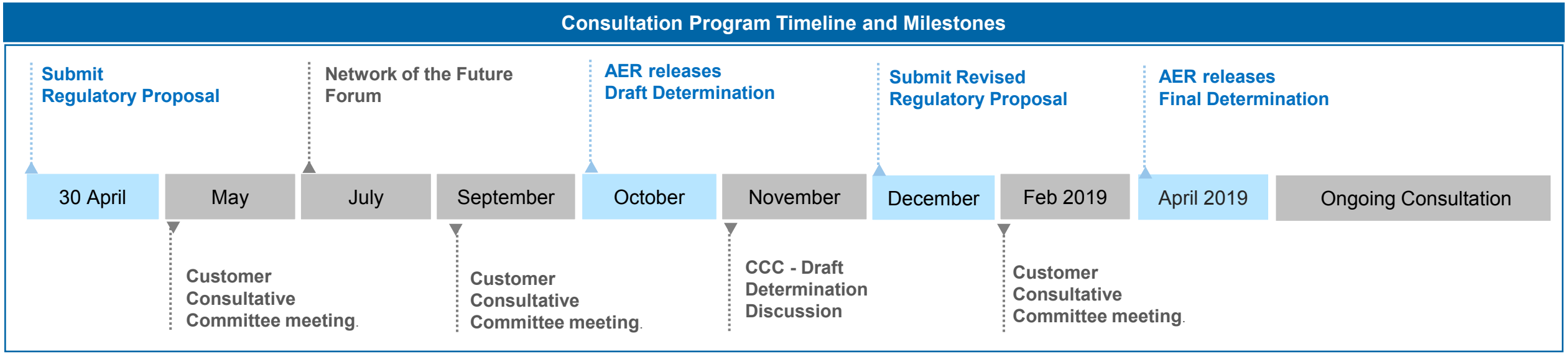
Stakeholder Consultation

Melanie Koerner
Selina O’Connor

Revisiting Stakeholder Expectations

- To provide stakeholders a detailed overview
- No surprises / let's have the hard conversations NOW
- Reach agreement (or agree to disagree)
- To understand how costs translate into fees/charges/prices/consumer bills
- To feedback consumer priorities to Ausgrid
- To tell Ausgrid the information stakeholders require
- To link with previous engagement/build on what has already been done
- To make the best use of the extension
- To understand how stakeholder feedback will be incorporated (timetable for decision making)
- To understand each other

Ongoing Consultation



Final thank you and wrap up

Trevor Armstrong