Solar charged EVs in Australia

Unlocking Australia's $8.9B market for electric vehicles with household solar and battery systems

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Plenti accenture

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Electric vehicles and **solar panels and batteries** will change the way Australians see **household** energy

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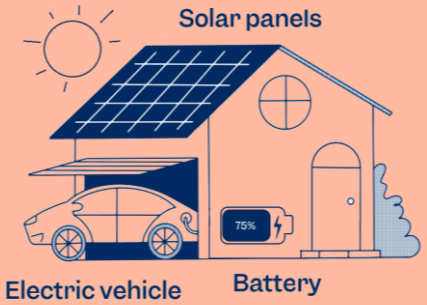
~58,000 EVs

Australia has strong demand for EVs, with potential sales to reach 58,000 in 2022

EVs are now **cost-competitive** with combustion engine cars over their lifecycle

83%

Together, an EV, solar and a battery can reduce average household emissions by up to **83%** compared to using an ICE car and grid power



The combination of **EVs with solar and battery systems** could be worth

$8.9B

per year in 2026

Most Australian households will see a **positive financial return** by switching to an EV and solar and a battery compared to using ICE and grid power over 15 years

$230/year

Installing solar and batteries limits the average electricity bill of households with EVs to $230/year

6.5x

Australia could grow EV sales by **6.5x** by 2026 if strong policy support and sustainable finance options are in place

EVs with household solar and battery systems are changing the future of household electricity. This report explores their potential in Australia.

Electric vehicles, solar panels and batteries will change the way Australians see household energy.

Compared to vehicles with internal combustion engines (ICE), Electric Vehicles (EVs) are cheaper to fuel and maintain and produce less carbon emissions.

Households with an EV, solar panels and a battery, can charge their vehicle and power household appliances with solar. Excess solar power can be sold to the grid via a feed-in-tariff (FiT) or be stored in the battery for later use. At night, during cloud cover, or when consumption is higher than solar output, the electricity stored in the battery can be used to power the EV and appliances.

By connecting this home setup with others on the network, households can be part of a virtual power plant (VPP), where they get paid to send power back to the grid when there is excess demand in the grid.

By reducing their need for grid electricity and by earning income from feed-in tariffs and VPP payments, households can lower their electricity costs and cut their carbon emissions. This report quantifies those benefits for Australian households.

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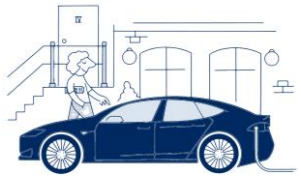
Future household energy systems will enable families to generate their own clean energy to power EVs and household appliances, and receive additional income

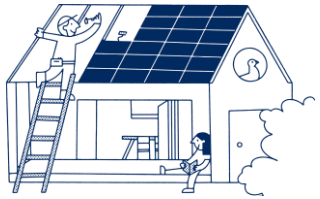


Electric vehicles

- EVs outperform conventional vehicles. They have lower running costs, offer a better driver experience and are more environmentally friendly.

Batteries

- Home batteries (typically lithium-ion batteries) can store excess solar electricity for future use when the sun disappears.
- While battery prices are relatively expensive, prices are expected to drop in the coming years.[1]



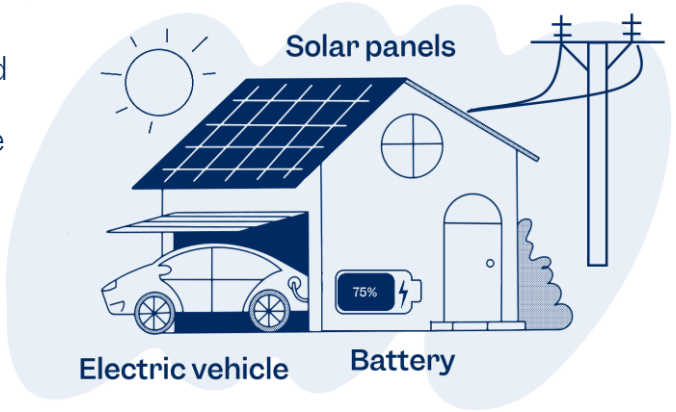
Solar panels

- Rooftop solar panels are generators. During the day, they convert sunlight into electricity.
- The price of solar panels has declined by 80% in the last decade, making them the cheapest renewable energy option for households.

Future household energy

Together, households can:

- Power their **EVs and household appliances** with direct solar generation during the day and from battery power at night.
- Get paid to send excess solar back to the grid for **feed-in-tariff** revenue.
- Act as a **virtual power plant** and get paid to send solar back to the grid during an electricity shortage.



Source: 1: Mauler (2021)

Contents

Executive summary

This report examines the financial and environmental implications of combining EVs with rooftop solar PV and battery storage systems for Australian households.

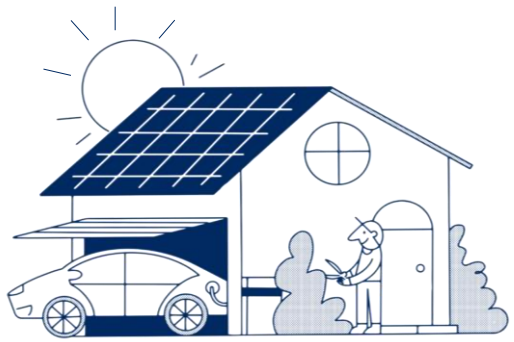
The report draws on responses to a Plenti-Accenture survey of over 3,000 Australians, and publicly available data.

Australia is well below the global average for EV sales, but demand is strong.

- In 2021, EV sales made up only 1.95% of all new car sales. This is well behind the global average of 8.6%. However, demand is rising, and EV sales nearly tripled in 2021 compared to 2020.
- Countries with strong EV policy support have seen sales soar. EVs are 12% of new car sales in California, 15% in China and 17% in Europe.
- Australian households are increasingly interested in buying EVs. New survey results show that 58,000 Australians want to buy an EV within the next 12 months – equivalent to 5% of all new car sales.

EVs are now cost-competitive with ICE vehicles over 15 years.

- Modelling for this report shows that EVs are now cost-competitive with conventional combustion engine cars over their 15-year lifetime. There is only a 3% difference between the lifetime cost of a mid-range ICE car and an EV.
- Comparing by running costs, EVs are less expensive than conventional cars. Most households can save about $1,000 in running costs each year by switching to an EV.



The combination of EVs with household solar and battery systems are also now cost-competitive with ICE cars and grid power over their lifecycle.

- By charging an EV mostly with grid power at home, the average household would increase their electricity costs by 22% and see an emission reduction of up to 33%.
- But if EV owners install a solar and battery system, they can limit the household electricity costs to around $230 a year. Most of that remaining cost comes from the use of public EV chargers and the use of grid power during the winter months when the solar system generates less electricity.
- While the purchase price of solar and battery systems is relatively high, over 15 years, all household types could see a positive financial return compared to having an ICE car and using grid power.
- EVs and solar and battery systems also deliver significant environmental and social benefits. Owning an EV combined with a solar and battery system could reduce the average household's energy-related emissions by up to 83%.

Addressing affordability and non-financial barriers (e.g., charging stations) to EV and home battery ownership could unlock an $8.9 billion annual market by 2026.

- The Plenti-Accenture survey found that the major barriers to EV and solar and battery system uptake are affordability and access to public EV chargers.
- The Plenti-Accenture survey suggested that many Australians are also unaware of the financial benefits of EVs and solar and battery systems. Informing consumers about these benefits is crucial to unlocking demand.
- Access to charging infrastructure is being addressed, with work underway across Australia to build EV charging networks. But the upfront cost for EVs and solar and battery systems remains a major issue, according to survey respondents.
- Australia's EV sales could grow 6.5 times to reach $7.5 billion in 2026 if sustainable finance and strong policy supports are introduced to address major barriers. The market for solar and batteries for EV-owning households is estimated to be $1.4 billion in 2026.

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1. Australia is well behind the global average in EV uptake, but consumer demand is at record levels

Australia currently falls short of the global average in electric vehicle uptake, with EVs making up less than 2% of car sales

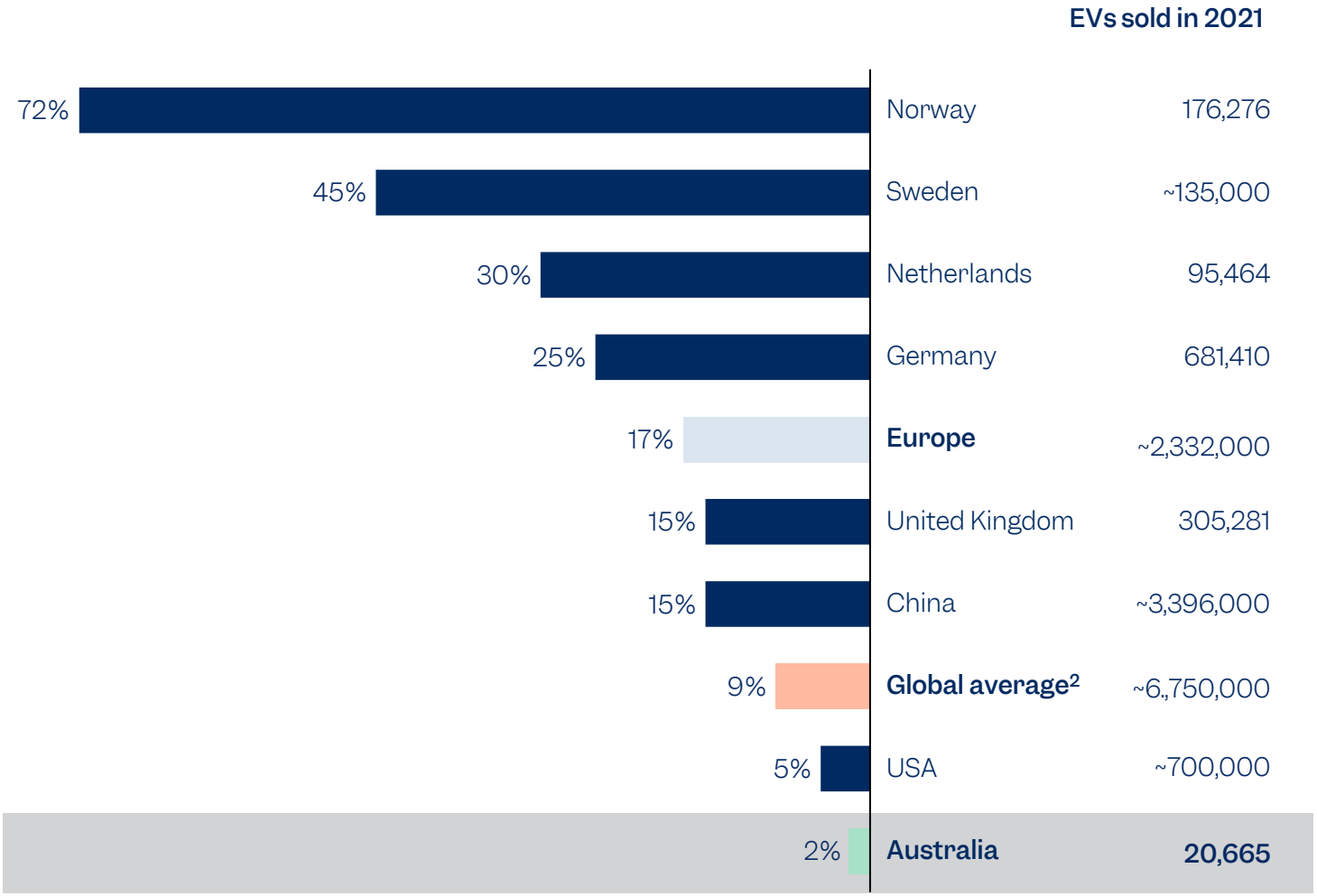
Australia is significantly behind other major economies in EV uptake, with battery electric vehicle (BEV) and plug-in hybrid electric vehicle (PHEV) sales making up only 2% of new car sales in 2021.[1] While this is a significant increase from 0.8% in 2020, Australia is still far behind the world average of 8.6%. Among major economies, Australia's EV sales are ahead of Russia, South Africa, Argentina, Indonesia, Japan and Mexico.

