



THE SOLAR INDEX

POWERED BY SOLAHART

AUSTRALIANS INVESTING IN
A SOLAR FUTURE



The time to act is now. Australia has one of the sunniest climates in the world and the adoption of solar, yields both short and long-term benefits for the planet and our wallets.”

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Australia is a renewable energy powerhouse and a world-leader when it comes to solar energy, thanks to its sunny climate, constant innovation of solar technology, and the high percentage of households and businesses opting to use green energy.

Renewable energy currently makes up 24 per cent of Australia’s total electricity generation¹, chosen by a growing population of home and business owners seeking to live more sustainably, save money, and live more independently.

When talking about solar, people often associate this technology with solar power alone, sometimes forgetting that there are other ways to use the sun for its energy. This report refers to both solar power (Solar PV) and solar hot water (Solar Thermal) technologies.

Heating and cooling can account for approximately 40 per cent of household energy use², while conventional water heaters typically make up around 25 per cent³ of a household’s grid-energy consumption in Australia. Water heating is also the largest source of greenhouse gas emissions⁴.

In 2020, Australia’s rooftop PV market remained healthy, showing no slowdown in the growth of residential and commercial PV installations, despite the initial social and economic impacts of COVID-19⁴, and we’re expecting continued growth in 2021 and beyond.

With the installation of a 6kW solar power system, a typical family could reduce their greenhouse

gas emissions by up to seven tonnes per year⁵ and potential savings of approximately \$1,500 on their annual energy bills, it is clear going green pays.

Additionally, choosing to switch from a conventional electric storage water heater to a Solahart solar hot water system reduces a home’s greenhouse gas emissions from between 1.6 to 2.7 tonnes a year – the equivalent of taking a small conventional car off the road!⁶

While Solahart’s own research⁷ shows that cutting down power bills is a key priority for customers who choose solar power (71 per cent), almost half believe solar is a necessary part of our future (44 per cent), while wanting to live a more sustainable lifestyle was in the top three motivators (38 per cent) for those searching for solar power.

When it comes to solar hot water, the key driver for those interested is cutting down electricity bills (71 per cent), having a reliable source of hot water (46 per cent) and viewing solar energy as the way of the future (44 per cent)⁷.

The devastating bushfires of 2019/2020 were a harsh reminder of our impact on the planet, and more than 70 per cent⁸ of Australians agree that the bushfire crisis was a wake-up call for the world.

The time to act is now. Australia has one of the sunniest climates in the world and the adoption of solar, yields both short and long-term benefits for the planet and our wallets.



Stephen Cranch,
General Manager of Solahart

SMARTER SAVINGS

Transitioning to clean, renewable power is not only better for the planet; it is also an instant cash saver, with solar owners seeing benefits from day one.

Solar is a great way to reduce energy bills and reliance on energy companies by harnessing the sun’s free energy. Research by Solar Citizens⁹ found that on average, households with solar power have bills that are approximately 20 per cent lower than households without solar technology.

However, not all solar solutions are the same, and there is a way to achieve smarter savings. For example, if a family of four in Sydney with an average daily power use of 25kWh installs a 6 kW solar power system, it could result in exporting up to 50 per cent of its generation back to the electricity network if the energy produced is not used during the day.

To overcome this, this family could add a Solahart PowerStore, Australia’s first solar-smart electric water heater, to divert much of this excess power to heat water. By replacing an electric water heater on an off-peak tariff, the combined solar power and Solahart PowerStore systems could save this household up to \$1,760 per year on their energy bills.

The above is a case study; savings will vary depending on how much power is being used, the size of the solar power system installed and where the home is located.

It makes sense to start the journey into renewable technology by firstly reducing the amount of energy used. Conventional water heaters typically make up around 25 per cent³ of a

household’s grid-energy consumption in Australia, and installing a solar hot water system can reduce this energy use by up to 65 per cent¹⁰.

Therefore, a great way to minimise the energy consumed from the grid or gas network is to replace a gas or electric water heater with a solar water heater. This will ensure households are taking advantage of the abundant Australian sunshine to produce the hot water required for the home.

For ultimate savings, combine a solar water heater with a solar power system to provide energy to the home, and supplement this with a battery system to store free energy that can be used at night, or when the sun is not shining. Any surplus power can then be fed back into the grid.

With Solahart, each customer’s solar solution is determined via a proprietary Savings Estimator to ensure the best system is selected for their needs. Starting with a free on-site solar assessment, Solahart’s extensive network of qualified consultants will evaluate the home and provide the best solutions to meet the customer’s needs. They now offer an additional \$1,000 up-front saving to customers who purchase an eligible solar hot water and solar power system package.

