The Solar Revenue Co.
Turning sunshine into income

SOLAR FOR STRATA

ON-LINE MANUAL

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NOOSA BIOSPHERE awards
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PEOPLE & ECONOMY

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Contents

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See the Header to check how old this information is, and to check this version is the same as you may have perused before.
Primarily intended for Bodies Corporate in Queensland.

This is a long document.
It is easier to save paper than plant trees.

Executive Summary

Barriers to solar for strata

Maintaining a sustainable balance between people and nature is paramount. Body Corporate or Strata properties, have a huge impact on the sustainability of our country. Yet adoption of solar for strata lags far behind solar for 'normal' households and businesses. For example, it is thought only around 14% of strata properties have any solar installed (cf. 50% of residential and 46% of businesses in the Noosa Shire. Source: ZEN Inc, Sep 2022). Why is that?

The often reported two main barriers to strata solar are:

- Cost - or a return on investment.
  - The strata organisation expects to have to fund the installation.
  - Sinking Fund Forecasts focus on *essential* building maintenance, hence money is rarely set aside for *non-essential* building enhancement.
  - Historically, BCs have not seen financial returns from solar, other than for savings on common power.
  - Solar on individual lots benefits occupiers, in the form of cheaper electricity bills, not the community
- Effort - lack of time or knowledge.
  - Most strata committee volunteers have little expertise in solar.
  - They have little time to devote to researching or obtaining sufficient knowledge.
  - They commit enough time on essential building maintenance, with little capacity to consider a solar project.

The "Solar *Revenue* Model"

Seeks to overcome the above two main barriers to solar for strata:

- Cost
  - Solar revenue models create a revenue stream for the BC by diverting funds from retailers to the BC.
  - Occupiers buy solar energy from the BC, rather than from the Grid giving protection from market volatility.
  - Solar can often be installed with no money down, and no increase to BC levies.
  - Solar is one of the only building expenses which *earns*, rather than *costs* money.
  - Solar can provide economic (in addition to environmental) returns for 20+ yrs.
- Effort
  - Solar revenue models do not rely solely on BC committee volunteers and can be delivered in 6-12 months.
  - Strata solar can be monitored, maintained and managed by independent, insured service providers.

1. Background to the Manual

This manual is intended for an audience of solar enthusiasts (or "champions"), Body Corporate Committee (BCC) members, on-site or care-taker managers, and Body Corporate Managers (BCMs), who wish to inform themselves of electricity supply options, particularly including solar, to be able to add value to their Body Corporate (BC) clients. It outlines various options and pitfalls a BC should consider when investigating a potential *community* solar for strata project for their scheme. It is based on regulations governing BCs in Queensland.

It does not seek to advise individual owners within a BC scheme of the steps to have *individual* solar systems installed. There are various building formats and individual scheme by-laws, in addition to the BC regulations, which regulate and hamper an individual's abilities to "change the appearance" of their Lot, make an "improvement to common property", and other legal aspects. From a BC point of view, owners should be made aware that these provisions exist and must be complied with. A BCC cannot place a blanket ban on individually owned solar, but may wish to review its policy as to whether, in principle, they wish to set conditions or controls on individual installations to:

- ensure quality, safety and conformity of appearance of installations;
- avoid legal responsibility for maintaining, repairing or removing individual systems (whether due to poor, dangerous or unlawful installation, or maintenance, or due to required roof works);
- avoid a hazard or nuisance, damage or restriction to other owners' use and enjoyment of common property (e.g. should there be an equal share of BC roof space, or first in best dressed?), or their Lot (e.g. ocean views);
- avoid legal argument as to individual solar owners' rights over common property roofs, or whether an individual installation becomes BC common property if it has been installed on common property without approval.

Remember, if an owner wishes to use common property roofs or walls for panels, inverters, or cables and conduit, permission needs to be obtained. Further, any "improvement" to common property over $3,000 is not within the BCC's power to authorise; approval must come from owners at a General Meeting. This area is far from simple. BCCs may find it simpler to refuse owners' requests for *individual* solar installations, in favour of a BC-led, community-wide project, for the equal benefit of all owners. It may prove simpler than dealing with individual requests.

