

Overview

Without a constraint on electricity emissions, Australia will find it difficult to meet its emissions-reduction targets. Left to its own devices, the electricity sector will continue to decarbonise, but not fast enough.

Expanding the Safeguard Mechanism – a federal government policy which already constrains greenhouse-gas emissions from big industry – to the electricity sector could solve this problem.

This need not mean a big jump in household energy bills. Household bills are already on track to halve by 2050 as more people move away from using petrol and gas, and constraining electricity emissions in the way we recommend would shave that saving only slightly.

Our modelling finds that, with no policy change, the average annual household energy bill (including petrol, electricity, and gas) in 2050 would be about \$2,900 – down from about \$5,800 today.

For too long, governments in Australia have avoided pricing carbon because the trade-off is higher electricity prices. But this assumption is becoming outdated, because the world has changed since Australia last debated carbon pricing.

Renewable power has grown from 11 per cent of total electricity generation in 2008 to 36 per cent in 2024. The cost of wind power has fallen by 25 per cent, and the cost of solar by 88 per cent. Batteries and storage have become realities. Coal plants have been closing without the lights going out, and most remaining coal-fired power stations are scheduled to close in the next decade or so. Carbon markets have matured. Many of Australia's most important trading partners are acting to reduce emissions, and using trade policies to ensure no unfair advantage accrues to countries that don't price carbon. And the benefits to households of the energy transition are now clear.

The Safeguard Mechanism is already constraining emissions in the industrial and transport sector, so it would be a natural choice to use it in the electricity sector. It may require some modifications, but no wholesale redesign. It also has a good chance of maintaining bipartisan support, because it was introduced by the former Coalition government and has been reformed to reduce emissions by the incumbent Labor government. And it would make upcoming essential reforms to the National Electricity Market more effective.

The Safeguard will be reviewed next year. The federal government should use that review to analyse the benefits and costs of activating the Safeguard in the electricity sector. In the meantime, all governments should increase efforts to ensure all households can get the benefits of electrification.

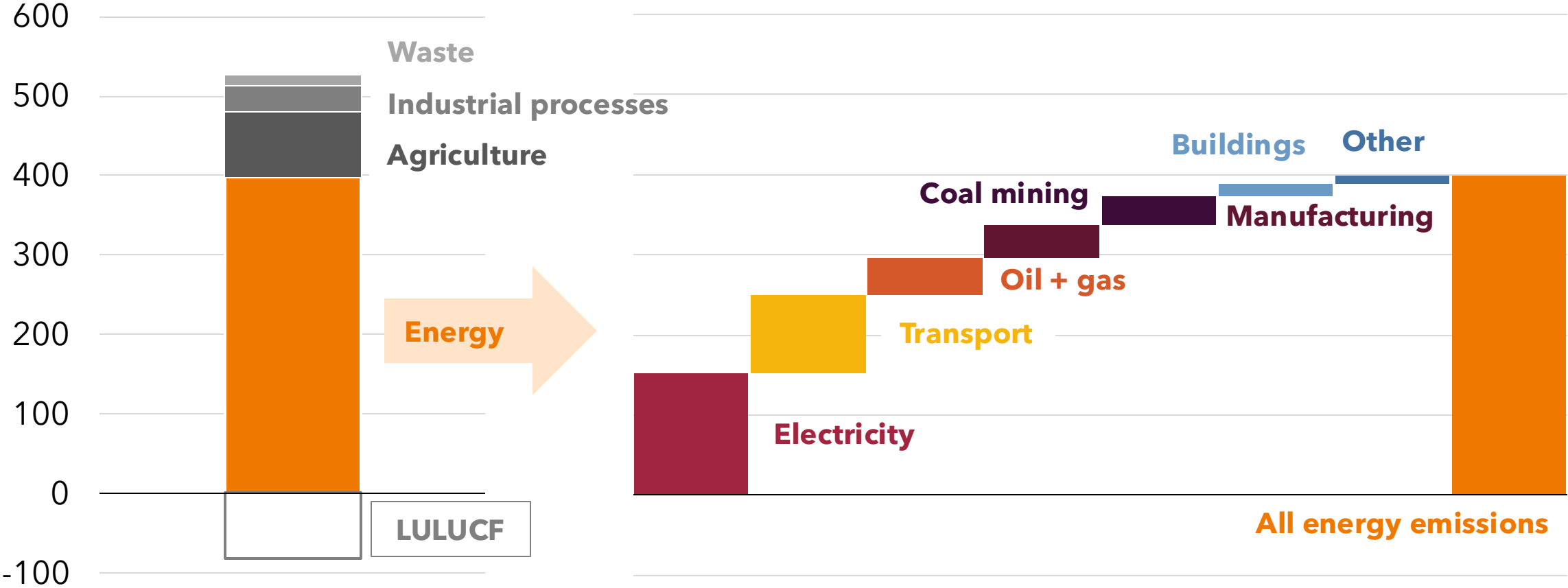
Introducing a carbon constraint into the electricity sector would increase Australia's chances of finding the least-cost road to net zero, and could be done without hurting households. This report shows how.

Recommendations

1. The federal government should begin designing and consulting on policies to constrain emissions in the electricity sector from 2030, to complement measures recommended by the National Electricity Market review, and to keep costs low for consumers.
2. The federal government should focus on extending the Safeguard Mechanism into the electricity sector, and it should test the effect on the wider economy via the planned review of the Safeguard Mechanism in 2026-27.
 - a. This should include considering the impact on other Safeguard facilities, the supply of Safeguard Mechanism Credits, appropriate thresholds for participation, and treatment of new entrants.
3. Federal and state governments should maintain and extend programs to ensure that the benefits of electrification are available to all households.
 - a. Ensure renters, low-income households, and multi-unit dwellings have access to rooftop solar, batteries, electric vehicles, and all-electric appliances.
4. Federal and state governments should continue reforms to make planning approvals for transmission faster and easier, and build social licence in host communities.

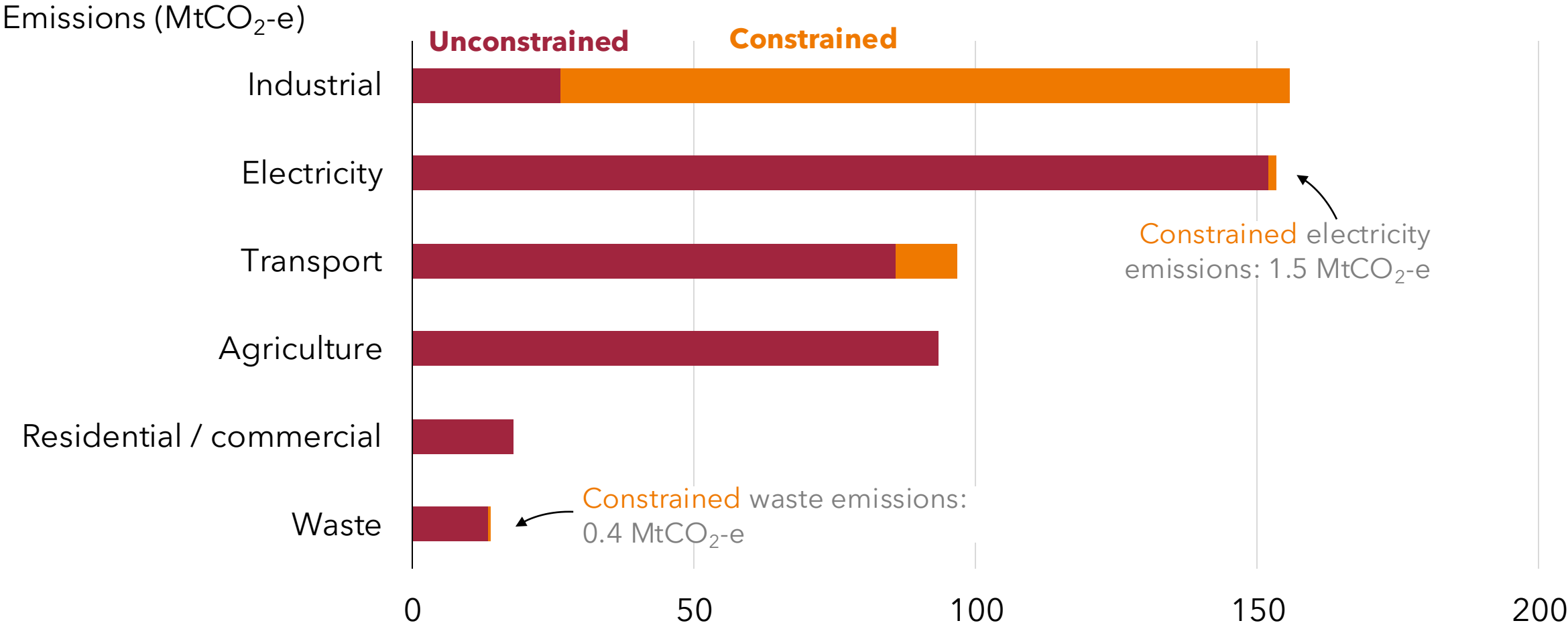
Most of Australia's emissions come from energy, and most energy emissions come from electricity...