Europe is leading the world in EV sales. During the first half of 2021, the top 15 nations by EV sales share were all European countries. Norway has the highest EV uptake in the world, with EVs making up 72% of new car sales in 2021.

China has the highest EV uptake in absolute terms globally, with around 3.4 million EVs sold in 2021, equivalent to 15% of new car sales.

Australia's EV sales are well behind leading countries

EVs as % of new car sales, selected countries, 2021



Source: 1: Electric Vehicle Council (2022); 2: International Energy Agency (2022); 3: Inside EVs (2022)

EV sales are picking up, but still lag many high-growth countries such as China and Norway

The gap between low-growth markets such as Canada, the United States and Japan and fast-growth markets such as Europe, California and China is widening.

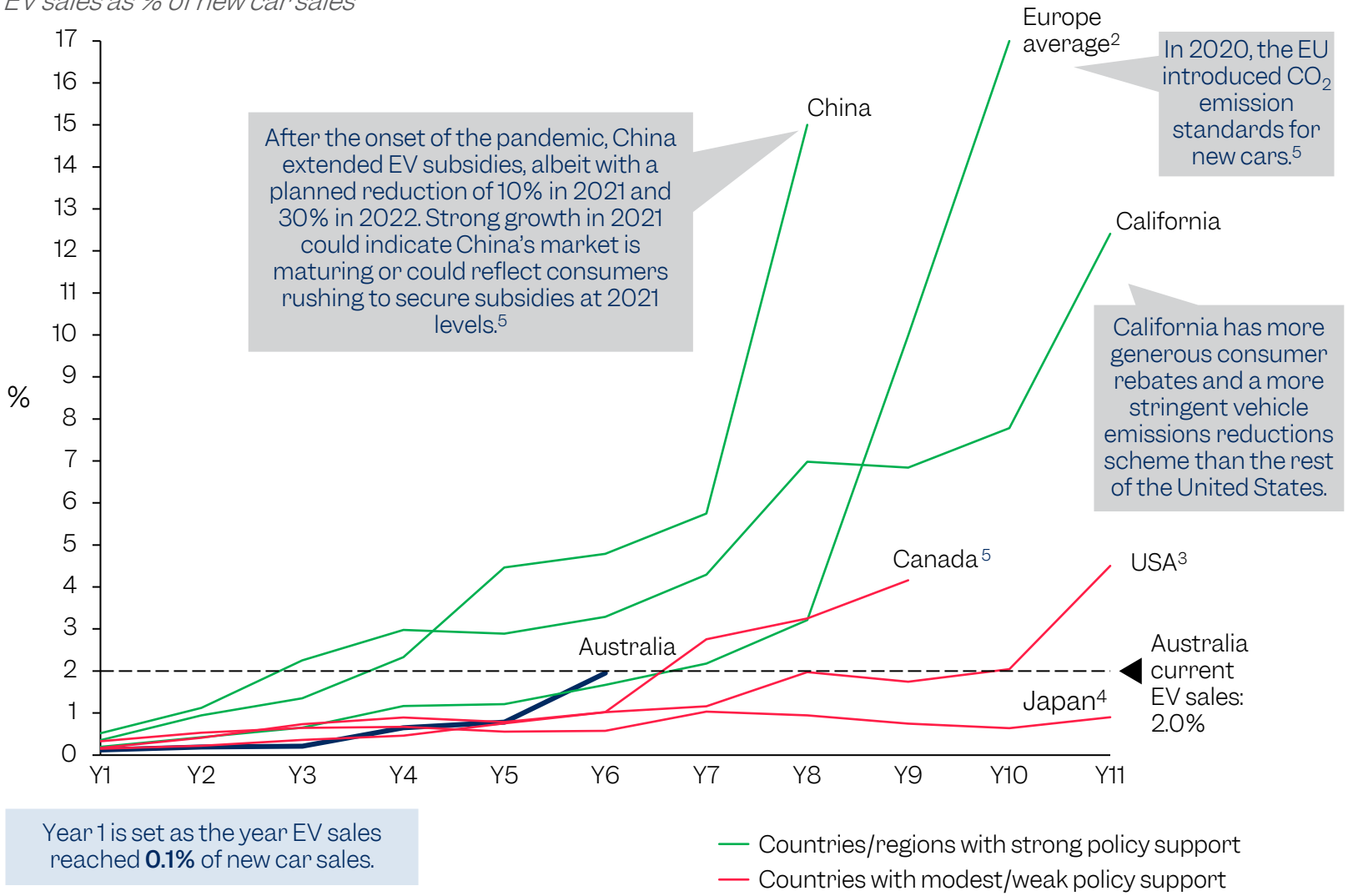
Policies such as emission standards, subsidies and support for charging infrastructure can accelerate EV uptake. Sales in China, Europe and California accelerated strongly when policy support was introduced.

Australia's EV sales growth picked up in 2021, but our trajectory to date is closest to that of the United States, which has seen only modest growth at a national level. EV adoption in the United States has been largely driven by sales in California, the state with the highest level of policy support.

Japan's EV market share has been below 1% for 10 years, despite a generous subsidy scheme (up to ~$5,000 for new vehicles) and other support measures.[1] There are few EVs made for the Japanese market. Japanese vehicle manufacturers have also pursued hybrids and hydrogen cars rather than all-electric vehicles.

EV sales in leading markets such as California, China and Europe have accelerated past slow-growth markets such as Canada, the United States, Japan and Australia

EV sales as % of new car sales



Note: 1: Nippon (2021); 2: Includes the EU27, Norway, Iceland, Switzerland and UK. 3: Includes California; 4: Japan year 11 estimated at 0.9% - International Energy Agency (2022) provides "less than 1%";
Source: 5: International Energy Agency (2022); 6: International Council on Clean Transportation (2017); 7: California Energy Commission (2022); Accenture analysis.

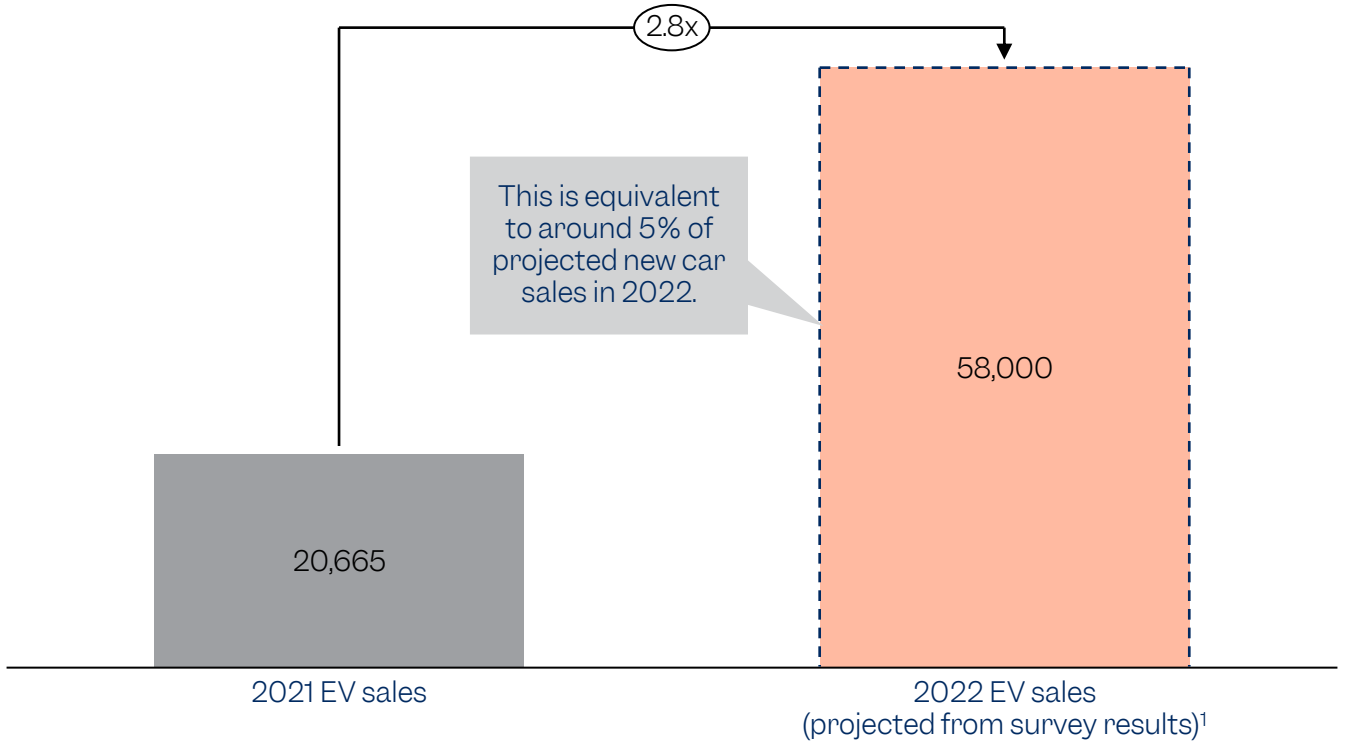
EV demand is now at record levels – sales have nearly tripled in the past year, and interest is strong

While our EV uptake has lagged other nations, Australians' interest in buying EVs has never been higher.

