



SOLAR & BATTERY STORAGE **BUYING GUIDE**

WELCOME TO YOUR ENERGY FUTURE

As energy bills continue to rise, thousands of Australians every year are turning to solar panels and battery storage as the key to a lower cost, sustainable and clean energy future.

The number of Australian households enjoying the benefits of solar power has already passed a staggering two million - more than 20% of homes across Australia. And the uptake is only increasing, with a record 1.4 GW of solar PV installed across the country in 2020¹. Growth in home battery storage installations is now also being seen as families and businesses access the cost-saving benefits of using solar energy day and night. Some of the strongest growth in battery storage systems has been seen in South Australia, where generous Government subsidies are on offer as part of the Home Battery Scheme.

As the market continues to grow, so do your solar and battery storage options - it can be overwhelming. What effect will solar or battery storage have on your power costs? What kind of system do you need? How do you know which retailer to trust?

This guide is designed to clearly and comprehensively explain the benefits of solar energy and battery storage, and provide you with the tools and know how to find the best solar panel and storage solution for your needs now and into the future.

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ABOUT SOLAR ENERGY & BATTERY STORAGE

More and more households around Australia and the world are doing their bit to reduce their carbon footprint by using renewable energy

What does ‘renewable energy’ actually mean?

Renewable energy sources are called “renewable” for a good reason; they’re naturally renewed with time. Unlike fossil fuels, such as coal, gas and oil, renewable energy sources are unlikely to ever run out and are a much more sustainable long-term solution for electricity generation.

Renewable energy can be generated from a wide range of naturally occurring sources, including:

- **Wind:** using wind motion to generate electricity through turbines.
- **Solar:** tapping light from the sun to generate electricity through solar panels.
- **Hydropower:** moving water through turbines to produce electricity.

- **Biomass:** decomposing organic matter to produce electricity, chemicals or biofuels to power vehicles.
- **Ocean:** capturing the energy from the rise and fall of ocean tides to generate electricity.
- **Geothermal:** uses the natural heat from deep underground to generate electricity.

With recent advances in technology, grid-scale renewable energy generation is now on-par with or lower-cost than fossil fuel generation; it’s not just our homes and businesses but also our **entire electricity grid that is moving to clean energy options.**

Why choose solar power?

The benefits for a household or business taking advantage of solar energy are obvious; generating your own power for free instead of paying for electricity from the grid, and selling unused electricity back to the grid for credits.

Solar power is not only a great way to save hundreds or even thousands on your power bills each year, it's also a clean, sustainable, green energy choice. Solar energy doesn't only have the benefit of reducing your electricity bills; it also has wide-ranging benefits for our planet and our community.

Solar energy uses less water

Water is one of our most precious natural resources. We live on the driest continent on the planet, and we run the risk of running out of fresh water in the future. Traditional electricity production can use thousands of litres of water each year. Water is used for cooling generators, processing and refining fuel and transporting fuel through pipes.

Generating power through solar panels, however, uses no water whatsoever. The operation of solar photovoltaic cells doesn't require water to generate electricity, reducing the strain on this precious resource. The only time you'll need water is to clean the panels if they get a bit grubby or dusty - which also helps ensure you're maximising the potential of your system.

Solar energy reduces air pollution

Using the sun to generate more of our power means less harmful emissions from burning fossil fuels. Electricity generation from fossil fuels can generate harmful carbon dioxide and methane gases that lower the quality of the air we breathe.

Generating electricity with solar panels **produces no harmful emissions**, and the more homes that rely on solar power means less toxic emissions from fossil fuels being pushed into the air we breathe.

Solar power helps to fight back against climate change

The release of toxic gases into the atmosphere, such as carbon dioxide, methane and nitrous oxide, doesn't just contribute to air pollution, but also contributes to the enhanced greenhouse effect. While the greenhouse effect is a natural process that warms the Earth's surface to a liveable temperature, human activities, such as the burning of fossil fuels, have increased the amount of greenhouse gases in our atmosphere. This has led to the enhanced greenhouse effect, which is warming our Earth faster than ever before.

Generating electricity from solar panels produce no greenhouse gases, and so can help to reduce the effect of climate change if used widely. With solar energy powering a home or business, there is no burning of fuel and no emissions from energy production.



*An average family can save up to
\$3,500 over the course of a year.*

What can solar and battery storage do for your energy bill?

The effect that solar and battery storage can have on your energy bill depends on a number of factors, including the size system you choose, whether you're purchasing both solar panels and battery storage, how much energy you use, the time of day you use energy, and which solar company you go with.