All Solahart installers are trained to the highest standards with Clean Energy Council (CEC) accreditation, and every Solahart Dealer is part of the CEC retailer code of conduct scheme, to ensure the safety and effectiveness of every system. This is backed by comprehensive Solahart Warranties and the peace-of-mind customers will get from dealing with Australia’s solar pioneer.

WHEN IT COMES TO SOLAR – AUSTRALIA LEADS THE WAY

Australia is a global trailblazer when it comes to the per capita roll-out of energy generated by solar and wind, resulting in lower greenhouse gas emissions and reduced energy bills for those who invest across the nation.

A RECENT GLOBAL SOLAR SNAPSHOT FOUND THAT...

- Australia deploys renewable energy 10 times faster per capita than the global average¹¹
- The nation's estimated renewable energy would make up 40% and 50% of electricity by 2025²

THAT'S...

- 4 times faster per capita than in Europe, China, Japan or the United States of America!¹²

ACROSS THE NATION, WE'VE ALSO RECENTLY SEEN...

- 6.3GW (the equivalent of four large coal plants) of renewable capacity installed in 2019, up 24%¹³
- Australia's large-scale renewable energy capacity increase by 2.2GW across 34 projects¹

DID YOU KNOW...

- Australia has the highest uptake of solar globally, with more than 21% of homes using rooftop solar PV¹⁴
- Australia (per capita) has the most installed solar PV, the fastest deployment speed of solar PV, and the fastest combined deployment speed of solar PV and wind¹¹
- As of 31 December 2020 more than 2.66 million rooftop solar power systems have been installed across Australia¹⁴
- In 2019, renewable energy was responsible for 24% of the nation's total electricity generation, an increase of 2.7 percentage points year-on-year¹
- Australia has the world's highest solar radiation at 58m petajoules per year, approximately 10,000 times larger than its total energy consumption¹⁵

THE TWO WAYS TO CAPTURE THIS SOLAR RADIATION ARE SOLAR PV AND SOLAR THERMAL

WHAT IS SOLAR PV?

Solar power systems generate electricity from sunlight, using solar panels made up of photovoltaic (PV) cells that convert the light from the sun into DC electricity which is then fed through an inverter and converted to 240V AC electricity to power a home.

Solar power systems greatly offset electricity costs by minimising the power consumed from the grid. The amount of electricity produced depends on the number of panels installed, their efficiency, the size and quality of the

inverter, the orientation of the roof, the season, and the amount of sunlight available in the homeowner's location.

WHAT IS SOLAR THERMAL?

Solar Thermal, also known as Solar Hot Water, is the process where solar radiation is converted to heat energy - usually carried through a liquid such as water, or other (anti-freeze) fluid in frost-prone or hard water areas. As the sun heats the water or fluid in the solar collector panels, it rises and enters the storage tank to provide hot water for household use.

WHAT IS A GIGAWATT?

Gigawatt (GW) is a unit of electrical power equal to one billion watts. How much power is in 1 Gigawatt? 1 Gigawatt of solar is enough to power around 300,000 homes, more than enough for Canberra and Hobart!¹³

WHAT IS A PETAJOULE?

A joule (J) is a measure of energy, a watt (W) is a measure of power and is the flow of one joule per second. A petajoule (PJ) is a quadrillion (1 followed by 15 zeros – a million, billion) watts!

THE SUNSHINE CAPITAL

The portion of Australia's solar radiation received by each region is dependent on the average sunlight hours. Queensland has always boasted that it is the 'Sunshine State', Western Australia is often referred to as Australia's sunniest capital, and the Northern Territory has a huge desert topography which could make it the leader, but what does the data say?

From a capital city perspective, according to the Bureau of Meteorology¹⁶, Darwin was the leader, when calculating the average sunlight hours from January to December 2020.

When looking at the uptake of small-scale solar power installations across the states in 2020, New South Wales led the way, with 107,605 installations. However, when factoring in a per capita breakdown, South Australia was the clear winner, with 1,982 out of every 100,000 in the state investing in solar PV!

Interestingly, although Darwin has the most sunlight hours, Northern Territory does not have the greatest uptake in solar power installations from a residential perspective, coming in sixth with 1,252 people out of every 100,000 in the state choosing solar PV across the same period.