The Plenti-Accenture survey of over 3,000 car owners and potential buyers in Australia indicates that the number of people who are likely to buy an EV in the next twelve months is nearly triple 2021 sales. This suggests that there is significant pent-up demand for EVs, even without new policy interventions.

New survey results show that around 58,000 Australians are expected to buy an EV within the next 12 months, equivalent to 3 times current EV sales

Number of EV sales; survey n = 3,011



Note: 1. Projected 2022 sales based on survey respondents who intend to buy a car within 12 months, and are likely to purchase an EV.
Source: 2: Electric Vehicle Council (2022); 3: Plenti-Accenture survey n=3,011, January 2022; 4: Accenture analysis.

EV supply is now a significant issue, with limited EVs in stock and a five-and-a-half-month average wait time before delivery

Compared to conventional cars, stocks of EVs are much lower across all major models, with only a few in stock across the country.

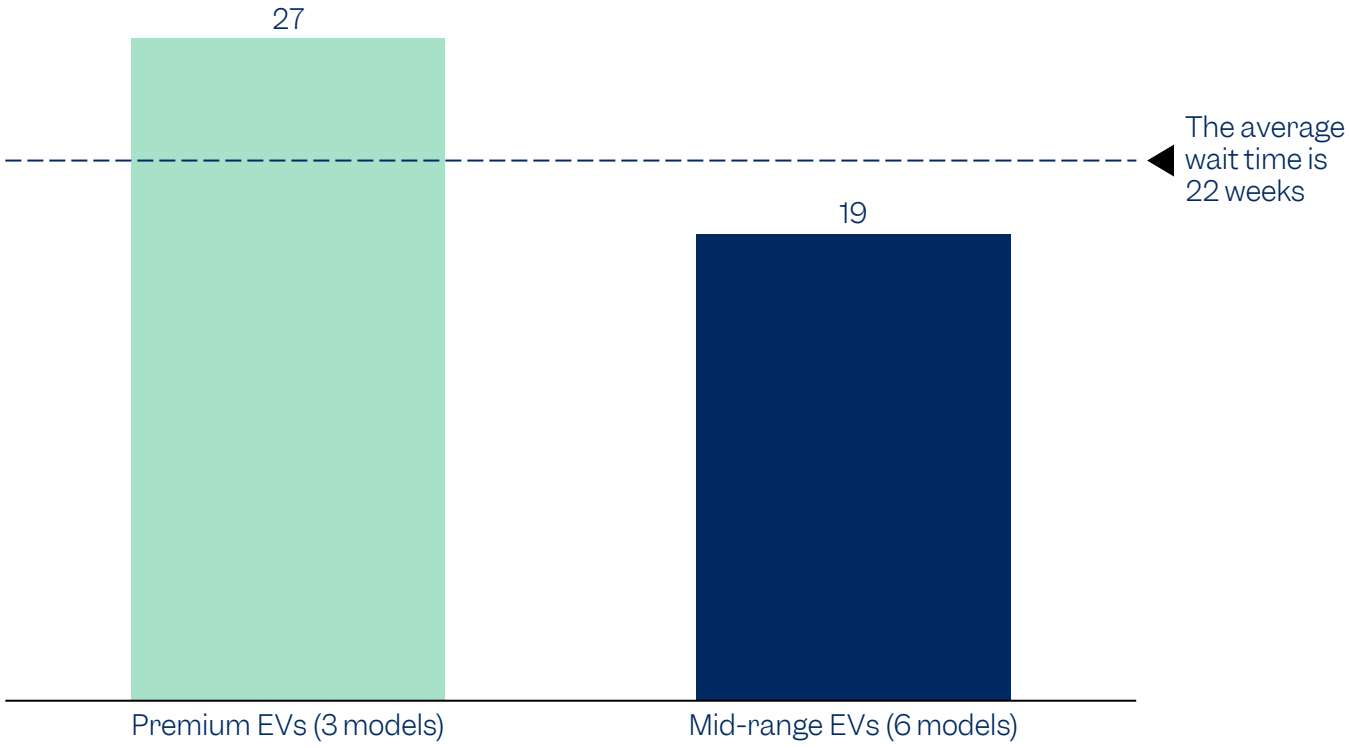
With few EVs in stock, most EV buyers in Australia need to place an order with a manufacturer. On average, delivery takes about 22 weeks.

Global semiconductor shortages and supply chain disruptions caused by COVID-19 have contributed to extended manufacturing times, as EVs generally require more semiconductor parts than combustion engine cars.

In addition, manufacturers are directing EV stock and sales incentives to markets with fleet average emission standards (which involve fines for manufacturers for sales exceeding a fleet average CO_2 target) and to markets offering government incentives to encourage EV uptake.[1]

The average wait time for EVs in Australia is around 22 weeks

Average number of weeks from order date to customer delivery



Compared to EVs, dealers have much higher stock levels for ICE vehicles, which means that ICE buyers typically do not have to wait long for vehicles to be delivered. For those who have to order from the manufacturer, the average wait time for delivery is shorter than EVs at around **18 weeks**.[2]

Source: Accenture market research; 1: ABC News (2021); 2: WhichCar? (2022)

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2. EVs are now cost-competitive with ICE vehicles over 15 years

EVs are now cost-competitive with combustion engine cars over their lifecycle

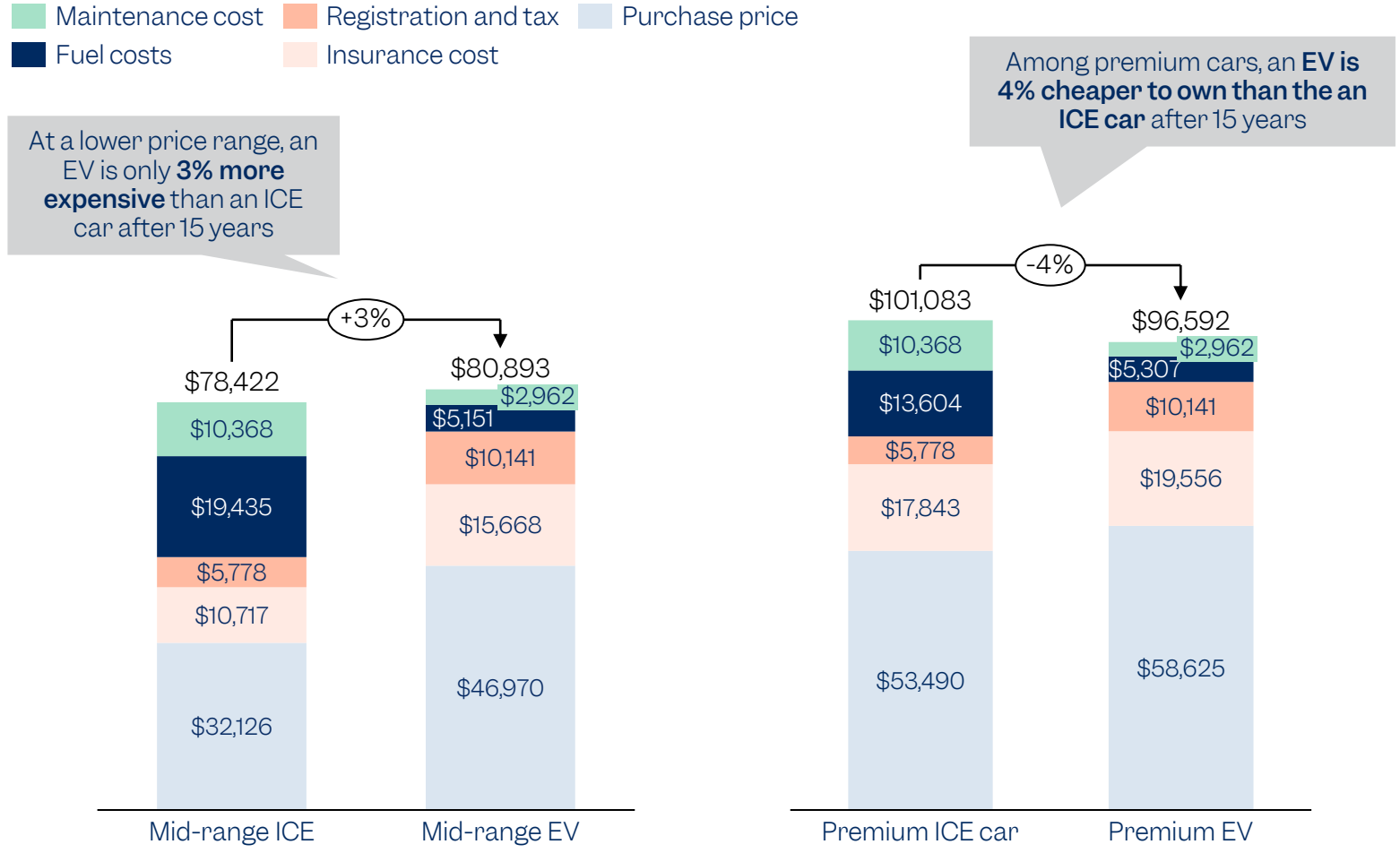
Until recently, EVs have not been cost-competitive with ICE cars owing to higher purchase prices. 65% of survey respondents think that EVs are still too expensive.[1] However, declining purchase prices, lower running costs and increasing petrol prices are combining to make EVs cost-competitive with combustion engine cars over their lifecycle.

Modelling the lifecycle ownership costs shows slightly different results across vehicle classes, though the gap between EVs and conventional cars is consistently narrow. A mid-range EV costs 3% more than its nearest ICE car equivalent after 15 years, which is the average lifespan of vehicles in Australia.[2-6] Meanwhile, a premium EV costs 4% less than its nearest ICE car equivalent after 15 years of ownership.[7,8]

Many consumers are prepared to pay more for an EV than a conventional car, with 48% of survey respondents saying they would pay a 10% premium for an EV. But Plenti-Accenture modelling and survey results suggests that even a small decline in EV purchase prices could increase EV demand significantly in the next few years.

While EVs are more expensive upfront, over the typical vehicle lifespan of 15 years, lower running costs make EVs cost-competitive with ICE cars

15-year total cost of ownership, for vehicles bought in 2022, for average households



Note: Registration and EV road user charge based on NSW's current and stated future policy. Purchase prices include applicable stamp duty. Results are based on the average Australian household's energy consumption and driving habits, based on survey results and research. See appendix for additional assumptions.

