Expenditure forecasting methodology

CITIPOWER

2026–2031 REGULATORY PERIOD

Contents

1. Overview of our forecasting methodology 2

2. Understanding what our customers value 3

2.1 Service level outcomes 4

3. Expenditure forecast methodology 6

3.1 Capital expenditure 6

3.2 Operating expenditure 9

1. Overview of our forecasting methodology

We deliver electricity to a 157-kilometre square area covering Melbourne's CBD and inner suburbs. This area includes some of Australia's most iconic sporting and cultural facilities such as the Melbourne Cricket Ground, the National Tennis Centre and the Victorian Arts Centre.

Households represent approximately 80% of our 348,300 customers. We also support over 2,500 commercial and industrial businesses and almost 54,000 small businesses.

The service level outcomes that we provide to our customers are amongst the best in the National Electricity Market (NEM). For example:

- our customers experience the lowest minutes off supply of all networks (an average of 23 minutes per annum over the previous three-years)
- our distribution charges are amongst the lowest in the NEM.

The way our customers are using electricity, however, is rapidly changing through the energy transition.

Customer behavioural preferences are evolving, climate extremes are becoming more frequent and severe, and electrification policies supporting the achievement of net-zero targets have become clearer. Uptake in new technologies is also growing, and intersecting with typical network drivers like growth, asset risk, safety and regulatory compliance to influence the service levels we can provide our customers.

In the context of these changes, ensuring our forecast methodologies are robust is more important than ever before.

Accordingly, this document describes our proposed approach for estimating capital and operating expenditure for the 2026–31 regulatory period.[1]

[1] Consistent with the National Electricity Rules, cl. 6.8.1A.

2. Understanding what our customers value

Our forecasting methodology places customer outcomes at the core of our decision-making process. These outcomes are underpinned by customer research and engagement to ensure that any investments are aligned with customers' needs, priorities and expectations.

We have been on a continuous engagement journey with our customers and stakeholders since the beginning of our current regulatory period, recognising that what drives consumer needs is constantly evolving.

To ensure our engagement program provided comprehensive and effective insights to inform our regulatory proposal, we designed and implemented a three-phase approach:

- **phase 1 (2021–2023):** focused on broad outreach, aiming to explore and surface community concerns and needs across diverse perspectives. This phase sought input from a wide range of stakeholders and identified themes of community interest and future opportunities
- **phase 2 (2023–2024):** involved targeted engagements with key stakeholders and customer groups. The focus was on specific themes identified as important during earlier engagements. This phase allows for in-depth discussions and feedback on specific topics. A critical part of this engagement phase was conducting trade-off analysis to better understand customer preferences when there is a cost impact from their energy choices. Phase 2 will culminate in the release of our draft proposal
- **phase 3 (2024–2025):** provides an opportunity for customers and stakeholders to respond to specific proposed solutions and service improvements, along with the associated investments. This phase will ensure our regulatory proposal aligns with the expectations of customers and stakeholders.

Key examples of the targeted initiatives from our customer engagement program are summarised below.

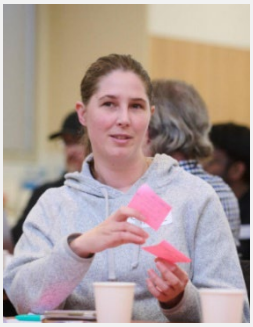
Future Home Demand: Monash service level options paper

In 2023, we partnered with Monash University to better understand longer term behavioural trends to inform electricity sector planning. This involved research inside our customers' homes, with questions about their lifestyles, energy use practices and how they expected these to change in the future.

The study was a multi-staged research project with 36 households, supported by a survey of 1,325 customers.

The study identified household impacts for energy forecasting and implications for forecasting. The research generated insights for EV's and charging practices, demand management opportunities and future peak scenarios.

Customer values analysis



We conducted a willingness to pay study that quantified the value that customers place on different services we provide such as resilience, worst-served reliability, and environmental outcomes in addition to the AER's quantification of the value of customer reliability. The research included surveys of over 1,500 residential and small-business customers.

We updated our original research to re-quantify customers' willingness to pay for improvements to service outcomes at the suggestion of our customer advisory panel, to recognise changes in prevailing economic circumstances.

We apply these values in our internal investment decisions, as well as in the cost-benefit analyses that underpin our 2026-31 regulatory proposal to better reflect the customer voice in our future investment plans.