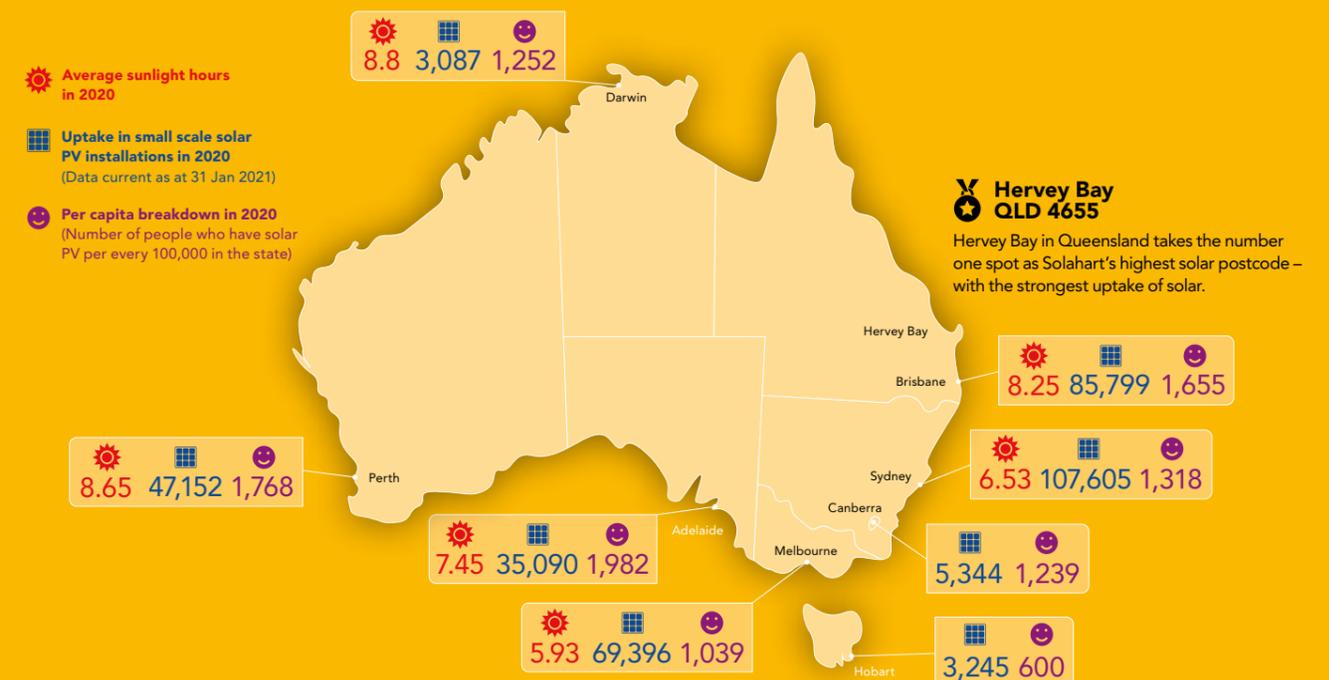
It is important to note that Northern Territory has built up a very high penetration of solar water heater installations over time, due to the favourable conditions.

DAYLIGHT HOURS vs. SUNLIGHT HOURS

While daylight hours include all direct and indirect sunlight during the day, sunlight hours refer to the hours of full direct sunlight received relative to where a solar PV system is in the world (Angle, Tilt, Position, Time).

AVERAGE SUNLIGHT HOURS PER CAPITAL CITY vs. UPTAKE OF SMALL-SCALE SOLAR INSTALLATIONS

Sunlight hours were calculated from Bureau of Meteorology data. The average was based on the monthly mean sunlight hour data recorded at the station closest to each capital city, from January to December 2020. Data was unavailable for Hobart or Canberra across this period. Sources: Average sunlight hours calculated from Bureau of Meteorology data.¹⁶ Uptake of solar installations data provided by Clean Energy Regulator.¹⁷ Data was unavailable for Hobart and Canberra across this period.



For those living in an area of Australia that gets less sun, the good news is, as you can see from the map above, there are still ample rays to power a household's energy needs, no matter the location.

Regardless of whether you live in sunny Darwin and Perth or the cool-climate Hobart, even in the depths of winter, households can still generate solar energy that would otherwise come from the grid.

When it comes to solar hot water systems that rely on the sun's heat, all Solahart solar water heaters include electric or optional gas boosters to ensure hot water is available during the winter months. In frost-prone areas, roof-mounted systems use a glycol (anti-freeze) fluid to circulate in the collectors, so there are no freeze issues in winter.

The cooler the winters, the more efficient the collectors need to be. Solahart has even installed systems in Antarctica and at Mt Everest base camp!