Emissions (MtCO₂-e in 2023)



Note: MtCO₂-e = Millions of tonnes of carbon dioxide-equivalent. LULUCF = land use, land-use change, and forestry. 'Oil + gas' includes oil and gas extraction, processing, refining, and delivery. 'Buildings' includes all stationary fuel combustion emissions in the commercial and residential sectors. 'Other' includes stationary fuel combustion emissions from manufacture of solid fuels, agriculture, forestry, fishing, and military activities; and fugitive energy emissions not associated with oil, gas, and coal production.
Source: Grattan analysis of DCCEE (2023)

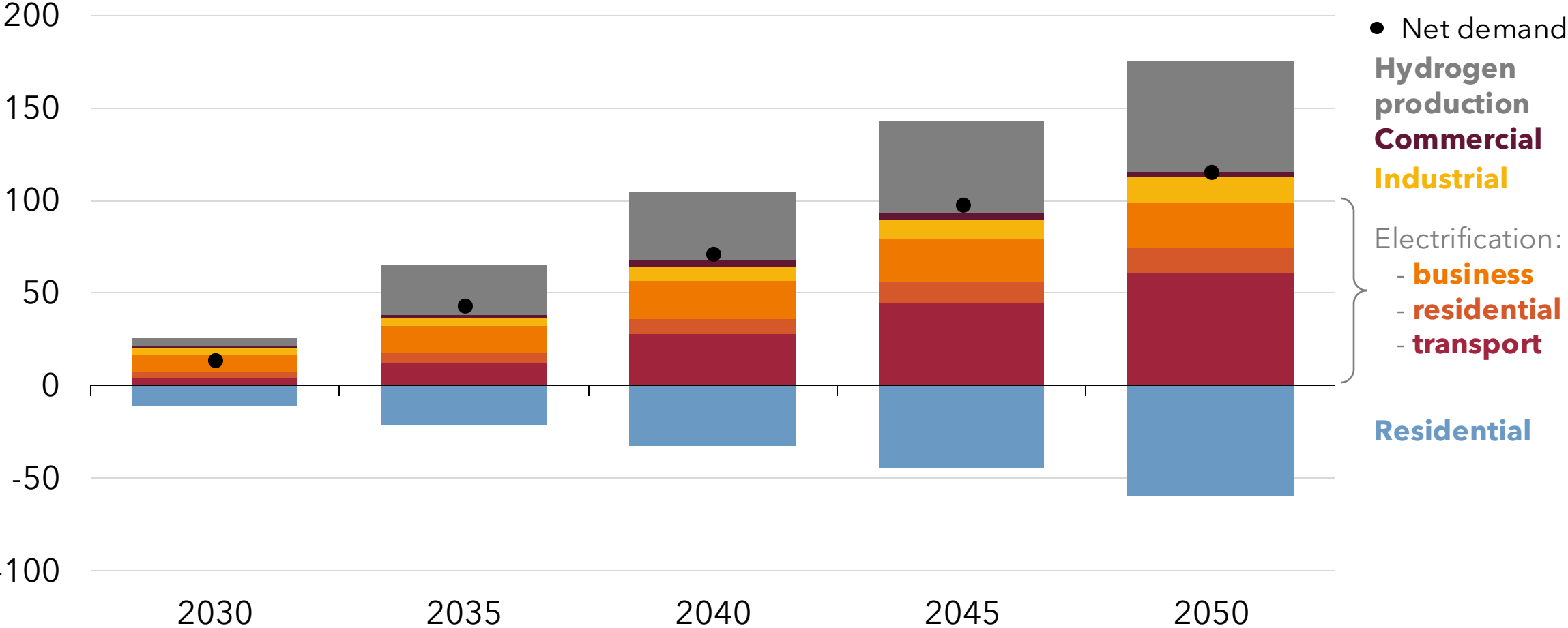
... and most of Australia's emissions are not subject to an effective regulatory constraint



Note: MtCO₂-e = Millions of tonnes of carbon dioxide-equivalent. Land sector and military emissions not shown.
Source: Grattan analysis of DCCEEW (2023), CER (2025), and BITRE (2023).

Electrification to support net zero will drive an expansion of the electricity system

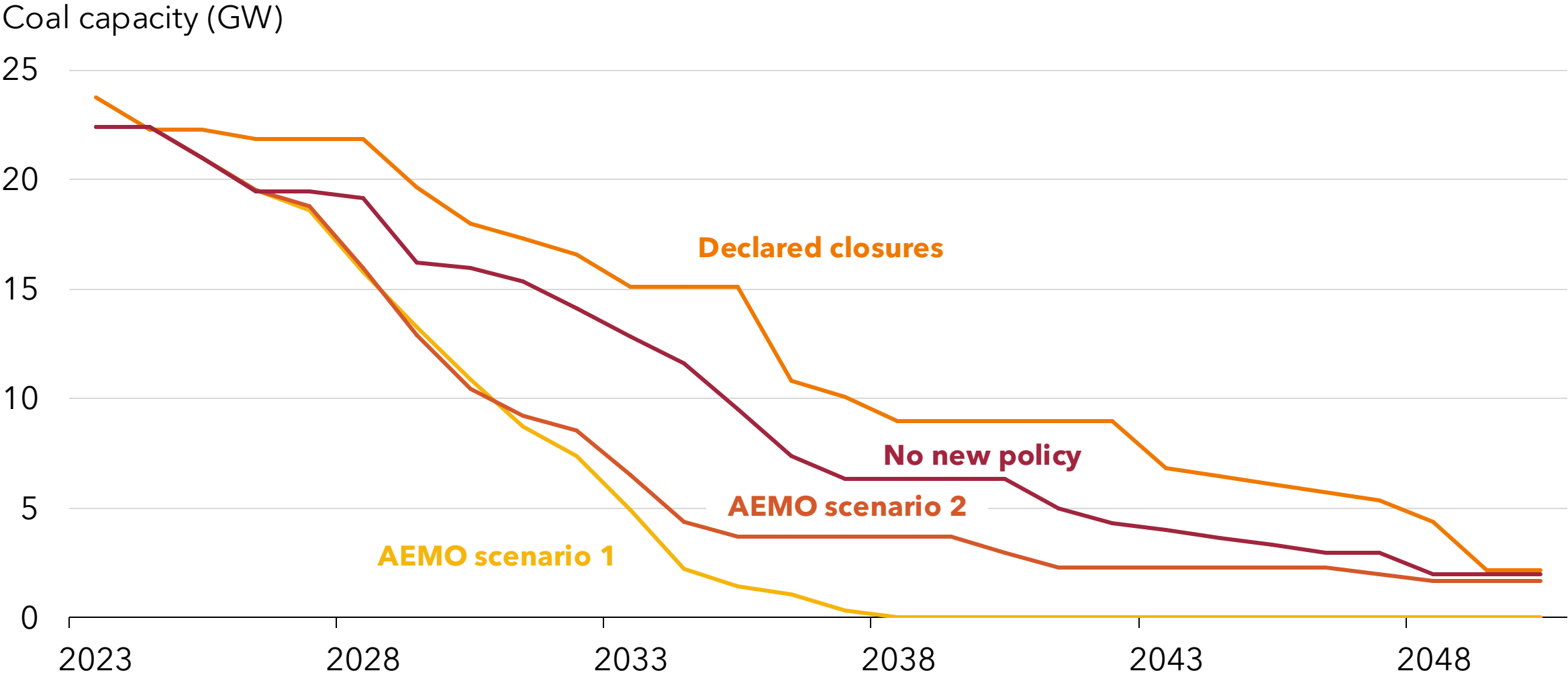
Additional electricity demand (TWh) above 2025 levels, National Electricity Market



Note: 'Industrial' category includes large industrial loads and LNG. Residential sector has falling demand because of increased uptake of rooftop solar (which shows up as reduced demand in the NEM due to own consumption and net exports to the grid). 'Hydrogen production' category includes production for domestic use and exports

Source: Grattan analysis of AEMO (2024a).

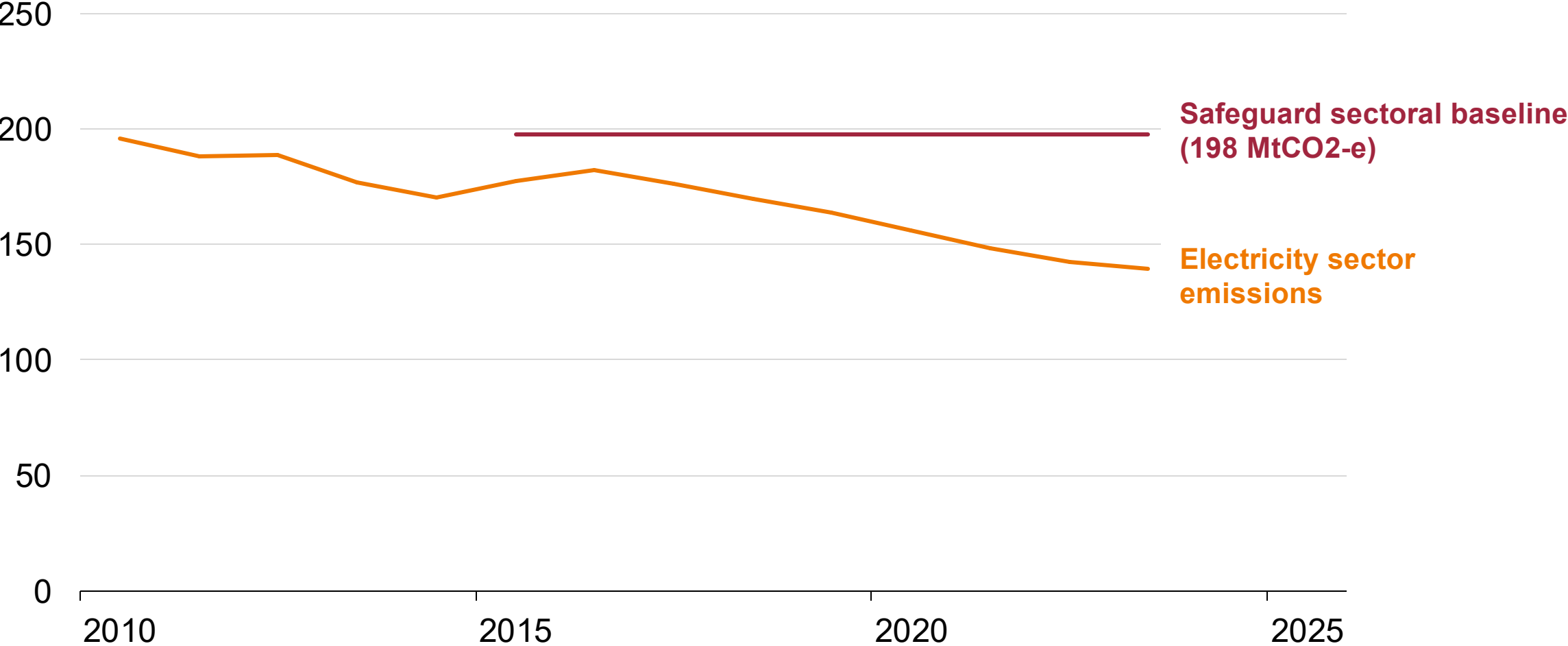
Over the same timeline, all scenarios show coal exiting quickly for economic reasons



Note: Includes National Electricity Market (NEM) and Western Electricity Market (WEM). Worsley Power Station not included because it is converting to gas rather than exiting the WEM. 'Declared closures' scenario assumes Callide C Units 3 and 4 remain open past 2050 in the absence of a nominated closure date and is correct as at 9 May 2025. AEMO = Australian Energy Market Operator. 'AEMO scenario 1' combines Integrated System Plan (ISP) Step Change scenario and WEM Electricity Statement of System Opportunities (ESOO). 'AEMO scenario 2' combines ISP Progressive Change scenario and WEM ES00. 'No new policy' was modelled by Jacobs on behalf of Grattan.
Source: Declared closures: AEMO (2025). No new policy: Jacobs (2025). AEMO Scenarios: AEMO (2024c) and AEMO (2024d).

