SOLAR REPORT

QUARTER 2 2025

Australian Energy Council

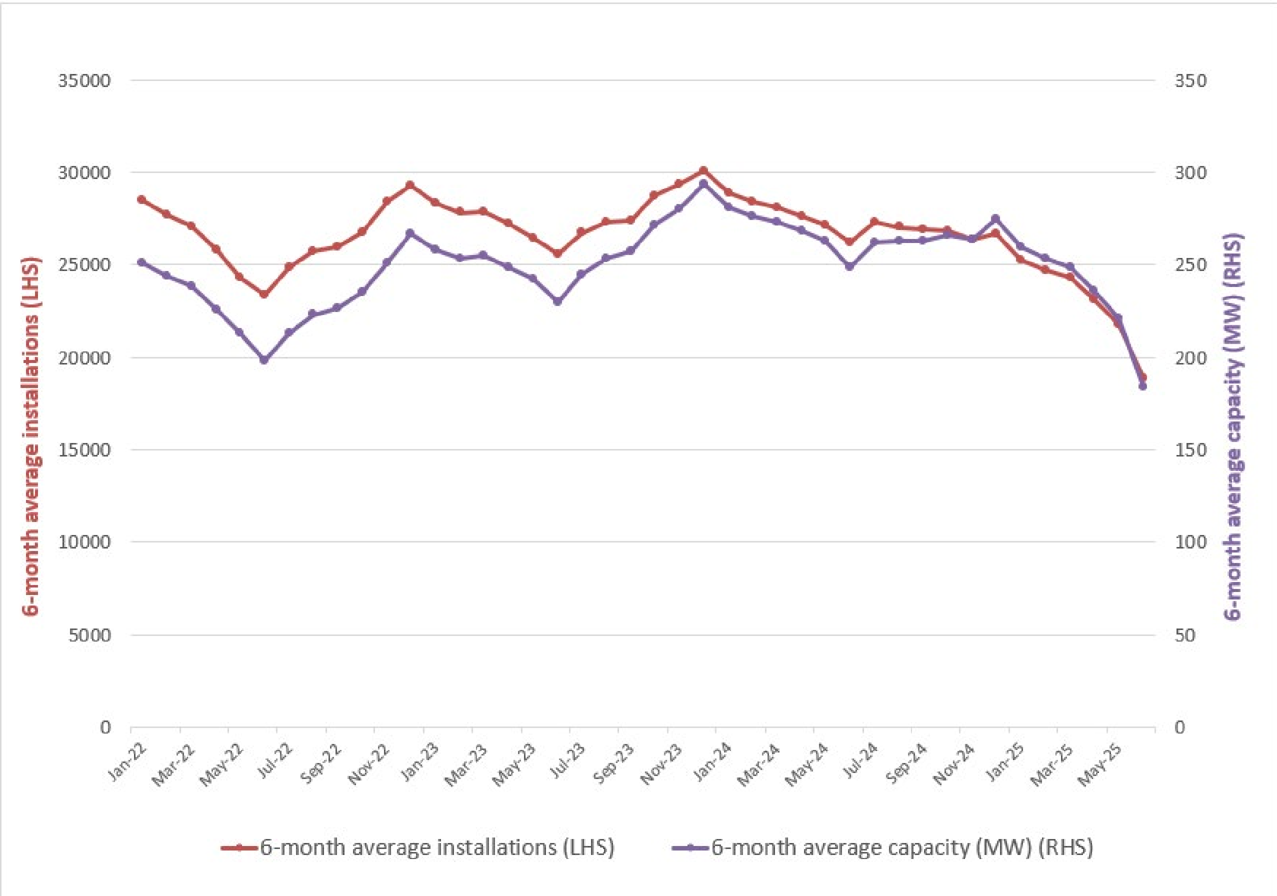
Table of contents

SECTION I: STATE OF SOLAR IN AUSTRALIA

As of June 2025, data from the Clean Energy Regulator (CER) shows rooftop solar capacity for homes and businesses has surpassed 26.7 GW, with more than 4.15 million photovoltaic systems now operating nationwide.

Figure 1 tracks rooftop solar installations and installed capacity from January 2022 to June 2025, highlighting a clear seasonal pattern. Installations and capacity typically dip during the mid-year months, coinciding with winter, before rebounding in warmer seasons as solar conditions improve. Despite these fluctuations, rooftop PV has continued to record steady year-on-year growth when comparing peaks and troughs. Because of the usual 12-month reporting lag, data from July 2024 to June 2025 remain incomplete and are expected to be revised upwards.

