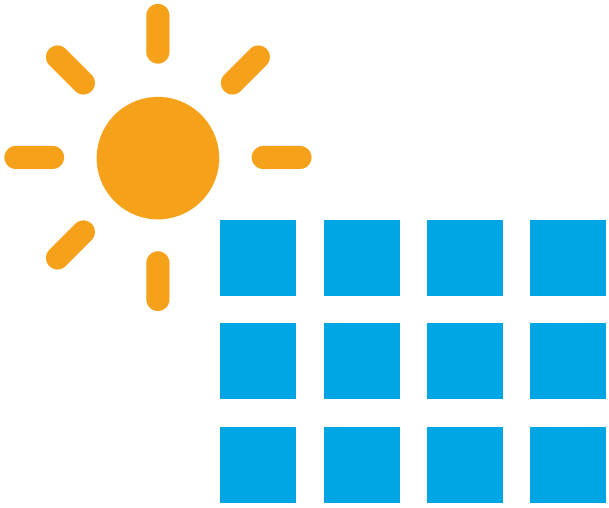


Solar Health Check

Moreland Energy Foundation

ENERGY CONSUMERS AUSTRALIA

Activity Explanation

This worksheet will help you understand how well your solar panels are performing. Combined with the Solar Health Checklist at the end of this booklet you'll be able to identify the cause of any issues you might be having with your system, as well as tips on how you can solve these issues.

What's involved?

1. You'll collect the information you need to complete the check
2. You'll calculate your system's efficiency from that information
3. You'll compare your system to expected results

What you'll need

1. A phone or calculator
2. Your latest electricity bill

Step 1.
Collecting the information

Grab a calculator and a pen and this booklet and pop outside so you can see your solar panel installation. If your panels are not easily accessible or visible you might need to find this information via an aerial photo from an online mapping service such as Google Maps.

Checking how your system is installed

1. System Size (S) in kW?

S	kW

e.g 4 kW

How do I find my system size?

If you don't know the size, you can calculate it by knowing how many panels you have and the rough age of the panels.

For systems older than 5yrs multiply the number of panels you have by 0.2

For systems newer than 5yrs, multiply the number of panels you have by 0.25

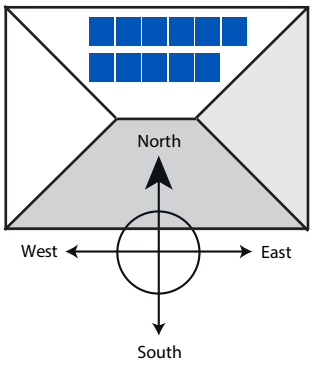
2. Orientation (O). Which way are the panels facing?

The direction (sometimes called orientation) of your panels affect their performance.

If your panels are facing more than one direction, list both directions.

O	

e.g North



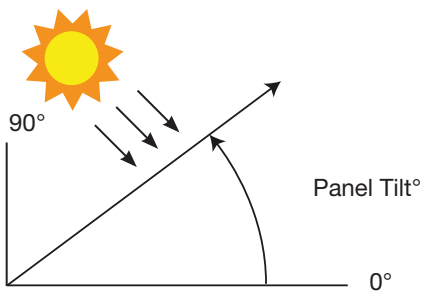
3. Angle (A). What angle are the panels tilted to (To the nearest 10°)?

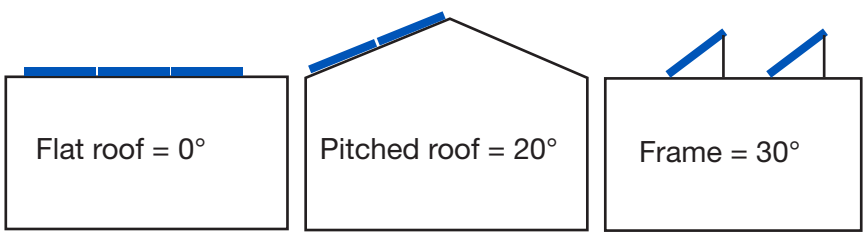
A	°(degrees)

e.g 20°

How do I find the angle?