Energy transition summit and Future energy network forum

Recognising the fundamental changes that are occurring as part of the energy transition, we released an options paper and facilitated two separate forums to explore the priorities and expectations of customers and stakeholders on the utilisation and management of emerging energy technologies.

Focusing on rooftop solar and electric vehicles, we sought preferences on service levels and investment options to better identify customer value propositions.

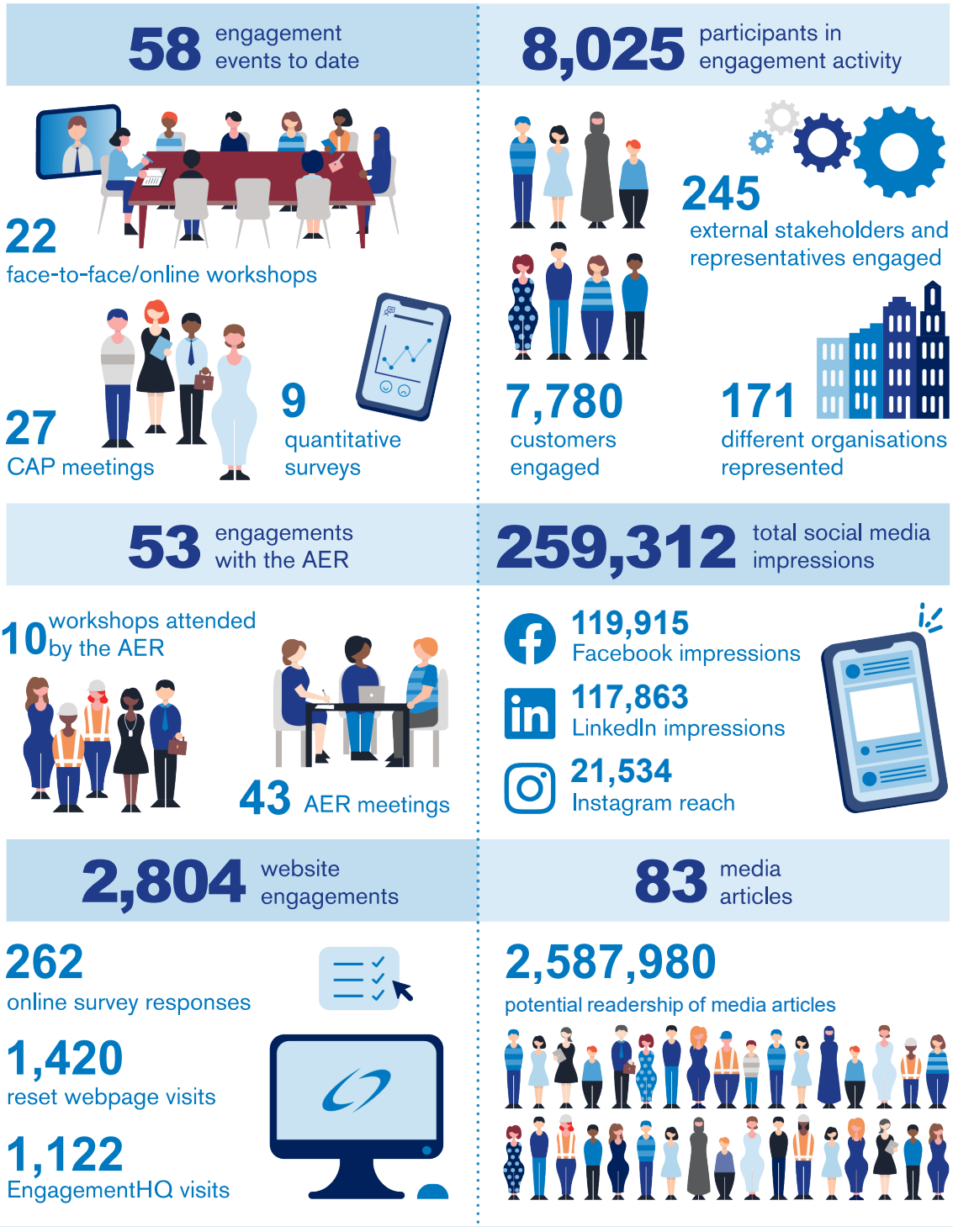
We also sought feedback on assumptions and uncertainties on expected EV usage, battery charging/discharging preferences and the speed of electrification of gas, which are being used directly in our demand forecasts.

