

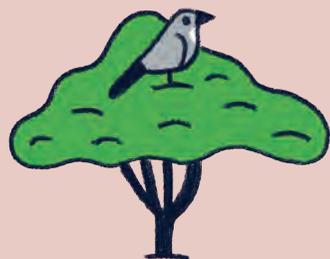
# solar buyers guide



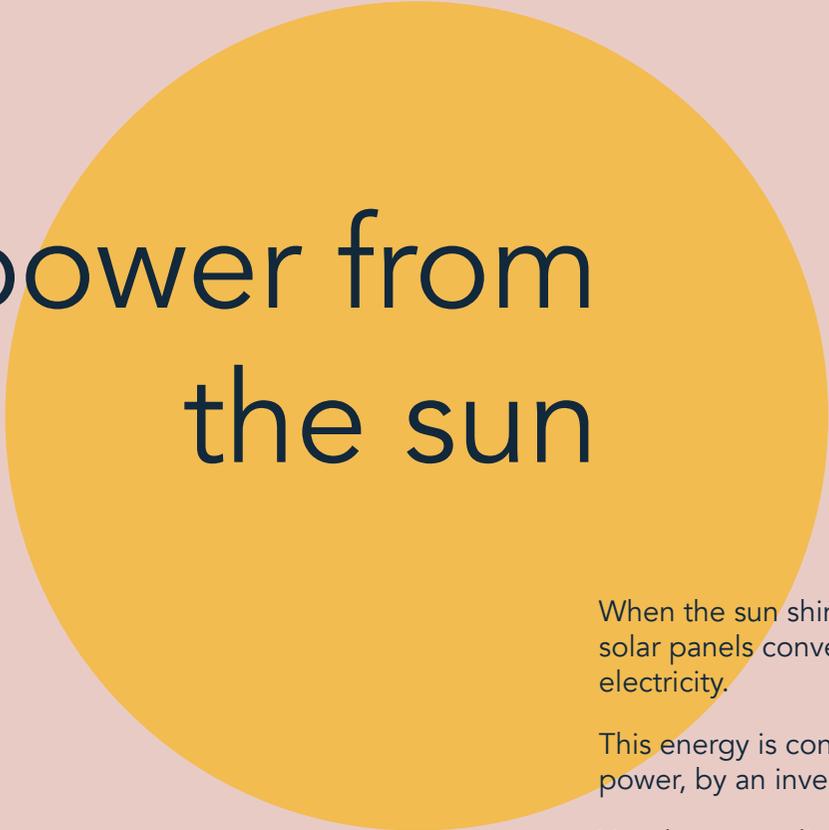
# welcome to your solar buyers guide

This Solar Buyers Guide is designed to give you an understanding of how solar works as well as the key benefits of powering your home with the sun's energy.

It will also help you make an informed decision on what sort of solar solution is right for you, and why it's important to choose the right partner on your solar journey - someone who understands what you are wanting to achieve by installing a solar system at home.



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# power from the sun

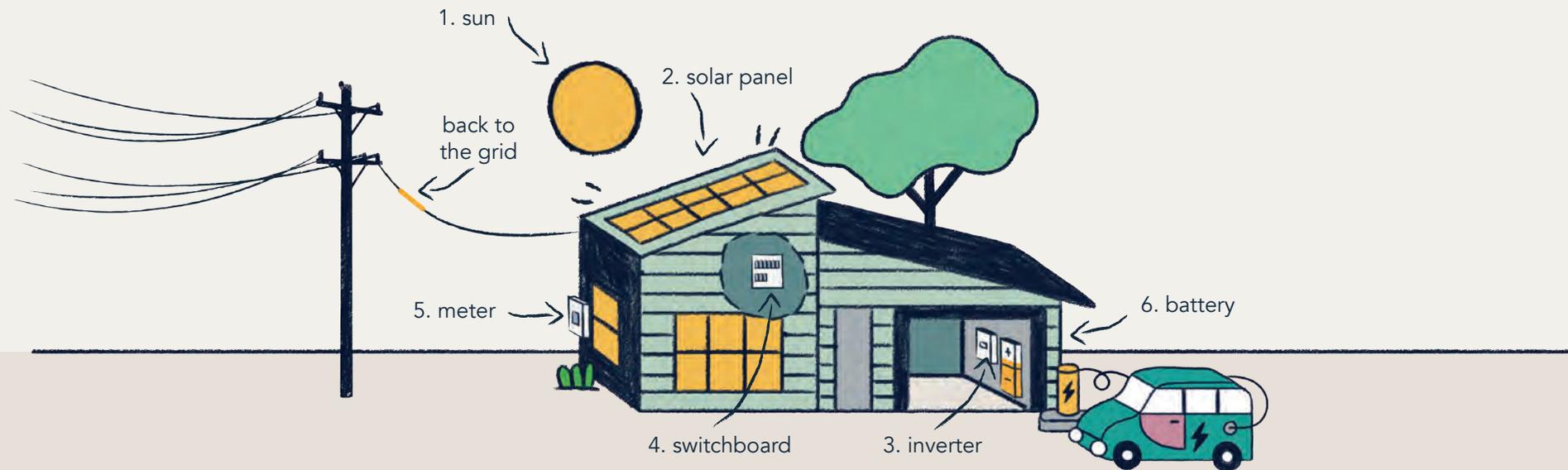
When the sun shines, PV (photovoltaic) cells in the solar panels convert sunlight into DC (direct current) electricity.

