Making sense of solar

Everything you need to know about getting a solar electricity system installed in Queensland.

Produced by a business that is independent of the solar industry but committed to providing its clients with the best advice and information.

This document is long. Very long! 26 pages to be precise. I'm guessing that you don't want to read 26 pages and I don't blame you. If you have a passing interest in how solar works and whether it will suit your particular situation then you might just want to read the 'Nutshell' section and skim over some of the other sections. If however, you are commiitted to getting solar installed then I would suggest you read the whole thing when you get a chance. That way you are going to be better informed when making a decision about installing solar.

We will be regularly updating this document so for the latest version go to the Knowledge Centre on our website for a free download. www.compasshomeloans.com.au

Compass Home Loans
Not JUST mortgages - mortgage ADVICE

Dave Hirst
Finance Specialist
BA MAS, Cert IV Financial Services

M: 0401 612 298
F: (07) 5471 3050
E:
dave@compasshomeloans.com.au

In a Nutshell

Why Install Solar?

- It's good for the environment.
- It can help reduce or eliminate your electricity bill and therefore reduce your exposure to rapidly rising electricity costs.
- You can make money out of it by selling your excess electricity back to the grid at a very good rate.

Your Electricity Bill

- You currently buy peak electricity for about 21 cents (including GST) per kilowatt hour. This is going to increase significantly over the coming years.
- On average, Australian households use between 15 and 25 kilowatt hours of electricity per day.

How Solar Works

- Panels which are fixed to roof with racking collect sunlight and transform it into DC electricity and send it to the inverter.
- The inverter changes the DC into AC electricity which can be used in your home.
- Electricity being produced is first fed into your house to power the appliances you have on.
- Whatever is not used is then fed back into the grid and you are paid for this.
- At night, you are not producing electricity so you have to buy it from the grid.
- The good news is that you can sell your solar electricity to the grid for a minimum of 44 cents and when you buy electricity at night it only costs you 21 cents.

What size solar should I get?

- For each kilowatt in the size of your solar system, it will produce a conservative estimate of 4.2kW hours per day. So a 1.5kW system will produce 6.3kW hours of electricity per day and a 5kW system will produce 21kW hours per day.
- Find out how much electricity you use on average each day and consider getting a system large enough to cover your total usage so you never get a bill again.
- If you want to make money out of solar you'll need to install a system that is larger than your household requires.

Tweaking the System

- Try not to use electricity during the day when your solar system is producing electricity. This will allow you to sell as much as possible back to the grid when they are paying 44 cents for it.
- Run your major appliances during the evening when you are only paying 21 cents for electricity.

Financing your Installation

- Crunch the numbers to see if having a solar system is going to benefit you. (Call me for assistance)
- If you have existing credit card or personal debt, consider clearing this up first as any savings made on electricity could be lost to interest if you can't reduce your high interest rate debt.
- Use the lowest cost funds to pay for solar – typically savings. The next lowest cost funds are probably from your home loan. Avoid personal loans and credit cards.
- If you are increasing your home loan, take the opportunity to re-assess your structure and lender to see if a better solution is available.
- Call me to organise a meeting to discuss your options.

Can Solar Pay for Itself?

- If you can install a system that will eliminate your bill, then you will save about $1,600 a year in electricity costs.
- If you borrow $10,000 to install a system against your home loan at 7%, then your annual interest on the loan will be $700, but your electricity bill will have reduced from $1,600 a year to $0.
- In this situation, the solar is not only paying for itself, it is paying itself off very quickly.
- Once the initial loan has been repaid, any future savings on electricity could be helping you reduce your home loan.

How can I help?

- Call me to organise a cost and obligation free consultation to discuss your finance options when considering installing solar.
- Register with our Solar Buying Group. We are negotiating discounts on solar installations for Compass Home Loans clients and friends by using group buying power. We'll keep you posted on negotiations and available prices.
- Email us at info@compasshomeloans.com.au to register your interest.

Why make sense of solar?

A wise person once told me “Don’t invest in something that you don’t understand”. With so many people interested in getting solar installed, we’re seeing several companies door knocking, telemarketing and hitting the airwaves trying to sell us a solar system but not too many of them are taking the time to help us understand how it all works. The internet is full of useful (and useless) information, but finding a single website that tells me everything I need to know about solar electricity systems is like finding a needle in a haystack. For this reason I’ve decided to get as much information on the topic as I can, put it all in a neat information pack and send it to my clients for their convenience and here it is.

To all my wonderful clients, please share this information with your friends and family and anyone you know who might be interested in learning more about solar. If you have received this information and haven’t got a clue who Dave Hirst or Compass Home Loans is, I hope you find this information useful and share it with your friends and family too.

Disclaimer: I am not an electrician. I am not employed in the solar industry. I am not an expert on photovoltaic solar energy. I don’t even have a solar power system yet myself! The information here is based only on my research and shouldn’t be taken for gospel. If you are interested in getting a solar power system installed then you’ll need to do your own research, crunch the numbers and read the fine print. Feel free to give me a call though if you would like to pick my brains about any of the information here.

Did you know?

- The first solar cell was constructed by Charles Fritts in the 1880s.
- It would take only around 0.3 per cent of the world's land area to supply all of our electricity needs via solar power.
- The area of roof space available in Australia is enough to provide all of the nation's electricity, using solar panels.

Why install solar?

For Greenies

If you believe that anthropogenic (man-made) global warming is about as likely as Shane Warne becoming the next spokesman for the Seventh Day Adventist Church, then you should probably stop reading now and skip straight down to the 'For Capitalists' section. There are very many theories about global warming and also a healthy level of scepticism about whether we are causing it or not. People who choose to get solar power installed for environmental reasons usually believe that humans are having a negative impact on the earth and want to do their bit to reduce their carbon footprint.

The vast majority of electricity we use in our homes in generated by power stations which burn coal. The burning of coal creates carbon dioxide as a by-product which is released into the atmosphere. The build up of atmospheric carbon dioxide is widely regarded to be the main contributing factor for global warming and all the subsequent issues that raises. Coal is also a non-renewable resource. We dig it out of the ground and either burn it ourselves or sell it to other countries who burn it and then it is gone. The only way to get more is to dig some more out of the ground. Despite many in the energy industry saying we have enough coal to last hundreds of years, it still remains a finite resource that will eventually run out.