Solar within strata is a complex area, but so is renovating an older swimming pool, or replacing rotten timbers in balconies. Volunteer BCC members should not be expected to be across the nitty gritty of the ever-changing solar scene, nor the fluctuating Queensland Electricity Market. BCCs are entitled to rely on expert third parties to help make decisions, in the best interests of all owners. BCCs will find most owners are supportive of *community* solar projects (particularly if there is no direct cost to them). This manual is intended to equip readers with sufficient knowledge to understand the options and raise concerns or questions of any expert they instruct to assist them. It is not intended to make the reader an expert themselves.

Think of Heston Blumenthal providing you with a 50 page, 500 step recipe to make, say an amazing dessert that appears out of the smoke. You would get an idea of the steps, you might even feel confident in having a go, but do you think you would do as good a job as Heston?

More importantly, would your owners be happy with your result?

a. Zero Emissions Noosa - history and involvement in strata for solar

Zero Emissions Noosa Inc (ZEN Inc) commenced work with this sector in 2020 with its first industry event - a "Solar for Strata Masterclass". A month later COVID interrupted the sector, and the world. BC owners, BCCs, BCMs and (particularly tourist-based) building and letting managers were focused more on "heads on beds", and surviving the financial and logistical upheaval caused by the pandemic.

With the assistance of funding from Noosa Shire Council, ZEN Inc returned its focus to the strata sector in March 2022, hosting a second industry event "Solar for Strata - A New Era", focusing on a new model of solar for strata that had successfully been installed, despite COVID. "The New Era" described a solar *revenue* model that had not been seen before on BC properties, that could be copied and applied for the benefit of other BCs.

For more details of the installation at Noosa Lakes Resort, the largest in the Noosa Shire, and thought to be the first of its kind in Australia, click for video, by Watershed Australia.

At the "Solar for Strata - A New Era" event, BCs within the Noosa Shire were invited to apply to be one of the "Lucky 8" to receive free Solar for Strata Feasibility Studies, via ZEN Inc, funded by Noosa Shire Council. By November 2022, ZEN Inc were ready to share the "Learnings from the Lucky 8" at a final industry seminar for the year, which showed the potential of the solar *revenue* solutions in various different models (3 out of the 4 models detailed in this Manual), as well as the common challenges faced by BCs when investigating renewable energy opportunities.

Keep abreast of ZEN Inc's work on Solar for Strata at www.zeroemissionsnoosa.com.au.

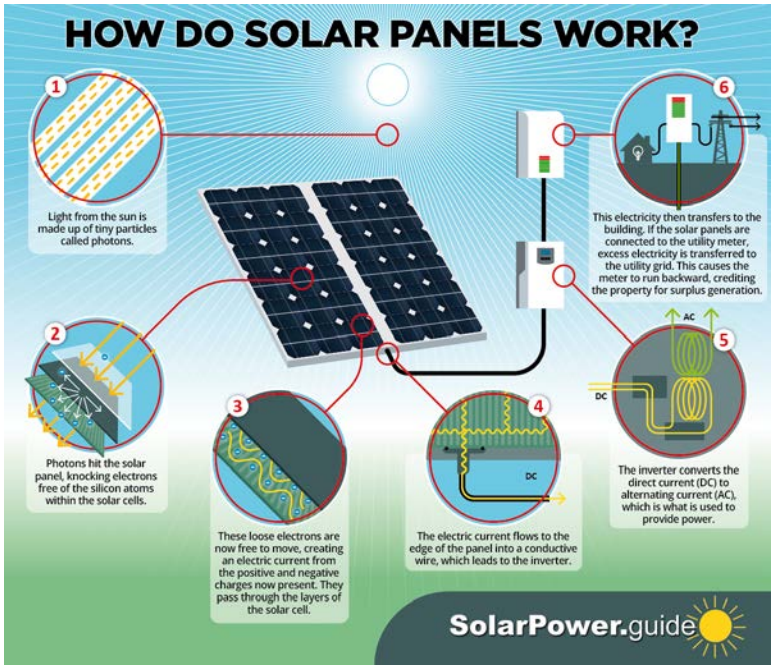
b. Noosa Shire Council support

Zero Emissions Noosa Inc adopted Noosa Shire Council's ambitious goal set in 2016: to achieve net zero emissions by 2026. Zen Inc has both assisted Council, and been assisted by Council, in striving to encourage the population of the Noosa Shire to help achieve that goal, through various projects including adoption of electric vehicles (eVs), community batteries, solar for strata and others.