The electricity Safeguard baseline is well above business-as-usual emissions, with almost no impact

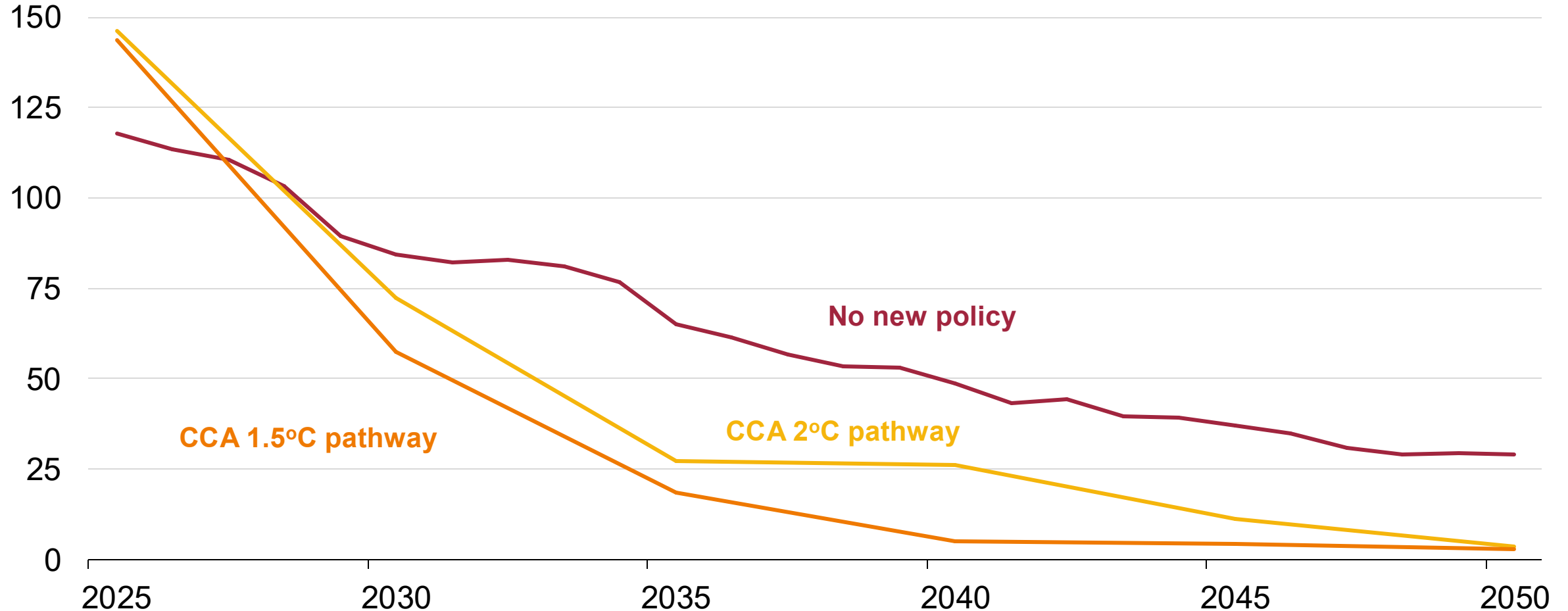
Electricity sector emissions (MtCO₂-e)



Note: MtCO₂-e = millions of tonnes of carbon dioxide-equivalent. Electricity emissions exclude off-grid electricity generation, because this is not covered by the sectoral baseline.
Source: DCCEEW (2024a) and Commonwealth Government (2015).

Without policy change, electricity emissions will stay too high for too long

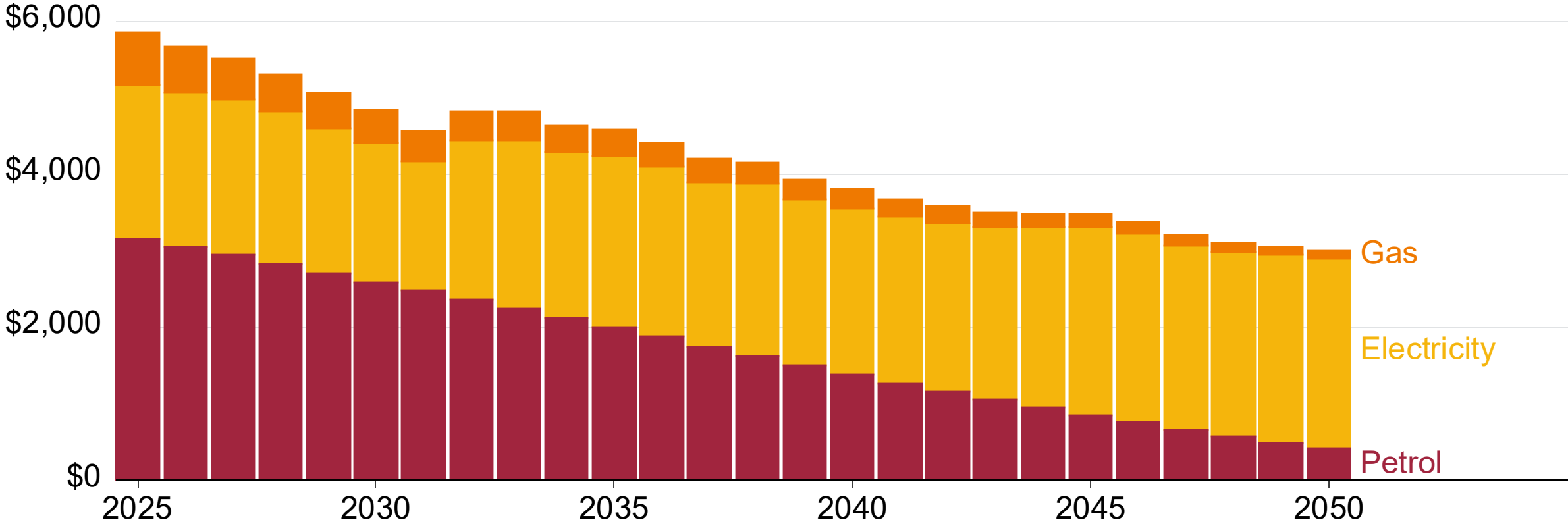
Electricity sector emissions (MtCO₂-e)



Note: CCA = Climate Change Authority. CCA scenarios only report data every five years. For a full description of the assumptions behind the 'No new policy' scenario, see Appendix B.
Source: Jacobs (2025), CCA (2024b).

Households are set to save on energy costs throughout the transition

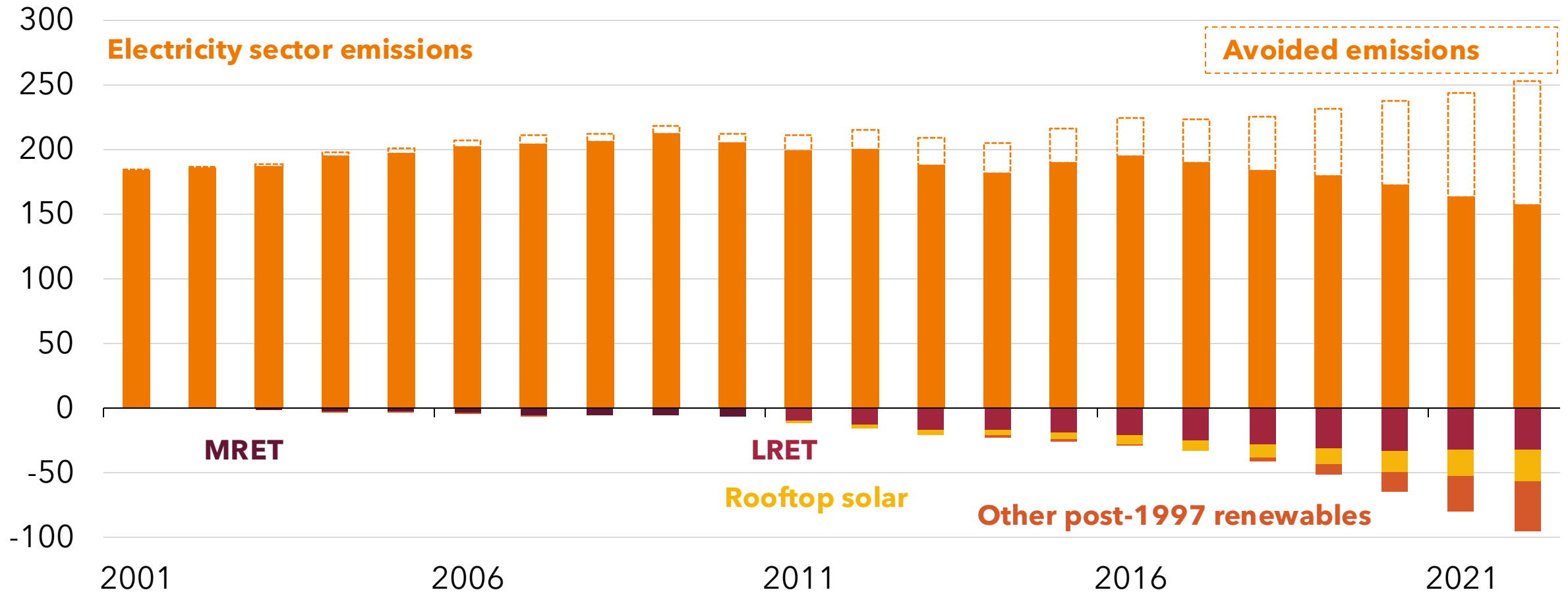
Average NEM household energy costs in the Safeguard < 2°C scenario, (\$2025)



Source: Grattan analysis.