The sun on the other hand is an infinite resource. In the billions of years of earth's existence, it hasn't taken a single day off. No one can predict how long it will continue to rise and set each day but if it ever did decide to call it quits then electricity bills and global warming would be the least of our concerns. By generating your own energy from the sun you are reducing your reliance on coal fired power stations and reducing the amount of atmospheric carbon dioxide that you are directly responsible for. Will it make a difference? I'm sure we'll still sell coal to countries who will burn it so in the grand scheme of things your individual choice of not relying on coal power probably won't have a global impact. But what if a billion people made the same choice as you? I think it's safe to say that would have a global impact.

So it's great to install solar if you are worried about the environment, and for that reason you've decided to get a solar expert to come and give you a free quote. You already grow your own herbs, have a worm farm, buy your vegies at the local grower's market, use a calico shopping bag and sneer at people who use plastic, love pedal power and braided hair and kiss your poster of Bob Brown before bed every night. Now your only concern is how much this solar will cost...

The Nuclear Debate

Weight for weight, advanced silicon based solar cells generate the same amount of electricity over their lifetime as nuclear fuel rods, without the hazardous waste. All the components in a solar panel can be recycled, whereas nuclear waste remains a threat for thousands of years.

For Capitalists (and Green Capitalists)

Yeah yeah yeah... When I want a sob story I'll watch Today Tonight. Show me the money! If installing solar is going to benefit my hip pocket then I'm interested, otherwise go knock on the neighbour's door.

Sorry, that was very presumptuous. I'm sure many of you would like to save some money as well as the environment and the way things currently stand, that is definitely possible. What a lot of people look at when installing solar is how quickly they will recoup the cost to install it in savings on electricity bills. Some may even look at it as an investment with a predicted Return on Investment (ROI) which they could compare to other possible investments like shares and superannuation. Others may wish to make money from day one by selling excess energy back to the grid and in that way have a cash flow positive investment. For me, the best way to look at is to compare the costs to install solar with the savings on electricity bills. If you can save more on your electricity bills than it costs to have solar installed, then it could be quite a smart financial move.

Understanding Your Electricity Bill

To get a good grasp on the economic benefits of solar power, you need to understand the different information on your electricity bill. Regardless of which electricity retailer you are with, most bills will show a graph which compares your electricity usage over the last year and a table explaining the different readings, tariffs, usage, transactions and costs. There should be two tariffs on your bill – Peak and Off Peak. The Off Peak tariff is basically your hot water system and has a much lower rate. All other electricity used is charged at the Peak rate which is the higher rate. Peak may also be called Domestic and Off Peak is sometimes referred to as the Night Rate.

Have a good look at your current Peak and Off Peak rates. Remember when petrol cost 60 cents a litre? In a couple of years you're going to look at the current Peak and Off Peak rates and say "Remember when the Peak rate was only 19.41 cents per kW hour"? We are looking at a 13% increase in electricity prices this year alone. Should the carbon tax be implemented, we could be looking at another increase in electricity prices of over 20%. If you think your electricity bill is scary now, wait and see what it looks like in a couple of years. (The 19.41 cents is excluding GST, which when applied brings it up to about 21 cents).

There might also be a Service Fee or Charge displayed which we are not going to worry about too much right now. The table should also show you what your meter reading was at the beginning and end of the billing period which is usually 90 days. Subtracting the first reading from the last reading will give you your usage and this is usually displayed in the kWh column. Divide this number by the number of days in the supply period and you will get a daily average usage.

New electricity charges

Trans Description	Meter Code	Reading 25/11/2010	Reading 22/02/2011	Multiplier	kWh	Days	Rate	Total
T11 Domestic	657850:01	28267	29619	1	1352	90	$0.194100	$262.42
T11 Service Fee						90	$0.245589	$22.10
T31 Night Rate	754383:01	12515	13060	1	545	90	$0.079200	$43.16
Rounding Adjustment								$0.01
Total electricity charges								$327.69
INhome SmartSaver discount								$16.38 CR
Total charges with INhome SmartSaver								**$311.31**
GST charge								$31.13
Community Ambulance Cover Levy				1		90	$0.298770	$26.89
Total electricity and other charges								**$369.33**

So you can see from my latest bill that as a family we used 1352kW hours of Peak electricity and 545kW hours of Off Peak electricity in the 90 day supply period. That means we used a total of 1897kW hours of electricity in that time which works out to be 21.07 kW hours per day. This is an important number so your first job is to go get your latest bill and work out how many kW hours a day you use on average. Better still, grab the last 4 bills and work out your average daily use based on the last year, rather than just the last 3 months. Write that number here. We'll need it later.

My average daily electricity use:

kWh

Wind power

The world's largest wind turbine is currently the Enercon E-126 with a rotor diameter of 126 metres. 126 metres!! This single wind turbine produces 20 million kW hours per year. This works out to be just shy of 55,000 kW hours per day, enough to power up to 5,000 European households.

How solar works

Solar panels

They may all look alike but solar panels come in more than one variety. There's your Chinese, American and Australian panels and then there's the uber-efficient, Mercedes-style, German top-of-the-range panels. Isn't it funny how cloudy and cool Germany has better solar technology than Australia? The panels can vary in size, how much energy they produce, how long they will last and importantly how much they cost. I am not going to dig my hole any deeper by trying to compare them all though. Just be aware that there are significant differences and discuss your options with the installer.

ASK

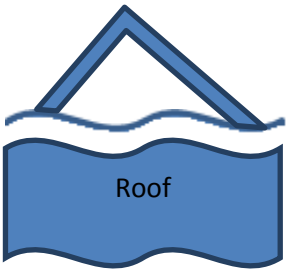
Check with your installer that your panels have a toughened glass surface. The reason is not due to surviving hail or summer storms. They are designed for this anyway. The reason is that some of the cheaper panels are plastic covered. Plastic starts to go from clear to opaque in the Australian sun over time and then turns brittle and starts to crack. The solar cells may have a 20 to 25 year warranty and are guaranteed to be at least 80% efficient for that timeframe however if they have a protective layer of plastic over the top, what is the guarantee on the plastic? If the clear plastic starts to turn cloudy there will be less light getting through to your solar cells!