This energy is converted into AC (alternating current) power, by an inverter, for use in your home.

Your home appliances (fridge, lights, TV, etc.) use this solar power before drawing any additional power needed from the electricity grid.

Excess energy created can be stored in a battery to be used when the sun goes down or exported back to the electricity grid.

# how solar works



1

When **the sun** is up, there's an abundance of energy available to power your home!

2

**Solar panels** convert this sunlight into DC electricity.

3

Your **inverter** converts the DC electricity into usable 240V AC electricity to power your home appliances.

4

This power comes into your **switchboard** which directs the electricity to different circuits in your home.

5

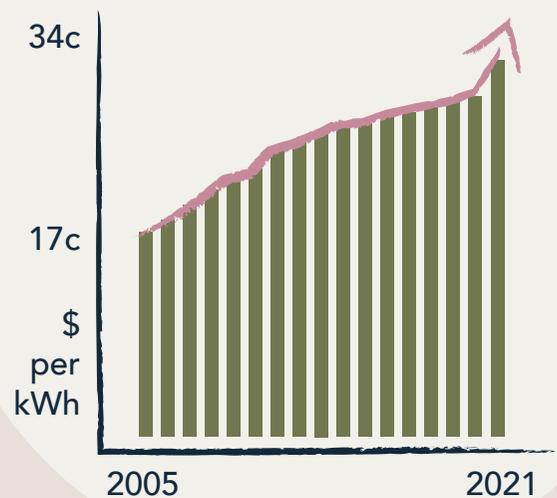
Your new **import/export meter** will measure your excess solar being fed back to the grid (export) as well as the additional power you import from the grid.

6

Adding a **battery** allows you to store your excess solar energy for use when you need it i.e. when the sun goes down.

# energy trends

the cost of power has doubled in 16 years



The cost of power in NZ has increased around 7 percent per year, meaning an average power bill of \$250 will be \$515 in 15 years.

Over the next 10 years, the forecast demand on the national grid is set to increase by 75%, even though the national grid is already struggling to handle NZ's current energy demands.

The cost of solar and batteries has come down significantly and is now a viable option for many families and businesses. When homes, businesses, and farms are producing, storing, and using their energy internally this will take the pressure off the already stretched national grid.

There's no better time to go solar and start enjoying the benefits of being powered by the sun!

# is solar a good investment?



Without solar, you pay a regular monthly bill to your power company for the power you use from the electricity grid.

You could use that same money to pay off a solar system that generates free power for your home, building a valuable asset on your roof, and increasing the value of your home.

Plus, when it's paid off, you keep getting free power i.e. it's all savings from there.



## savings

The economics of installing your own solar system now makes sense.

Payback on a solar system can be as quick as 5 years, depending on your energy demands, usage profile, and current power company charges.

Investing your money in a solar system can mean a return on investment of up to 6x what you could achieve by putting that money in the bank. (see graph)

If you decide to put the upfront cost of the system onto your mortgage, you save money from day 1, as long as your power bill is over \$180 per month on average.