Figure 1: Six-month moving average of rooftop installations and installed capacity in Australia

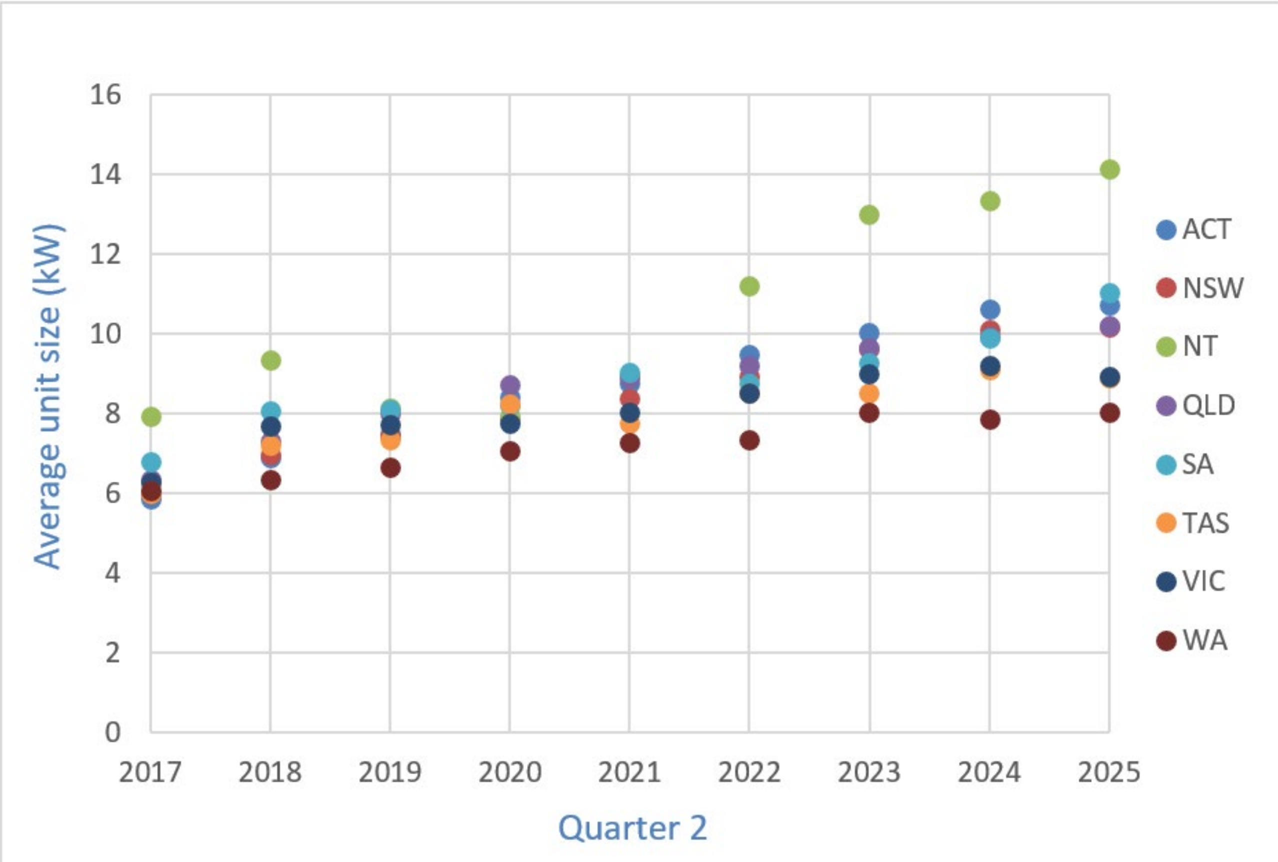


Source: Clean Energy Regulator data, Australian Energy Council analysis, data as of 21 July 2025

Figure 2 shows the average rooftop solar system sizes in the second quarter of each year since 2017, highlighting a consistent upward trend across all states and territories. The Northern Territory recorded the strongest growth, reaching the highest national average in Q2 2025 at 14.1 kW. While the NT accounts for just 0.3 per cent of total capacity and 0.2 per cent of installations, its market is characterised by fewer but significantly larger systems, likely driven by commercial-scale residential or off-grid applications.

Other jurisdictions have also seen steady growth in system sizes, reflecting rising demand for larger residential and small-scale commercial installations. In Q2 2025, the ACT, New South Wales, Queensland and South Australia all recorded averages above 10 kW. South Australia was the standout, leaping from fourth place in Q2 2024 to second in Q2 2025 - a shift that points to growing adoption of larger rooftop systems, potentially underpinned by stronger commercial uptake.

Figure 2: Average unit system size of rooftop PV in the second quarter of each year in Australia



Source: Clean Energy Regulator data, Australian Energy Council analysis, data as of 21 July 2025