2.1 Service level outcomes

An important outcome from our stakeholder engagement program is the development of service level outcomes that we will deliver over the 2026–31 regulatory period. These service level outcomes are tested iteratively with customers, stakeholders, and our customer advisory panel, and seek to balance our regulatory requirements with consideration of efficient long-term costs, benefits and risks.

We recognise the need for our regulatory proposal to demonstrate how these service level outcomes and our proposed investment program have been shaped by customer and stakeholder expectations, particularly as these evolve through the energy transition as new technologies, opportunities and behavioural preferences emerge.

FIGURE 1 SUMMARY OF OUR REGULATORY RESET ENGAGEMENT TO DATE



3. Expenditure forecast methodology

Our capital and operating expenditure forecasts are developed through a series of expenditure iterations to test and refine our investments over time. The underlying methodologies to support these forecasts are consistent with the analytical methods and techniques set out in the AER's Better Resets Handbook, including for example:

- demonstration of the role of consumer engagement in our regulatory proposals
- application of risk-based modelling techniques, including for replacement expenditure
- demonstration of efficient trade-offs between capital expenditure and operating expenditure
- adopting the AER's value of customer reliability, value of emissions reduction and customer export curtailment value
- adopting a base-step-trend approach for forecasting operating expenditure
- evidence of top-down challenge to capital expenditure.

Our regulatory proposal will also provide robust explanations where expenditure categories differ from history.

3.1 Capital expenditure

Our approach to forecasting by capital expenditure category is described in table 1. For all material investments, our approach includes the identification of the investment need and an assessment of credible network and non-network options, including different project scopes, designs, timings, risks and benefits.

As set out in the case study below, our forecast methods are also leading the industry in how we leverage the data available to us from our smart meters and network systems to model network constraints.

CASE STUDY: COMPREHENSIVE TIME-SERIES LOW VOLTAGE NETWORK FORECASTING

Given the increasing volatility and uncertainty in demand forecasts, and the growing impacts of new technologies and change drivers on our network, we have invested significantly in developing an internal forecasting tool, known as Energy Workbench, to improve the granularity of our forecasting capabilities for network constraints.

Historically, we could only forecast point-in-time estimates for thermal constraints on our high voltage network. Energy Workbench, however, now allows us to forecast the location, timing and severity of thermal and voltage constraints across our entire network area, including low voltage (LV) and high voltage (HV) networks.

The tool uses real customer data and the interconnected nature of our network, and models change drivers such as solar systems and electric vehicles enabled by flexible exports, at a customer level, to create a robust bottom-up assessment.

HISTORIC CONSTRAINT MODELLING

- HV forecasts
- Forecasts thermal constraints for HV assets
- Forecasts daily minimum and maximum demand
- LV assessments limited to direct impact on individual circuits

NEW ENERGY WORKBENCH MODEL

- Holistic HV and LV forecasts
- Forecasts thermal and voltage constraints for HV and LV assets
- Forecasts demand for every 30-minute interval
- LV assessments based on power flow modelling that considers holistic localised network and customer impacts