Since 2005, electricity emissions have been falling as renewables take a greater share of generation

Electricity sector emissions, avoided emissions, and sources of abatement (MtCO₂-e)

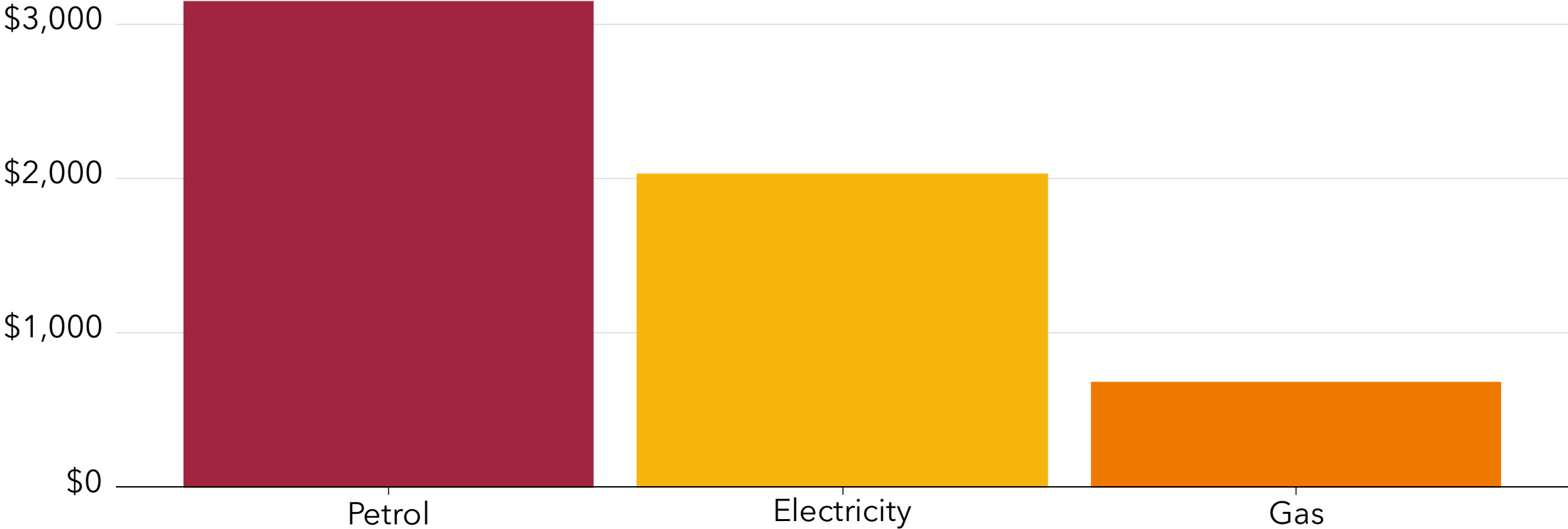


Note: MtCO₂-e = millions of tonnes of carbon dioxide-equivalent. MRET = Mandatory Renewable Energy Target. LRET = Large-scale Renewable Energy Target. SRES = Small-scale Renewable Energy Scheme. The LRET and SRES replaced the MRET in 2011. Abatement assumes that extra renewable generation in a given year would otherwise have been generated at the emissions intensity of the previous year.

Source: Grattan analysis of DCCEEW (2025b) and DCCEEW (2023).

Electricity forms just part of total household energy costs

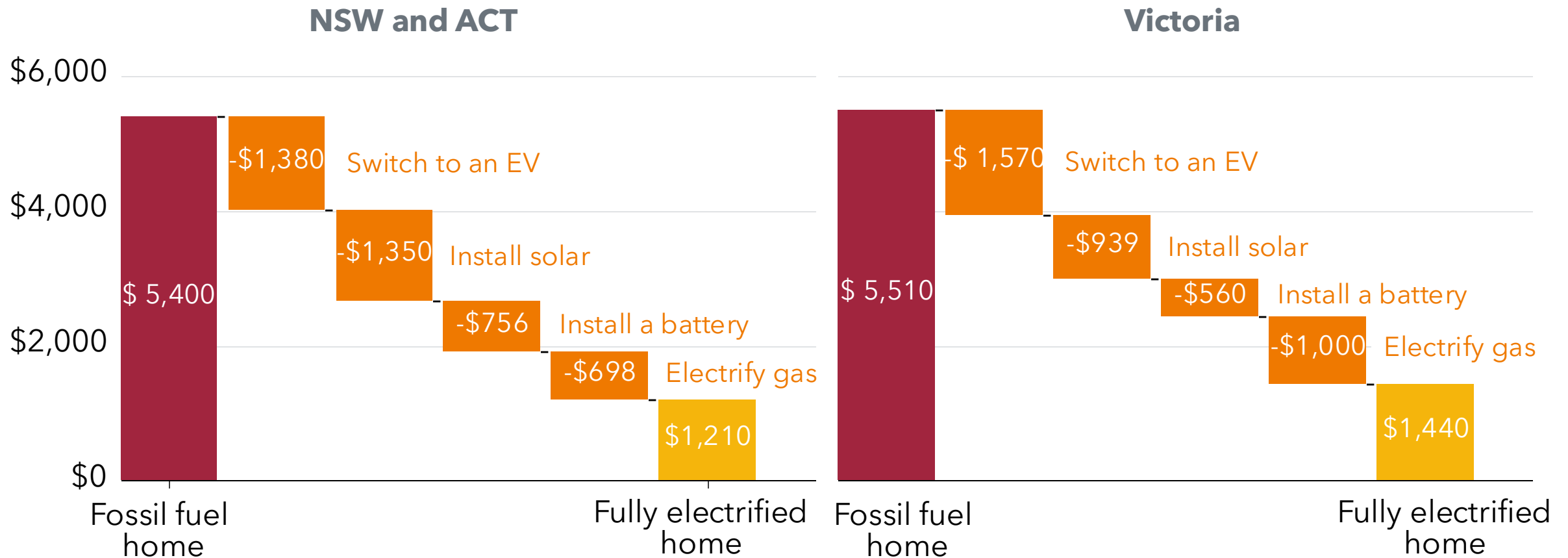
Average annual household energy costs in NEM states, by fuel source, 2025



Source: Grattan analysis.

Households can make large savings by switching to electricity and solar

Annual household energy costs, by household type in 2025

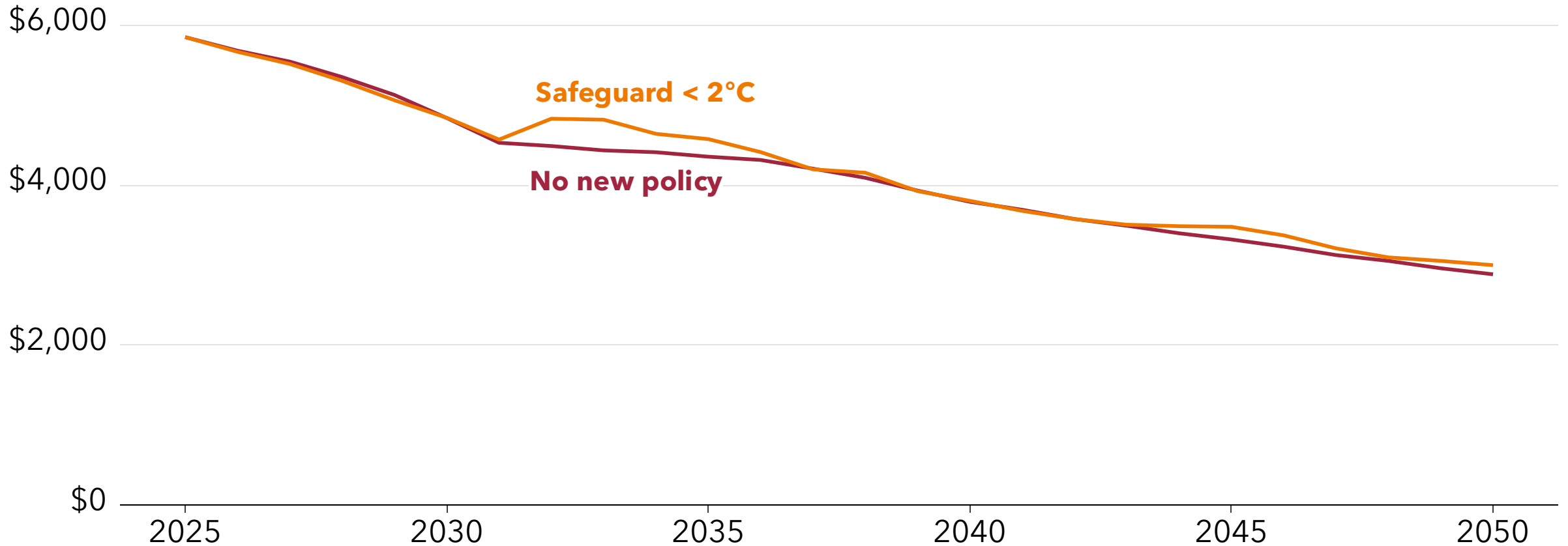


Notes: Costs represent the estimated total energy costs for a household in 2025 depending on their household type. The order of installing solar and a battery relative to other steps affects the size of the saving for that step. For this analysis, a fossil fuel home is one without a solar array or battery installed, with gas cooking and water and space heating, and with a single petrol car.

Source: Grattan analysis.

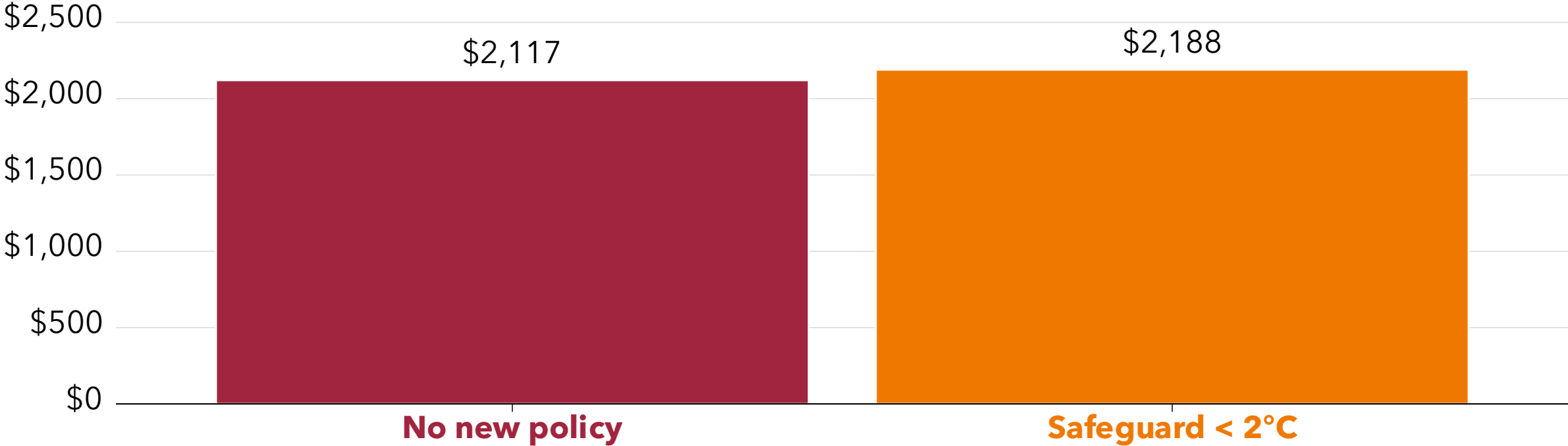
Households' energy bills will fall significantly between now and 2050, including under the Safeguard