Flat panels are 0°. Most roofs are pitched around 20°. If your panels are on a frame, they're probably at about 30°.

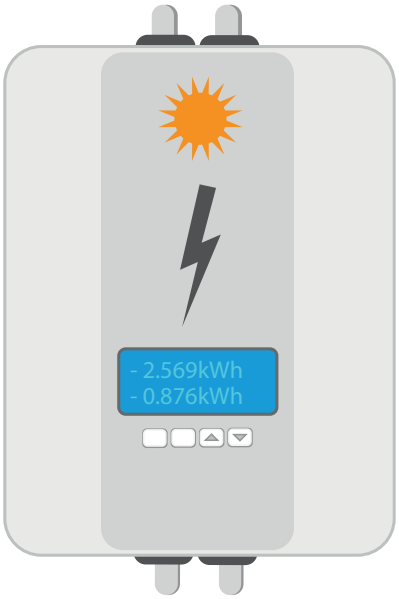




Take readings from your solar inverter

Your solar inverter will have a display on it which allows you to find the following information. Most inverters have displays showing either current energy production or log data. You might need to press buttons near the display to make it show you the right screen.

If you're having trouble you might need to look up the manual for the inverter to figure out how to access these figures.



4. What is the total (T) amount of energy generated since the system was installed?

This is normally a figure called **E-tot**, or simply just **Total** and might need to be accessed through the LOG screen.

T	kWh

e.g 19345 kWh

5. Real-time Power Check (P)

On a sunny day, at midday, note the current output power of the system on the inverter. You might need to access the NOW screen to see this.
Look for a figure called **P-ac, P-out or Power.**

P	kW

e.g 2.95 kW

Find out when your system was installed

1. System installation date (I)

I	DD/ MM / YYYY

How do I find this?

Find an old invoice, email or calendar entry that recalls when your system was first installed and switched on. You might also be able to contact your electricity retailer to find out when it was connected.

Find out how much sun you get at your location

1. Solar Irradiance (SI)

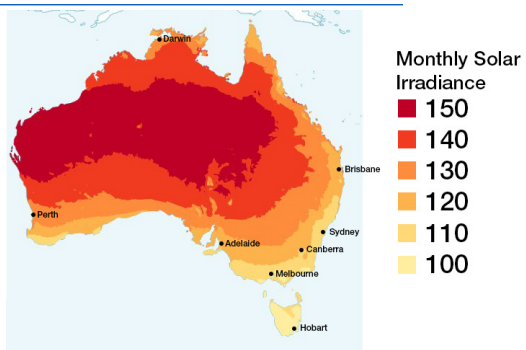
Using the map, find your location and write down the SI figure for your area based on its colour.

SI	

e.g 110

Major cities SI

Adelaide	120
Brisbane	120
Canberra	120
Darwin	130
Hobart	100
Perth	130
Sydney	110
Melbourne	110



Step 2. Calculate system efficiency

Now that you've gathered the required information, you can use those numbers to calculate how your system is performing.
Follow the steps below...

1. Calculate the ideal monthly output (IMO).

Calculate your ideal monthly output by multiplying your system size (S) in kW by your Solar Irradiance figure (SI).

S x **SI** = **IMO** kWh

2. Calculate the age of the system in months (M).

Using the date of installation (I) of your system, figure out how many months the system has been installed for from that date.

M months

3. System efficiency calculation

By taking the total power generation and dividing by the number of months it's been installed you'll get how much power it's been generating per month.

T ÷ **M** = **Y**

By dividing that number by the ideal output and multiplying by 100 you get the efficiency of the system.

Y ÷ **IMO** x 100 = **E** % efficiency

Your system's efficiency is dependent on a lot of different factors. The next section will help you compare your results with similar systems.