Source: 1: Plenti-Accenture survey, n=3,011; 2: Hyundai (2022), 3: ABS Survey of Motor Vehicle Use (2020), 4: ABS Motor Vehicle Census (2021); 5: Auto Service World (2020); 6: Statista (2021) 7: Audi (2022), 8: Accenture analysis

Households that drive more save more on running costs by switching to an EV, with many households saving around $1,000 a year

The annual running cost savings gained from having an EV compared to an ICE car increase as households drive more often and over longer distances. Based on the Plenti-Accenture survey of over 3,000 Australians, large households in cities and regions tend to drive the most and therefore see the highest annual running cost savings of $1,160.

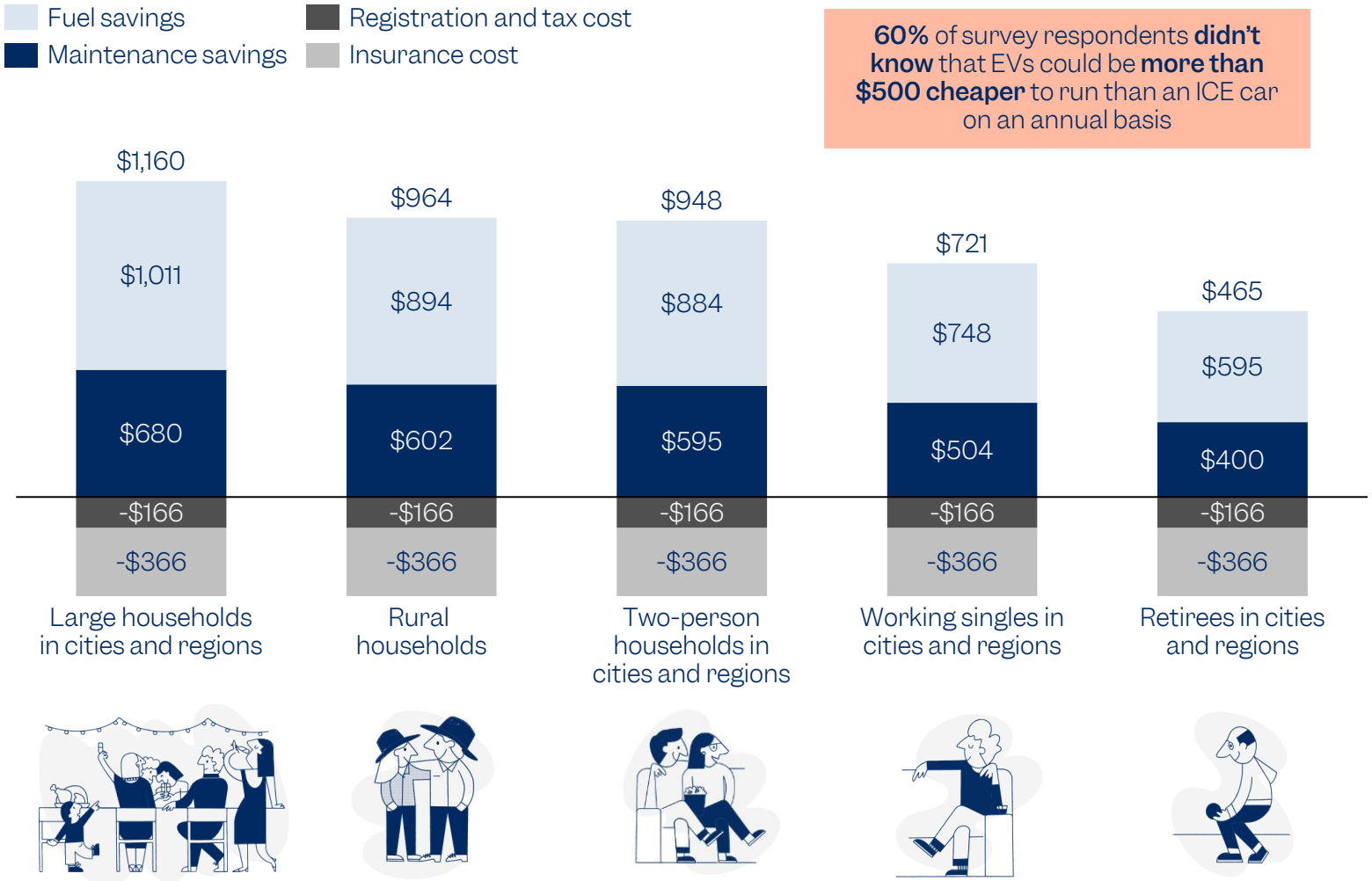
Retirees in cities and regions were found to have the lowest annual running cost savings of $465 a year from an EV, since they typically drive less than other households.

Annual savings would be higher if petrol prices continue to rise, and electricity prices fall.

Awareness of lower running costs appears limited. 60% of survey respondents said they were not aware that an EV could save them more than $500 a year compared to a combustion engine car. This suggests that educating consumers about these benefits could increase EV uptake.

The running costs of owning an EV are lower than a combustion engine car, with large households in cities and regions expected to save the most at $1,160 a year

Estimated annual running cost savings of EVs compared to ICE cars, 2022, n = 2,472



Note: Larger, two-person and single person household segments exclude retirees, which are instead classified as one segment 'retirees in cities and regions'. Larger households in cities and regions includes households with 3 or more people. Rural households include survey participants who identified as living in a 'rural' area rather than a city or regional area. Savings based on the Hyundai Ioniq and i30 elite. See appendix for additional assumptions.
Source: Accenture analysis

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3. The combination of EVs with household solar and battery systems are now cost competitive with ICE cars and grid power over their lifecycle

Switching to an EV increases a households electricity bill by 22% but reduces average household emissions by a quarter, increasing to one third if the grid decarbonises faster

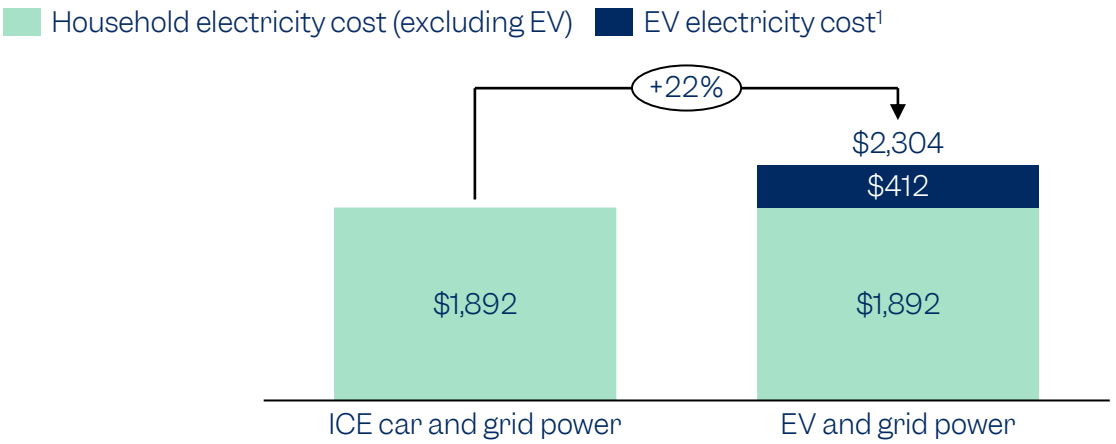
While EVs are cheaper to run than ICE cars, the average household would still increase their annual electricity bill by about 22% by powering an EV mostly with electricity from the grid.

EVs would reduce a household's carbon emissions, by eliminating petrol/diesel emissions. However, EVs still indirectly generate carbon emissions when grid electricity is used to power them. This is because fossil fuels contribute to a large proportion of Australia's total electricity generation. In 2020, 76% of the electricity was generated by using fossil fuels in Australia.[7]

The Australian Energy Market Operator forecasts that electricity emissions will decrease 55% by 2037 under current policies.[8] Under this scenario, an average household would reduce their carbon emissions by 23% over a 15-year period by switching to an EV. If Australia's electricity grid decarbonises more rapidly, an EV would reduce average household emissions by up to 33% in the same period.

EVs could increase the average household's electricity bill by 22%

Estimated annual household electricity bill, 2022



EVs would reduce average household emissions by 23% to 33% over 15 years [6]

15-year cumulative tCO_2e emissions under two grid decarbonisation scenarios, 2022 – 2037

	Under scenario 1: Grid decarbonisation under current policies[2]	**Under scenario 2:** Rapid decarbonisation of the electricity grid[3]
ICE car and grid power (15-year cumulative emissions)	79.1 tCO2e	63.1 tCO2e
EV and grid power (15-year cumulative emissions)	60.8 tCO2e	42.3 tCO2e
Reduced average overall household emissions by switching to an EV	23%	33%
Reduced average vehicle emissions by switching to an EV	68%	78%

Note: 1: Assumes 25% of EV charging is from public charging stations, which is included in EV electricity costs. 2: Refers to AEMO's Central scenario. 3: Refers to AEMO's Step Change scenario. 4: The emission intensity of the grid estimates the average tCO_2e emissions produced per MWh of electricity generated across the national electricity market, calculated using the AEMO 2020 Integrated System Plan. 5: Assumes 70% of public charging power is green, zero emission power. 6. The household emissions include emissions from using grid electricity and running cars, and exclude emissions from food, public transport or other sources.
Source: Accenture analysis; 7: Department of Industry, Science, Energy and Resources (2021), 8: AEMO (2020)

A solar and battery system will offset the additional electricity costs from switching to an EV