Take the example of an 8kWh system with a battery, which could reduce your bill by 80%. With a \$300 a month average power bill, the mortgage repayment would be around \$170 per month. This means each month you have gained \$130 of money you otherwise would have spent.

Whichever way you decide to pay for your system, the savings are real and immediate.

\* based on 80% reduction of a \$300 per month power bill. As an asset, studies show that installing a solar PV system at your home adds value to your property price, as well as appealing to potential buyers

† based on 2% compounding interest

# investing in solar vs the bank



● solar savings\*

● interest earned on \$30k invested †

# how the grid works

99% of the power in NZ is generated at large-scale power stations in locations across NZ by a combination of hydroelectric, gas, geothermal, wind, and coal.

This power is sent around the nation via Transpower's large power pylons. It is then sent down local power lines to your home by your lines company. Power companies/retailers then sell that power to you to use in your home.



## transmission

Transpower national grid

## generation

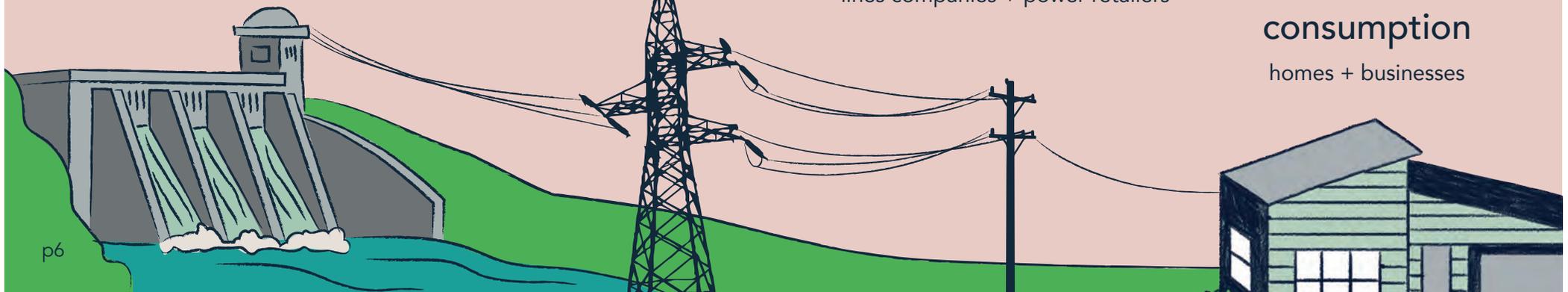
power stations

## distribution

lines companies + power retailers

## consumption

homes + businesses



# the relationship between solar and the grid

## without solar

Most NZ homes have a one-way connection to the national grid.

All the power used in these homes is generated by power stations and supplied via electricity retailers.

You pay for the energy that you use.

## with solar - (grid tied)

A common misconception is that if you have solar panels on your roof, you are "off-grid".

In reality, most solar-powered homes are still connected to the main grid (grid-tied) in fact, they have a two-way connection.

The difference with solar is that you have your own 'power station' on your roof generating free power for your home.

If you need more power than your panels provide, you'll automatically draw power from the grid which you buy from your electricity retailer.

If your panels generate more than you need, that energy can be sold back to the grid (or stored if you have a battery).

## with solar - off grid

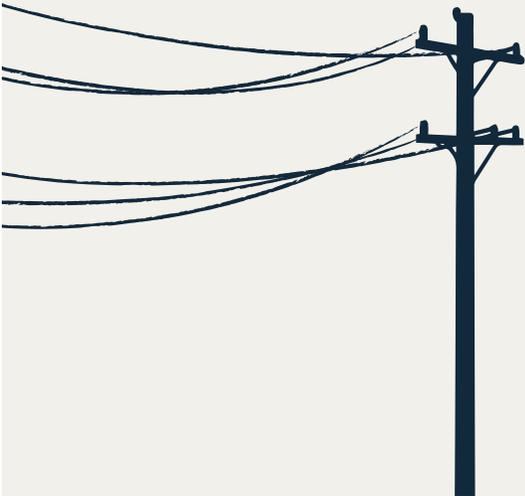
Some systems (mostly in remote areas) can be completely off-grid.

These systems are not connected to the grid and therefore won't have the security of the grid supply if you are unable to generate and store enough power from your off-grid system.

For that reason, these systems are generally sized much bigger than a grid-tied system with large amounts of battery storage, and often a backup generator too.