Racking

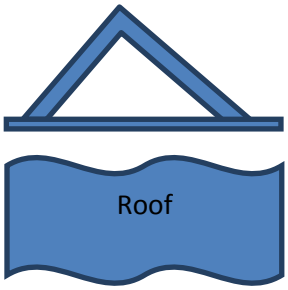
The solar panels are going to need to be fixed to your roof and for that, a frame (racking) is required. The racking may also put your panels on the best tilt so that they are facing the sun straight on for most of the year which will allow you to make more electricity. You could save some serious coin by getting the cheapest racking available and it will probably work a treat for a couple of years. But do you remember The Gap storm? Get one of those through your suburb and your el-cheapo racking could very well become an adornment on your neighbour's roof. Once again, check what kind of racking your installer is using and don't be afraid to spend a little more on much better quality.

Another major consideration when getting quotes to install solar is that you may not be able to get solar panels on the whole roof. The racking needs to be bolted to the actual roof battens under the roof. While some installers may be quite happy to attach the racking directly to your roof's colorbond sheeting, consider that the solar panels are set on the racking with about 10cm high gap between them and the roof. This is perfect for wind in the next storm to get under it, in which case you may feel more secure knowing that your investment is secured to your house as opposed screwed in to the iron. Some companies calculate the area of roof available and see how many panels they can cram on it. They will then give you a quote without ever actually setting foot in your yard (not joking!!). The reality, however, is that when it comes to installing they may not be able to install the original number they said they would, particularly if you would like your investment secured to your house rather than just the iron.

A final consideration here is the feet of the racking, the bit that actually attaches the frame to your roof. Ask your installer to display the feet they use. It should appear very strong and suitable for the job… but does the bottom of it have a base that matches the shape of the iron on your roof? The majority are flat!! Those of you with corrugated roofs will appreciate that if something with a flat base is bolted onto your corrugated iron roof the iron will begin to buckle at the point of attachment and will only have a small contact area. The larger the contact surface area the more snug and secure the fit so consider asking if they have feet with a base to match your roof's surface.



Base matches Roof Surface



Base doesn't match Roof Surface

Inverter

The solar panels collect the irradiation from the sun which they turn into DC (Direct Current) power but to use this energy to fire up the 42 inch flat screen the energy needs to be changed into AC (Alternating Current). For this we will require an inverter which is the third major component of the solar power system. The inverter is a box which will be attached to your wall near your power box. It will also have meters which tell you how much electricity has been produced.

If your house is getting on in age and you haven't had a new power box installed in the last few years then it may be possible that you will require a new one that is compatible with your inverter. This could add to the overall cost of installing solar so make sure you get the installer to have a good look at your power box to see if it is compliant.

The amount of energy that goes into creating solar panels is paid back through clean electricity production within anywhere from 1.5 - 4 years, depending on where they are used. This compares with a serviceable life of decades.

The Nitty Gritty

So this is where it all gets confusing!! I'm going to try and keep this as simple as possible and I guess I'm going to run the risk of making it too simple. All I'm aiming at here is to give you a basic understanding of how it all works so that you can ask more detailed questions to your solar installer. Here goes...

System sizes

1.5 2 2.5 3 3.5 4 4.5 5

Even without knowing the topic, most people looking at these numbers these days would probably guess that they relate to the different size solar systems available to install on homes. Most advertising focuses on the 1.5kw to 2kw system as these are the cheapest and the rebate is most effective when buying one of these systems. You could get a 1.5kw system installed for as little as $2,000 from some installers. The problem is that the smaller the system – the less energy it produces. Typically a 1.5kw system has a total of 8 solar panels on the roof, so depending on the size and orientation of your roof, you may not be able to get a much bigger system. Some people may also want to get the biggest system possible, but it is all going to boil down to how much roof space you have and whether it points towards the sun. Last of all, be very wary of companies that sell on price. The best systems and the best installers are not the same price as the cheapest and there is a very good reason for that.

Output

How much electricity your solar system puts out is going to depend on how big your system is, the orientation of your solar panels, whether your panels are exposed to the full sun or get shaded during the day and the average amount of sunshine per day in your area. There are other factors as well, including the slightly ironic detail that your solar panels don't work very well when it's hot. To me that sounds like a vampire that's scared of the dark, but I have been assured that there is a scientific explanation for it and it's not a case of identity crisis.

On average, in South East Queensland, 4.2 kilowatt hours are produced each day per kilowatt system you have. On a clear, sunny and not too hot day it could be as high as 8 kilowatt hours and if we have another bout of January's weather it could be as low as 2 kilowatt hours. It also varies between summer and winter, but averaged out, 4.2 kilowatt hours per day is a good starting point. So if you have a 1kw system, then your system will produce 4.2 kilowatt hours per day. If you have a 2kw system it will produce 8.4 kilowatt hours, and a 5kw system will on average produce 21 kilowatt hours per day. This is a really basic and quite conservative average and it would pay to discuss this further with your installer as higher quality panels will produce more while your roof orientation and the huge gum tree hanging over it may mean it produces less.

WARNING: Some solar companies will work on 'best case scenario' and calculate how much you will save or earn based on your system generating over 6kW hours per kilowatt system per day, 365 days a year. This might have been slightly closer to accurate during the drought but it would have been way off during the last 6 months in South East Queensland. 4.8kW hours per kilowatt system per day is an often used yardstick, but to be really safe I'd use 4.2kW hours per kilowatt system per day.

Cost

Honestly, the different costs for solar systems can vary ridiculously. I'm not going to try and give you a rough estimate of the average costs of installing solar, as rough is exactly what they would be. In researching what kind of solar system to put in, you definitely need to take into account more than just the costs. Are you getting a high quality panel which is covered by a strong warranty? Is the company you are using reputable? Is the inverter large enough to allow you to increase the size of your system in the future if you so wish?

I may be wrong in many cases but when someone tries to sell me something because it is cheap, I often wonder whether the fact that it is cheap is the only thing it's got going for it. My advice would be to do some research. First of all work out what size system you will require, then shop around, getting a number of different prices for that sized system. You'll need to ask questions about the quality of panel and don't be afraid of the more expensive panel and inverter; they could save you much more money down the track.

Compass Home Loans Buying Group

It's a fact that the more you buy, the cheaper it is. Or should be. Since telling my clients of my plans to write this information pack, I have had no less than 20 different clients contact me to register their interest in solar. Once this goes out, I think that should jump to around 50. With those numbers, we should be able to negotiate a good discount with a reputable company. The more people interested, the better our discount should be too. If you are interested in solar, please email your details to info@compasshomeloans.com.au You don't need to be a Compass Home Loans client to register your interest – the more the merrier. We'll keep you posted on our negotiations and available prices as they come to hand and it's free to join.