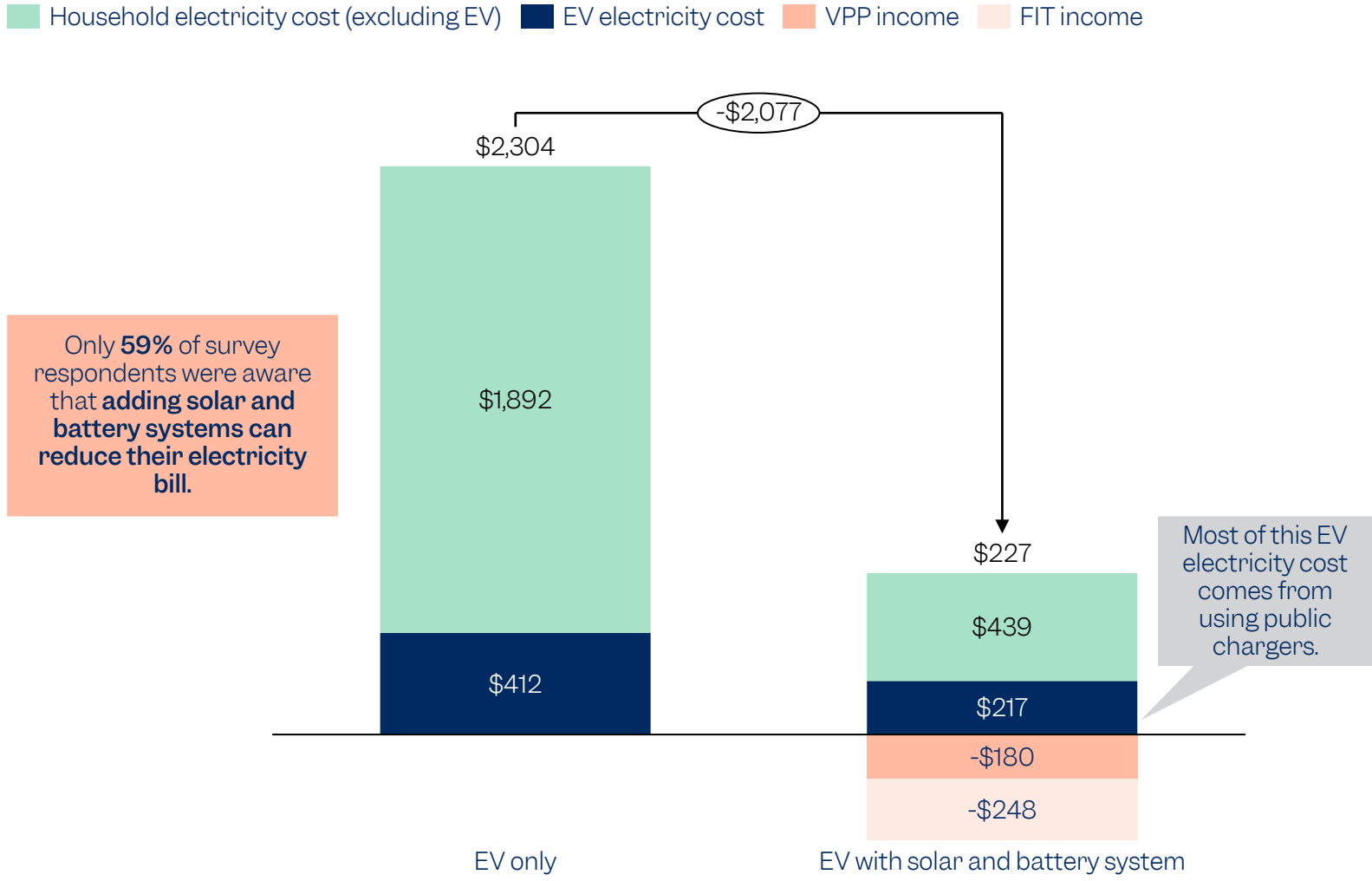
While buying an EV increases a household's electricity usage, adding a solar and battery system reduces the average household's electricity bill to around $230 a year. Most of the remaining cost comes from using public chargers and grid power during winter, when there is less electricity generated by the rooftop solar.

With solar and a battery, households are consuming 'free' solar electricity most of the time, from direct generation during the day and from solar energy stored in the battery at night. They could also earn payments from energy retailers to send unused solar energy into the grid at the feed-in tariff rate. Households may also receive payments to coordinate their solar and battery energy to support the grid and stabilise electricity prices as part of a virtual power plant.

Many Australians are unaware of the impact solar and battery systems can have on their electricity bill. Only 59% of survey respondents are aware that combining an EV with a solar and battery system could reduce their electricity bill, suggesting that education about the benefits could increase uptake.

While buying an EV increases a household's electricity bill, adding a solar and battery system limits average household electricity bill to around $230 a year

Estimated annual household electricity costs, average household, $AUD, 2022



Only **59%** of survey respondents were aware that **adding solar and battery systems can reduce their electricity bill.**

Note: Estimated benefits for the average Australian household, with a daily energy usage of 19 kWh, small sedan, 6.6 kW solar PV system and 12 kWh battery. Savings will vary by factors including energy use patterns, location and changes in yearly weather patterns. See appendix for additional assumptions.
Source: Accenture analysis.

Despite higher purchase costs, owning an EV and installing solar and a battery is cheaper than owning a conventional car and using grid power, over 15 years

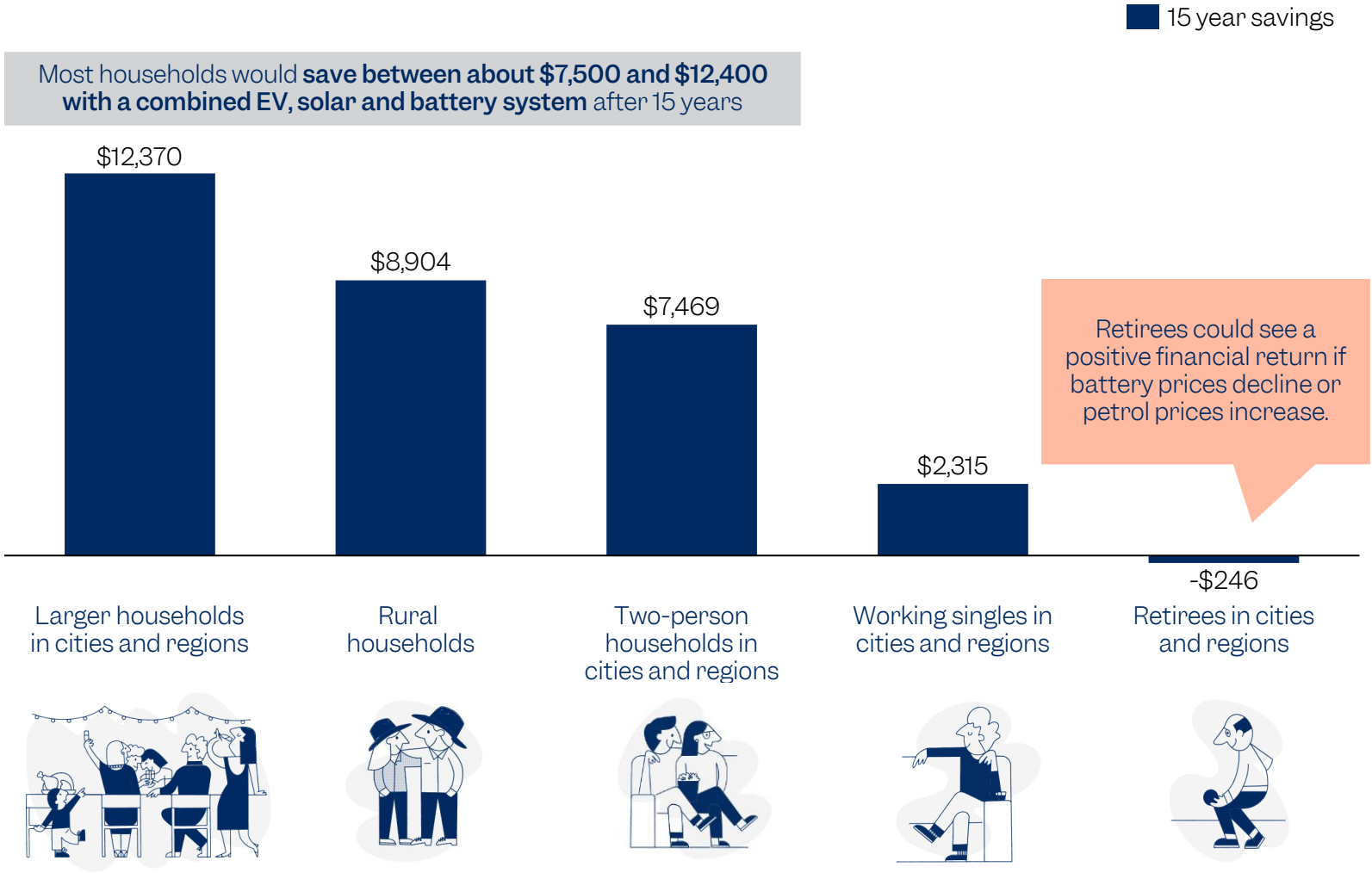
For households that can install a solar and battery system, combining EVs with solar and a battery could save thousands of dollars over 15 years compared to owning an ICE car and using grid power.

High energy consuming households would save the most, with the average large household in cities and regions estimated to see the largest saving of $12,370 after 15 years of ownership. Two-person households in cities and regions also receive a modest saving of $7,469 after 15 years.

Modelling suggests that retirees in cities and regions would make a small negative return over 15 years by buying an EV and solar and battery system today. However, this segment would see a positive return once battery prices decline by 2%.

All household types could see a positive financial return over 15 years from switching to an EV with solar and a battery

15 year total savings from EV with solar and a battery, compared to ICE and grid power only, from 2022



Note: Cost saving is achieved by switching to an EV from an ICE petrol car and adding a 6.6kW solar PV and 12kWh battery storage system. See appendix for additional assumptions.
Source: Accenture analysis.

Combining EVs with solar and battery systems would deliver significant environmental, social and economic benefits for all Australians

The average household could reduce their household electricity and vehicle emissions by 81% by substituting grid electricity for solar power, if the grid continues to decarbonise based on existing policies.[2] This number could increase to 83% under a scenario where the electricity grid decarbonises more rapidly.[3]

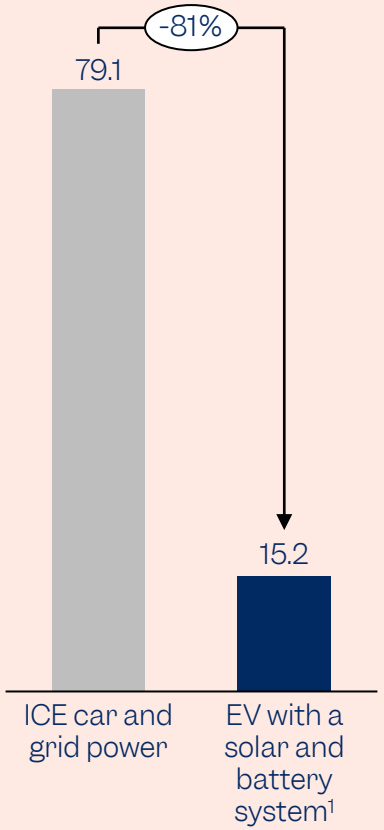
The survey suggests that there is a strong need to inform households of these benefits. 39% of survey respondents were not aware that coupling an EV with a solar and battery system reduces carbon emissions. Only 59% of respondents were aware that EVs coupled with a solar and battery system reduces air pollution, and only 40% were aware that EVs would reduce noise pollution.

Renewable energy also creates thousands of jobs in Australia, with over 13,000 already employed in rooftop solar and a further 28,700 expected to be employed in diversified battery industries. Combining EVs with solar and battery systems would also protect households from fluctuating electricity and petrol prices.