For a family paying a typical South Australian rate of around 40c for every unit of grid electricity they use, adding just 6kW of solar panels and a battery to their house can help them to save up to \$10 a day on their energy bills - up to \$3,500 over the course of a year.

In today's market, a well designed residential solar energy system without batteries will pay itself back in around three to five years; that's a return on investment of around 25 to 30%. If you bundle a battery into your system at the same time, your complete solar and battery storage system could pay itself back in as little as 7 to 8 years, as well as providing added benefits of increased solar energy usage, the latest in home technology, and power in a blackout.

How does solar work?

Solar panels need sunlight to function – it's an obvious necessity. But what you might not realise is that your home's exposure to sunlight, or how many sunshine hours you get, has a direct impact on the number of solar panels you might need.

When it comes to buying your new solar energy system, don't make the mistake of thinking 'one size fits all'. Finding the perfect fit will make sure you get the best result for your investment.

Your daily energy usage

Your current energy usage pattern should inform the number of solar panels you need and what you want to achieve. The best way to begin is by reviewing your electricity bills.

- 1 | Collect your past year's worth of electricity bills and look for your "average daily energy use" figure on each of them – it will typically be shown on the first or second page of the bill, and in kilowatt-hours or "kWh".**
- 2 | Note this number down for each bill you have, and then take an average of all of those numbers. The final number you arrive at will be your average energy use over 24 hours.**
- 3 | To maximise your consumption (using your solar energy in your home, rather than sending it to the grid), you should also consider the time of day that you use energy. For a house that uses most of its energy during the morning, placing solar panels on an east-facing roof space ensures you can capture the morning sun and generate free electricity when you need it most. However, if you find you're using most of your energy in the afternoon - once the kids are home from school, for example - it might make more sense to place solar panels on a west-facing roof.**

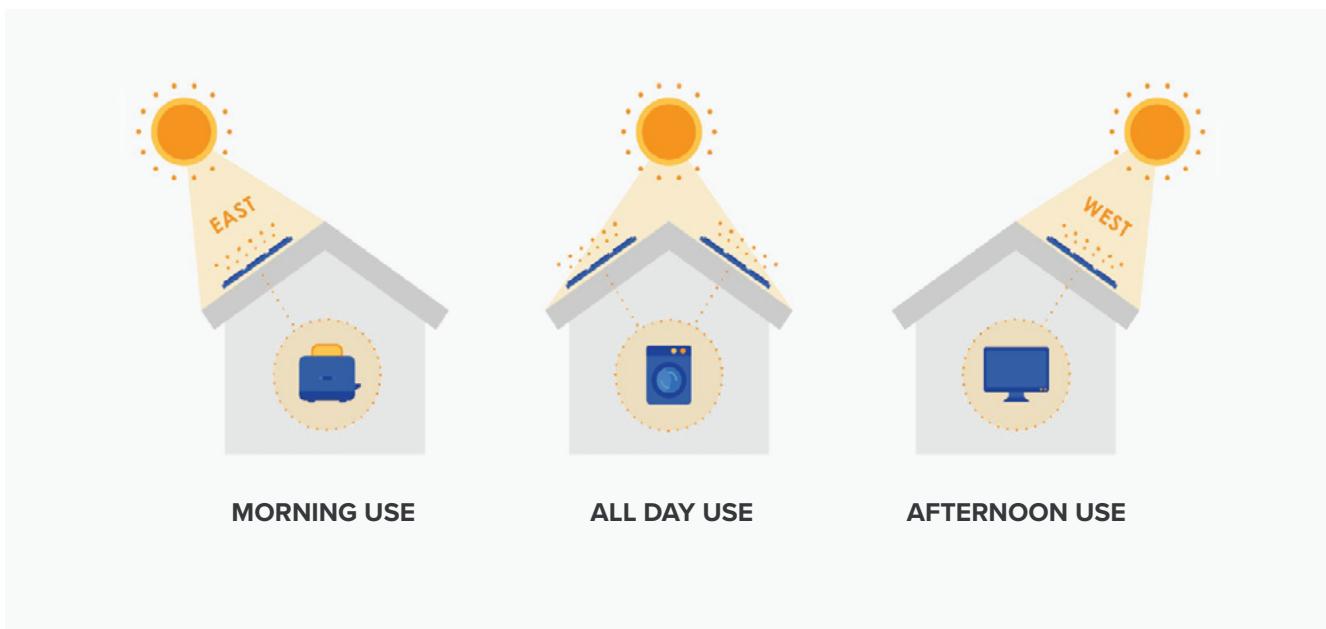
How do solar panels work?