Rebates

The rebate available on solar power systems is a source of much confusion. Some solar companies are using the tried and tested sales technique of instilling a sense of urgency by making it sound as if you will miss out on the rebate if you don't get solar installed before June 30. True, the rebate is reducing on July 1 by 20% and will continue to be gradually reduced until there is no rebate in 2015. Why? Solar is a booming industry and the technology is moving ahead faster than it ever has in the past. Similarly, costs are coming down and with greater competition in the market we should see the overall cost of installing a solar system come down significantly over the next couple of years. If prices come down and the rebate doesn't, then we could be at a point where it costs absolutely nothing for a home owner to install solar. Sound familiar? Remember that insulation scam…I mean scheme? It seemed every man with a ladder and a ute became an insulator overnight and unfortunately it ended in disaster for some. We don't want a repeat of that, do we?

So the government will always want us to fork out a bit of our own money and reducing the rebate over time will ensure that happens. In the meantime, the current rebate (and even the post June 30 rebate) is still very generous and will more often than not save you over $5,000. Don't stress yourself out too much worrying about the rebate. When you get some quotes, ask your installer to explain the rebate to you and how it works. At the end of the day, what you need to compare is the quality and size of the solar system as well as the after-rebate cost to you.

How big should I go?

It's really up to you which sized system you go with. You could be limited by available roof space that is suitable for solar panels. You might also be limited financially, only able to afford a small system. Another deciding factor is your reasons for installing solar in the first place. Are you trying to do your bit for the environment or would just like to reduce your electricity bill? Then you might want to go for the smaller system which is relatively cheap after the rebate. Do you want to get rid of your bill altogether, or possibly get rid of your bill AND earn some money by producing excess electricity? Then you will need to get a bigger system and fork out a bit more, maybe...

Kill the Bill

Let's look at installing a system that will eliminate your electricity bill altogether and insulate you from rising electricity costs. First you need to find out how much energy you use, and you've already done that. Rewrite your average number of kilowatt hours you use on a daily basis again here:

My average daily electricity use: _____ **kWh**

Remember that for each 1 kilowatt in your solar power system you will produce about 4.2kW hours of electricity per day. So divide the number in the box by 4.2 and you will get the solar system size you will need to install to produce enough electricity to cover your average usage so that you won't get a bill.

My average daily use is 21kW hours.

$$21 \div 4.2 = 5$$

So I would need to install a 5kW system to generate enough electricity for my household use. By making all my own electricity, I won't need to buy any from my electricity provider and as a result I won't be using coal-generated electricity. In addition, as long as I don't go and increase the amount of electricity I use, then theoretically I may never have to pay another electricity bill in my life. So if my bill is about $400 a quarter and now I have no bill, then I'm saving $1,600 a year by not having to buy electricity. This savings will only increase as electricity becomes more expensive.

What size system would you need to kill your bill?

	kWh	÷ 4.2 =		**kW system**
(Your average daily usage)			(System size required)	

But what if I want to make money out of this baby?

Solar Income

In order to make money out of solar, you have to have a system that is going to generate more electricity than you use. This surplus energy flows back to the grid and you will be paid in credits by the electricity company. If you consistently earn credits you can save them up and convert them into cold hard cash which you can use to purchase whatever your heart desires (just remember to tell your friendly Finance Specialist Dave that you are using the income to reduce your home loan debt).

In my particular situation, I'm going to need to install a system that is bigger than 5kW if I want to make money. That might be hard considering I'll need to find enough roof space for over 24 panels if I want a 5kW system and even more if I want a bigger system. Another drawback is that in a lot of residential areas the existing electricity grid would not be able to cope with the excess energy flowing back to the grid from several houses with large systems. So to install anything over 5kW you might need to get Energex to check it out and approve it.

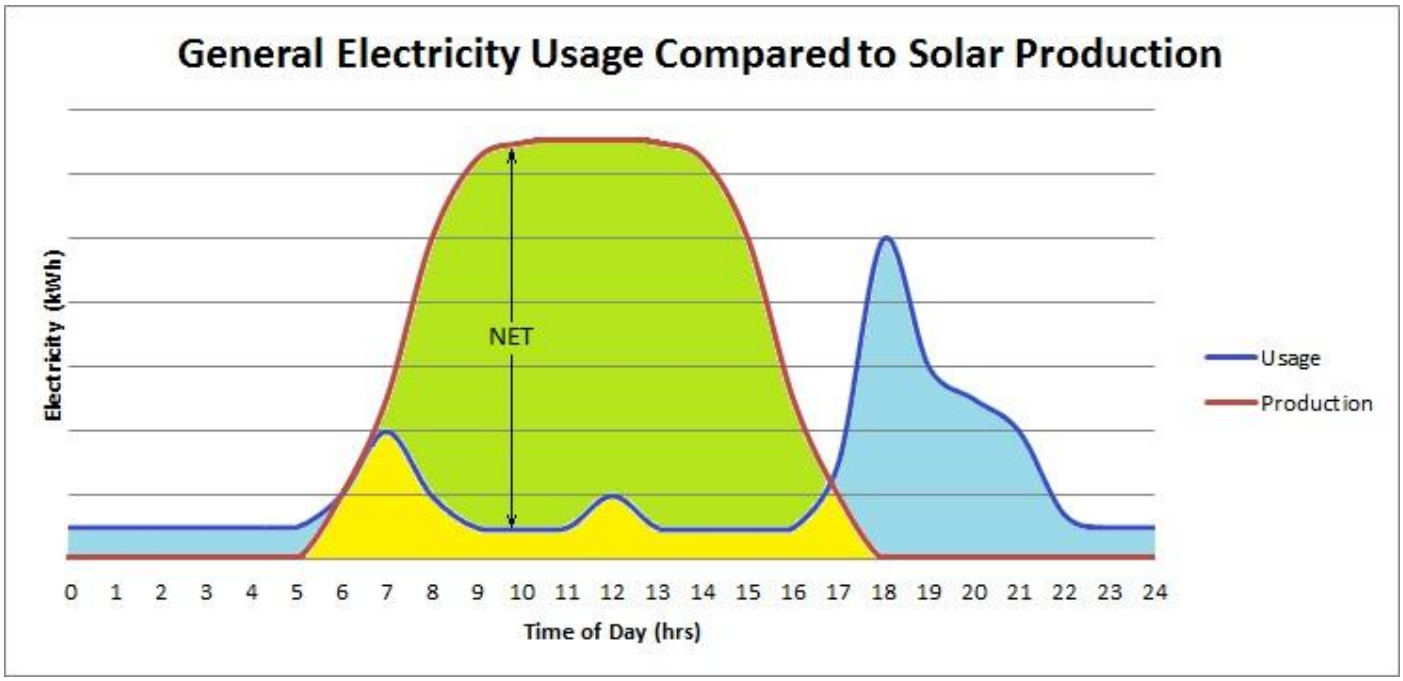
Personally I think my household uses a lot of power and that 21kW hours per day is pretty high. Maybe it's because I run a home office. Many homes may only be using 15kW hours per day or less. For these households, they may be able to install a 5kW system, use the first 3.5kW to cover the amount of electricity they use and sell the remaining 1.5kW back to the electricity company. But it's not that simple, and that's a good thing because there are some nice rewards for producing excess electricity.