Because of this, off-grid systems can be very expensive.

Most people that choose to go off-grid do so because they are in remote locations where a grid connection is not available.





## energy security

Reducing your reliance on the national grid is a great way to future-proof your family against power price increases for years to come.

NZ's electricity grid is under immense strain, unable to handle our current, let alone future, energy demands. Our network of transmission lines and substations throughout the country are becoming increasingly overloaded.

Localised and regional blackouts are happening more regularly because of a lack of investment in upgrading the grid, towns, and cities increasing energy demands, combined with reduced generation capacity when weather events become more extreme.

The fast-paced move to the electrification of our lifestyles, including the uptake of electric vehicles, will continue to put even more pressure on the already struggling grid.

As extreme weather events become more common, cold snaps drive energy demand, and droughts affect our hydro generation capacity. Recently, this has resulted in the import and burning of coal from Indonesia to meet our energy demands at a time when we urgently need to move away from carbon-based power.

Solar on your roof is not only energy security for your home, but every home with solar helps alleviate the pressure on the grid itself and reduce our collective carbon footprint.

# solar system basics

## solar panels only

The simplest solar system is a panel-only system. Depending on a range of factors, the panels can potentially provide a significant proportion of your power needs.

Solar panels produce energy when the sun is up and, without a battery to store it, you need to use the energy produced when it is being produced.

If you are not at home during the day, that energy will be exported to the grid. At night time, when the sun is down, you will need to get all your power from the grid.