Council sponsored the above three ZEN Inc industry forums, as well as funding, via its Climate Change Grants, Stage 1 - "The Lucky 8" BCs, who received funded feasibility reports, and Stage 2 - the drafting and sharing of solar for strata knowledge throughout the sector, via this online "How to" solar for strata manual.

The writer and ZEN Inc are mindful of, and grateful for Noosa Shire Council's support, both financial and otherwise.

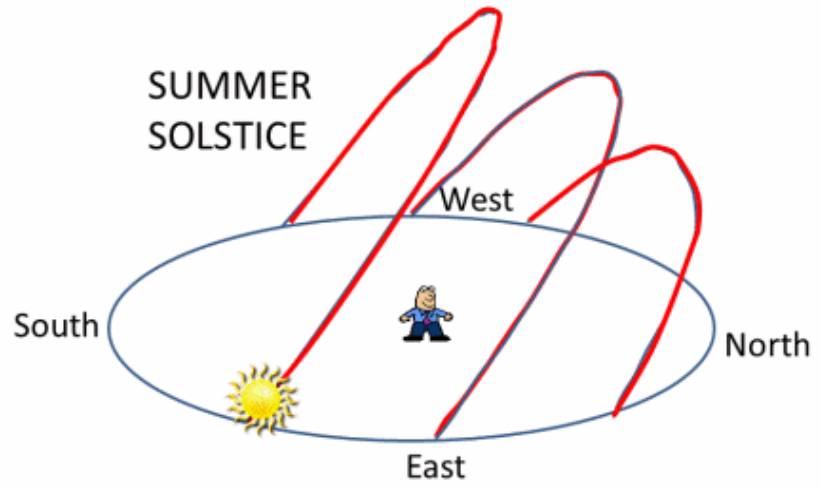
2. Introduction to solar



a. The basic premise

i. Solar electricity is produced when sunlight activates the semiconductors (most commonly silicon) in PhotoVoltaic (PV) cells inside a solar panel, creating an electrical current. This direct current (DC) passes to an inverter which converts the DC current to AC to be able to power residential and commercial properties.

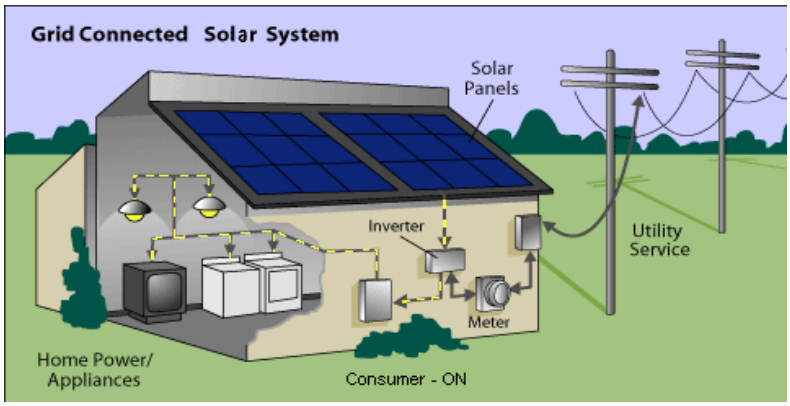
ii. Many factors influence the amount of electricity produced, including the efficiency of the inverter, the panels - particularly their ability to absorb sunlight, influenced by their location, orientation and gradient - and voltage drops, caused by the length of cable runs.



iii. The strength and angle of the sunlight to the panels affects solar production: the lower journey of the sun in the sky, and shorter days in winter, the less solar hours and the less energy generation.
image by By Nick Lomb @ maas.museum

iv. To size a solar array to generate enough energy to cover winter usage means that excess solar will be generated in summer. Finding the optimum balance can be difficult. Batteries can store some of the excess power generated, to be retrieved after solar hours.

b. Solar in action



greensolarsolutions.com.au

i. Solar electricity is available to be used when sufficient current is generated for the inverter to convert to AC. Whenever there is a load connected to the distribution board, any available solar electricity will be drawn to that load, to the exclusion of Grid energy being imported. If there is not sufficient solar electricity for all loads, Grid electricity will cover the shortfall. If there is more than sufficient solar to cover all loads, the excess solar energy generated will be exported to the Grid.