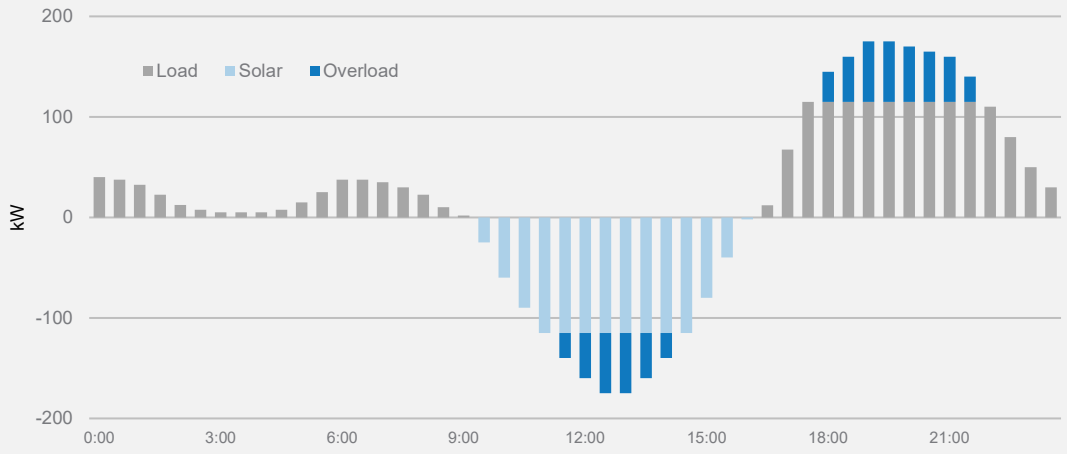


TABLE 1 FORECASTING APPROACHES FOR EACH CAPITAL EXPENDITURE CATEGORY

CATEGORY	FORECAST METHOD
Replacement Replacement (or other intervention) of existing network assets, for example due to unacceptable safety, reliability or environmental risks	• Replacement of high-volume, low-cost assets are typically based on observed historic trends and adjusted for any known changes or efficient proactive interventions • Replacement of low volume, high-cost asset works (e.g. zone substation transformers) are based on risk assessments of individual assets. Risk assessments compare a monetary value of the likelihood and consequence of failure on reliability, safety and the environment against the cost of options to manage risks, which can include replacement, refurbishment or other options
Augmentation Demand driven works to meet localised growth and demand at peak times, and non-demand driven works to maintain reliability, security and quality of supply	• Augmentation projects to resolve demand-driven constraints are identified by forecasting load growth and voltage levels and comparing these to available network capacity and voltage compliance obligations. Our augmentation forecast only includes capital works where the value of alleviating a constraint exceeds the cost • Non-demand driven works are forecast by considering the potential risk and consequence of adverse events, and to meet stipulated regulatory obligations where relevant
Resilience Supporting our network and communities to prepare, respond and adapt to the increasing frequency and severity of extreme climate events	• Resilience investments are forecast based on analysis of climate projections, their expected impact on our network, and the ability for any investments to improve how we and/or our communities can prepare, respond or adapt to climate extremes. Our forecasts are also targeted at locations or communities that are expected to be most vulnerable to prolonged outages, and are strongly informed by outcomes from our stakeholder engagement and reviews undertaken recently by the Victorian government
Consumer energy resources Delivering a combination of smart and flexible solutions, and no-regrets augmentation, to deliver customer value from CER investments	• We forecast time-series voltage and thermal constraints based on granular power flow modelling of our entire network. These constraints are valued in line with the AER's value frameworks including the value of customer reliability, customer export curtailment value and value of emissions reduction • A combination of ICT and augmentation-based initiatives are considered to efficiently alleviate constraints, ultimately delivering a level of service to customers commensurate with their value expectations
Connections Additions, upgrades or alterations to the shared network to meet the requirements of specific customer connections	• We employ a top-down forecasting approach for all connection expenditure categories where we apply forecast growth indices to each category to project future volumes based on historical volume baselines. These forecast volumes are then combined with historical baseline unit rates to determine the expenditure forecast
Non-network Maintain, upgrade or replace information and communications technology (ICT), property, vehicles or equipment to support our network operations	• For ICT assets, we forecast system upgrades required to maintain current ICT capability based on vendor support requirements and upgrade releases. As required, non-recurrent ICT investments are forecast based on new and/or evolving needs, including compliance with external obligations (e.g. new system to comply with AEMO requirements) • We forecast property upgrades based on a review of existing facilities to identify any changes needed to meet current health and safety requirements, and/or operational requirements to maintain network performance • We forecast volumes of vehicles, tools and equipment replacements based on historical investment rates, asset age and lifecycles

3.1.1 Top-down challenges

Our expenditure iteration process provides a top-down challenge on our capital investments by continually testing and refining individual investments and their contribution to our overall investment portfolio. Our ongoing stakeholder engagement process, including our draft proposal and the role of our customer advisory

panel, provides further challenge and testing of how well (or not) our overall package of works will deliver on our customer and stakeholder needs and expectations.