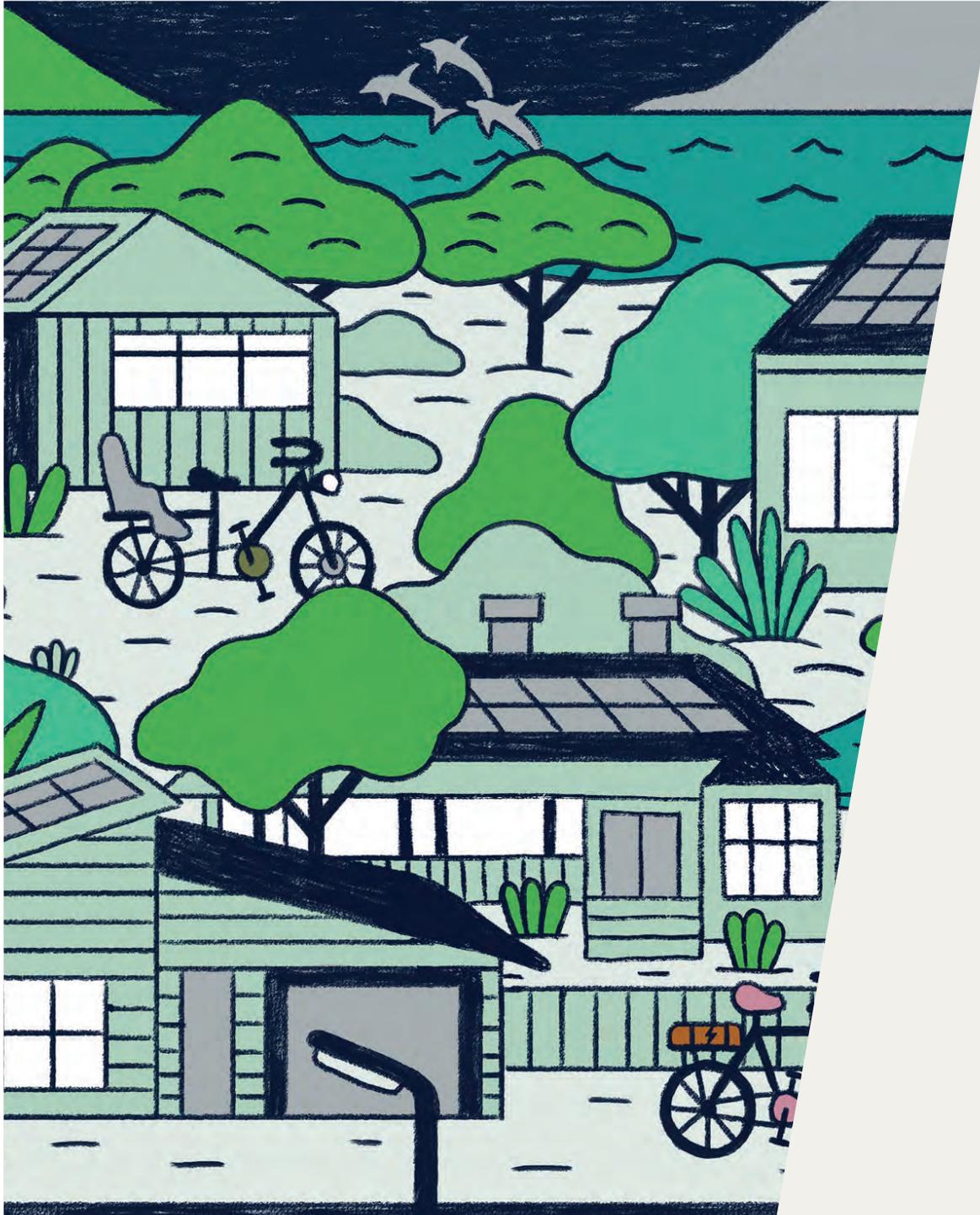
## with solar and battery

If you have a battery installed with your solar system, you can store the excess energy your panels generate for use when the sun goes down.

The majority of solar systems installed over the past 10 years have been panel-only systems. However, over the past few years, battery storage technology and pricing has improved significantly, making solar panel + battery systems a much more common solution.

A battery is a great way to maximise the potential of your solar panels, and utilise the electricity generated when it suits your energy needs, not simply when it is generated.





there's no  
*one size fits all*  
with solar

Choosing the right system is about understanding how you use your energy, knowing certain details about your home and your roof while considering what you are wanting to achieve by going solar.

# your home

Understanding the physical aspects of your home is a major part of designing a solar system that will work for you.

## getting to know your roof

We'll need to get a clear understanding of your roof and its potential to power your home from the sun. Its construction and material type, size of the roof faces, as well as the condition it's in.

## which way is the sun?

Different roof orientations require different solutions. We use LiDAR (light detection and ranging) software to analyse the sun's intensity on your roof throughout the year, to maximise the solar potential of your roof.

## getting the pitch angle right

Decisions need to be made on mounting flat or on raised stands called tilts, also ensuring a minimum of 10 degrees for water run-off. Setting the angle right to capture the daily and seasonal variations.

## minimising shading, maximising the sun's energy

The other consideration is around shading - nearby trees, buildings, chimneys, and other obstructions need to be factored into the system design and components.

# your energy profile

Having understood your physical home setup, the next step in designing the best system is understanding how you live in that home

*A good solar system should be designed for the people living in the home, and not simply a package system the solar company might want to sell.*

## when you use your energy

Is your household at home during the day i.e. will you consume the energy being produced?  
Or are you using more energy at night?

## historical power usage

The way you've been using your energy to date is the best place to start in understanding your energy usage. Taking a look at a recent power bill will help make sense of this.

## future load

Can you see your energy needs changing in the future? Are you considering purchasing an Electric Vehicle? How about the swimming pool or spa pool? It's important to understand what the future looks like, to future-proof your system for this.

## being smart about changing your energy behaviours

Understanding how you consume your energy can help you reduce your electricity usage considerably. Making small changes, like putting your washing machine or dryer on during the day when the solar output is maximum, can make a big difference.



# Lightforce is New Zealand's fastest growing solar provider

with 6,000+ installs,  
we know solar.

Expert solar technicians

We protect your roof

No sub-contractors

Market leading products

Support for the life of your panels

10 year Lightforce workmanship warranty

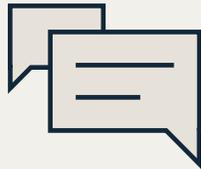


tip

## your power bill tells a story

*It is important to have your electricity bill in front of you when making contact with a solar provider so they can get an initial understanding of your power use. This is one of the first things your solar consultant will ask to see as it will help them design the right system for you.*

# the next steps



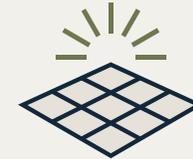
## talk through your options

One of our consultants will talk to you to understand your house and your energy needs - as well as answer any questions you may have.



## review your roof eligibility

Using our LiDAR software we can check your roof pitch, sun direction, and intensity as well as any shading that might impact your roof. Our experienced team has designed and installed enough systems (over 6,000!) on all types of roofs to know the best approach.