Household Electricity Production and Consumption

Consumption

The following graph shows how household electricity is used and produced through the course of an average weekday. Starting with usage, the blue line shows that there is always some electricity being used regardless of what time it is. The fridge is always on, you may have hard-wired smoke alarms, a deep freeze, cordless phones and clock radios as well as the hot water system. So even if you turn off all your appliances at the wall before bed (and you should), there will always be some electricity being used at all times of the day, but there are times when electricity use spikes.

The morning spike from around 5am to 9am is our morning coffee and toast. It's firing up the computer and turning on the TV to get some news and flicking between Karl Stefanovic and Kochie before making a sensible decision to turn the thing off. Once we head off to work, the usage drops back down to the base load for most of the day. When we get home our electricity use spikes again as the TV goes back on along with quite a few lights, the oven, a blender, the laptop, the kid's wii and the fridge is on overdrive because of little miss so-and-so not being able to choose between juice and cordial. It should drop down after dinner as we turn off a few lights, put the kids to bed and relax in front of the box. When the last bedside lamp goes off, our electricity use drops back down to the base load again until we wake up and the cycle starts all over again.



Solar electricity production

Believe it or not, solar electricity is generated when it's sunny. There is a little bit of electricity generated in the early morning and the late afternoon, but the peak period is between 9am and 3pm. Of course, there are a lot of factors which will determine how much electricity is produced. Clouds, rain, trees shading the panels and even a hot day can reduce your panel's effectiveness. Needless to say, your panels will not produce any electricity whatsoever between dusk and dawn.

You can see from the graph that the time of day when we typically use a lot of electricity is at night – when we are home and the lights and appliances are on. It also the time when we are not generating solar electricity. Conversely, our solar electricity is produced during the middle of the day when most of us are not home and therefore not using much of it. So if we produce the electricity during the day but use most of it during the evening, where is the electricity stored? Is there a great big oversized car battery hidden somewhere?

Feed in tariffs

Imagine you drop into the local convenience store to buy an iced coffee. You pay $3 for the bottle and as you start walking away, the cashier stops you and says "Yum, iced coffee. I could really do with one of those right now, can I buy it off you? I'll give you $6 for it, no hang on, I'll give you $7 for it".

You start looking around for the hidden camera but to no avail. Thinking it's a joke, you go along with it but can't believe it when $7 is placed on the counter and the cashier grabs the coffee and starts downing it in front of you. You start to leave again but remember what you came here for so go and grab another iced coffee from the fridge and take it to the counter. Unbelievably, the cashier takes your $3 and then immediately offers to buy it off you again for $7, which you graciously allow.

Now imagine that the cashier does this for every single item in the shop. They sell it to you for the standard retail price then offer to buy it back off you for more than double what you just paid for it. I would assume that once the word got out about such a shop it would take about 10 minutes for the cashier to go broke.

Well this is exactly what the government, with the help of the electricity companies, is doing right now. Any electricity that you use at night time when you are not producing solar electricity, you are buying. And you are buying it for the peak rate of 21 cents per kilowatt hour. However, during the day when you are generating solar power, whatever you are not using is being fed back into the grid and the government and the electricity company are buying it off you for between 44 and 52 cents per kilowatt hour.

Yep. You sell the electricity you made to the electricity company for 44 cents and they sell the electricity they made for 21 cents. Your solar generated electricity is not in any way a higher quality product. It's not like yours is premium unleaded and theirs is kerosene – they are exactly the same. Yours is called 'green energy' and in this day and age of carbon footprints and taxes, how it's generated carries a premium. Welcome to the crazy world of feed-in tariffs.

Why?

It certainly doesn't seem like a very good way to run a business. In fact it seems like a great way to ruin a business. But there is a method to their madness. As explained earlier, the cost of coal fired electricity is going to greatly increase in the coming years. Our rising population means that more power plants will need to be built and more coal will need to be dug out of the ground and burned to provide enough electricity for our personal, business and industrial needs. The current federal government is determined to introduce a carbon tax and as coal fired electricity is a mass producer of carbon, then the imposition of the tax will increase the retail cost of the electricity. There is also a danger that if the price of coal increased significantly then this would also trickle down to the end user, increasing the retail cost of electricity even further. The future cost of electricity has got so many people worried that the possible introduction of a large scale nuclear power industry is being debated more seriously than it ever has in our past.

At the beginning of 2009, the peak rate was about 14 cents per kWh. It is now 19.41 cents and by the end of this year it will be almost 22 cents (excluding GST). Once the carbon tax is introduced, it could jump up to over 26 cents. This rising cost is inevitable and it's fair to assume that it won't be too long before the retail price of electricity is the 44 cents that the government is currently offering for solar generated electricity. So it makes sense why the government is encouraging us to install solar power – they know that eventually electricity is going to be more expensive than 44 cents per kWh. By making domestic solar power installation as cheap as possible and helping thousands of households generate all the electricity they need, the government is taking pressure off the grid and decreasing the need to build more power plants. One way of doing this is the rebate on the installation, and another is by paying handsome prices for the electricity that you make and sell back to them.

The Scheme

Never let the government come up with a nickname for a promotion. The bright sparks in the Queensland Government have decided that the otherwise positive sounding Solar Bonus Scheme is to be known informally as "the scheme", which makes me automatically think of pyramids and Nigeria. However, this scheme is great for people wishing to install a solar system. For an in-depth explanation straight from the horse's mouth, go to www.cleanenergy.qld.gov.au/solar_bonus_scheme.cfm

In a nutshell, the Queensland government will pay you 44 cents for each kilowatt hour of electricity that you don't use and gets fed back into the grid. This feed-in tariff (the rate you are paid when you feed your solar produced electricity into the grid), has been legislated to remain in place until 2028. ***Legislated***. Not ***guaranteed***. But having the tariff legislated is as good as guarantee right? I mean, politicians rarely go back on their word, do they?