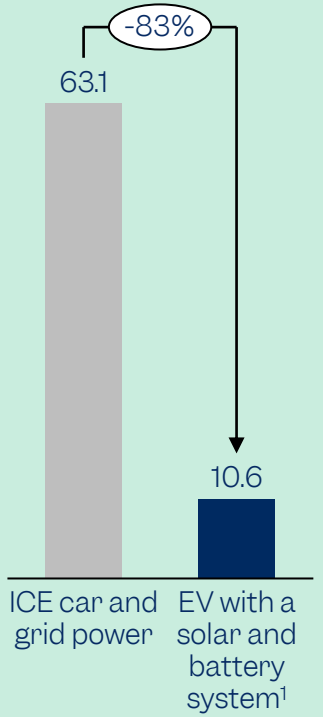
The average household could reduce their vehicle and electricity emissions between 81% and 83% by getting solar and a battery with their EV

15-year cumulative CO_2 emissions, 2022 – 2037, tCO_2e

Scenario 1: Grid decarbonisation **under current policies**[2]



Scenario 2: **Rapid decarbonisation** of the electricity grid[3]



The reduction in air and noise pollution from EVs will improve health outcomes

The EV Council estimates that NSW will save $2,400 in health costs for every EV that replaces an ICE vehicle.[4] Since EVs are much quieter than ICE vehicles,[5] less road traffic noises could reduce sleep disturbance and have positive effect on health.[6]

Survey found only **59%** of people were aware that EVs, solar and battery systems reduce **air pollution** and only **40%** were aware that EVs would reduce **noise pollution.**

EVs, solar and batteries support jobs

As of 2019, 13,070 Australians were employed in the rooftop solar industry.[7] A diversified battery industry could support a further 28,700 new jobs by 2030, including 6,900 EV technicians.[8]

EVs with solar and battery systems can stabilise household budgets

EVs eliminate exposure to potentially large fluctuations in petrol prices, while solar and batteries supply 'free' electricity and can take households largely off-grid.

Note: 1: Emission saving is from switching to a BEV from an ICE petrol car and adding a 6.6kW solar PV and 12kWh battery storage system. Average Australian is based on survey average. See appendix for additional assumptions. 2: Refers to central scenario, which is based on decarbonisation under current federal and state policies. 3: Refers to step-change scenario, which is based on aggressive global decarbonisation.
Source: 4. Electric Vehicle Council (2019) 5: Nissan (2019); 6. European Environment Agency (2020), 7: ABS (2020); 8. Future Battery Industries Cooperative Research Centre (2021), Victorian Automotive Chamber of Commerce (2021)

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4. Australia could unlock a $8.9B annual market by educating consumers and providing sustainable finance and strong policy support for EVs, solar and batteries

Affordability concerns and non-financial factors such as accessing public chargers are barriers to increasing uptake

Results from the survey indicate that Australian consumers' concerns center on affordability and range anxiety.

Affordability is a problem because Australians are paying premium prices for EVs. This is due to the lack of subsidies, EV supply and range of affordable models compared to other, high EV uptake countries.

Range anxiety stems from Australia's relatively low concentration of public charging stations, especially fast chargers. With long distances between cities in Australia, many households travelling long distances are anxious about running out of power or spending hours during a trip recharging their EV.

Home solar costs have declined over several decades and the purchase price is subsidised by the federal and state governments,[1] bringing the cost to around $5,300 for a typical 6.6 kW system.[2] However, since household batteries have only become widely available in the last decade and few subsidies exist, batteries are more expensive, costing around $12,300 for a typical 12 kWh battery.[3]

The market for EVs combined with solar and battery systems is also limited by the number of people who live in apartment buildings, rent, or do not have the space.

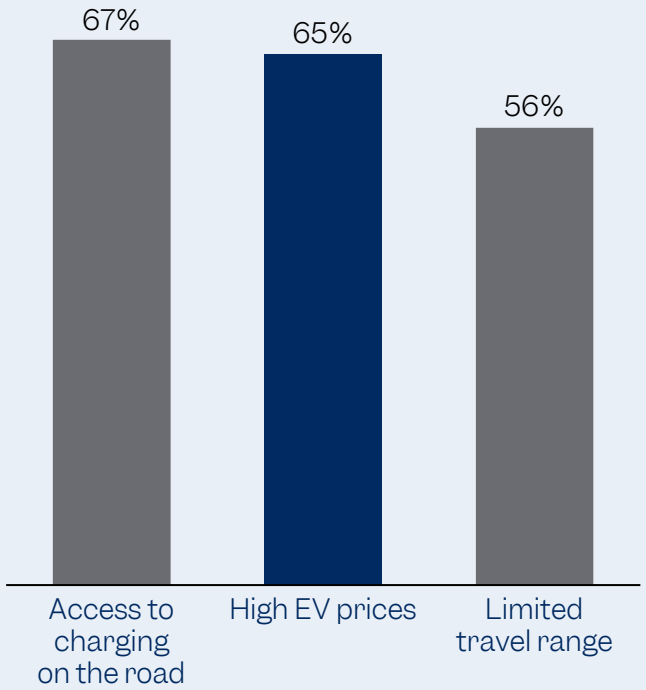
The uptake of EVs with solar and battery systems is limited by affordability concerns and range anxiety

% of survey respondents

Financial barriers Non-financial barriers

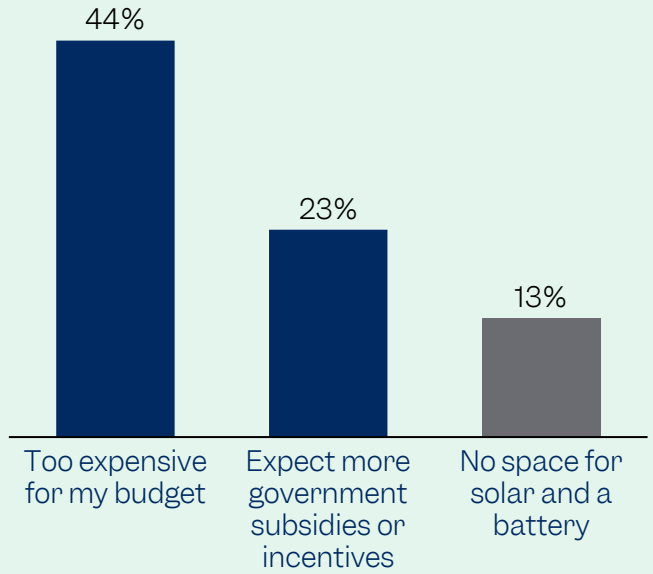
Top 3 barriers to **EV uptake**

% respondents, "Major concern", n = 3,011



Top 3 barriers to **adding a solar and battery system to an EV purchase**

% respondents unlikely to add solar and battery system to EV purchase, n = 1,279



Note: 1: Clean Energy Council (2022).
Source: 2: Gosolarquotes (2022); 3: Solar Choice (2022); Accenture analysis.

To unlock greater demand, Australians need to know the financial benefits of combining EVs with solar and battery systems

The Plenti-Accenture survey results suggest that consumers could be better informed about the running cost savings from the combination of EV with solar and a battery.

While modelling estimates that most households could save almost $1,000 a year, 27% of respondents estimated that an EV would cost the same as a combustion engine car in annual running costs.

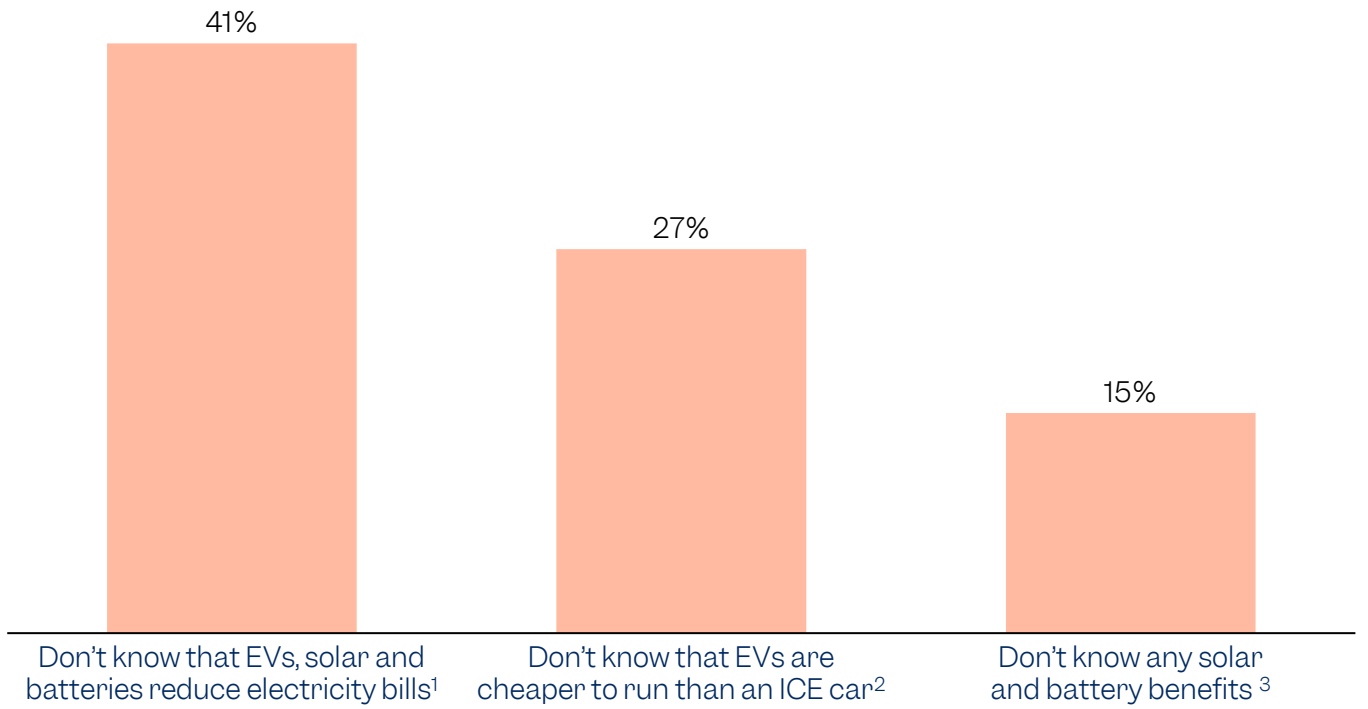
41% of respondents were also unaware that combining EVs with solar and battery systems can reduce their electricity bill. Modelling indicates that households could reduce their electricity and fuel costs by about $1,400 to $1,600 a year.

Around 15% of consumers indicated that they did not know any benefits from household solar and battery systems.

These results suggest that helping consumers understand the significant benefits from combining an EV with a solar and battery system is an essential part of unlocking demand.