## design your system

We want to make sure you end up with the system that is right for you, your family, and your home, now and into the future. We are with you for the life of your system, so we only ever present a system that will deliver for you and meet your needs and expectations.

After this free, no-obligation process, we will present you with the design and cost for a custom solar system, designed specifically for you.

"our home is powered  
by the sun"

*"I wanted to get solar to help with the environmental effects of producing electricity. My kids are solar kids, they love it. They love the fact that we are not contributing to climate change."*



Elke Chillwell - Grey Lynn, Auckland  
mother of three and eco-warrior  
21 panels (6.3kW) + 2 batteries (16.4kWh)

A photograph of an elderly man with white hair, wearing a dark jacket, smiling and holding a small, fluffy brown kiwi bird. The background is a blurred outdoor setting with greenery and a white railing.

we believe in empowering  
communities that share  
our values of a lighter,  
brighter future.

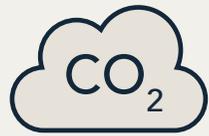
Robert Webb  
Whangarei Native Bird Recovery Rescue Centre  
with Sparky the kiwi

System donated:  
24 Trina 425W panels  
12.2 kWh Energizer Battery

take a look at [lightforce.co.nz](http://lightforce.co.nz)  
to find out more about our community projects

# supporting a lighter, brighter future

It's an incredible feeling to have your home running on sunlight. With solar, a typical family can be proud to see the equivalent environmental impact of



Reduction of  
900kgs in carbon  
every year



Driving  
4,000 km less  
every year



Planting  
40 trees  
every year



## a lighter future

Solar is now the most cost-effective form of renewable energy.

While NZ's electricity production is predominantly from renewable sources, we still burn a considerable amount of coal to keep our national grid functioning.

Most renewable energy is also not sustainable, especially if it is being consumed hundreds of kilometers away from where it is being generated.

Building more mass renewable generation, like hydro or wind, is good for reducing carbon, but it will only put more pressure on the already stretched national grid. When homes, businesses, and farms are producing, using, and storing their energy internally, that provides a seriously effective solution for our broken power model – tiny power plants on the roofs of NZ homes, businesses, and farms.

Going solar means you are supporting a greener energy future.

It's time to let the sun in.

# solar installer checklist:

- does the company specialise specifically in solar?
- do they offer monitoring?
- do they reimburse the meter charge?
- do you own the system after it's installed?
- Is their service delivered by a fully in-house team or do they use subcontractors?
- do they only use top quality products with full warranties?
- are their batteries cobalt-free?
- do they have in-house engineers?
- have they asked for your power bill or new build plans?
- do they have good reviews and customer testimonials?
- do they have ongoing in-house customer support well beyond your install?

# faq's - top 5 questions answered

## **Are there government subsidies?**

No, there are no government subsidies or incentives for residential solar in New Zealand.

## **What happens when its not sunny? (cloudy, winter, night-time)?**

In bad weather, or in winter, your solar output will reduce anywhere from 25-50%.

During the night time, your solar panels are not producing energy. If you have a battery, any excess energy generated during the day can be stored and used at night. Effectively giving you access to solar power 24hrs a day.

## **What happens in a blackout?**

As above this is where batteries come in handy, storing energy created in excess during the day, the battery can supply this stored energy during a blackout.

However, whether the battery still charges from the solar panels and whether your panels will still produce power during a blackout, depends on the system you have purchased. Please talk to your solar consultant about your options and have them explain the difference between Storage, and Backup (or Emergency Power Supplies - EPS)

## **How does selling back to the grid work?**

As long as you're grid-connected, and have an import-export meter (which all systems we sell have) you will be able to sell back to the grid. The rate at which you get reimbursed for exported power depends on the retailer you are signed up with and is always lower than it costs for you to purchase from the grid. To maximise ROI on your system you should aim to use 50% or more of the power generated.

## **How long does my solar system last?**

Solar systems are designed to last for over 25 years, as all top-tier panels provide warranties for this period. Lightforce provides workmanship warranties of 10 years, while battery and inverter solutions offer similar warranties of around 10 years - although they last much longer. Quality battery solutions, such as the Energizer Homepower solar battery, lose little efficiency over this time.



it's time to let the sun in

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