The truth of the matter is that if Can Do Campbell becomes our next premier and decides the Solar Bonus Scheme is indeed a "scheme/scam", then the government could legislate to reduce the feed-in tariff significantly. Enter disclaimer – I do not profess to know what future governments will or will not do in regards to the Solar Bonus Scheme. However, my guess is that if any future government did reduce the tariff and made the recently installed systems all over the state less cost efficient, they wouldn't be terribly popular and could soon find themselves out of government.

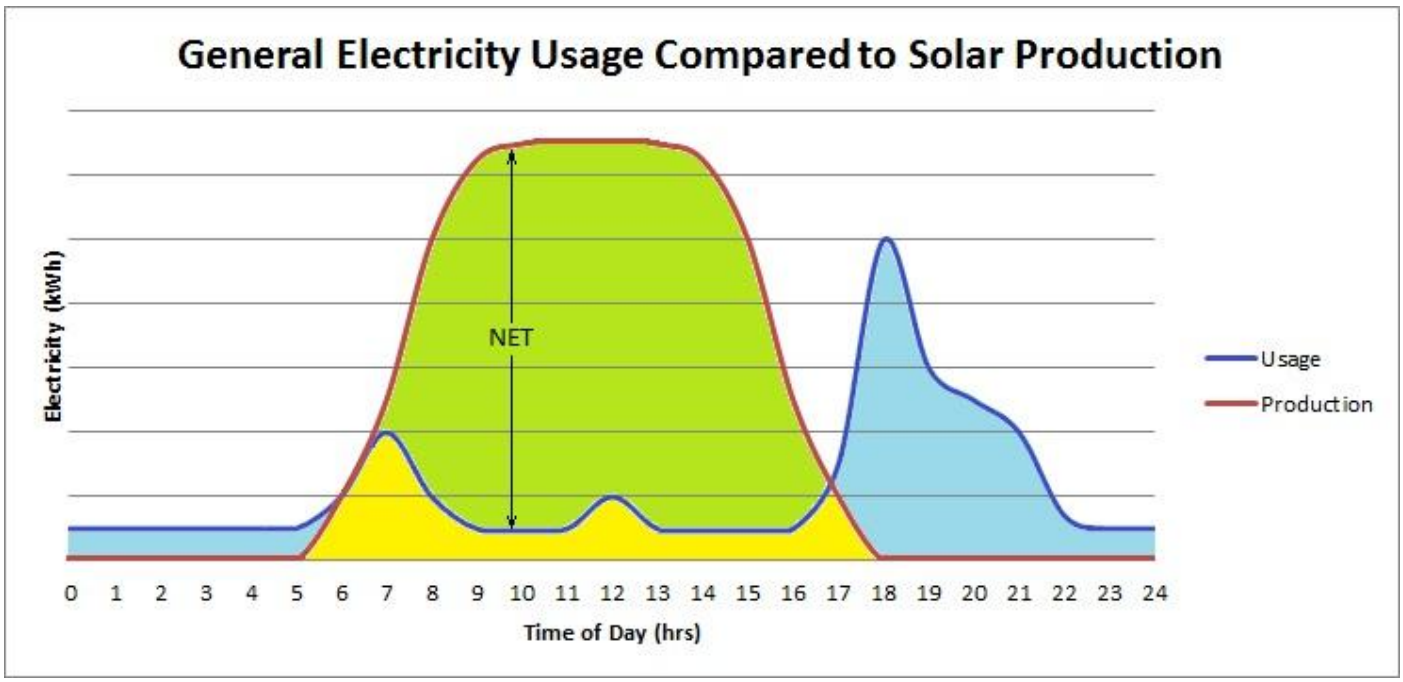
The icing on the cake is that some electricity companies will add another few cents on top of the government legislated 44 cents per kW hour that you sell back to the grid. This means that the minimum feed in tariff is going to be 44 cents but if you are with Origin then they will add in another 6 cents bringing the feed in tariff up to 50 cents and AGL will add 8 cents for a total of 52 cents per kW hour that you sell back to the grid.

WARNING: The Queensland Government Solar Bonus Scheme has been legislated to pay a 44 cent feed-in tariff for excess solar electricity not used and fed back into the grid. **It has not been guaranteed.**

Tweaking the System

My clients are well aware that I like to see them moving their money around in a way that makes the best possible use of every dollar they have. Whether it's using an offset account or depositing your income directly into your home loan or even using a credit card in a way that means you pay LESS interest, I want to see your money working hard for you. I don't want to see it working hard for the bank, putting more profit in their already bulging pockets. Similarly, if you are going to install solar, make sure that you are using it to its highest possible use by buying low and selling high.

Let's have another look at our electricity consumption and production graph.



In Queensland we have a net system which is quite different to the gross system they have in New South Wales. The NSW gross system allows you to sell ALL of the electricity you produce for the government subsidised feed-in tariff, and buy ALL of your electricity for the standard peak rate. If they had the same tariffs as Queensland then it would mean that all your electricity would sell for 44 cents and all the electricity you use would only cost you 21 cents per kW hour.

In Queensland however, the electricity company will only pay you for the electricity that you **don't use**. The idea is that you first use the electricity that you are producing and sell the leftovers to the grid. So if you had a 3kW system, in the middle of a sunny day you might be producing about 4 kW hours per hour of sunshine (stay with me here – check the Calculation box below). Because you are at work and the kids are at school, the house is not using much electricity. But the fridge and freezer are on and you forgot to turn the entertainment system, toaster, kettle and microwave off at the wall so even though nothing is really on, you are still using about 0.4 kW per hour.

CALCULATION

Sunny days that are not too hot will produce the most electricity and this could be over 8kW hours per day per kW system that you have. If you had a 3kW system, this means that your system will produce 8kW hours for each of those 3kWs in your system which is 24kW hours for that day. The vast majority of this electricity is generated between 9am and 3pm which is 6 hours. So if the system is producing 24kW hours over a 6 hour period, then on average it should be producing 4kW hours for each productive hour of sunshine.