A standard solar energy system consists of photovoltaic (PV) panels mounted on your roof, with the panels connected to an inverter (or inverters) on your wall. The inverter is connected to your home's power switchboard, forming a controlled link between the solar panels on your roof and the electricity requirements of your home.

When sunlight hits the PV cells in the solar panels, electrons inside the panels are activated. These electrons are captured and move in the same direction around a circuit, which ultimately forms direct current (DC) electricity. This DC electricity moves down the wires from your solar panels to the inverter (or inverters) on your wall, where the inverter converts this DC electricity into alternating current (AC) power to be used in your home or business.

The energy produced by your solar panels is available for use almost instantaneously. Unless you have a battery storage system that stores the energy, any excess electricity that isn't used is often sent out to the electricity grid for a small credit or feed-in tariff.

Solar Panel Placement



Match your solar panel placement with the time of day that you use the most energy

Why get both solar panels and battery storage

Australians are installing solar panels and battery storage in their homes to take advantage of our long, sunny days. And the benefits are plentiful - lower bills, a more sustainable energy choice, and power in a blackout.

One of the biggest concerns for people considering solar power is that they aren't home during the day when their panels are producing the most energy. Installing battery storage in your home allows you to store energy that your solar panels produce during the day for use at night, so you can harness the sun's rays to provide you with energy at all hours of the day.

One of the major downfalls of our current, grid dependent energy system is that when one part of the system fails, hundreds or even thousands of people can suffer from blackouts. Installing battery storage allows you to store energy and have it available to use in a blackout. With a battery on your home, you may well be the only house on your street with the lights still on.

Depending on the system you choose, you might also be able to:

- reserve a portion of your battery always to have energy available for blackouts;
- force a full charge of your battery remotely from your smartphone or device when a storm is approaching; or
- continue charging your battery with power from your solar panels if an outage occurs during the day.



WHAT TO LOOK FOR WHEN CHOOSING YOUR SYSTEM

Where should I start?

The first step when looking to install solar panels or battery storage for your home should be to carefully review your current and future energy needs. It may sound obvious, but it's often the most important step that people, and even some companies, miss out on.

It's vitally important that your system is sized appropriately to match either your current household electricity consumption or your expected future consumption, and designed to maximise self-consumption which saves you cash on your ongoing energy bills.

The size of system that suits your needs will ultimately depend on your energy generation goals, your current and future energy needs, the physical size available for solar panels and, of course, your budget. A good solar provider will ask you about your goals, timelines and your budget. Whether you're looking for the fastest payback, grid independence, blackout power, reduced environmental impact, or a combination of these, your solar provider should tailor a system to your unique circumstances and needs.

*Sunshine: Average daily hours,
Bureau of Meteorology, Australian Government
<http://www.bom.gov.au/watl/sunshine/>*

Your location and sunshine hours

The amount of sunlight your home receives changes based on your location in Australia and the time of year. Sunlight hours are at their highest in summer, and fall during winter thanks to shorter, cloudier days.

Of the Australian capital cities, Perth has the highest amount of average sunshine hours with Adelaide not far behind, and Melbourne has the least. This means that a household in Melbourne may need a larger sized system to make up the same amount of energy as a household in Adelaide or Perth, simply because of the sunlight they receive.

Your energy goals

The size of the solar energy system you choose will also depend on how much you're aiming to save on your future electricity bills. Do you want to just cover your daytime energy needs, or do you want to add a battery to make yourself almost completely self-sufficient? If you just want to cover your daytime needs, you might need fewer panels. But if you want to also have a battery, either now or in the future, you may need more panels to cater for the required energy generation.

Your energy goals will directly influence the size of the system, the number of solar panels, and the way it's designed for future expansion. Even if you select a smaller system that won't supply 100% of your electricity needs, your new investment will still help to bring your electricity costs down almost immediately, and could set you up for easy addition of a battery in the future.

Should I add battery storage?

Imagine being able to not only generate your own electricity, but also having the ability to store your power during the day, and use it when you get home at night or - in some cases - even during a power outage.

Home energy storage is an investment that you'll see returns on as soon as the installation is complete. Combining solar energy generation with battery storage allows you to use clean, green, renewable energy, 24 hours a day, instead of more costly coal or gas-fired power from the grid.