Battery installations with rooftop solar

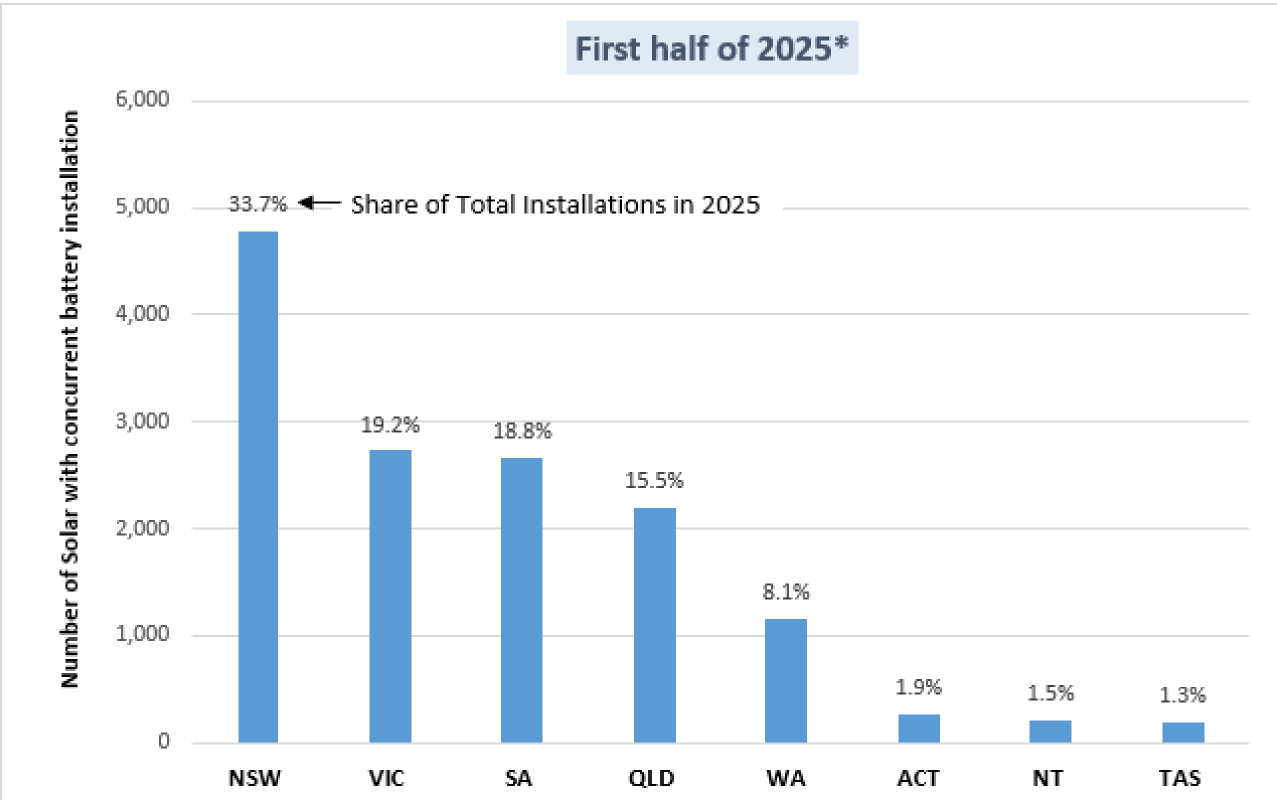
During the first half of 2025, Australians installed more than 14,200 battery systems alongside rooftop solar. New South Wales led the nation with 4,782 installations, while Victoria saw a sharp increase in the second quarter, adding 1,556 systems as households rushed to take advantage of interest-free loans offered through the Solar Victoria program. This surge made Victoria the second-highest contributor nationally in Q2 2025.

South Australia recorded 2,666 installations, followed by Queensland with 2,196 and Western Australia with 1,152. The Australian Capital Territory, Northern Territory and Tasmania collectively accounted for 661 installations, representing around 5 per cent of the national total. Battery uptake continues to grow, particularly in states with widespread rooftop solar, reflecting rising interest in energy storage for greater self-sufficiency, grid stability and lower electricity costs.

Installation year	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
Q1 - 2025*	168	2,379	81	1,060	1,476	109	1,170	776	7,219
Q2 - 2025*	97	2,403	127	1,136	1,190	79	1,556	376	6,964

** Due to the 12-month creation period, the figures will continue to change (increase)*

Figure 3: Number of solar PV installations with concurrent battery installations, per state since 2014