More specifically, we review the reasonableness of our bottom-up forecasts using top-down approaches:

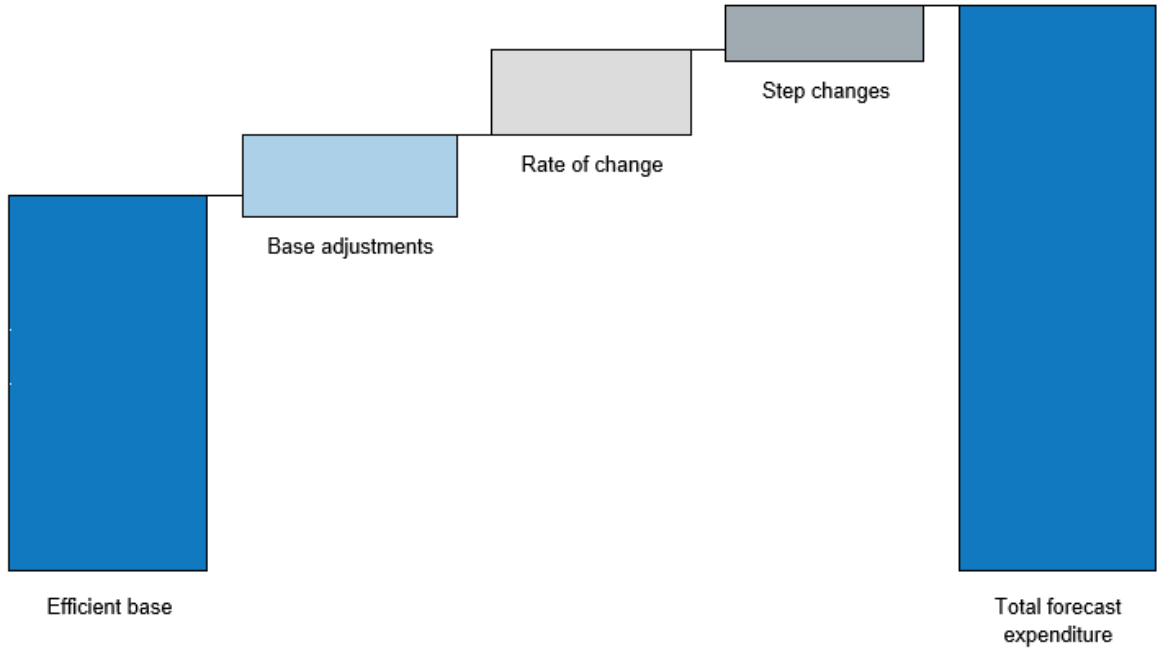
- comparing different capital works programs to align program timing where possible to achieve synergies in scope and works delivery, resulting in potential deferral or bring-forward of capital works
- deferring lower value capital works in response to stakeholder expectations to balance cost and service level outcomes
- assessing the deliverability of our forecast total portfolio of works given our forecast resourcing levels, resulting in reprioritisation, external resource availability and appropriateness, or deferral of work programs.

3.2 Operating expenditure

We forecast our total operating expenditure requirement using the base-trend-step approach, consistent with the AER's preferred assessment approach. Under this approach we:

- determine the efficient base year of expenditure
- apply a rate of change for growth in real input prices, network size and productivity
- adjust for step changes in scope occurring in the next regulatory period.

FIGURE 2 OVERVIEW OF OPERATING EXPENDITURE FORECAST APPROACH



3.2.1 Base year and adjustments

Our operating expenditure reflects the day-to-day costs of running our network efficiently, including network maintenance and operations, support services, vegetation management, non-network options, customer service and emergency response.

Our proposed base year will be the most recently available year of actual, audited operating expenditure performance at the time the AER is required to make its distribution determination, recognising that:

- we operate under the AER's efficiency benefit sharing scheme (EBSS), which incentivises us to seek efficiencies in our operating expenditure and share these savings with customers

- we continue to benchmark highly on the AER's operating expenditure benchmarks.

Adjustments are also made to our base year to align with relevant changes, such as to our capital allocation methodologies.

3.2.2 Rate of change

We apply a rate of change to trend our base expenditure into the future. Our rate of change approach includes:

- **real price escalation**: we apply forecast real price escalation to our costs for labour and non-labour inputs to reflect expected price changes in future
- **output growth**: we forecast increased operating expenditure to meet network growth over the 2026-31 regulatory control period, including growth in customer numbers, peak demand and line length
- **productivity growth**: productivity growth reflects shifts in the production possibility frontier driven by technology advancements or other innovations.

3.2.3 Step changes

Finally, we adjust our base operating expenditure to account for step changes in operating expenditure that increase our costs during the regulatory period, but that are not already captured in base expenditure or the rate of change.

Activities impacting the scope of our operating expenditure can include changes in regulatory obligations, substitutions between operating and capital expenditure, technological change or other material changes in cost drivers.