You'll be protected from electricity retailers hiking up prices, could have power in a blackout, and you'll help the environment in the process.

How much will this cost?

A brand new solar and battery storage package could cost as much as renovating your kitchen or doing up the bathroom; it's a major investment.

However, unlike your bathroom or kitchen renovations, solar panels and battery storage will potentially save you thousands in ongoing electricity costs, and effectively pay themselves off in a matter of years.

As a very rough guide, for a standard installation in a metropolitan area, the total cost of your solar could fall anywhere between \$3,000 for a small 2kW system to \$12,000 for a top of the line 10kW system. You should expect to pay more if you're also adding battery storage, with more in-depth design requirements as well as additional costs for installation and possible modifications to your existing electricity setup in your home or business.

Additional costs could also include changing or reconfiguring your meter, switchboard or cabling works, access requirements to work safely on your roof, installing panels across multiple roof areas, removing any trees or shading and preparing your roof for installation.

The upfront cost of your solar solution is affected by a number of things:

- Government incentives and schemes
- Installation costs
- Type and number of solar panels
- Type and size of inverter
- Framing equipment
- Height and accessibility of your roof
- Componentry and installation quality
- After sales support

A solar energy system without a battery will typically take between 3 and 5 years to payback if it is wellsuited to your daytime energy needs. A well designed battery storage system that is combined with new solar panels will typically take between 6 and 12 years to reach its payback period.

Just like any major investment, you should consider the full range of benefits that solar panels and battery storage can offer (not just the payback period), including:

- Using more of your own solar energy.
- Reducing your grid costs and reliance on grid electricity.
- Reducing your carbon footprint with cleaner, greener energy use.
- Reducing the impact of future electricity price increases.
- If you choose battery storage, you will have backup power in a blackout.

Learn more about the South Australian Home Battery Scheme on our website



HOW TO CHOOSE THE RIGHT RETAILER

You've decided on the type of solar energy or battery storage system that you would like. Now, you need to decide on the right retailer.

There are hundreds of retailers to choose from; how do you know which one is the right fit for you? Here are our top nine questions to ask when searching for a retailer.

1 | What brands are they selling?

Solar energy is a huge investment in your home for the long term, so you should do everything you can to learn about the products and brands that a provider is selling. Do some research online by reading testimonials and reviews. Call each company directly and ask them what kind of solar panels and inverters they use in their solutions, the brand and manufacturer, and why they have chosen those brands for their solutions.

2 | Are their prices too good to be true?

With the proliferation of solar panels across Australia, it's easy to think that all solar companies are the same, and that it's smartest to just go with the cheapest system you can get. Agreeing to the cheapest quote may lead you to big problems later on.

With cheap solar panels, you often get what you pay for; low quality or poorly installed panels, faulty inverters, a system that doesn't deliver on its promises, and terrible or no after-sales customer service or support. While a premium solution might be a bigger investment at the start, it will pay dividends in greater energy savings, longterm performance and ongoing after-sales support.

3 | Are they recommending a one-size fits all solution or are they tailoring their quote for you?

Your solar energy solution should be sized carefully according to your current energy usage, the days and times that you most commonly use energy, your expectations and goals for reducing your energy bills or your reliance on the grid, and your plans for the future; will your family be getting bigger or smaller, or will you want to add a battery later?

Your solar retailer should request a copy of one of your recent electricity bills, and ask you:

- how and when you typically use energy;
- what sort of appliances you have and when you use them; and
- if you're expecting any changes to your energy habits in the future.

You should also be clear on what you're looking to achieve; the best payback, getting ready for battery storage, having power in a blackout, or simply using cleaner energy. If the retailer you are talking to isn't asking these sort of questions, **hang up the phone and find a company who does!**

4 | Is your provider accredited?

Your provider should have relevant insurance cover, the appropriate certification and robust systems and processes to undertake the installation of your solar and battery solution safely. The quality of the installation is just as important as the quality of the product; safe installation procedures are essential. Having experienced teams to manage your project from start to finish is imperative.

ZEN Energy has invested in the quality of systems and team members to provide excellent technical and customer service support, along with a wealth of experience to deliver every project safely and to a high standard. ZEN maintains ISO 9001 certification together with 14001 and 18001 and is fully accredited and insured.

5 | Are their customer support team based locally?

Customer support centres that are based overseas can often mean costly delays in service or repairs, language or context barriers between you and the customer service representative, and high costs on freight or postage when sending products overseas for review.