Sunny Day = 8kW hours of electricity produced per kW system.
3kW system X 8kW hours = 24kW hours of electricity produced per day.
24kWh ÷ 6 hours of sunshine = 4kW hours of electricity produced for every hour of productive sunshine.

If the tariffs were the same, then in NSW you would be earning 44 cents for every kW hour you produce which for that particular hour would have been $1.76 (4kWh X 44 cents). As you were using 0.4 kW because you didn't turn all your appliances off you would need to buy that energy for 21 cents per kWh, which would be 8.4 cents (0.4kWh X 21 cents). You've sold $1.76 and bought $0.08 worth of electricity. Your net position for that particular hour, is that you made $1.68. (This assumption is based on NSW also having a 44 cent feed-in tariff – but in reality theirs is only 23 cents. Another great reason to be a Queenslander, but as if we needed any more)

As a Queensland household, you will be subject to a different calculation. In Queensland, instead of working off the different costs and prices of electricity, the electricity companies calculate how much you produce and take away the amount of electricity you use and pay you on the difference. So if we use the previous example it means you generated 4kWh of electricity and only used 0.4kWh. This means that your net electricity usage is 3.6kWh (4 kWh produces minus 0.4kWh used). The electricity company will then pay you 44 cents for each of those 3.6kW hours which would be $1.58. On the surface it looks like the NSW system is a little better as they would pay you $1.69 for that hour while in Queensland they will only pay you $1.58. The problem with the NSW system is that they don't pay you 44 cents per kWh; they only pay you 23 cents, which is only marginally better that the amount that you but electricity for. Anyway, none of this really matters as we cannot choose which system we take. I just wanted to demonstrate the difference between the Gross System and the Net System.

Sell High, Buy Low

Under the net system, the way to get the most out of your solar system is to not use any electricity while you are producing it. Before you go to work, turn all your appliances off at the wall so that when your solar system is producing electricity, as much as possible is being fed back into the grid for which you'll be paid 44 cents per kWh. Once the sun has gone down, your solar system is no longer producing electricity so any electricity that you use will come from the grid and will cost you 21 cents per kWh. Sell at 44 cents; buy at 21 cents. Try not to use electricity when you are producing it because this will reduce the amount that you can sell for 44 cents. For all those household tasks that do require a lot of electricity, such as the washing machine, dishwasher and oven, try to only use them at night when you are not producing solar power and will therefore only buy the electricity for 21 cents.

Making Money

If you fall into the Capitalist category and wish to actually earn an income from installing a solar energy system, then you will need to do the following:

- Work out how many kilowatt hours you use on average each day.
- Use the calculations described above to find out what size system you would need to install to kill your bill.
- Install a larger system than one that would just eliminate your bill.
- Maximise efficiency by not using electricity during the day and reducing your use of electricity during the evening.

Case Study

Ray and Sunny Helios (not their real names) installed a 5kW system on their house and going on a conservative average, the system should produce 21kW hours per day. The Helios family are very sensible with their electricity use and only use on average 13kW hours per day. This means that they have a net surplus of 8 kW hours of electricity per day which they can sell back to the grid for a minimum of 44 cents per kW hour. 8kW hours X $0.44 = $3.52 income per day. $3.52 X 365 = $1284.80 income per year. So in this case, the Helios family eliminated their electricity bill by installing a 5kW solar system. This alone will **save** them about $1,100 a year as they won't have to pay any more electricity bills. However it will also **earn** them another $1284.80 in electricity they will sell back to the grid. But wait, it gets better!

Ray and Sunny are smart. They try to sell as much electricity as possible by not using electricity during the day when they are producing it. This way they can sell it for a minimum of 44 cents per kW hour. Instead, they run their washing machine, dishwasher and most other appliances at night time when they have to buy the electricity – but at the peak rate of 21 cents per kW hour. Out of their 13 kW hours of electricity they use every day, 10 kW hours are used in the evening and only 3 kW hours are used during the day. This means that they should be able to sell 18 kW hours at 44 cents and buy 10 kW hours at 21 cents.

21 kW hours produced – 3 kW hours used during daylight = 18 kW hours net produced and sold.

18 kW hours X $0.44 = $7.92 income per day.

10 kW hours X $0.21 = $2.10 spent on electricity per day.

Net income: $5.82 per day. Or $531.07 per quarter. Or $2,124.30 per year.

If they went with a company that paid 48 cents per kW hour produced, their income could be $2,387.10 per year and if they got the 52 cent deal then it could be as high as $2,649.90 per year. This is in addition to the $1100 a year they are saving by not getting any electricity bills.

However, these figures do not include the electricity company's service fee (usually around $100 a year) and will only be accurate if the Helios family continues to use only 13 kW hours per day. If they decide to run the air conditioner for 3 months running over summer then they are probably not going to earn much at all, and could well find themselves in a position where they are back paying a bill each quarter.

Finance

So who wants solar? Great, just call one of the many companies and hand over a lazy $10,000 or so and you'll be up and running with a 3kW system that is going to kill your bill. Simple. Oh, you don't have a lazy $10,000 sitting around? Then you've just wasted the last 10 minutes by reading this information package as you simply can't afford it, right? Well, there could be a solution...

First of all, you could pay for it with a credit card. Think of all the rewards points! It's a shame that you will be paying around 18% interest on it though. Having said that, there are some very low rate credit cards out there that may have an interest rate of only 9%.

Another option may be to get a personal loan for it. Unfortunately, these have only slightly better rates than credit cards and you could be paying up to 15% interest on it. With cards and personal loans, it's quite likely that any benefit you do get in terms of money saved on electricity bills will now be chewed up by interest, which makes it a pretty pointless exercise.

Some companies are offering interest free loans to help you install solar. READ THE FINE PRINT!! The devil is in the detail and no company is going to lend money without the prospect of getting something out of it. I'd be more than happy to go over such contracts for you to let you know exactly what you are in for should you take that option.

If you are seriously considering getting solar, then it's very likely that you own your own home and that you are paying off a mortgage. If you had $10,000 sitting around, I would sincerely hope that it was working for you by sitting in your home loan as available redraw or in an offset account. There's no point having money sitting in a savings account earning 6% when your home loan is costing you 7%. If you are one of my clients then you would be sick to death of my advice about making extra repayments off your home loan and parking any spare funds in your mortgage to reduce interest costs. So if you are thinking about increasing your home loan to pay for the solar installation, you'd better make sure it is going to be worth it. So what is the formula to work out if increasing your home loan to pay for solar is going to be worth it?