RENEWABLE SUPERSTARS

The Climate Council¹⁸ crowned South Australia as the leader in *The Australian Renewable Energy Race*, a race that sees states and territories measured across a range of metrics, including share of renewable electricity; share of households with rooftop solar; large-scale wind and solar capacity per capita; and government targets or policies in place to support the transition.

SOUTH AUSTRALIA'S POSITION AS THE LEADER IN THE RENEWABLES RACE¹⁸ WAS FURTHER CEMENTED IN THE PAST 12 MONTHS WHEN:

- SA became the first major jurisdiction in the world to be powered entirely by solar energy for over an hour on October 11, 2020¹⁹
- In February 2021, the state announced the SA Smart Network²⁰, the largest and most advanced smart water heater trial conducted in Australia to date – a project which will provide thousands of SA residents with access to affordable, sustainable hot water and support grid stability

IN ANOTHER WORLD FIRST, THE NORTHERN TERRITORY ALSO:

- Signed a milestone agreement which will see the territory host the largest solar farm and renewable energy system in the world set to power 20% of Singapore's electricity supply by 2027²¹

STATE AND TERRITORY EMISSIONS REDUCTION TARGETS

- SA: Set goals to reduce the state's greenhouse gas emissions by more than 50% below its 2005 levels by 2030, and to achieve net zero emissions by 2050²²
- VIC: Long-term target of net zero emissions by 2050 with interim emissions reduction targets every five years²³
- QLD: Set a state target to reach net zero emissions by 2050 and an interim target for at least a 30 per cent reduction in emissions on its 2005 levels by 2030²⁴
- NSW: The NSW Government has committed to an aspirational objective of achieving net zero emissions by 2050²⁵
- WA: Introduced an aspirational target of net zero emissions by 2050²⁶
- NT: Introduced a draft target of net zero emissions by 2050²⁷
- ACT: Working towards a goal of achieving net zero emissions by 2045²⁸. The ACT surpassed its 2020 emissions reduction target, announcing that it had achieved emissions reductions of 45% per based on 1990 levels²⁹.

The renewable revolution taking place in Australia is impressive, particularly as it is clear that all states and territories are committed to achieving significant targets.

In order to achieve these targets, states and territories need to work together with a common purpose and outcome.

One such scheme is the Renewable Energy Target (RET)³⁰, an Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources.

Since it was introduced in 2001, the Renewable Energy Target, which underpins Australia's Small-scale Technology Certificates (STCs), has significantly reduced the up-front cost of installing solar. This incentive is now reducing slightly every year as we get closer to 2030 when it is phased out, so the time to act is now.

Solahart has also noticed a spike in businesses paving the way to a more sustainable future through the adoption of renewables. Taking into account that any PV systems greater or equal to 10kW are counted as 'commercial' PV systems, Australian PV Institutes PV map³¹ reveals that New South Wales, Queensland and Victoria are leading the pack.

COMMERCIAL LEADER BOARD³¹

Position	State/Territory	Count over 10kW
1	NSW	40,823kW
2	QLD	37,054kW
3	VIC	23,081kW
4	SA	18,441kW
5	WA	9,137kW
6	ACT	1,697kW
7	TAS	1,547kW
8	NT	909kW

*Data sourced from Clean Energy Regulator and is up to date as of 31 December 2020



THE NEXT GEN BOOMERS AND GEN X DRIVING THE SOLAR GAME

Google Analytics data from Solahart reveals that Boomers and Gen X are driving the solar game and are the most 'switched-on' solar generations.

Solahart's data found that those aged between 45 and 54 years of age are most interested in embarking on the solar journey.

Solar Citizens⁹ backs this finding, noting that retired consumers are more likely to adopt solar power and that there is evidence of disproportionately higher uptake among consumers who are more than 50 years old.

A report³² on Australian millennials and Gen Z's found that climate change is the number one concern for the younger generation, and while the top aspiration for millennials is travel, Gen Z wants to invest in their own homes.

With a growing concern for the environment, restrictions on international travel, and Australian consumers becoming more ethically-

mind and looking for ways to go green, solar-powered homes will be top of mind in 2021 and beyond.

THE SMART HOME OF THE FUTURE

Smart home technology has been in demand for years with homeowners wanting to bring increased interconnectivity into their lives and homes.

Reports show³³ that smart home penetration is currently at 32.7 per cent and is expected to reach 59.6 per cent by 2025, with this growth set to include solar.

Most people associate smart homes with home automation, but the other growing trend in homes with solar power is the inclusion of a home energy management system (HEMS), to enable smart control over your household energy use, optimise the energy generated by the solar power system, and use grid energy when it's cheaper.