If your provider can offer ongoing support with an Australian-based customer service centre, this will add even more value to your investment. Australian-based customer support provides you with local knowledge, personalised product advice, and a local advocate for any warranty claims.

Local customer support means:

- You are dealing with a local who knows your area and understands your needs.
- They will have comprehensive knowledge of local rules, regulations and the history of the local electricity network.
- Local technicians and support staff can be hired and come to your home as required.
- You have a local advocate in warranty claims with overseas suppliers, saving you time and money.

6 | Are they and their installers Clean Energy Council accredited?

The Clean Energy Council is the leading regulatory body for the clean energy industry in Australia, helping to ensure ethical sales and marketing practices by clean energy retailers, designers and installers in Australia. Clean Energy Council accreditation of a company's designers and installers shows good capability in the design and installation of solar energy systems, and that your solution will be designed and installed to appropriate guidelines and strict safety standards.

7 | Are they using panels from a 'Tier 1' provider?

In the solar industry, there are three industry-accepted 'tiers' of manufacturer quality for solar panels. Tier 1 encompasses the top 2% of solar panel manufacturers, and is the highest quality technology and manufacturing. Tier 1 solar panel companies invest heavily in research and development of new technology, have been in the market for longer than five years, are in control of every step of the manufacturing process and use only the best quality Silicon to produce solar cells.

8 | Are they future-proofing your system?

Most solar energy systems can be connected to a battery. However, selecting the right battery for your existing solar energy system depends on a few different factors, including what you want to achieve and the current feed-in-tariff you're getting.

Your battery storage provider should know the ins and outs of your solar panel system before making a recommendation on the storage system you might need. If not, they could be selling you a system that works best for their bottom line, instead of a system that is built to last and suits your unique situation.

As part of reviewing your energy needs when looking at battery storage, you may need to consider adding some more panels to cater for your night-time energy usage as well as your

daytime usage. You can even work towards taking your home completely 'off the grid'. Many homeowners are content with being 70% to 90% grid independent, with the grid connection there as a back-up if needed.

9 | What documentation will they provide?

Your solar provider should provide you with all documentation for your system soon after the installation has been completed. This documentation will be critical if you ever need to lodge a warranty or insurance claim.

At a minimum, you should receive a system user manual including:

- a list of equipment supplied
- shutdown and isolation procedures for emergencies
- connection diagrams
- performance estimates
- maintenance guides and timetables
- the commissioning sheet installation checklist
- the installer's declaration of compliance with the **Clean Energy Council**
- warranty information
- the PV array frame engineering certificate
- the equipment manufacturer's documentation and
- handbooks and a checklist of actions to be taken in the event of an earth fault alarm.

A photograph of a woman and a young child playing in a garden sprinkler. The woman is in the background, and the child is in the foreground, both laughing and splashing water. The scene is bright and sunny, with lens flare effects.

Choosing a Clean Energy Council Approved Solar Retailer is a smart move to protect your investment. As part of the approval process, the retailer has signed on to abide by the Clean Energy Council Code of Conduct - a Code that aims to lift the bar higher than minimum government and regulatory requirements, and bring about a better standard of service for the industry. It is also the only solar industry code of conduct authorised by the Australian Competition and Consumer Commission (ACCC).



FINANCING YOUR INVESTMENT

Finance options can be an attractive option for solar and energy storage systems, as the energy cost savings from a system can often exceed the financing costs.

Everyone's circumstances are different. We recommend getting financial advice from your accountant or a registered advisor prior to making any decision concerning the use of credit for your system.

Your Home Mortgage

In many instances the simplest and most cost-effective solution may be to extend or redraw from an existing home loan. This is because the interest rates are generally lower, your credit risk has already been assessed, and a relationship has already been established with the lender.

Consumer Finance*

If extending or redrawing your home mortgage is not appropriate for you, other sources of consumer finance are also available. A number of companies are offering credit products to finance renewable energy systems for households and businesses who do not have a home loan in place or wish to explore other options. While ZEN is not a credit provider, we are able to put customers in contact with some of these to assist you in this approach if they wish.

* Please note: ZEN Energy is not licensed to provide credit or credit assistance, and ZEN Energy does not recommend any particular credit contract. ZEN Energy receives no financial benefit from any credit providers for any customers referred to them.



NEXT STEPS

If you're ready to invest in solar energy for your home, do lots of research and take your time to find your perfect fit.