Average NEM household energy costs by scenario



Electricity bills would be only \$70 higher on average under the Safeguard

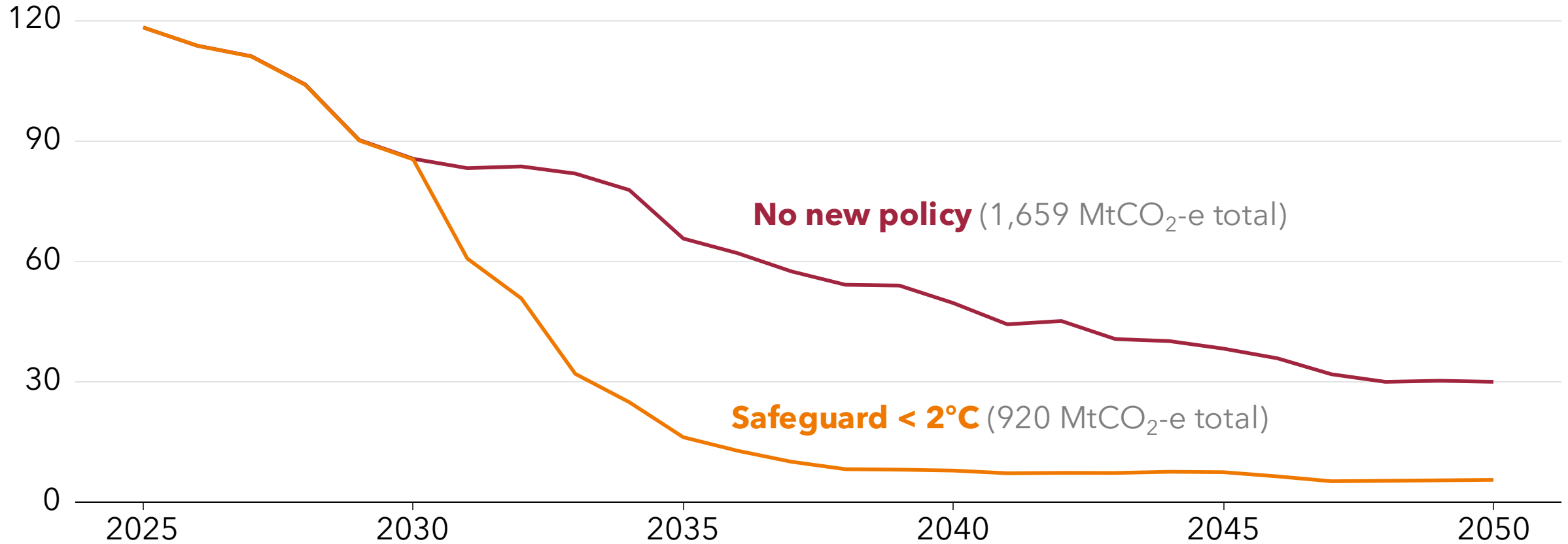
Average annual household electricity bills in the National Electricity Market, 2026 to 2050 (\$2025)



Note: bill average calculation based on the consumption and costs faced by all households.
Source: Grattan analysis of Jacobs (2025)

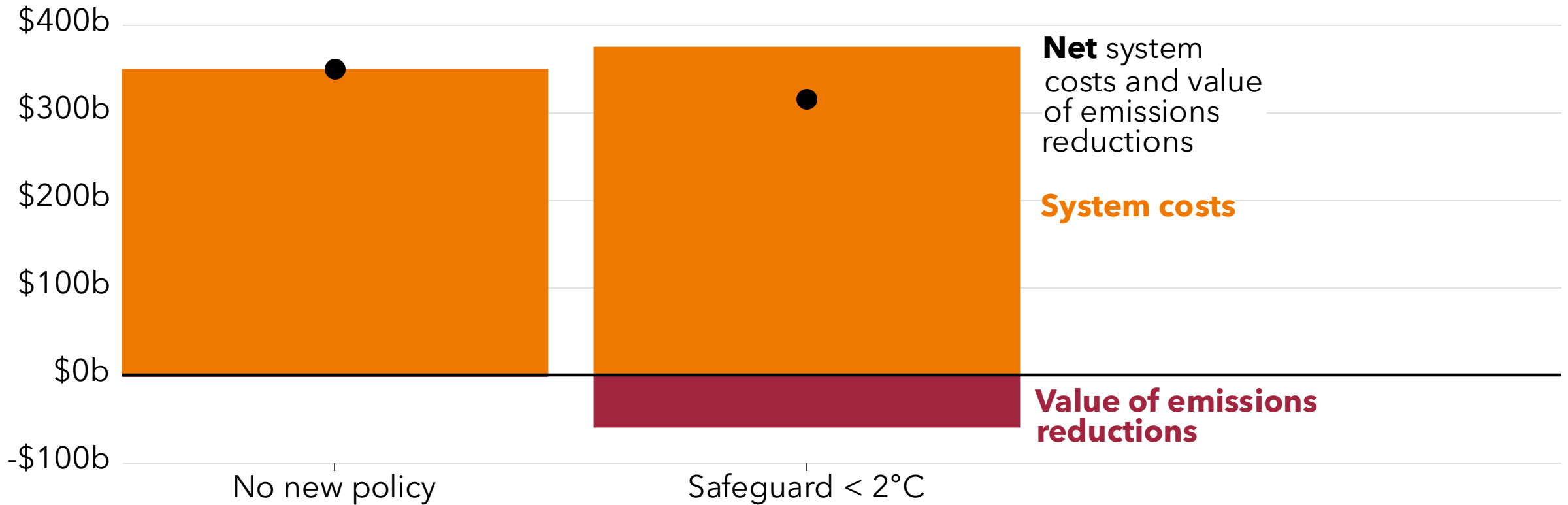
Emissions would fall quickly under the Safeguard

Annual and total Australian electricity sector emissions (MtCO₂-e), 2026 to 2050



Total system costs would be lower under the Safeguard

Net present value of system costs and emissions reductions (\$2025)

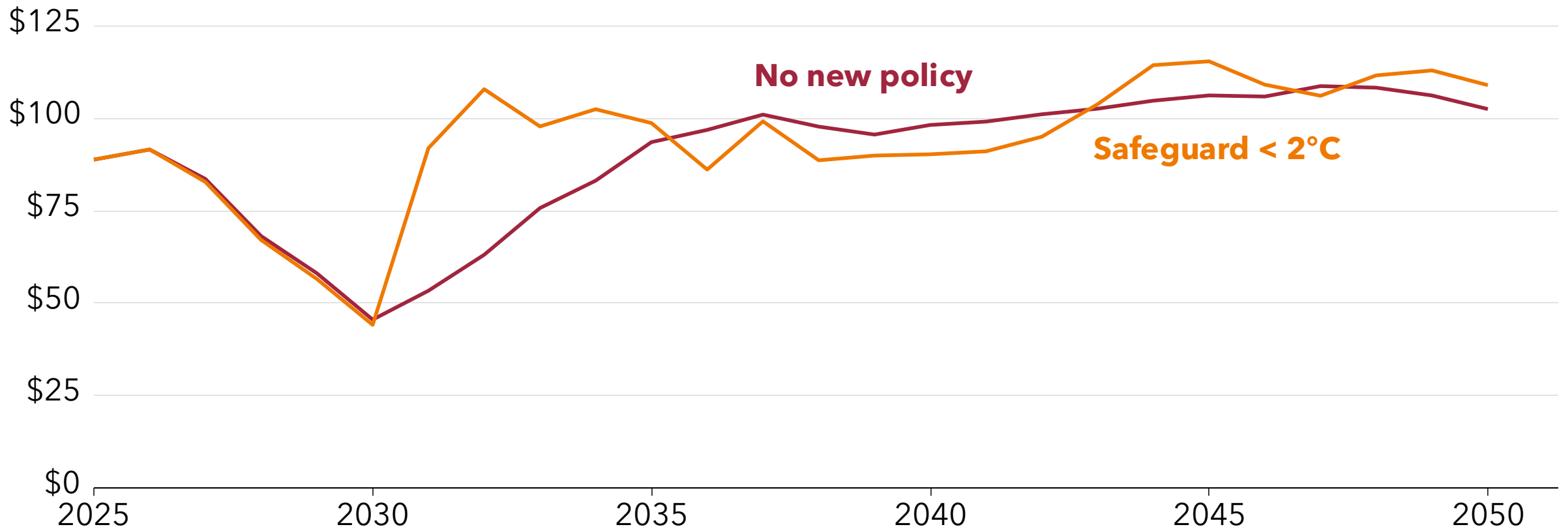


Note: Total net system costs and value of emissions reductions is calculated by summing the present value of the total cost of building, fuelling, and operating generation, storage, and transmission assets. The present value of total emissions reductions is that incremental to the 'no new policy' scenario. The value of emissions reductions is calculated using Australian Energy Regulator (AER) guidance values. Net present value is calculated using a discount rate of 7.4 per cent

Source: Grattan analysis of Jacobs (2025), AEMC (2024).