NOTE: If your efficiency is over 100% you may have incorrectly reported your system age or size. Please re-check those values.

Step 3. Compare your results

Your efficiency result is affected by how your system is installed. Using your Orientation (O) and Angle (A) information collected in Step 1 look up the tables below to see if your system is performing as well as can be expected.

If it helps, write your figures for those items again below:

Efficiency: **E** _____

Orientation: **O** _____

Angle: **A** _____

Realtime Power: **P** _____

System Size: **S** _____

Realtime Power Check

The realtime power figure should be equal to, or slightly less than your system size.

Expected efficiency based on orientation and panel angle

Orientation (O)	Panel Angle (A) 0°	10°	20°	30°	40°
North Facing	90%	95%	100%	100%	100%
East Facing	90%	89%	88%	84%	81%
South Facing	90%	79%	73%	65%	53%
West Facing	90%	89%	88%	85%	81%

A note on accuracy

For simplicity, these figures are an Australia wide average and could vary by 10% depending on location.

Please see the *Solar Health Checklist* overleaf to understand what you can do if your figures are more than 20% lower than expected.

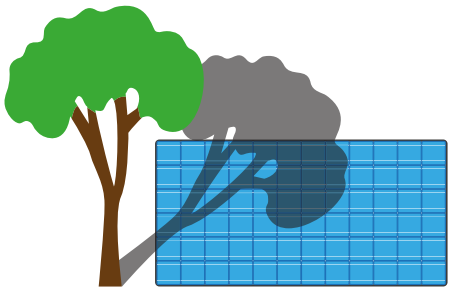
Solar Health Checklist

Overshadowing on panels

Have any trees grown up near the panels? Check them during the morning as well as the evening to make sure they're not being shadowed by any foliage.

If they are shadowed, you can expect reduced performance from your panels.

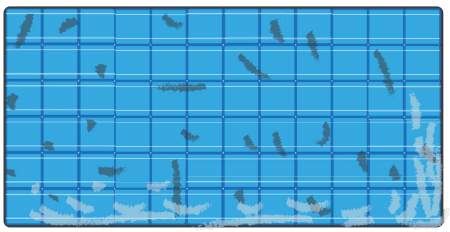
Hiring an arborist, or simply doing some pruning yourself could end up saving you money in the long run.



Soiled/dirty panels

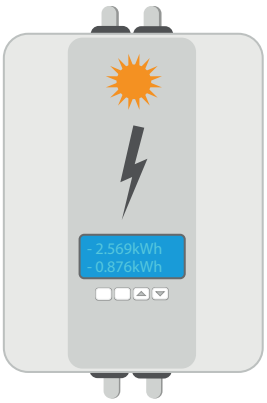
Are the panels dirty? If you live near an airport, or busy road there could be oil and dust on the panels that needs to be cleaned off regularly. Bird droppings, leaves and airborne litter can also be issues.

Unless your panels can be easily and safely accessed, it's best to get a professional to access the roof safely and clean them.



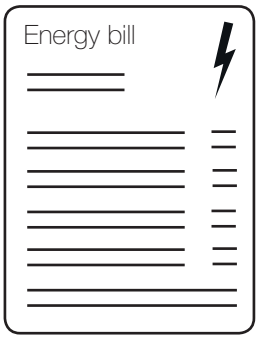
Inverter or panel issues

If your panels are orientated and tilted correctly and aren't shadowed or dirty, then there could be an electrical issue either in a panel, or the inverter. In this case it's best to contact your provider directly and get them to diagnose the problem further.



Check your bill

One thing to check is that your solar power is being credited to your electricity account correctly. Check your latest bill and ensure you're getting paid for any energy you're selling back (exporting) to the grid.



Make the most out of your solar

Are you using your appliances in a way to get the most out of your solar installation? Complete the "Your *Energy Profile Activity*" to discover if you could save money simply by changing what time of day you use your appliances.