✓ **Set your goals for investing in solar energy**

Have a clear goal in mind about how much of your energy requirements you'd like to have generated by your new solar energy system. Your energy goals will directly influence the size of the system, the number of solar panels, and the way it's designed for future expansion.

✓ **Review your current average monthly household energy usage**

Collect your past year's worth of electricity bills and look for your "average daily energy use" figure on each of them – it will typically be shown on the first or second page of the bill, and in kilowatt hours or "kWh". Note this number down for each bill you have, and then take an average of all of those numbers. The final number you arrive at will be your typical energy use over a 24 hour period, including both day and nighttime hours.

✓ **Understand your finance options**

We recommend getting financial advice from your accountant or a registered financial advisor prior to making any decision.

✓ **Research the type or size of system that you might need**

When it comes to buying your new solar energy system, don't make the mistake of thinking 'one size fits all'. Even if you select a smaller system that won't supply 100% of your electricity needs, your new investment will still help to bring your electricity costs down almost immediately, and could set you up for an easy addition of a battery in the future.

✓ **Speak to retailers and ensure they are offering a tailored solution**

The best solar energy providers will always ask you about your current energy habits and your future plans, and these considerations should be carefully included in designing your system.



FREQUENTLY ASKED QUESTIONS

What sort of ongoing maintenance is needed for a solar energy system?

Solar energy systems are more or less maintenance-free. The only things you should really consider on a regular basis are to ensure that your solar panels are clean and free of any dust or debris, and to make sure that any trees or vegetation are pruned as necessary to minimise shading on your panels.

Do I need to clean my solar panels?

Your solar system's energy output may be limited if the solar panels become dirty and cleaning is not carried out regularly. Natural rainfall will often be enough to wash the panels and remove accumulated dust and dirt. However, we recommend that your panels are cleaned properly every six months to optimise system performance. The best time to clean the panels is late spring and late autumn. Read our '**How to clean solar panels**' fact sheet for a step-by-step guide.

What happens to my electricity meter?

In most circumstances, there will need to be some alterations to your existing electricity meter as part of a solar or energy storage installation. The exact type of alteration will depend on a range of factors, but will typically be anything from a simple reprogramming for newer meters through to a full meter replacement and upgrade for older meters.

What is a solar feed-in tariff?

A feed-in-tariff is the amount that your electricity retailer pays you for any electricity your solar energy solution generates that is fed back into the grid. This may happen if you generate more power than you can use. Feed-in-tariffs differ between states and retailers. With feed-in-tariffs continuing to be reduced by Australian electricity retailers. Your solar provider should be focused on getting as much self-consumption out of the system they design for you, rather than focusing on feed-in-tariff returns. If you're unsure about how much you should be receiving, get in touch with your electricity retailer or an energy advisory service in your area.

What happens in a blackout?

In a blackout, if you don't have a battery, your solar energy system will stop producing electricity. This mandatory safety measure is imposed to protect people that might be working on the poles and wires in your area to restore power during the blackout. As soon as power is returned to the grid, the ability to generate electricity from your solar panels will return.

If you have a battery connected to your solar system, you may be able to have some electricity in the event of a blackout. However, the exact amount of energy you will have, what you can power, and for how long will vary from system to system.

ABOUT ZEN ENERGY

ZEN stands for Zero Emissions Now, our call to action. We believe that by turning towards low cost, renewable energy, our communities will become more sustainable and prosper accordingly. Our purpose is to lead communities into that zero-carbon world.

Founded in South Australia in 2004, ZEN was first a supplier of renewable energy systems to homes and businesses. From those beginnings, we have installed more than 30,000 energy systems across Australia. Our renewable energy solutions help our customers make a positive impact in their homes, at their work and with large commercial and industrial businesses. We bring new ideas such as advanced demand management and energy storage services and are focused on helping our customers reduce their impact on the environment.

As an energy retailer, ZEN counts renewable energy leaders like the CSIRO and the South Australian Government as clients. ZEN has partnered with many large-scale renewable energy projects to supply these customers, and we continue to seek new opportunities as our renewable energy requirements increase.

Across our business, our team shares a core belief Australia has the potential to be a superpower of the post carbon, global economy.



**PROUDLY
AUSTRALIAN**
Solar & storage experts



**TAILORED
SOLUTIONS**
No lock-in contracts



**ZEN TECHNOLOGY
PARTNERS**
Solar & storage experts

Our commitment to quality

ZEN Energy, our staff and our installers are held to the highest standards of quality, safety, efficiency, and environmental protection.



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