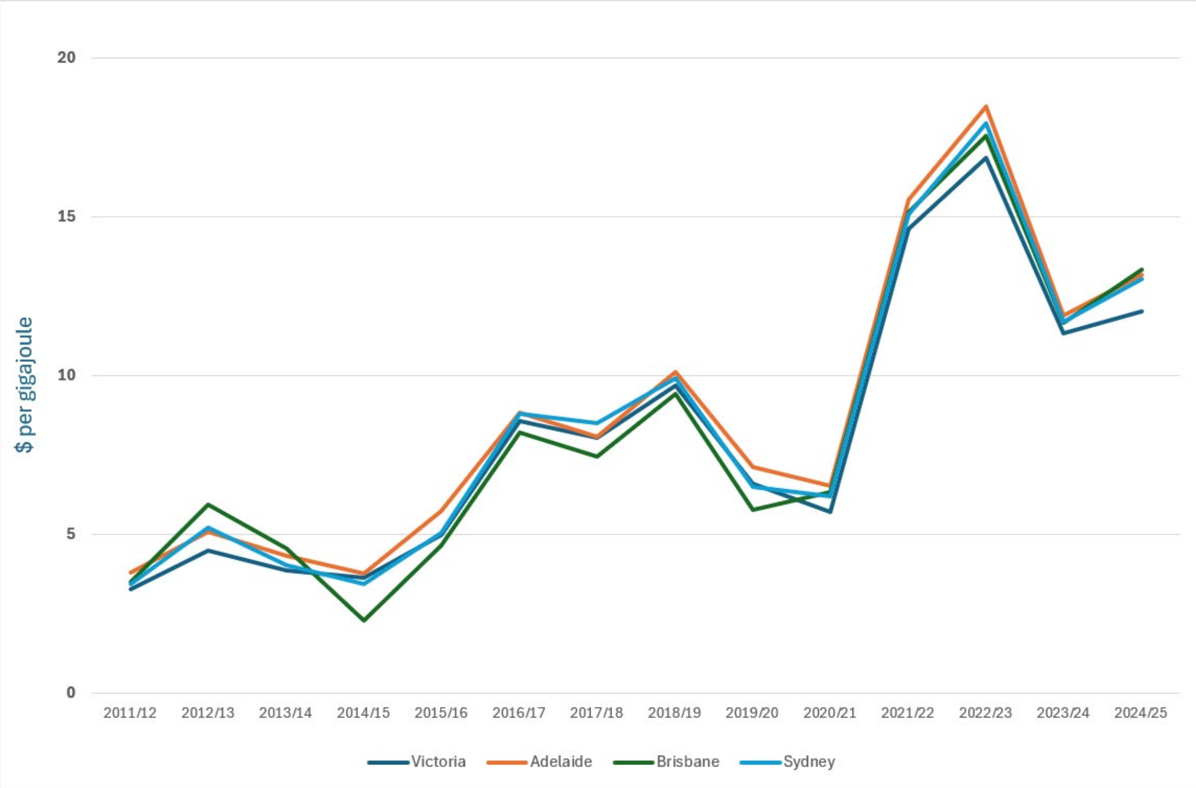
Source: Clean Energy Regulator data, Australian Energy Council analysis, data as of 21 July 2025

SECTION II: WINTER BILLS: GAS VERSUS SOLAR ELECTRIC

Gas prices in Australia have seen significant fluctuations in recent years, driven by a combination of global market dynamics, domestic supply constraints, and rising demand. As both a major exporter of liquefied natural gas (LNG) and a domestic consumer across residential, commercial, and industrial sectors, Australia's prices are increasingly influenced by international trends. The east coast market, in particular, has faced upward pressure due to limited infrastructure and competition from export contracts. As of financial year 2024/25, average wholesale gas prices have come down from the 2022/23 peak, but they remain at the third-highest level over the past fifteen years (Figure 1).

Although wholesale prices do not directly affect household power bills, sustained high prices flow through to retail prices in the coming years. For households and businesses, this volatility affects energy costs and decision-making, as consumers increasingly consider alternatives such as electrification and investments in Consumer Energy Resources (CER) in response to rising prices.

Figure 4: Average gas prices $/GJ for the Victorian gas market, STTM hubs in Adelaide, Brisbane and Sydney



Source: Australian Energy Council's analysis

In Victoria, these price pressures are particularly acute during winter, when gas heating demand peaks. Melbourne households typically see their highest gas bills between June and August, as shorter daylight hours increase electricity use while gas heating surges. The state has the highest rate of residential gas consumption in the country (see Table 1). This heavy reliance on gas heating during the colder months makes Melbourne the most relevant location for examining the economic viability of switching to solar-powered electric alternatives. We will compare household bills using traditional gas heating with those using electric heating systems supported by rooftop solar generation.

Table 1: Natural Gas Consumption (TJ) by residential and small businesses during financial year 2023-24

Consumption (TJ)	NSW & ACT	VIC	QLD	SA	WA	TAS
Residential & small businesses	47,349	106,964	6,602	9,982	21,386	774

Source: 2025 Electricity Gas Australia, Australian Energy Council

Table 2: Average gas usage in winter and summer by household sizes

Household size	Winter (MJ)	Summer (MJ)	Difference (MJ)
1	14,375	2,484	11,891

2	23,855	3,911	19,944
3	23,855	4,192	19,663
4	26,426	4,694	21,732
5+	33,375	6,028	27,348

Source: **Frontier Economics - Simple electricity and gas benchmarks - From June 2021**

The sharp seasonal difference is primarily due to space heating, as gas use for hot water and cooking remains relatively steady year-round. This highlights that the vast majority of gas consumption in Victorian homes during winter is driven by heating demand, not other appliances. Research by Frontier Economics indicates that for the average family of four, the additional 21,732 MJ consumed during winter can result in a gas bill of roughly $1000. Larger households of five or more typically use 27,348 MJ more during winter, with gas bills exceeding $1,300.