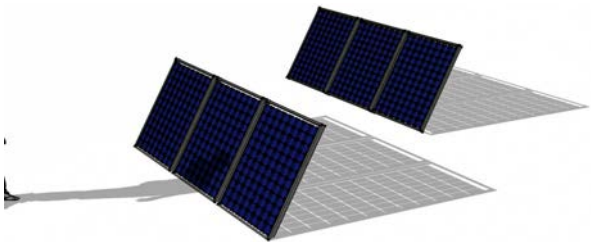
ii. Smart electricity meters (provided free of charge by most retailers, after a solar installer notifies Energex that solar has been connected) measure:

- the amount of electricity *imported* into your property from the Grid, which is charged by the retailer at the agreed energy usage rate (in cents per kilowatt hour, “c/kWh”), plus
- any solar electricity being *exported* to the Grid - which is paid for by the retailer as a solar export credit at the agreed Feed In Tariff or “FIT”, set-off against the cost of imported power on your bill.

iii. As the cost to buy electricity from the Grid (currently around 25c/kWh) is usually significantly more than the FIT paid by a retailer for excess solar, the more solar electricity you self-consume, the lower your bill, as you import less from the Grid. The standard FIT is currently around 5c/kWh, though some people still have a very high FIT of >40c/kWh (from early government incentives. Hence they export the majority of their solar).

c. Site suitability

i. Panels need direct sunlight. Shade will not provide sufficient energy to make a system viable. North, then west and east facing panels generate more energy than south facing roofs. Tilt-racking systems can improve production,although less panels can be installed on a roof when tilted, due to the shadows they cause on other panels.



ae-solar.com

ii. In a strata setting, ownership of the roof is an important factor. Often the BC owns the roofs, but there are other schemes where each Lot owner owns, and is responsible for, their individual roofs. Owners’ permission is necessary for a BC to install solar on those roofs in such cases, usually by way of licence. To bind *future* owners, such permission must be recorded in the by-laws.

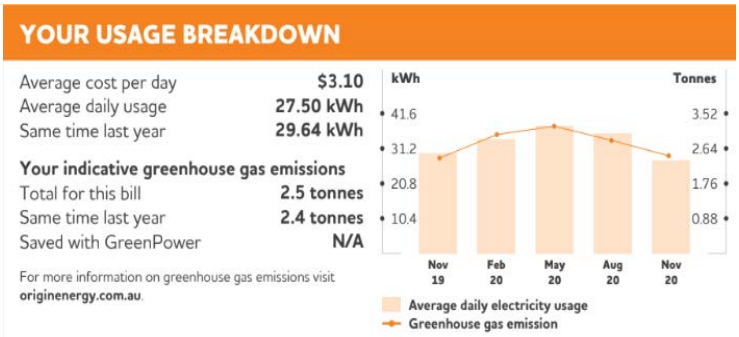
iii. To reduce the length of cable runs (and associated voltage drop), panels and inverters need to be installed closer to either the electricity meter, or a distribution board.

d. Sizing a system

Getting the balance between usage and generation is paramount. Not enough solar means more reliance on imported Grid electricity. Too much solar means exporting the excess solar electricity to the Grid, receiving less per kWh in FIT than would have been saved had the solar been consumed on site.

i. Usage

1. Historical usage (kWh/pa) is easy to determine from totalling the usage on each previous electricity bill over a 12 month period. Thereafter it is necessary to consider reasonably anticipated future usage: are occupancy rates likely to increase; would you heat your pool/s if "free" solar power was available; are you intending to install electric vehicle (eV) chargers? Remember, a solar installation is likely to last 20+ years.
Will anyone still be driving ICE vehicles by then?



origin.com.au

2. Without battery storage, solar can never cover your total usage. Grid electricity needs to be imported outside of solar hours. Peak residential usage times are early in the evening and first thing in the morning, therefore not usually covered by solar. Unless you have smart meter data, it is essential to make assumptions regarding the amount of your usage will occur during solar hours, rather than sizing a system to cover your total usage. Up to 50% usage should be possible in residential situations, with thought and effort, though with many residences empty during the day 30% self-consumption of solar is more reasonable.