After an initial adjustment, wholesale prices are similar under both scenarios

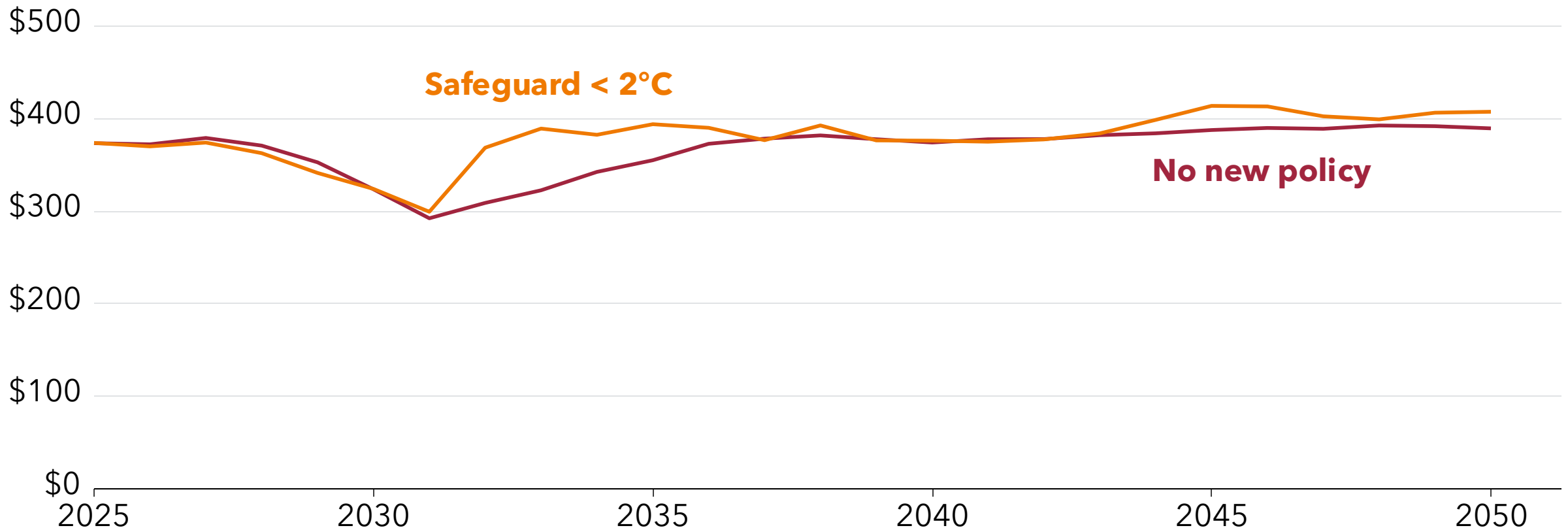
Average time-weighted wholesale price across all Australian grids (dollars per MWh), 2025 to 2050 (\$2025)



Notes: Average prices are calculated by weighting prices in each grid by total sent out generation.
Source: Grattan analysis of Jacobs (2025).

Retail prices are also similar over the full time period

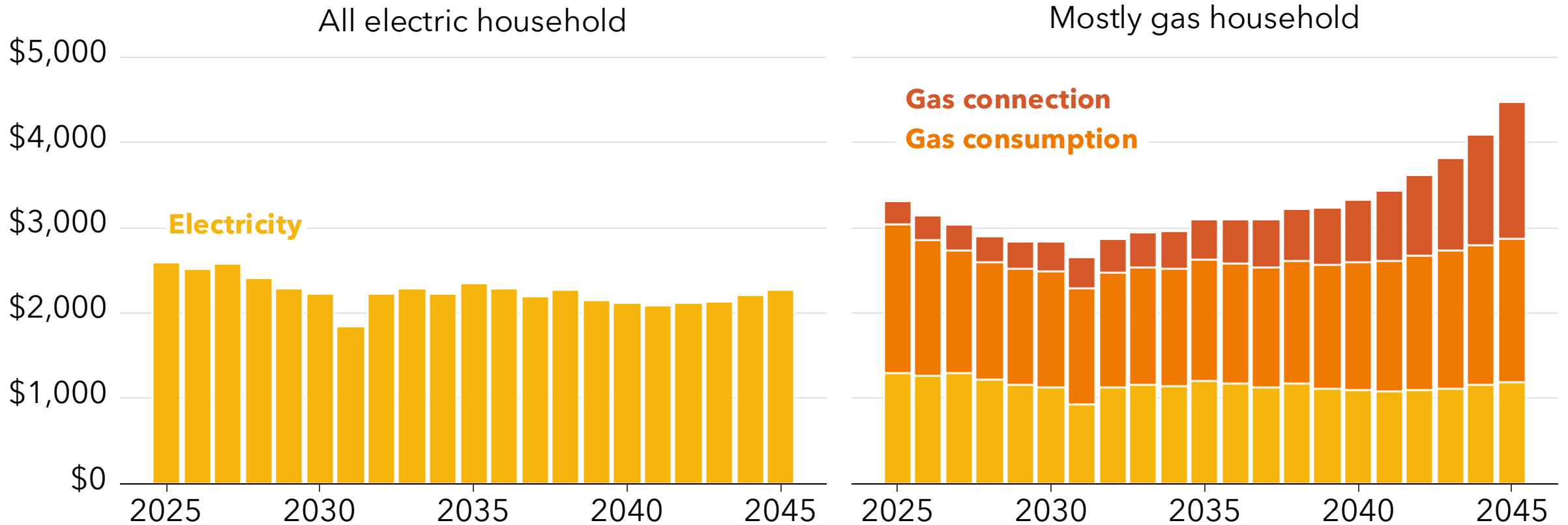
Average NEM residential retail prices, dollars per MWh (\$2025)



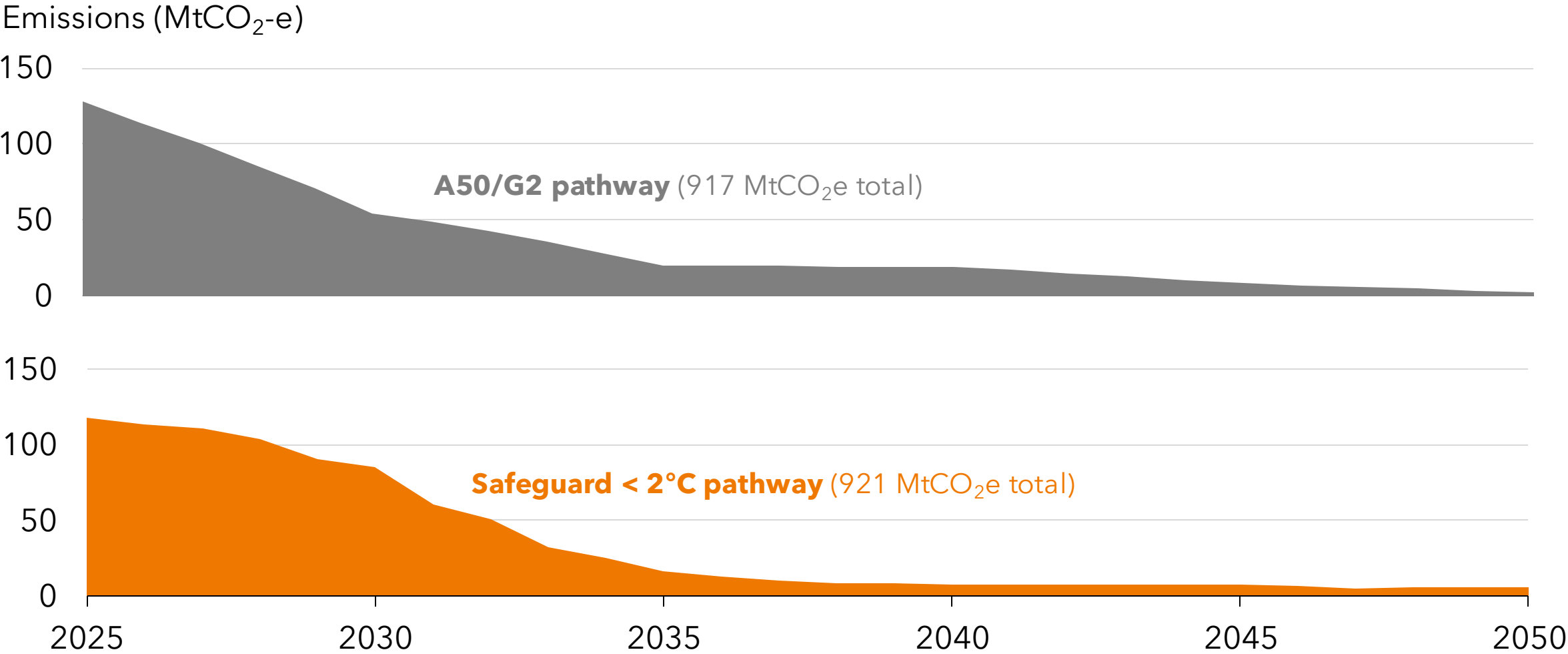
Note: Average prices are calculated by weighting prices in each state by the estimated residential billable volumes.
Source: Grattan analysis of Jacobs (2025).

As connection charges grow, households that are stuck on gas will pay far more than they need to

Annual gas and electricity costs by household type, Victoria, 2025 to 2050 (\$2025)



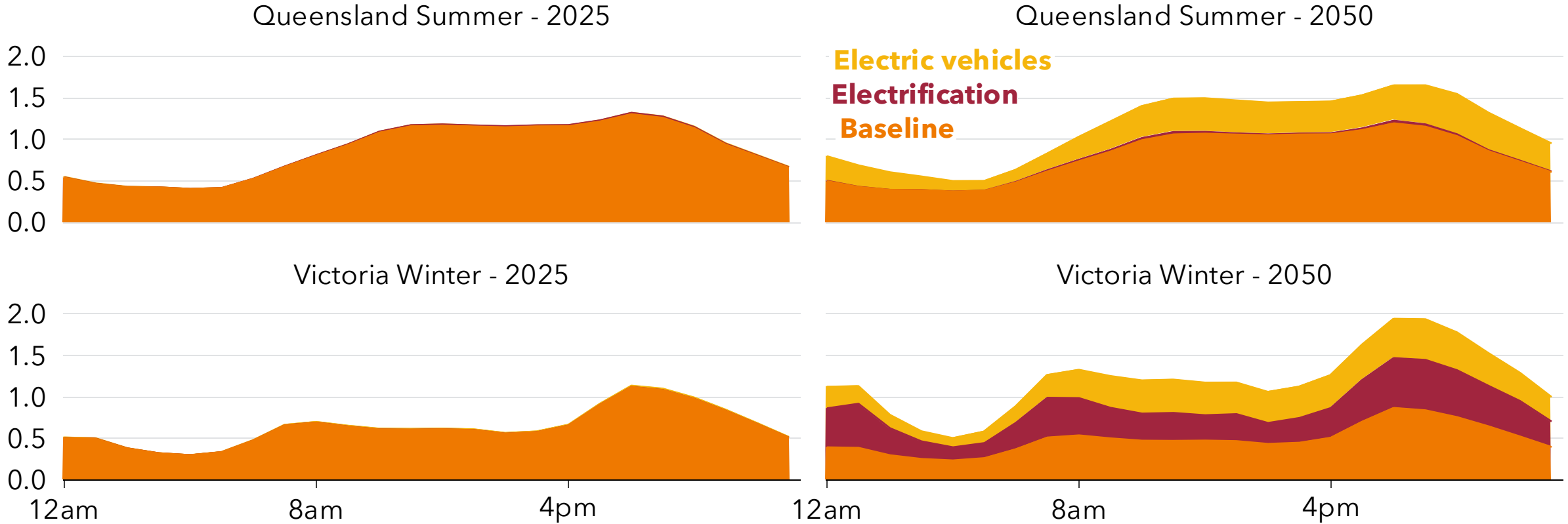
Cumulative emissions from policy scenarios are within 4 MtCO₂-e of the CCA's electricity emissions



Source: Grattan analysis of Jacobs (2025) and CSIRO (2024).