Table 3: Estimated Winter (June, July & August) Gas Bill in Victoria by household sizes

Gas Distributor	Key Regions	Gas charge (cents)*	Gas Daily Rate (cents)*	Household Size (Quarterly Gas Bill)				
				1	2	3	4	5+
AGN	Mildura, Bendigo, Bairnsdale, western/northern Melbourne	3.8	90.2	$ 634	$ 998	$ 998	$ 1,097	$ 1,363
Multinet	Eastern & south-eastern Melbourne suburbs (e.g. Glen Waverley, Ringwood, Dandenong)	3.4	110.3	$ 586	$ 905	$ 905	$ 992	$ 1,226
AusNet Gas	Bright, Mt Beauty, Falls Creek, alpine towns	3.8	89.2	$ 622	$ 979	$ 979	$ 1,076	$ 1,337

Source: **Frontier Economics - Simple electricity and gas benchmarks - From June 2021**, Australian Energy Council's analysis

*Average rate of all gas retailers across different gas distributor regions
*Many gas retailers use tiered pricing (e.g. different rates for the first 27 MJ). For simplicity, a flat rate (c/MJ) is assumed in this analysis.

While the gas market is competitive, many consumers focus on switching electricity plans rather than gas, often leaving money on the table with their gas bills. One way to reduce the impact of high winter gas bills is to consider electric heating alternatives, particularly those powered by energy-efficient appliances or rooftop solar systems.

To fairly compare gas and electric heating costs, we first estimate the electricity required to deliver the same amount of heat currently provided by gas during winter. This depends on the efficiency of electric heating systems, with reverse-cycle air conditioners among the most efficient. A reverse-cycle system has a coefficient of performance (COP) of 3–5, delivering 3 to 5 units of heat for every unit of electricity consumed. Using this efficiency factor, household gas consumption (in MJ) can be converted into the equivalent electricity demand (in kWh) needed to provide the same level of heating.

To establish an accurate baseline for electricity use without heating or cooling loads, this analysis uses autumn consumption data. Autumn in Melbourne requires minimal space heating or air conditioning, reflecting true household electricity use for lighting, appliances, and hot water. Unlike spring, autumn's lower solar generation avoids artificially reduced consumption from the 35–40 per cent of Victorian households with existing solar systems. The converted gas heating demand is then added to this autumn baseline to estimate total winter electricity requirements for households switching to electric heating.

Table 4: Estimated total winter electricity usage in Victoria

Household size	Autumn (kWh usage)	Winter (add kwh of reverse cycle heating with COP = 4)	Total Winter usage (kWh)
1	763	826	1,588
2	1,275	1,385	2,660
3	1,487	1,366	2,853
4	1,531	1,509	3,040
5+	1,997	1,899	3,896

Source: [Frontier Economics - Simple electricity and gas benchmarks - From June 2021](), Australian Energy Council's analysis

Note: Total = autumn electricity usage + converted gas usage for heating into electricity (from MJ into kWh)

As shown in Table 5, even without solar, electricity bills are already competitive with gas for many household sizes, particularly in lower-cost distribution regions such as Jemena or United Energy.

Table 5: Estimated Winter (June, July & August) Electricity Bill in Victoria by household sizes

Distributor			Household size (Quarterly electricity bill)

	Usage charge (not controlled load) ($ per kWh)	Daily supply charge	1	2	3	4	5+
AusNet Services	$0.35	$1.41	$682	$1,055	$1,122	$1,187	$1,485
Jemena	$0.27	$1.24	$548	$841	$894	$945	$1,179
Citipower	$0.30	$1.23	$585	$904	$961	$1,017	$1,271
Powercor	$0.30	$1.37	$604	$926	$984	$1,041	$1,298
United Energy	$0.29	$1.16	$565	$874	$930	$984	$1,231

Source: ESC, Australian Energy Council's analysis

While reverse-cycle electric heating is already comparable in cost to gas for many households, adding a solar PV system can reduce quarterly electricity bills even further across all household sizes. Table 6 shows the potential savings for Victorian families. Single-person households typically need around 3 kW of solar panels to reduce their winter bills to $473–$587, while larger households generally require 6.6–8 kW systems for the greatest savings.

Table 6: Estimated Winter (June, July & August) Electricity Bill with rooftop solar systems in Victoria by household sizes

Distributor	Household size (Quarterly electricity bill)											
	1			2		3		4		5+		
	No Solar	2 kW	3 kW	No Solar	4 kW	No Solar	4 kW	No Solar	6.6 kW	No Solar	6.6 kW	8 kW
AusNet Services	$ 682	$ 619	$ 587	$ 1,055	$ 928	$ 1,122	$ 995	$ 1,187	$ 977	$ 1,485	$ 1,275	$ 1,230
Jemena	$ 548	$ 498	$ 473	$ 841	$ 741	$ 894	$ 794	$ 945	$ 780	$ 1,179	$ 1,014	$ 979
Citipower	$ 585	$ 531	$ 504	$ 904	$ 795	$ 961	$ 852	$ 1,017	$ 837	$ 1,271	$ 1,092	$ 1,054
Powercor	$ 604	$ 549	$ 521	$ 926	$ 816	$ 984	$ 874	$ 1,041	$ 859	$ 1,298	$ 1,117	$ 1,078
United Energy	$ 565	$ 513	$ 486	$ 874	$ 769	$ 930	$ 824	$ 984	$ 810	$ 1,231	$ 1,057	$ 1,020

Source: ESC, Australian Energy Council's analysis

While ongoing energy costs are clearly reduced, households should be mindful of the initial capital investment required to install rooftop solar or upgrade to reverse-cycle heating systems, which can vary depending on system size, existing infrastructure, and available rebates. The latest federal battery rebate scheme further strengthens the economic case, allowing households to store excess solar and reduce their winter electricity bills even more.