Whilst the inclusion of HEMS should mean set-and-forget, it also allows homeowners to monitor

how much energy they are using and, if necessary, modify the operational time of appliances such as swimming pool pumps. It also highlights how much excess solar energy is being sent back to the grid.

As the cost of solar decreases, the need to have solar in our homes will move to a must-have item. The increase in demand will also drive growth in the connectivity between solar and other household products.

New pricing solutions will also be available as business models change to offer customers access to cost-reflective pricing. The best thing a homeowner can do to 'future proof' their home, is to choose a product that can adapt as the changing technologies do.

Some companies already offer solar solutions with smart technologies included, for example, all new Solahart products are designed with the future in mind, meaning customers can have peace-of-mind that their system won't become obsolete as the technology continues to advance.

TOGETHER WE CAN BUILD A SMART ENERGY FUTURE

Climate change is transforming the world as we know it, and its effects could be disastrous on so many levels. In addition to the economic costs, the environmental impact on the planet is unfathomable.

The economic costs of climate change by the end of the century could be \$77 trillion if global warming is limited to 1.5 degrees and almost \$100 trillion if it reaches 2 degrees³⁴.

Australians are becoming more aware of the impacts and are taking steps to combat the issue of climate change; however, there is so much more that can be done and the changes that are made today will truly affect our tomorrow.

As of June 2019, despite Australia's high uptake of solar, we are using less than five per cent of the potential capacity of residential and commercial rooftop solar.³⁵

Australia's vast land area, coastline and climate make the country rich in terms of renewable energy choices, and we should be taking advantage of all this enormous untapped potential.

A mix of renewables, including solar, hydro, wind, and even energy collected through the ocean's currents will provide Australia with the most consistent solution, and solar power is key to Australia's energy future.

Australians can grow their solar plans, piece by piece with Solahart's innovative and adaptive products, designed to future-proof the home and maximise savings.

Water heating accounts for around 25 per cent of a typical home's energy use¹⁹, so the best place to start is by installing a solar hot water system to minimise the energy consumed from the electricity grid or gas network and instead use the sun to produce hot water.

Combining solar hot water with a solar power system is the ultimate step, as this helps create even more energy free from the sun. Adding storage capacity in the form of a home battery or a smart-electric water heater like Solahart PowerStore is then a great way to ensure that where possible, the energy produced by a solar power system is used rather than sending it back to the grid.

Looking ahead, we expect new tech solutions to continue and a merging of the solar technologies, resulting in increased connectivity of products and improved compatibility between loads, generation and storage devices.

Stephen Cranch,
General Manager of Solahart

BUILD A SMARTER ENERGY FUTURE

Join the Australian solar revolution at www.solahart.com.au

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¹ Clean Energy Council (2020). Clean Energy Australia Report. [online] Available at: <https://www.cleanenergycouncil.org.au/resources/resources-hub/clean-energy-australia-report> [Accessed 1 March 2021]. ² South Australian Government (2020). Heating. [online] Available at: <https://www.sa.gov.au/topics/energy-and-environment/using-saving-energy/heating> [Accessed 8 March 2021]. ³ Energy.gov.au. (2020). Households: Quick Wins [online] Available at: www.energy.gov.au/households/quick-wins [Accessed 18 January 2021]. ⁴ Clean Energy Regulator (2020). Small-scale solar PV modelling report by Jacobs - September 2020.pdf (cleanenergyregulator.gov.au). ⁵ Your Home (2020). Energy. 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Any savings will vary depending upon your location, type of Solahart system installed, orientation and inclination of the solar collectors, type of water heater being replaced, hot water consumption and fuel tariff. Maximum financial savings off your hot water bill are achievable when replacing an electric water heater on continuous tariff. Refer to [solahart.com.au](http://www.solahart.com.au) for further information. ¹¹ Energy Change Institute. (2020). Australia, the global renewable energy pathfinder. [online] Available at: <https://energy.anu.edu.au/files/2020/09/2003%20-%20Australia%20the%20global%20renewable%20energy%20pathfinder%20-%20Andrew%20Blakers%2C%20Ken%20Baldwin%2C%20Matthew%20Stocks.pdf> [Accessed 27 November 2020]. ¹² Australian National University. (2020). Australia: the renewable energy superstar. [online] Available at: <http://re100.eng.anu.edu.au/publications/assets/100renewables.pdf> [Accessed 27 November 2020]. ¹³ Clean Energy Regulator. (2019). 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