3. The best way to save money on electricity is not through installing solar. It is through using less electricity. Energy efficiencies, such as LED lights, pool covers and heat exchange pumps, reduce usage, as does turning off lights and appliances when they are not being used, and keeping your AC settings to 25°C (Ergon reports that every 1° below 25° can add 10% to cost).

4. Shifting usage to, or spreading it throughout solar hours increases solar self-consumption rates, reducing reliance on Grid electricity. Simple actions such as using the delayed start switch on dishwashers and laundry appliances, or installing timers on hot water storage systems have a considerable impact.

ii. Generation

1. A site's viable roof space may limit the amount of panels, producing less energy than daytime needs, but if there is sufficient space, a decision needs to be regarding sizing to cover anticipated solar energy needs. Bearing in mind solar hours and generation vary through the seasons, a balance must be struck between covering winter usage and not 'wasting' too much excess solar generated, but not used, in summer.

2. Excess solar is not ‘wasted’ energy - it will be used by someone. If all solar generated is not consumed then it will be exported to the Grid. That clean energy replaces the need for the electricity generators to generate more fossil fuel-based electricity. Your neighbours will use the exported green energy, rather than ‘dirty’ Grid energy. Certainly not a waste - a definite win for the environment.

3. In the near future, there is likely to be even more economic wins - certainly in the lifetime of your solar system - as energy use increases in the future (through eVs if nothing else). Batteries can store unused solar, to ‘extend’ solar hours into the evening peak period, and battery prices are likely to reduce over the next few years...not to mention the potential of the numerous innovations increasingly being adopted globally - see Section 10 - The near future. It is better to oversize than undersize a solar system.

[Arty community batteries in the Yarra]

and a video explainer by CitiPowerPowercor (click for video)

3. Introduction to solar for strata

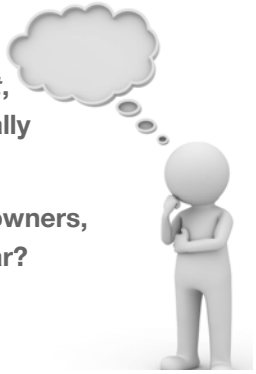
a. Environmental Impact

Government data from the Australian Greenhouse Office indicates that:

- households generate at least 20% of Australia's annual greenhouse gases (490 million tonnes a year)
- c.60% of an average household's 18 tonnes of CO_2/pa emissions are due to power usage.

From investigations by ZEN Inc, based on data from Energex and the Australian Bureau of Statistics, over 20% of dwellings in the Noosa Shire can reasonably be assumed to be within Body Corporate properties. Extrapolating those figures, across the estimated 10 million households in Australia, illustrates the likely contribution of greenhouse gas emissions by BC properties.

Whether you believe in man's impact on climate change, having BC properties install solar to account for even 30% of usage would reduce reliance on nonrenewable energy sources, potentially saving 32.4 millions tonnes of CO_2 pa. That's the equivalent of driving over 3 million cars right around Australia - *each year.*



- **If your Body Corporate had the opportunity to avoid or reduce pollution, *without cost*, would you consider you had an ethical obligation to look to become as environmentally sustainable as possible?**
- **If solar could reduce your environmental impact *and* provide an *economic* return to owners, would a BC be acting in the best interests of all owners if it failed to recommend solar?**

b. Economic Impact

Not only does installing solar have huge *environmental* impacts, it has direct *economic* impacts too. It is not just the installation costs: money stimulating electricians' business, but also "instead of flowing to electricity providers, an enormous cash equivalent now remains in the hands of Noosa businesses and residents, enriching the local economy" — Frank Wilkie, Noosa Council Deputy Mayor.