	$1,600 Current annual electricity costs (which will be going up)
	$10,000 Cost of Installation of solar system which will kill your bill
	$800 Amount of annual interest paid on a $10,000 loan if interest rate is 8%
	$0 New Electricity Bill

You've spent $800 and saved $1,600. You will never have another electricity bill if you keep your usage to what it is now. Your solar system is covering all its own costs and is actually paying itself off with no help from you.

Remember, these are just examples. Hopefully your interest rate is lower than 8% and it's also possible that you could kill your bill for less than $10,000. What I'm trying to demonstrate is that you can install solar without using any of your own money, and have the solar pay itself off in saved electricity bills. I haven't even considered if you wanted to make money out of it by putting on a bigger system than your household will require. By doing that, you could potentially have the solar pay itself off much faster and then help you pay off your home loan faster too.

It's no wonder then that many people are interested in installing the biggest system their roof can hold. They can see the benefit of eliminating their power bill and to never again be exposed to the rising costs of electricity. They like the fact that if big enough, the solar system will not only pay all the interest on the loan required, but will also pay a large chunk of the principal each year too. They love the fact that the panels on their roof can even earn them an income without much more than a hose down every now and then.

Once again, if you are considering solar power, then you need to do the research and crunch the numbers to see if it is going to work for your particular situation. You'll not only need to consider your physical requirements – roof orientation, shading etc – but also whether you are going to be living in your house long term or are considering selling soon. Your financial situation is also going to be an important issue – do you have enough equity, is your current loan and lender suitable to your current needs, do you have other debts that perhaps should be cleaned up first? If I can be of any assistance in this regard, please don't hesitate to contact me.

As I mentioned, I'm not an expert on solar but can help you crunch the numbers to see if getting it installed is going to benefit you. I'm here to help.

Case Study – Revisited

Ray and Sunny Helios have installed a 5kw system that should on average produce about 21kW hours of electricity a day. They only use about 13kW hours a day, and most of this is at night time when they are buying their electricity for half the amount they are selling it for.

Even if they only get the Queensland Government Solar Bonus Scheme feed-in tariff of 44 cents per kW hour for the electricity they sell back to the grid, then they should be making $5.82 a day as well as killing their electricity bill.

Annual savings on electricity:	$1,100
Annual income from solar feed-in tariff:	$2,124
Total annual benefit from solar:	$3,224

Ray and Sunny's solar system was $19,999 which is psychologically heaps cheaper than $20,000, but let's say they tipped the installer a dollar. Some companies will calculate the repayment time on a solar system by dividing the installation cost by the annual benefit. On this example, that would be 6.2 years and all savings and income the solar system produces after that point would be real benefit or profit. Such a calculation would be fine if the Helios family were completely debt free and had a spare $20,000 under the bed. Most people however, are not debt free.

Ray and Sunny's home loan was organised by an awesome but humble broker from Compass Home Loans and they are currently paying 6.9% interest per year. They are doing everything right – depositing all their income directly into their loan and leaving it there for as long as possible which is reducing the amount that the bank can charge them interest on. They decide to increase their home loan by $20,000 to pay for the solar installation and want to know the ramifications of doing this.

(6.9% is a pretty sharp interest rate at the moment and though no one really knows what the interest rate will be 12 months from now, few think it will be lower than it currently is. For safety, we are going to assume that the Helios family are paying 8% on their home loan)

$20,000 X 8% = $1,600 interest per year. Ray and Sunny could borrow 100% of the cost of the solar using none of their own money and the ongoing cost of doing so would be $1,600 a year based on them not reducing the loan balance. But they should be able to reduce the loan balance because though the loan has cost them $1,600 in interest, they have a total annual benefit of $3,224. So the solar has paid the ongoing cost of $1,600 plus another $1,624 off the loan, bringing the balance down to $18,376. Now that the balance is lower, less interest will be payable so in the next 12 months the benefit should still be the same but the interest component will be less which will allow for the debt to reduce faster.

Year	Opening Balance	Plus Interest	Minus Benefit	Closing Balance
1	$20,000	$1,600	$3,224	$18,376
2	$18,376	$1,470	$3,224	$16,622
3	$16,622	$1,330	$3,224	$14,728
4	$14,728	$1,178	$3,224	$12,682
5	$12,682	$1,014	$3,224	$10,472
6	$10,472	$837	$3,224	$8,085
7	$8,085	$647	$3,224	$5,508
8	$5,508	$441	$3,224	$2,725
9	$2,725	$218	$3,224	-$281

This shows that the real repayment time of your solar system is more like 9 years rather than 6 years when you factor in the ongoing cost of interest. Personally, I believe it should be better than this given that this example is based on an interest rate of 8% rather than their current rate of 6.9%. It also doesn't take into account the increasing cost of electricity, and as they are not paying for electricity anymore, the real savings is actually going to be higher. Let's look at it again based on the long term average variable rate of 7.5% and electricity costs increasing by 8% per year.

Year	Opening Balance	Plus Interest	Minus Benefit	Closing Balance
1	$20,000	$1,500	$3,224	$18,276
2	$18,276	$1,370	$3,279	$16,367
3	$16,367	$1,227	$3,336	$14,258
4	$14,258	$1,069	$3,397	$11,930
5	$11,930	$895	$3,461	$9363
6	$9363	$702	$3,528	$6,537
7	$6,537	$490	$3,598	$3,429
8	$3,429	$257	$3,671	$15

So the results should be even better when you factor in the rising cost of electricity and use the average long term variable interest rate. After 8 years, your solar power system will have completely paid itself off and will now be returning at least $3,671 a year in electricity savings and earnings on electricity sold. Once again, when you tell your friendly Compass Home Loans finance specialist what you are doing with this money, you will be telling them that it now coming off your mortgage, right? Good.

Thank you for making it all the way to the end! Don't forget, we are here to help. Please call or email if there is anything at all that you are not sure of or would like us to do some calculations for you.

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Register your interest in getting more solar power information including costs by joining our buying group.

This group should allow us to negotiate discounts with various solar companies by buying in bulk.

Email us at info@compasshomeloans.com.au to join the group and continue to receive regular updates on our negotiations and the available prices for the different sized systems.

Don't worry, it's free to join and it's completely up to you if you want to do anything with the information.

Dave Hirst
Finance Specialist
BA MAS, Cert IV Financial Services
M: 0401 612 298
F: (07) 5471 3050
E: dave@compasshomeloans.com.au

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