

The smarts of blue sky mining in the 'burbs

Your Money's
Neale Prior says
his solar panels
are big winners

A part from getting free entry to Nick Bruining's Retirement Masterclass, the best thing about this job is doing important home budgeting research on the boss's time.

And the latest bit of boss-funded research, into Chez Prior's investment in solar panels over the past 38 months, has not only shown what a good investment alternative energy can be, it also shows how wary we should be when electricity companies try to talk us into buying so-called off-peak "smart power".

And, as for those expensive new batteries that save solar power generated during the day so it can be used in the evening, the numbers do not stack up now and probably will not for years to come.

All this information is not generated from secret sources. Rather it comes from the Western Power smart meter and solar inverters that sit out the front of Chez Prior and are much the same as the inverters and power meters installed in tens of thousands of WA home since the solar revolution began a decade ago.

Amid shrinking Federal and State incentives, the Chez Prior crew spent \$1000 in late 2012 installing a 1.5kw solar panel system and had a Western Power smart meter installed at the same time.

We then spent another \$4000 in late 2014 on a higher quality 3kw inverter attached to 4kw of solar panels in two arrays facing east and west.

It is a complete no-brainer that the early adopters of solar panels last decade are doing very well after signing onto the deals with the State to sell their power into the grid 40¢/kwh.

The State Government has progressively slashed the solar power input price to 7.135¢/kwh, while the Federal Government slashed subsidies to people buying solar panels.

The inverter on the 1.5kw system shows it has produced around 8038 kwh in around 38 months, while the bigger system has produced a very respectable 8647kwh in around 15 months.

That is a total production of 16,685kwh but its value depends greatly on whether we used the power as it was generated or sold it into the grid.

This is where the smart meter becomes useful. The meter shows we have sold 7668kwh of electricity into the grid which, at 7.125¢/kwh, has generated a modest \$560 in rebates.

The real bounty has come with the other 9000kwh of electricity produced and consumed by us that would otherwise have been bought by us at the standard Synergy home power tariff.

With Synergy charging 24.6¢/kwh up until July last year and 25.7¢/kwh since, the solar panels have saved us around \$2200 in electricity purchases.

A \$2750 gross return on a \$5000 investment seems pretty good, however it is helped by the original solar unit having been bought before the Gillard Government slashed subsidies in 2013.

The \$1000 1.5kw unit has returned more than \$1300 in 38 months, while the \$4000 unit has probably given us a relatively modest but arguably respectable \$1400 in 15 months.

Even counting the \$250 in annual interest we might have saved had we instead put \$4000 on the mortgage, the more expensive unit will likely pay for itself within five years.

The original reason for the dive into inverter histories and smart power meter last week was to work out whether a potential purchase of one of those you-beaut Tesla batteries could in any way be justified.

The battery, which has an impressive 92 per cent efficiency in storing and discharging energy, would cost at least \$8000 if it were to be

installed within Chez Prior's existing system and around \$14,000 if starting from scratch.

It is a lot of top-up to pay for a unit that would take around 7kwh of solar-generated electricity that I might otherwise sell into the grid at 7.135¢/kwh during the day and instead let me draw 6.4kwh of power in the evening, at the standard Synergy home rate of 25.7/kwh.

We would be sacrificing 50¢ a day of energy credits to avoid \$1.64 of energy bills. This relatively small saving of around \$420 a year means it would take the solar battery upwards of 20 years to pay for itself, assuming it keeps working that long.

One of the arbitrage schemes being thrown around by promoters of solar batteries is they can be used to make the most of smart power schemes, including charging the battery with cheap off-peak power at night.

The battery advocates suggest we can use the battery to minimise the amount of power you buy from the grid during peak periods.

Synergy charges its smart power customers a whopping 47.18¢/kwh in its Monday to Friday peak period of 3pm to 9pm, and a modest 13.18¢/kwh during its off-peak from 9pm to 7am every day.

Smart power buyers are sluggish a marginally-discounted 25.06¢ during the so-called weekday shoulder period of 7am to 3pm and weekend shoulder from 7am to 9pm.

Would this work at Chez Prior? Do we use enough energy between 3pm and 9pm to justify the investment in a 6.4kw battery that could, potentially, save more than \$1100 in peak-priced consumption over a year for someone on a smart power plan.

The Synergy smart meter can reveal a lot thanks to its wonderful breakdown of our power consumption and power generation during peak and off-peak periods, as well in the so-called shoulder times.

The smart power meter at Chez Prior reveals we sold 2973kwh of energy into the grid during the 3pm to 9pm weekday peak periods since December, 2012, and we have bought 3751kwh during this peak period.