Underlying electricity demand will change substantially over time

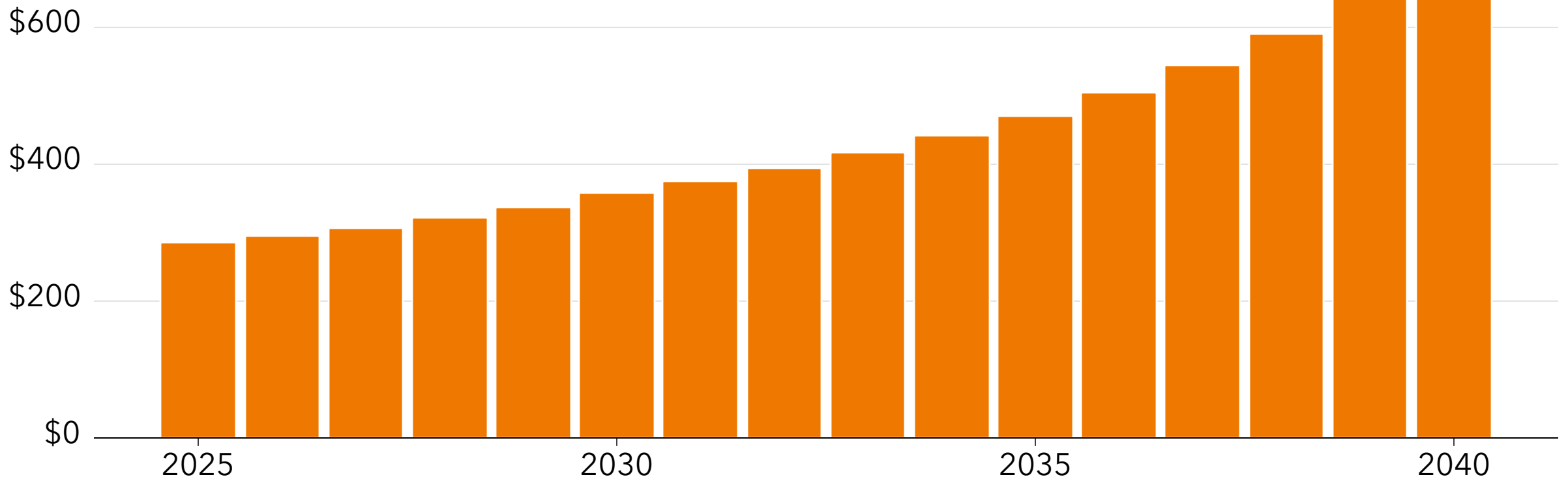
Average time-of-use demand for a household without solar (kilowatts)



Source: Grattan analysis.

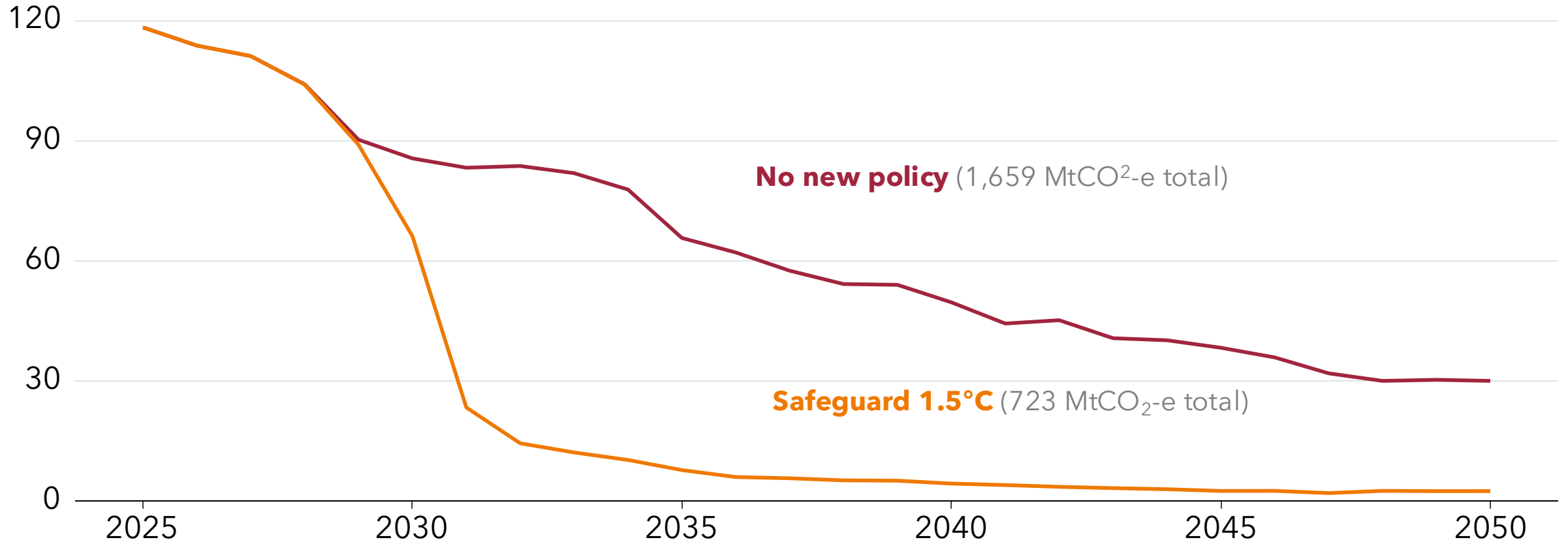
Residential gas network charges are set to rise rapidly

Projected annual average NEM residential network charges in the NEM, 2025 to 2040 (\$2025)



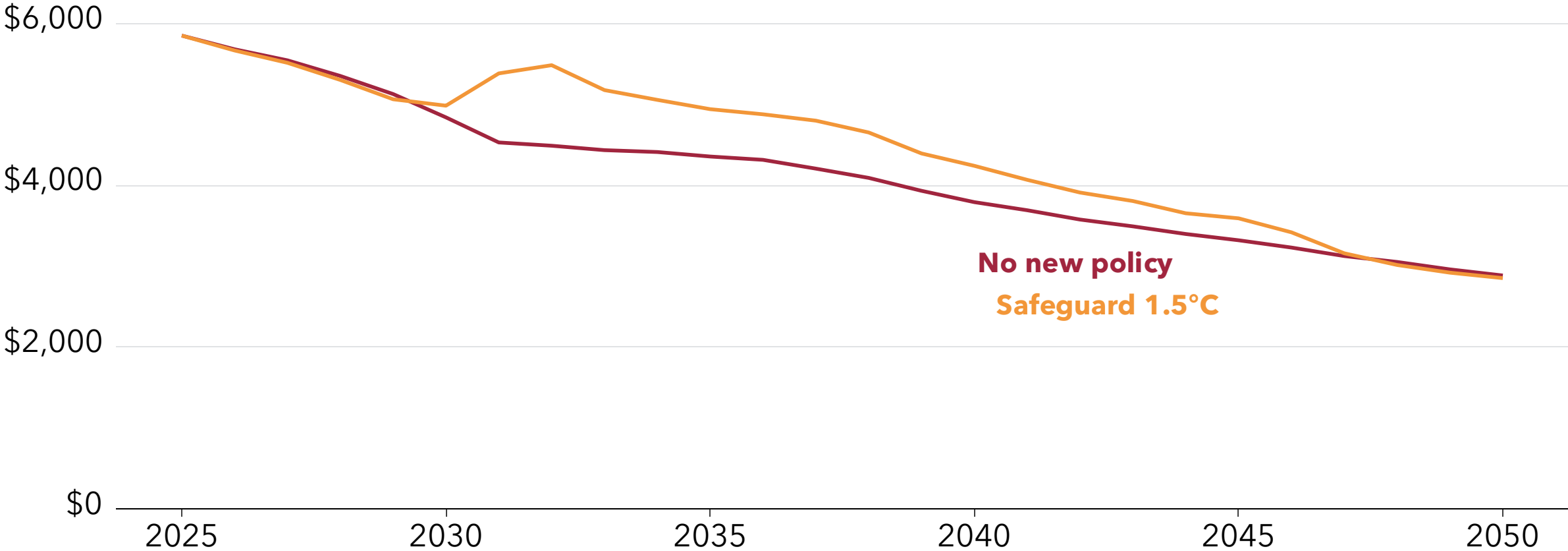
Emissions fall more rapidly in the 1.5°C scenario, limited to less than half 'no new policy' emissions

Annual and total Australian electricity sector emissions (MtCO₂-e), 2026 to 2050



Total energy costs fall significantly to 2050, and there is marginal difference under the Safeguard

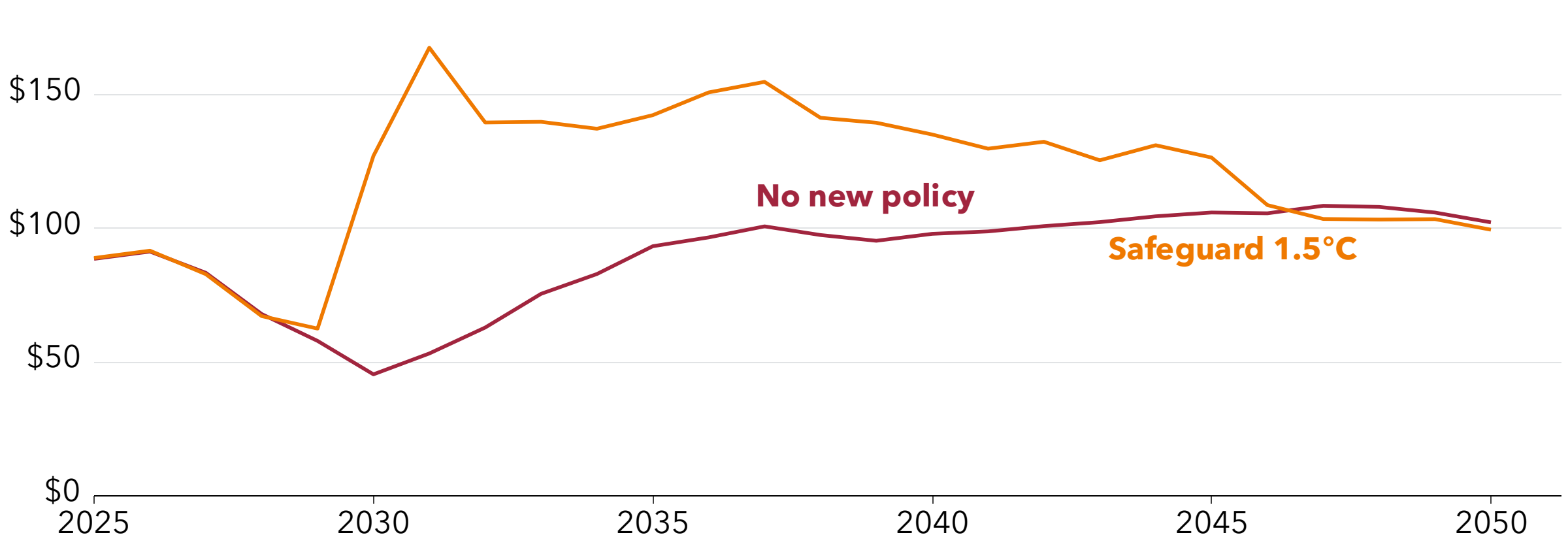
Average annual household energy costs (\$2025)



Source: Grattan analysis of Jacobs (2025).