In 2022, ZEN Inc delivered detailed Renewable Energy Consultant's Reports to a "Lucky 8" strata schemes, large and small, in the Noosa Shire, funded by a Noosa Shire Council Climate Change Grant. The economic potential for Noosa included:

- Potential installation costs >$1.3m
- Potential solar revenue >$315,000* per year (over $7m over the solar 20+ year lifetime)

* Cash equivalent remaining in the Noosa economy (at 25c/kWh), being diverted from electricity retailers, to BCs. Those figures were from just eight BC properties in Noosa. Imagine the potential - The Australasian Strata Insights 2020 reported there were over 340,000 strata schemes in Australia…

c. Barriers to solar for strata

As the Executive Summary states, maintaining a sustainable balance between people and nature is paramount. Body Corporate or Strata properties, have a huge impact on the sustainability of our country. Yet adoption of solar for strata lags far behind solar for 'normal' households and businesses. Why is that?

The often reported two main barriers to strata solar are:

- Cost - or a return on investment.
  - The strata organisation expects to have to fund the installation.
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- Effort - lack of time or knowledge.
  - Most strata committee volunteers have little expertise in solar.
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  - They commit enough time on essential building maintenance, with little capacity to consider a solar project.

d. The "Solar Revenue Model"

Seeks to overcome the above two main barriers to solar for strata:

- Cost
  - Solar revenue models create a revenue stream for the BC by diverting funds from retailers to the BC.
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- Effort
  - Solar revenue models do not rely solely on BC committee volunteers and can be delivered in 6-12 months.
  - Strata solar can be monitored, maintained and managed by independent, insured service providers.

4. Solar for strata solutions available

For those readers who know which model may best suit their scheme and who are confident with their knowledge of:

a. *strata power supply options:* including the differences between “on-market” and “off-market” (embedded networks) options;

b. *the Electricity market in Queensland*: including the wholesale market, network and environment charges, energy rates, the AER’s Default Market Offer (see Section 5); and

c. *contract options for strata*: including types of tariffs, commercial vs residential contracts, time of use and controlled load options;

…feel free to skip straight to that model of solar for strata solution by clicking the links below.

Alternatively, read up on the following sections on the Queensland electricity market, strata power supply options, and how to choose which strata solar model, to become better equipped to choose the model you think best suits your scheme…remembering there may be more than one.

1
Common Area Power Only

2
Solar for Individual Lots

3
Existing Embedded Network

4
New Embedded Network

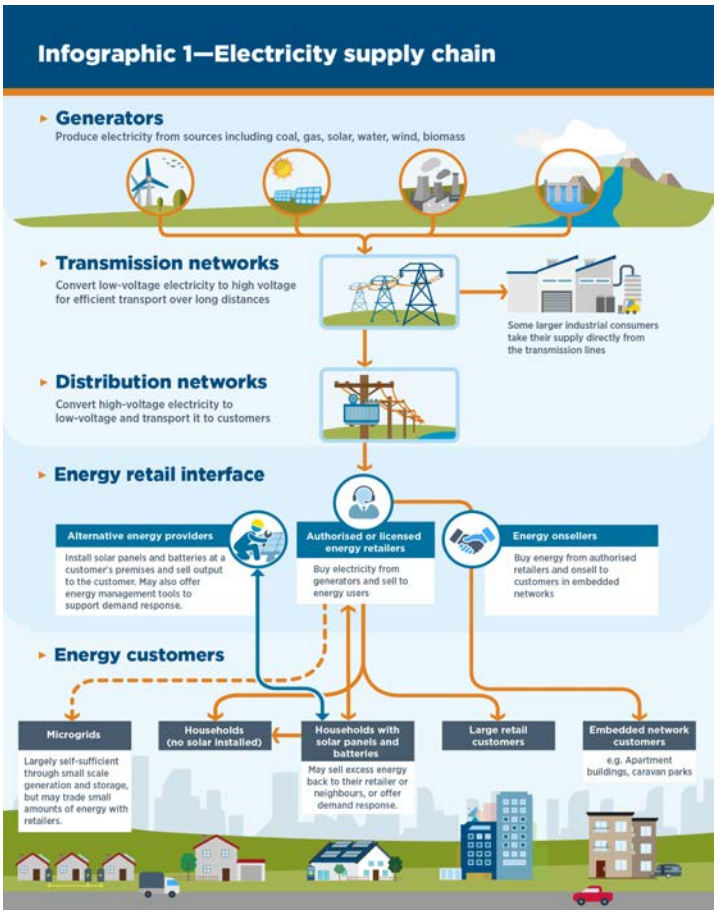
5. Electricity market in Queensland

a. Introduction

i. Power generation companies sell electricity on the National Electricity Market (NEM). The Big Four electricity retailers are "gentailers", generating and retailing electricity. To sell electricity to consumers, a retailer must be licensed by the Australian Energy Regulator (AER). Smaller licensed retailers purchase electricity from the generators and on-sell to consumers.