Our purchases from the grid average less than 3.5kwh a day — less than the 6.4kwh Tesla could supply to our house when our west-facing solar system shuts down in the evening.

It is more likely than not we would still be consuming the battery power in off-peak, when we could buy power from the grid for 13.18¢/kwh. The battery will be discharging energy we could have sold into the grid for 7.135¢/kwh if we had not spent \$8000-plus for the privilege of storing it in the battery.

If we elected to roll the dice with smart power and made the most of the 40¢ gap between the sale rate and peak price, the battery might save us around \$530 a year — meaning it would take more than 15 years to get our money back.

The meter reveals the truth about life at Chez Prior. Our air-conditioned dogs, ice-cooled guinea pig, pampered progeny and pool pump are big daytime users of power from the grid and from our solar panels as they pump out an average 1.3kwh every daylight hour (and more than 3kwh during peak production).

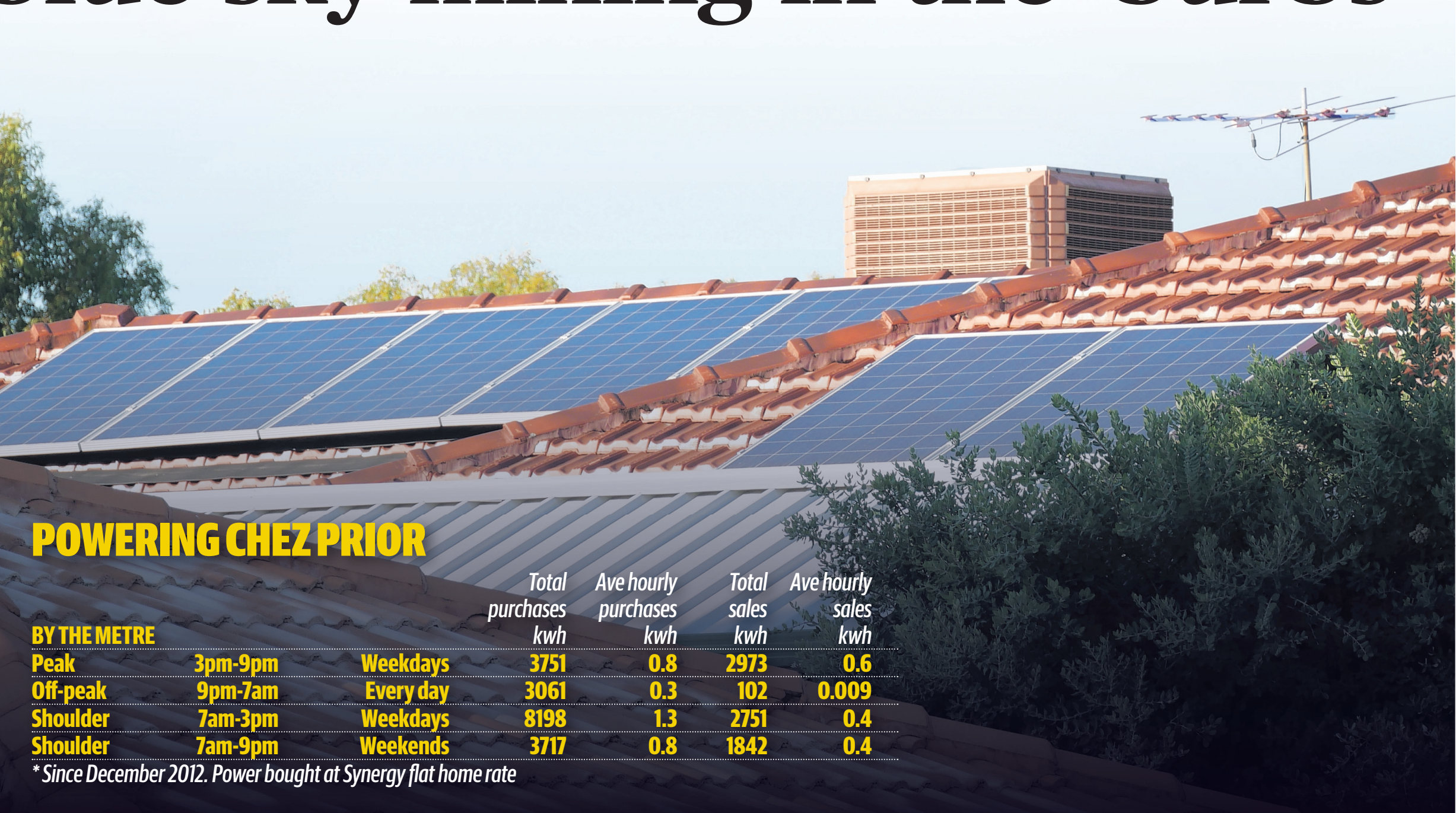
For the period 7am to 3pm Monday to Friday over the past 38 months, the smart meter shows we bought 8198kwh from the grid and sold a modest 2751kwh of unused solar-generated power into the grid.