SECTION III: LEVELISED COST OF ENERGY

The Levelised Cost of Energy (LCOE) measures the cost of electricity per kilowatt hour (kWh) produced. When the LCOE is equal to or lower than the retail price consumers pay, this is referred to as grid parity. Table 2 compares the LCOE for solar in Australia's major cities alongside indicative retail prices and current feed-in tariff (FiT) rates. A detailed methodology is provided in the Appendix.

Retail comparison rates are based on representative variable charges and exclude fixed supply costs. For all capital cities except Perth and Hobart, prices are drawn from St Vincent de Paul's market offer tracking, last updated in January 2025. Perth's regulated prices are sourced from Synergy (with a 2 cents/kWh FiT between 3pm and 9pm), Hobart's from Aurora Energy's Tariff 31, and Darwin's from Jacana Energy's regulated residential usage charges. Tables 7, 8 and 9 set out the LCOE across major cities under different discount rate assumptions.

Table 7: Central estimate: 5.10 per cent discount rate (ten-year average mortgage rate)

All figures in $/KWh	System Size						Retail prices	FIT
	3 kW	4 kW	5 kW	6 kW	7 kW	10 kW		
Adelaide	$0.10	$0.09	$0.08	$0.08	$0.08	$0.08	$0.43	$0.05
Brisbane	$0.10	$0.09	$0.09	$0.08	$0.08	$0.08	$0.31	$0.06
Canberra	$0.10	$0.09	$0.08	$0.08	$0.08	$0.07	$0.28	$0.09
Darwin	$0.11	$0.11	$0.11	$0.11	$0.10	$0.10	$0.28	$0.08
Hobart	$0.13	$0.12	$0.11	$0.11	$0.10	$0.11	$0.28	$0.10
Melbourne	$0.12	$0.11	$0.10	$0.10	$0.10	$0.09	$0.24	$0.05
Sydney	$0.10	$0.09	$0.09	$0.09	$0.09	$0.08	$0.32	$0.12
Perth	$0.09	$0.08	$0.08	$0.07	$0.07	$0.08	$0.32	$0.02

Source: Australian Energy Council analysis, August 2025

Table 8: Low cost of capital sensitivity: 5.98 per cent discount rate (low current standard variable rate)

All figures in $/KWh	System Size						Retail prices	FIT
	3 kW	4 kW	5 kW	6 kW	7 kW	10 kW		
Adelaide	$0.10	$0.09	$0.09	$0.08	$0.08	$0.08	$0.43	$0.05
Brisbane	$0.11	$0.10	$0.09	$0.09	$0.09	$0.08	$0.31	$0.06
Canberra	$0.10	$0.09	$0.08	$0.08	$0.08	$0.08	$0.28	$0.09
Darwin	$0.11	$0.12	$0.11	$0.11	$0.11	$0.10	$0.28	$0.08
Hobart	$0.14	$0.13	$0.12	$0.11	$0.11	$0.11	$0.28	$0.10
Melbourne	$0.12	$0.11	$0.10	$0.10	$0.10	$0.10	$0.24	$0.05

Sydney	$0.11	$0.10	$0.09	$0.09	$0.09	$0.08	$0.32	$0.12
Perth	$0.09	$0.08	$0.08	$0.08	$0.08	$0.08	$0.32	$0.02

Source: Australian Energy Council analysis, August 2025

Table 9: High cost of capital sensitivity: 16.00 per cent discount rate (indicative personal loan rate)

All figures in $/KWh	System Size						Retail prices	FIT
	3 kW	4 kW	5 kW	6 kW	7 kW	10 kW		
Adelaide	$0.16	$0.14	$0.13	$0.12	$0.12	$0.12	$0.43	$0.05
Brisbane	$0.17	$0.15	$0.14	$0.13	$0.13	$0.12	$0.31	$0.06
Canberra	$0.16	$0.14	$0.13	$0.12	$0.12	$0.11	$0.28	$0.09
Darwin	$0.19	$0.20	$0.18	$0.18	$0.17	$0.16	$0.28	$0.08
Hobart	$0.23	$0.21	$0.19	$0.18	$0.17	$0.18	$0.28	$0.10
Melbourne	$0.19	$0.17	$0.16	$0.15	$0.15	$0.14	$0.24	$0.05
Sydney	$0.17	$0.15	$0.14	$0.13	$0.13	$0.12	$0.32	$0.12
Perth	$0.14	$0.13	$0.12	$0.11	$0.11	$0.12	$0.32	$0.02

Source: Australian Energy Council analysis, August 2025

Small and large business - Levelised cost of electricity

Tables 10 and 11 present the estimated cost of electricity generation for commercial-scale solar systems, reflecting a growing trend as businesses seek to cut overheads through on-site generation. Unlike households, business tariffs vary depending on customer size and consumption levels, with many able to negotiate lower rates. If all electricity is consumed on-site, the figures in Tables 10 and 11 show the effective cost per kWh from different system sizes. For most businesses, the decision to install solar ultimately comes down to whether the long-term savings outweigh the upfront investment.