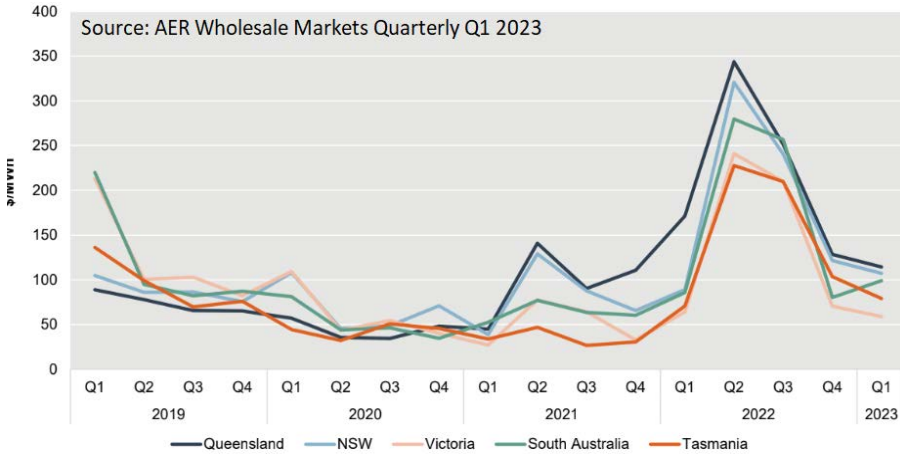
ii. A Body Corporate (BC) may, in certain conditions, *on-sell* electricity to Lot owners, if they have an AER Retail Exemption. This gives them the power to control the energy used on site, for the financial benefit of all owners.

iii. Historically, wholesale rates (the rates at which retailers purchase electricity) in Australia have been much lower than retail rates (the price small consumers pay for electricity). In 2022, the Queensland wholesale rates ***tripled***. They are the highest in Australia. Retail rates did not keep pace with wholesale rate increases, causing difficulties for electricity retailers who do not generate their own electricity.



aer.gov.au

iv. The falling reliability of coal-fired power plants and the lack of Russian supply on a global scale are cited as the main causes of these "unprecedented" price increases. Despite retail energy rates being increased (thus enabling retailers to recover more money from customers), many smaller retailers were unable to survive and ceased trading or exited the on-market retail market (e.g. LPE, ReAmped, Power Club, Enova Energy).



v. Whilst the wholesale market (and hence the retail sector) has stabilised somewhat after government intervention, it is still in a state of flux. Hardly a surprise when little has happened to affect the two main cited causes. These higher wholesale prices continue to put pressure on smaller retailers whose ability to pass on higher costs to consumers is limited by the AER. That said, in order to reflect the increased pressure on retailers, and to enable them to recover more from consumers, the government warned consumers of >50% increases in retail energy rates over 2023/2024. The AER has warned of increases from 1st July 2023 as high as 19.8% in Queensland. Consumers will be waiting for the bad news of rate rises hitting their inboxes very soon. Retailers are at least taking on new accounts again, unlike the peak of upheaval in mid-2022.

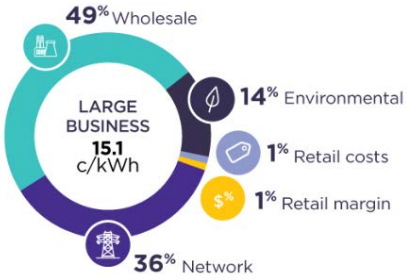
b. Consumer energy costs

Are made up of energy network and environment charges and energy rates, plus metering and billing costs included in retailers' daily supply charges.

i. Network and environment charges

Network charges - (otherwise known as poles and wires charges) are the costs of maintaining and expanding the energy distribution network (run, in SE Queensland, by Energex).

Environment charges - relate to federal and state energy efficiency activities to drive investment in renewables.