That is an average of 3kwh of unused solar power sold into the grid from 7am to 3pm every weekday and roughly same amount after 3pm, when our west-facing panels really start pumping out the watts until sunset. There are no guarantees we have enough spare power to charge the battery every day and we might not consume it all during the peak period anyway.

A household that was a bigger peak period user and needed the full 6.4kwh of stored power could always partially charge the battery overnight at the 13.18¢ off-peak rate.

The savings against the peak rate could exceed \$600 if it was completely charged with off-peak energy and more than \$1000 if it was mostly solar.

Either way, payback would take years.



Thumbs up for solar but batteries need to lower their charge



Neale Prior

Going by the financial rule of thumb for renewable energy investment that you should get your money back within five or six years, solar panels are very good value for many of us.

However, it is likely to take until early next decade for battery power to become worthwhile for those of us who have reliable electricity supply to our homes and don't have the money to spend on boosting our green credentials.

The other rule of thumb for Perth is that solar panels should have a year-round average of about 4.4kwh of electricity every day for each 1kw of solar panel and attached inverter you have on at your home. The actual daily rate greatly varies seasonally in line with the length and intensity of the sunlight and whether it becomes so hot that the panels lose efficiency.

But it is fair to say that 5kw solar panels from a reputable installer should generate an average of 22kwh, or a potential output of more than 8000kwh a year.

How that translates financially depends on whether you use the power, saving a tariff of at least 25¢/kwh, or you sell it into a grid.

A big solar system is not a viable option for someone who is going to sell most of their power into the

grid at the relatively humble price of 7.135¢/kwh. A smaller unit may provide much better value.

If you are at work most daylight hours and maybe have only an energy-efficient fridge running, you may well be selling up to 90 per cent of 8000kw of generated power into the grid at 7.135¢. You would be lucky to get \$500 of credits for the generated power and probably save \$200 on power you might have otherwise bought from the grid.

The low consumption rate would create a payback period of up to seven years. The payback would fall to five years if you were to consume 30 per cent of your average daily output given you'd be generating savings and rebates of around \$1000 a year.

The payback period would fall to roughly 44 months if you were to use 60 per cent of generated power in the home. At 60 per cent personal consumption, you could be saving \$1200-plus in power bills and getting around \$230 in annual credits for energy back into the grid.

It is with this 8kwh-plus of sold power every day that a Tesla solar battery theoretically becomes a viable consideration for people who are connected to the grid, who want to get more than 7.135¢/kwh for their power but who don't want to risk losing their access to the renewable energy buyback scheme. Home users must have less than 5kwh inverter capacity to sell

into the grid. Someone using almost two-thirds of their 22kwh of generated power during the day and fully charging a battery with 7kwh of unused power could have saved more than \$1800, plus earned a few dollars from the daily leftovers sold into the grid.

The annual net benefit of the battery is around \$400 for someone on the standard Synergy purchase rate of 25.7¢. This potentially rises to a net benefit of more more than \$800 a year for someone who pays the peak period tariff of 47.18¢/kwh from 3pm to 9pm.

In the peak period, someone on smart power will be using power stored in the battery that might have otherwise been sold into the grid at 7.125¢/kwh. Even once the energy lost in storing and drawing electricity with a battery are taken into account, the net saving is well over 30¢/kwh by shifting the solar power from day to peak period.

Even the \$800 net benefit for a battery represents a payback time of more than a decade for someone who spends up to \$8000-plus upgrading their solar system to a battery system. If the price fell to \$4000 for a decent battery installation, it would be worth considering given they could pay for themselves within five years.

Infinite Energy managing director Aidan Jenkins, who sells the Tesla battery systems, said batteries did not yet stack up on the five-

year payback threshold guideline.

However, he said they were popular with homeowners on the outer edges of the grid who had power interruptions and used batteries to provide continuation of supply.

He said people who liked to maximise the benefits of smart power on a "purely arbitrage perspective" were interested, as were the renewable energy enthusiasts. "There are those that want to maximise their solar systems and do it for the environment," he said.