Table 10: Central estimate: 4.91 per cent discount rate, ten-year average small business interest rate

All figures in $/KWh	System Size				
	10kW	30kW	50kW	70kW	100kW
Adelaide	$0.08	$0.09	$0.09	$0.09	$0.08
Brisbane	$0.09	$0.08	$0.08	$0.08	$0.08
Canberra	$0.08	$0.09	$0.08	$0.08	$0.08
Hobart	$0.11	$0.10	$0.10	$0.10	$0.09
Melbourne	$0.10	$0.10	$0.10	$0.10	$0.09
Sydney	$0.09	$0.09	$0.09	$0.09	$0.08
Perth	$0.09	$0.08	$0.09	$0.08	$0.08

Source: Australian Energy Council analysis, August 2025

Table 11: Central estimate: 6.71 per cent discount rate, ten-year average large business interest rate

All figures in $/KWh	System Size				
	10kW	30kW	50kW	70kW	100kW
Adelaide	$0.09	$0.09	$0.10	$0.10	$0.09
Brisbane	$0.09	$0.09	$0.09	$0.09	$0.09
Canberra	$0.09	$0.10	$0.09	$0.09	$0.08
Hobart	$0.12	$0.11	$0.11	$0.11	$0.10
Melbourne	$0.11	$0.10	$0.11	$0.10	$0.10
Sydney	$0.10	$0.09	$0.10	$0.09	$0.09
Perth	$0.10	$0.09	$0.09	$0.09	$0.08

Source: Australian Energy Council analysis, August 2025

SECTION IV: PAYBACK PERIOD, DETAILED MODEL

The payback period for rooftop solar PV systems is a key factor for households, showing how long it takes to recover the upfront investment. It represents the point when cumulative savings from lower bills and FiT's revenue exceed total costs, including installation and financing. A detailed methodology is provided in Appendix 2.

While solar requires an initial outlay, households benefit from reduced reliance on the grid and credits from exporting excess power. Falling wholesale prices, however, have seen FiTs reduced by many retailers, making system economics more reliant on direct consumption. Time-of-use tariffs are also becoming more common, offering higher rates during peak demand, though this analysis uses simple average FiTs to give a clearer picture of payback periods. Table 12 shows these across different system sizes and cities, with many regions recording short payback times that remain strong drivers for adoption.

Actual savings depend heavily on usage patterns. Homes that consume more power during daylight hours capture greater value, while those with lower daytime demand may see longer paybacks. Choosing an energy plan is also critical — the highest FiT may not always deliver the best outcome if it comes with higher supply or usage charges. Households should match their plan to both historical consumption and expected solar exports to maximise returns.

Table 12: Payback period for solar PV (at 5.10 and 5.98 per cent discount rate)

	Interest Rate %	System Size (kW) 3 kW	4 kW	5 kW	6 kW	7 kW	10 kW
Assumed Export Rate		**60%**	**65%**	**74%**	**77%**	**80%**	**90%**
Adelaide	5.08	4	2	4	4	5	6
	6.39	4	4	4	4	5	7
Brisbane	5.08	6	5	5	5	6	7
	6.39	6	5	6	5	6	8
Canberra	5.08	5	4	4	4	4	4
	6.39	5	4	4	4	4	4
Darwin	5.08	6	8	8	9	8	10
	6.39	7	8	9	10	9	11
Hobart	5.08	7	7	7	6	6	8
	6.39	8	7	7	7	6	9
Melbourne	5.08	8	7	8	7	8	11
	6.39	8	7	8	8	9	13
Sydney	5.08	4	3	4	3	3	4
	6.39	4	4	4	3	4	4
Perth	5.08	3	3	4	4	4	9
	6.39	3	3	4	4	5	10

Source: Australian Energy Council analysis, August 2025

The payback period for rooftop solar varies widely across Australian cities, shaped by local electricity prices, tariffs, and installation costs. Adelaide, Sydney, and Perth record some of the fastest returns, as short as 3 to 4 years, driven by high retail prices and favourable FiTs. Brisbane also performs well, with typical paybacks of 5 to 6 years depending on system size and exports.

In contrast, Hobart and Darwin face longer payback times of 6 to 9 years due to lower solar output in Hobart and high installation costs in Darwin, making both the most expensive locations to install. Melbourne consistently shows the weakest financial case, with payback often exceeding 8 years, largely because Victoria's low wholesale prices keep retail rates down, limiting savings from exported solar.