Many Australians are unaware of the financial benefits of EVs and solar and battery systems

% of survey respondents



Note: 1: Includes respondents who did not know that combining EVs with solar and battery systems would reduce their electricity bill (n=2,491). 2: Includes respondents who said EVs cost "more or less the same" to run on an annual basis compared to an ICE car (n=3,011). 3: Includes respondents who answered "not aware of the benefits at all" when asked "to what extent are you aware of the benefits of solar and battery systems" (n=2,556)
Source: Accenture analysis.

Non-financial barriers to EV uptake, such as access to charging infrastructure and narrow model choice, are being addressed

Australia has more than 3,000 EV public charging points, with around 700 new points installed in 2020-21.[1]

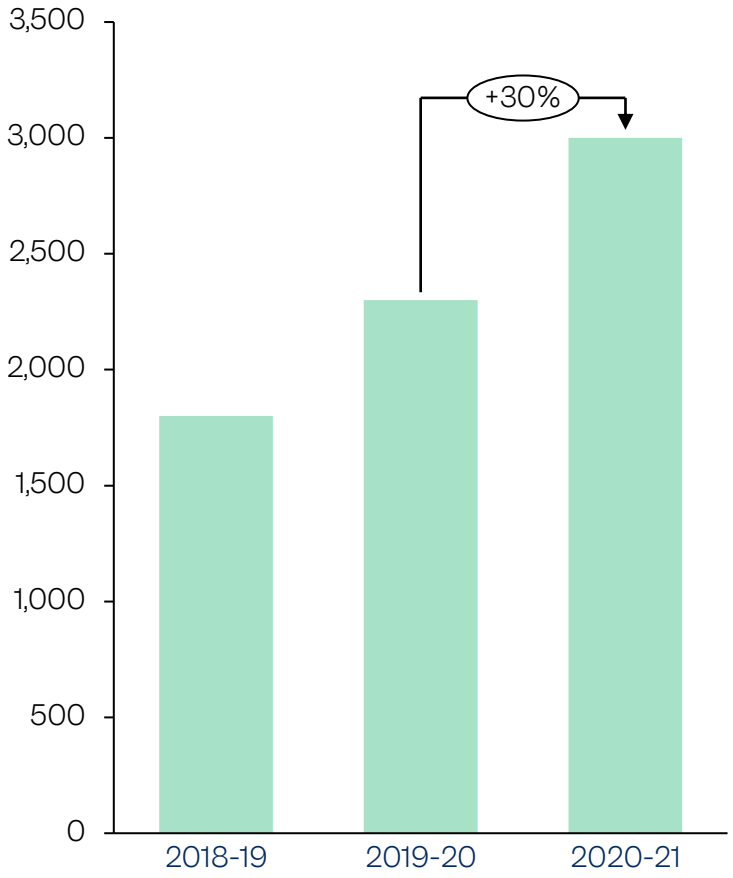
Federal and state governments have committed significant funds to co-invest with the private sector to build more standard and fast charging stations:

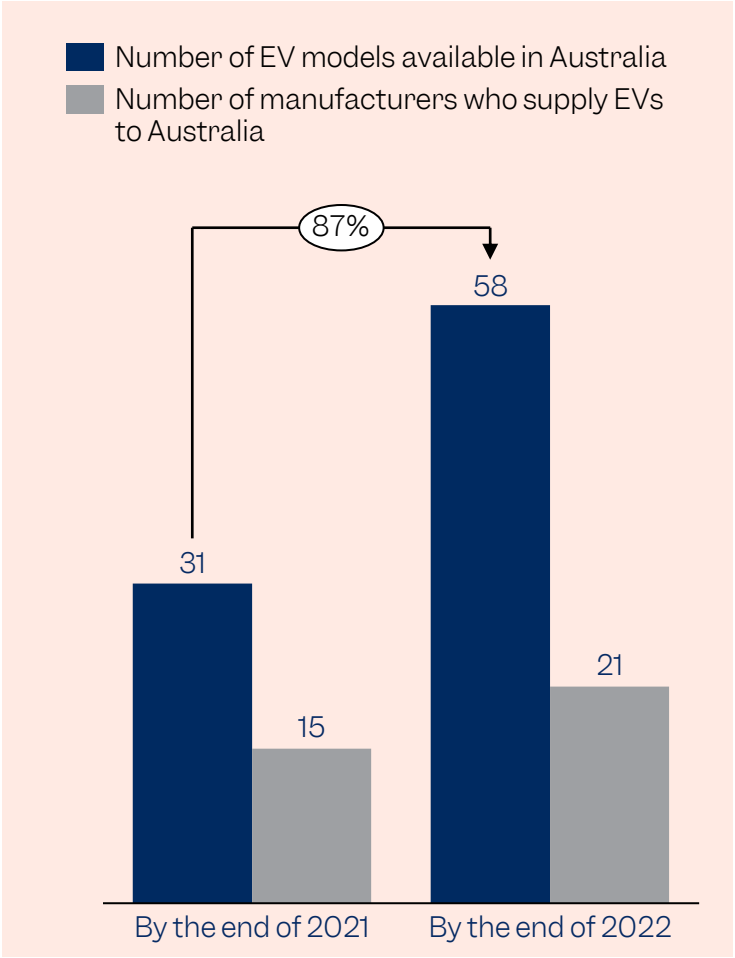
- As part of the federal government's Future Fuels and Vehicles Strategy, $178 million will be used to install 400 business charging stations, 50,000 household chargers and 1,000 public charging stations (including EV chargers and hydrogen refueling stations).[2]
- NSW has committed $171 million to build more than 1,000 EV charging stations in the state.[3]

The narrow range of models available in Australia is also expected to be addressed, with the number of models to almost double to 58 by the end of 2022. Six more manufacturers are expected to bring models to the Australian market this year.

Australia is ramping up public charger installations, and a wider range of EV models will come to our market this year

Cumulative number of standard and fast public chargers installed





Source: 1: Electric Vehicle Council (2021), 2: Department of Industry, Science, Energy and Resources (2021), 3: NSW Government (2021), Accenture analysis

The upfront cost of an EV with a solar and battery system could be reduced by ~$9,000 with subsidies and sustainable finance

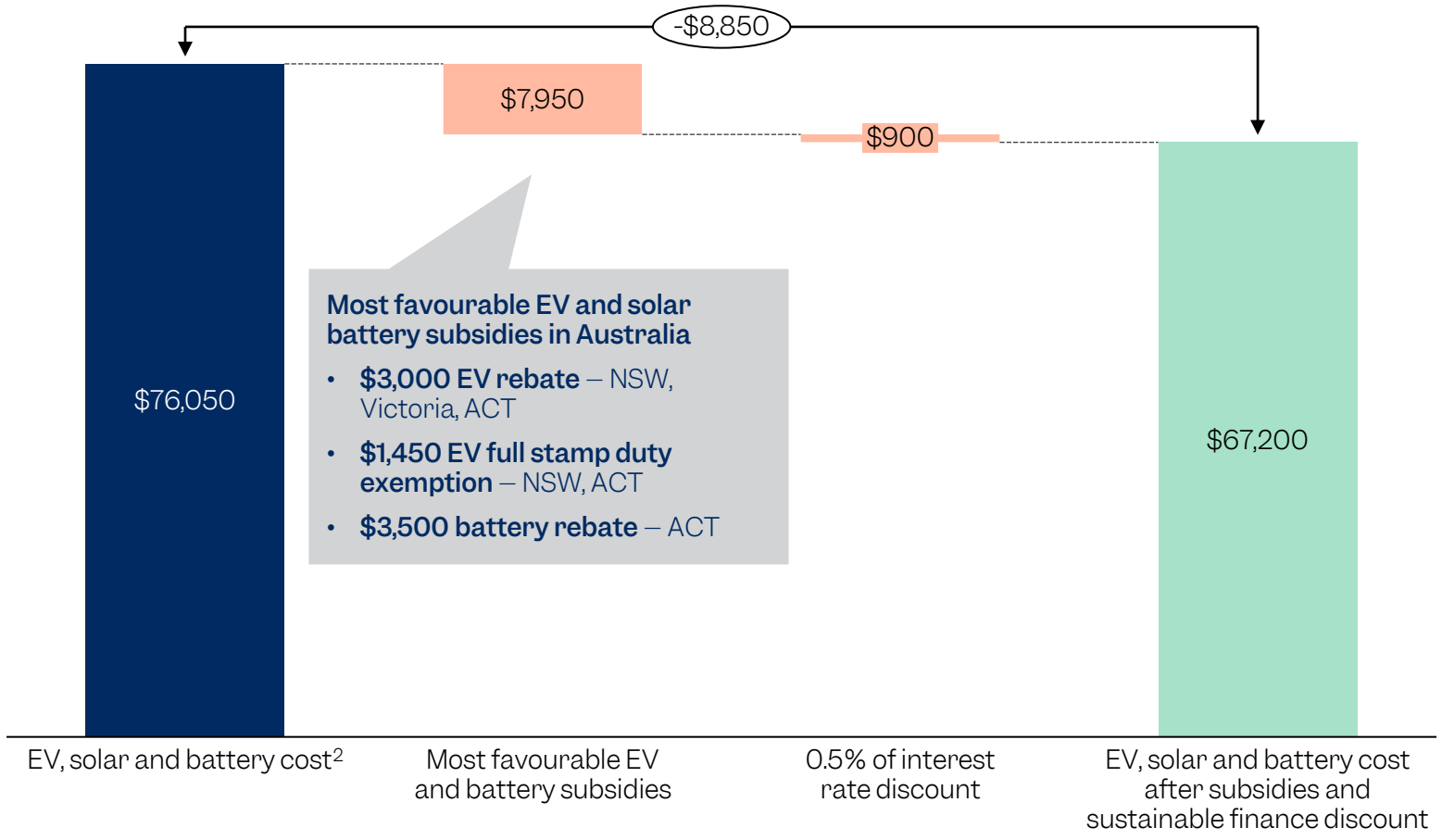
Evidence from Norway, where EVs made up 72% of new car sales in 2021, suggests that government subsidies that bridge the price gap between EVs and ICE cars can drive a rapid increase in EV uptake.[1] Currently, several state and territory governments in Australia offer rebates on the upfront cost of an EV, as well as stamp duty exemptions. Some governments also offer a rebate on solar and battery systems. Combined, these subsidies can reduce the cost of an EV with a solar and battery system by almost $8,000.

Evidence from other markets suggests that fuel efficiency or emissions standards encourage vehicle manufacturers to bring a broader, more affordable range of EV models to market.[1]

Sustainable finance also has a role to play. Consumer lenders can reduce the costs of EVs and solar and battery systems by offering lower interest rates on loans for green assets. A 0.5% interest rate discount could save $900 for a household buying an EV with solar and a battery.