Financial services group Lazard last year tipped that the price of cutting edge lithium ion systems would fall by around 50 per cent over the next five years. Most of the cost falls are tipped to come from engineering and manufacturing improvements with the batteries, rather than falls in installation costs and related control systems.

So the biggest falls will come from cheaper batteries rather than reduced installation costs or advances in equipment that let your battery to talk to solar system.

The expected big fall in battery costs presents a dilemma for people installing a solar system who are wanting to upgrade to battery storage when it is more affordable.

Batteries can be attached to a solar system through a dedicated battery inverter that draws energy from either the home's main switchboard until the battery is charged. That power comes from

the grid or the solar inverter, depending on whether excess solar is being generated. There is no direct interaction between the solar inverter and the battery inverter.

Mr Jenkins said the far more efficient option was to have a single hybrid inverter connected to the solar panels, the battery and the switchboard. For example, it could be programmed to charge from solar when electricity was not being used in the home and to discharge during the peak period.

"If you have dumb systems doing their own thing at certain times, you lose some of the benefit of having a battery," Mr Jenkins said.

However, hybrid inverters cost \$2000 more than a standard equivalent inverter — adding 40 per cent or more to the price of a new solar system.

For someone who spent \$7000 instead of \$5000 on their solar system by buying a hybrid inverter but then failed to install a battery when the price was right, their payback time would rise from 3.4 years to almost five years if they sold 40 per cent of their power into the grid. If there was a 50/50 split, the payback would rise from 3.8 years to 5.3 years and from 6.9 years to almost a decade if they sold 90 per cent of their output into the grid and did not upgrade to battery technology.

Mr Jenkins said the extra spend might be worthwhile for someone who was highly likely to install a battery system in the next couple of years. "But if you're umming and aching, don't do it," he said.

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5 per cent rule, big confusion

A number of self-managed superannuation fund trustees believe they can use the money accumulated in their SMSF to assist their businesses through financial hardship.

Quite a few accountants also believe this can be done as long as the money lent to their clients' businesses, does not exceed 5 per cent of the value of the SMSF's assets.

I'll explain this rule a bit later.

Unfortunately, this interpretation of the superannuation law is wrong. It probably explains in part why the Australian Taxation Office's statistics show that SMSFs providing financial assistance to members remains a large percentage of all contraventions.

Under the super law, if you operate your business as a sole trader or in a partnership structure, your SMSF cannot lend money to your business under any circumstances. Not even up to 5 per cent of the value of its assets.

To be fair, the law has caused some confusion with its seemingly contradictory related-party lending rules. One area of the law allows SMSFs to lend money to related parties. Unfortunately, another area of the law prohibits SMSFs from providing financial assistance to members and relatives of members. So if your SMSF adviser is only familiar with the lending provisions to the related-parties part of the law, they could easily misinform you.

In one area of the law, there is a term referred to as an "in-house asset". An in-house asset is a transaction. This could be something like an SMSF investing in a related party; lending the SMSF's money to a related party; or leasing an SMSF's asset to a related party. The superannuation law allows SMSFs to enter into these transactions as long as the dollar value of the transaction does not exceed 5 per cent of the total value of the SMSF's assets.

Does this mean an SMSF can lend up to 5 per cent of its total assets to a member's business? It depends on the structure of the business.

An SMSF can lend up to 5 per cent of its total value, if the SMSF member's business is structured as a company or a unit trust. But it cannot loan any money if the member's business is operating as a sole trader or a partnership.

This is because another area of the superannuation law states that an SMSF is prohibited from providing financial assistance to members and relatives of members.

So what you have is one area of the law allows SMSF to lend up to 5 per cent to related parties and another area of the law prohibits SMSF from lending any amount to members and relatives of members.

The confusion is caused because the term "related party" includes members and relatives of members as well as entities such as companies or trusts that the members and their associates control. Because members and relatives are included in the term "related party", SMSF members believe it is OK for their SMSF to lend money to their business.

If these people realised that another area of the law prohibits SMSFs from lending its money to members and relatives, they would understand that though, under the in-house asset law, their SMSF can lend up to 5 per cent of its value to their company or trust, it cannot lend money to them if they operate their business under a sole trader or partnership structure.

So what should you do if your SMSF has lent money to your business when it is prohibited? You need to unwind the loan immediately and make a voluntary disclosure to the tax office declaring your mistake. Hopefully the tax office will take a lenient approach if it is your SMSF's first contravention. It may issue an Education Direction without imposing any administrative penalties.

Monica Rule is the author of *The Self Managed Super Handbook - Super Law for SMSFs in plain English* www.monicarule.com.au