Overall, rooftop solar remains a strong long-term investment, but returns are much stronger in states with higher electricity prices or more generous FiTs, while weaker in regions reliant on low wholesale prices unless paired with batteries or high self-consumption.

SECTION V: METHODOLOGY APPENDIX

1. Solar installations methodology

Analysis from the CER's monthly data allows us to estimate the amount of solar PV installed in Australia. Since November 2015, the CER has consistently released data dated as at the first of each month. The new consistent release date allows us to provide a more accurate estimate of the capacity of recent installations. Due to the lag in reporting of new installations, however, the CER data takes up to 12 months to be finalised.

2. Payback period methodology

This methodology outlines our approach in calculating the payback period for solar panels installed across capital cities in Australia. Our analysis includes the following:

- Initial investment
- Discount rate
- Efficiency
- System degradation rate
- Export rate
- Avoided usage cost
- FiT

Initial investment, discount rate, efficiency and system degradation rate are described in appendix 1. Key difference to LCOE calculation is the payback period assumes no annual maintenance cost.

Calculation

Payback period occurs when $\sum$ savings > $\sum$ cost

Where:

Savings = (usage cost x $(1+ \text{CPI})^t$ x consumption / 100) + (Export x FiT)

Cost = investment x $(1 + \text{real discount rate})^t$

t = years

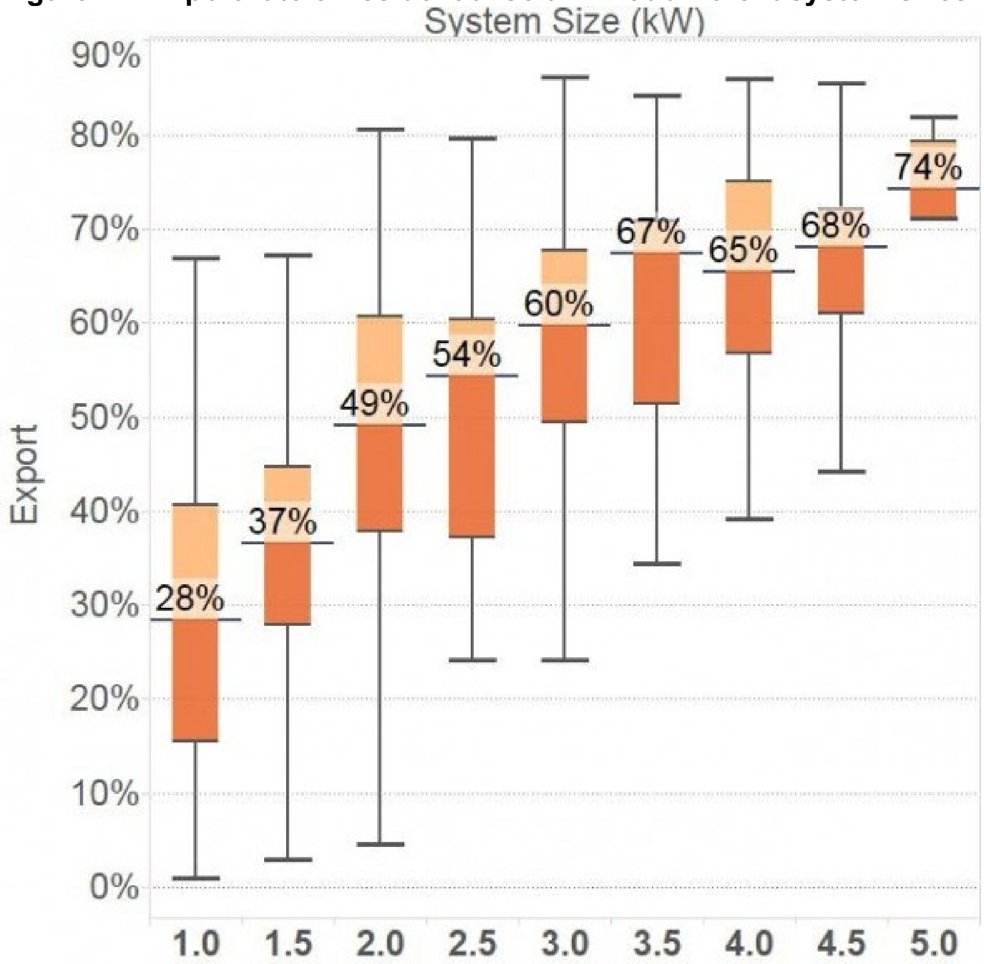
Avoided cost and FiT

The onsite consumption is multiplied by the retailer's usage charges. CPI has been applied to the usage charge to allow for growth in retail prices. The excess energy is exported to the grid and the customer is expected to receive the mandatory FiT or a realistic market offer where mandatory tariffs are not applicable.

Export rate

The percentage of onsite consumption and electricity which is exported to the grid is calculated using the median value from Sunwiz' analysis[i]. See Figure 11 below.

Figure 11: Export rate of residential solar PV at different system sizes



Source: Sunwiz' analysis, 2015

[i] Sunwiz, Solar Pays Its Way on Networks. Last accessed 17 June 2015.