The upfront cost of an EV and a solar and battery system can be reduced by 12% or $8,850 through subsidies and sustainable finance

$, mid-range EV, 6.6 kW solar system, 12 kWh home battery



Note: 1: ABC; 2: As the Australian Government offers a subsidy on solar PV for all Australians, the subsidy is included in the upfront cost. Also includes retail cost, stamp duty and financing at Plenti's 5.44% car loan rate. 3: The discount gained from accessing Plenti's 4.93% EV loan rate, for both the EV and solar and battery system.
Source: Hyundai (2022); gosolarquotes.com.au (2022); Solar Choice (2022); Department of Industry, Science, Energy and Resources (2022); Revenue ACT (2022); Service NSW (2022); Accenture analysis.

Australia could grow EV sales by 6.5x and unlock a $8.9B market for EVs, solar and batteries by 2026 with the support of strong policy and sustainable finance

The outlook for Australia's future EV sales depends on whether there is an increase in policy support and sustainable finance.

Policies that have been effective at driving sales in other markets include:

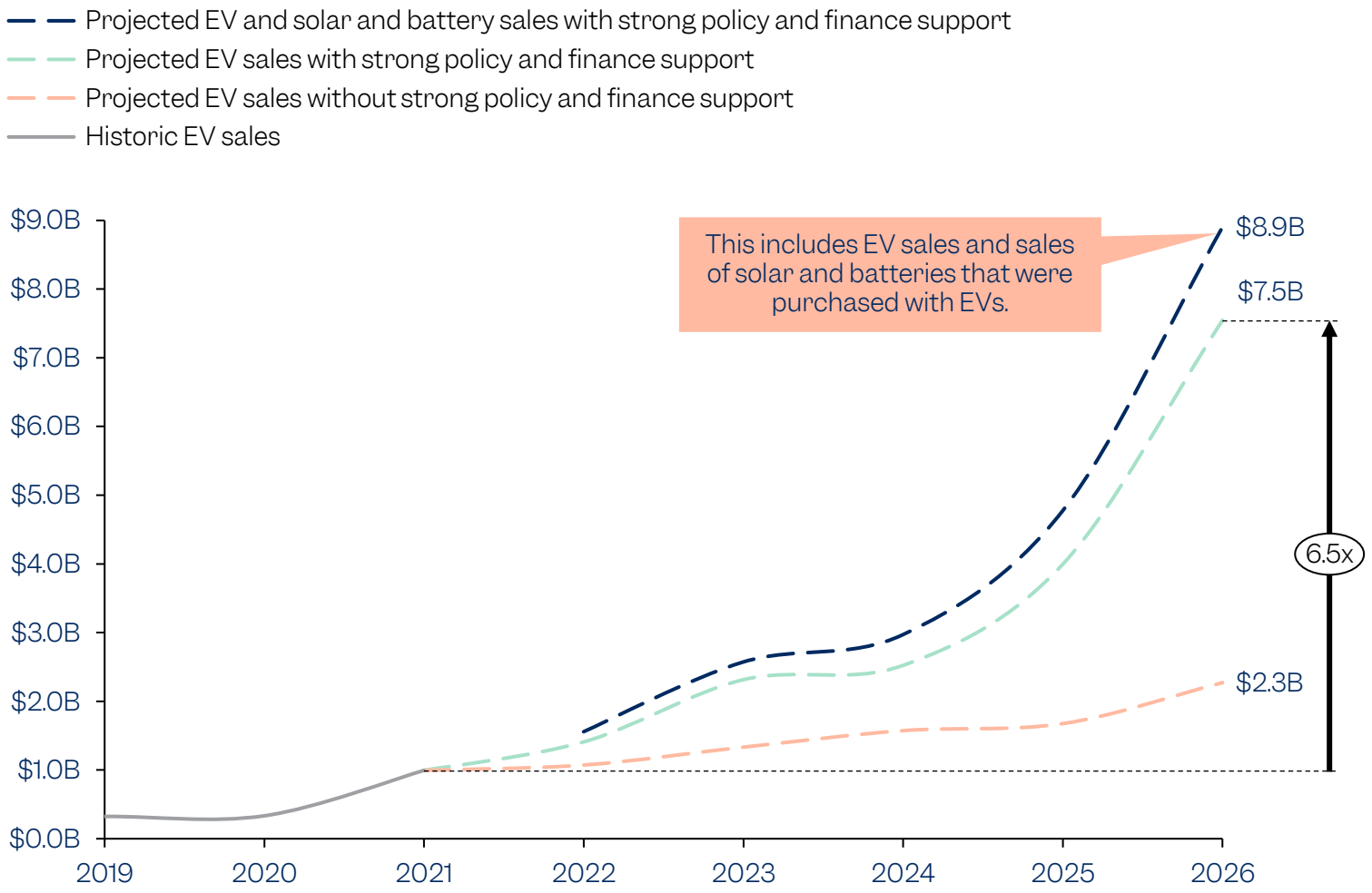
- CO_2 emission standards, where car manufacturers are fined for exceeding the fleet target (Europe).[1]
- EV subsidies and significant investment in charging infrastructure (China).[2,3]
- Subsidies, tax incentives and a mandatory EV sales target (California).[2]

With stronger policy support, Australia could follow Europe, China and California to grow 6.5 times in the next 5 years to reach a $7.5B market for EVs. The market size of solar and battery that are integrated with EVs is estimated to be $1.4B in 2026.

In the absence of strong policy support, Australia risks following the USA, Canada and Japan on a much slower growth trajectory with the projected EV sales to reach only $2.3B in 2026.

By 2026, EV sales could grow to $7.5 billion if strong policy support is in place and sustainable finance is available

$ billion



Note: The projection with strong policy support was an average growth rate of China, Europe and California over the past five years. The projection without strong policy support was an average of USA, Japan and Canada's growth rates in the past five years.
Source: Clean Energy Council (2021); Clean Energy Regulator (2021); CSIRO (2021); 1: European Union (2020); 2: International Energy Agency (2021); 3: Columbia University (2019); Accenture analysis.

Appendix: Methodology and assumptions

The study segments Australian households into five types

The survey asked respondents about their household characteristics, their driving habits and energy consumption, and their views and intentions in relation to EVs, solar and batteries.

The study segments Australian households into five types:

- **rural Australians**
- **retirees** in cities and regional Australia
- **large households** in cities and regional Australia
- **small households** in cities and regional Australia
- **singles** in cities and regional Australia.

Some respondents were excluded from the reported segments: the unemployed, students, and respondents who chose “other” for household size or employment status.

Rural Australians

- Live in rural Australia
- Employed or retired
- All household sizes

Retirees in cities and regions

- Live in cities and regional Australia
- Retired
- All household sizes

Large households in cities and regions

- Live in cities and regional Australia
- Employed
- Live with dependents and/or relatives

Two-person households in cities and regions

- Live in cities and regional Australia
- Employed
- Do not live with dependents

Working singles in cities and regions

- Live in cities and regional Australia
- Employed
- Live alone

Source: Plenti-Accenture survey, n=3,011; Accenture analysis

Methodology and key assumptions

Model design

The model estimates the cost savings and household emission reductions from purchasing and owning an EV compared to a comparable ICE car, and the benefit of adding a solar and battery system. Calculations are discounted to present value using a discount rate of 1.5%. Assumptions are based on a combination of research and survey data.

Segmentation

Survey respondents were segmented into mutually exclusive groups based on observed similarities in driving patterns. Respondents that identified as 'unemployed', 'students', 'other employment types' or 'other household types' were excluded.[1]

	Sample size	Annual km driven	Annual kWh (no EV)[16]	% of household on grid power with solar and battery
Rural	187	12,211	6,940	24
Retirees	539	8,130	5,625	16
Large households	915	13,808	7,853	30
Small households	493	12,075	5,625	16
Singles	338	10,224	4,493	10
Average household	3011	11,100	6,940	24

Assumptions

Electricity price: The residential cost of electricity is based on an Australia wide AEMC forecast for 2022, after which the price is assumed to fall 1.5% per year, based on a historical average.[2] From 2030, the electricity price is assumed to remain constant.

Petrol price: Assumed to be $1.6/L in 2022,[3] and increases 2.7% per year until 2030, based on the predicted rise in the brent crude oil price.[4] After this time, the price is assumed to remain constant.

EV tax: The EV tax uses NSW existed stated policy of $0.025/km from 2027 onwards.[5]

Emission Reductions: The emission intensity of the grid estimates the average tCO2e emissions produced per MWh of electricity generated across the national electricity market, calculated using the AEMO 2020 Integrated System Plan.[6]

Insurance as % of vehicle cost	2.5%
% of charging at home[7]	75%
NSW feed-in tariff ($/kwh)[8]	0.07
Solar PV capacity (kW)[9]	6.6
Solar kWh/ kW[9]	4
Solar PV CAPEX[10]	5,300
% of solar fed back to grid (EV + solar only)[11]	60%
% of EV charged with solar (solar only)	30%
Battery capacity (kWh)[12]	12
Battery CAPEX[13]	12300
% of EV charged with solar (solar and battery)	70%
ICE emissions ($kgCO_2e/L$)[14]	2.3
VPP income/year[15]	180

Vehicle Assumptions

Prices of vehicles are based on NSW estimates. Purchase price includes an EV subsidy of $3,000 (available in NSW)[5] and stamp duty.

ICE	Fuel efficiency (L/100km)	Registration[19]	Maintenance ($/km)[20]	Purchase price
Mid-range ICE car	7	433	0.07	32,126
Premium ICE car	4.9	433	0.07	53,490

EV	Capacity (kWh)	Range (km/charge)	Registration[19]	Maintenance ($/km)[20]	Purchase price
Mid-range EV	38.3	311	601	0.02	46,970
Premium EV	62.3	491	601	0.02	58,625

Sources: 1: Accenture Analysis; 2: Australian Energy Market Commission (2021); 3: Global Petrol Prices (2022); 4: The Balance (2022); 5: NSW Government (2021); 6: AEMO (2021); 7: Fuels Institute (2021); 8: Solar Calculator (2022); 9: Choice (2021); 10 Go Solar Quotes (2022); 11: Captain Green Solar (2021); 12: Go Solar Quotes (2022); 13: Solar Choice (2021); 14: National Transport Commission (2019); 15: AGL (2022); 16: Energy Australia (n.d.); 17: Hyundai Australia (2022); 18: Audi (2022), 19: Service NSW (2022); 20: Electric Vehicle Council (2021); 21: The Driven (2021)