Wholesale prices are more volatile in the Safeguard scenario

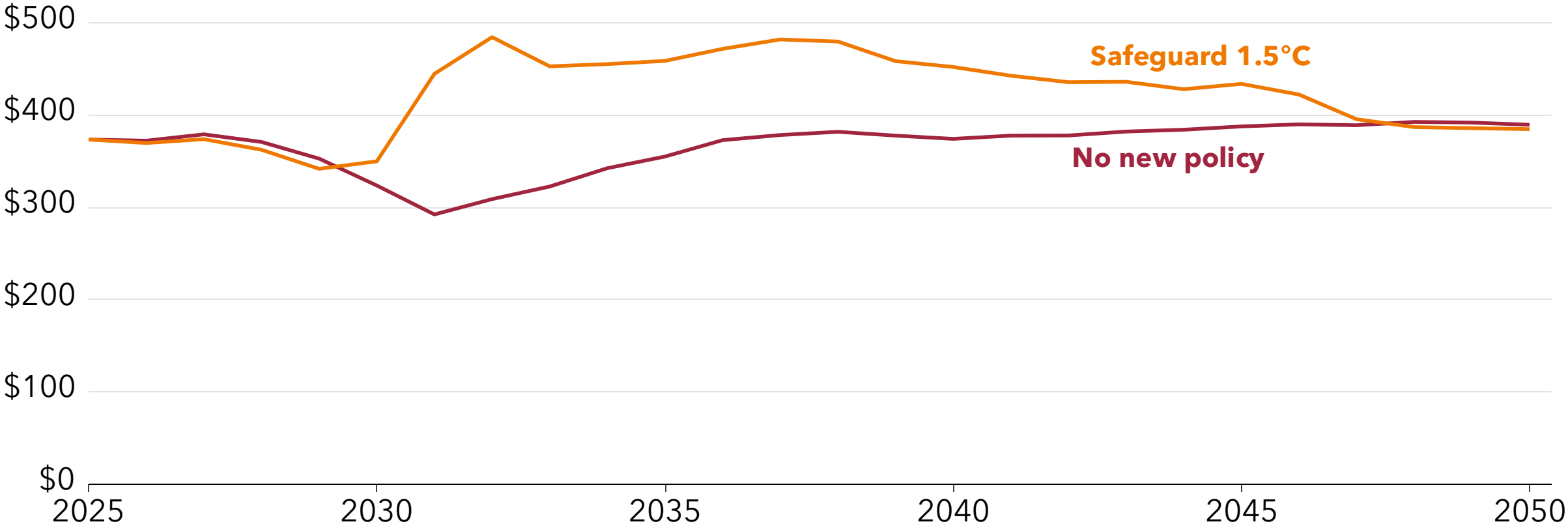
Average time-weighted wholesale price across all Australian grids, dollars per MWh (\$2025)



Notes: Average prices are calculated by weighting prices in each grid by total sent out generation.
Source: Grattan analysis of Jacobs (2025).

Safeguard retail prices spike and remain higher until around 2050

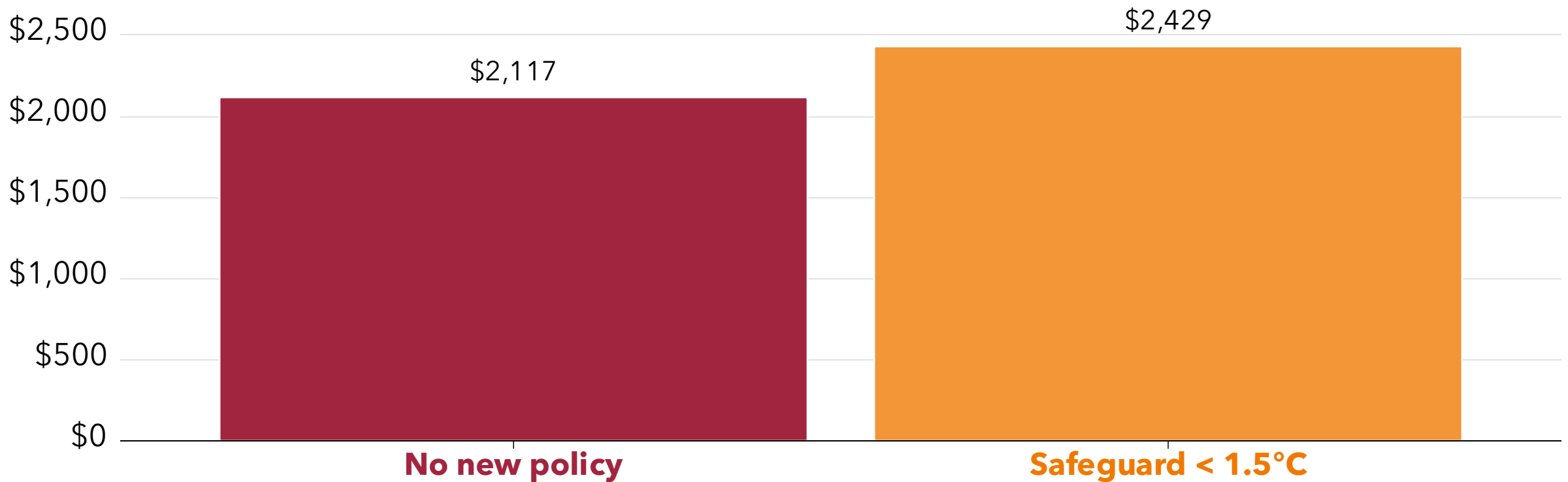
Average NEM residential retail prices, dollars per MWh (\$2025)



Note: Average prices are calculated by weighting prices in each state by the estimated residential billable volumes.
Source: Grattan analysis of Jacobs (2025).

The Safeguard is relatively more expensive in the 1.5°C scenario due to a higher adjustment cost

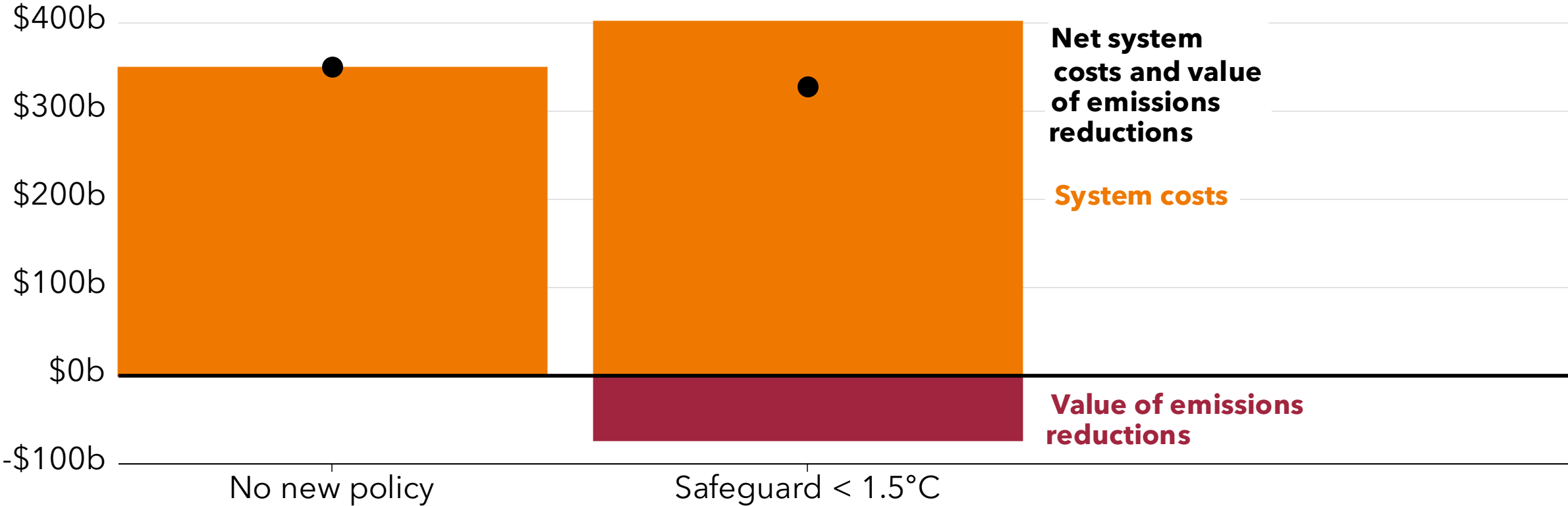
Average annual household electricity bills in the National Electricity Market, 2026 to 2050 (\$2025)



Note: Simple average over the period of 2026 to 2050 used.
Source: Grattan analysis of Jacobs (2025).

However, the Safeguard is still efficient in the 1.5°C scenario

Net present value of system costs and emissions reductions, in billions (\$2025)



Note: Total net system costs and value of emissions reductions is calculated by summing the present value of the total cost of building, fuelling, and operating generation, storage, and transmission assets. The present value of total emissions reductions is that incremental to the 'no new policy' scenario. The value of emissions reductions is calculated using Australian Energy Regulator (AER) guidance values. Net present value is calculated using a discount rate of 7.4 per cent
Source: Grattan analysis of Jacobs (2025), AEMC (2024).