These charges are not created or determined by your retailer, they are straight pass-through distributor and government costs, forming part of the energy rates and supply charges. Retailers' running costs: metering, billing (including reading meters, calculating, creating, sending and chasing bills), and profit margins comprise the remainder of the rates and charges.

accc.gov.au

ii. Energy rates

These are the rates retailers quote you for energy use. They may vary depending on the time of use, for example "Controlled Load" at nighttime, or peak and off-peak rates (more common with larger customers). Energy rates are what most customers compare, but lower energy rates often come with higher daily supply rates. Consider both, as some retailer's daily supply rates are 50% higher than others, effectively increasing the true cost of energy by as much as 3c/kWh. Do the maths.

iii. AER Default Market Offer

1. Also known as the DMO, this is the 'price cap' (effective 1 July each year), set by the AER to protect customers from "unjustifiably high prices". It is also intended to allow retailers sufficient a profit margin to enable them to recover their costs, offer new products and customer innovations to the market - oh, and stay in business. It is the second leg of this intention that is leading the AER to permit substantial retail rate increases, to reflect the wholesale market. The DMO is, necessarily, reactive. Time-lag has seen a fair few retailers cease trading or remove themselves from the market in the last 12 months.

However, do not feel too sorry for retailers. As the AER recognises, retailers can lock in the cost of their wholesale electricity contracts years in advance. It was those retailers paying "spot" market prices, or had not sufficiently 'hedged' that really struggled.

2. The DMO acts as a reference price on bills so all customers can easily compare plans between retailers (on sites such as the government's energy made easy.gov.au).

   Australian Government | ENERGY MADE easy The power to compare

   Do note that retailers are reluctant to update their prices on this site in July each year. They avoid being the first to increase their rates, risking looking more expensive than their competitors, and putting customers off. Accordingly, many rates still advertised after 1 July are old rates, no longer available (as you will find when contacting the retailer seeking the best deal). You cannot rely on them.

3. The DMO is designed to protect those "small customers" (residential and small business) who have not negotiated a better deal, from "unjustifiably high" prices. It is the maximum price that a retailer can impose for its default plan. It is ***not*** the maximum rate a retailer can offer. Retails can offer plans that are more or less than the reference price. It is estimated that only 10% of households and 18% of small businesses, nationwide, are on the DMO, but that still leaves over half a million households and 90,000 businesses on these high rate, default plans. SE Queensland has the highest percentage of consumers on the DMO. Maybe it is their laid-back nature?

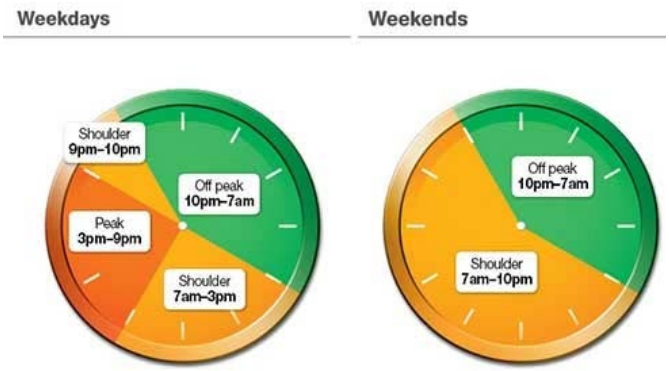
4. You do not want your BC to be one of those consumers. If your current retailer sends you a New Plan, ensure you do your research before deciding whether to accept it - and make sure you do not automatically fall onto the default (DMO) plan by not accepting the new offer in time.

c. Contract options

i. Types of tariffs

There are four different types of electricity tariffs: single rate, time of use, controlled load and demand. As the name suggests, there are no peak or off-peak periods with a single rate. You pay the same rate whatever time of the day you use energy. Also called flat, standard, anytime or (confusingly) peak rate, this rate is good if you use most of your electricity in peak times.

Time-of-use tariffs - (TOU) vary energy rates at different times of the day: peak (when, due to demand, electricity is dearest - usually evenings Mon-Fri); off-peak (when electricity is cheapest - usually overnight and weekends); and sometimes "shoulder" applied between peak and off-peak periods. Retailers must inform you of the times of the different periods.



TOU is beneficial if mainly using power during the day or at weekends, however TOU tariffs are being offered ("forced") more frequently. It is natural for energy costs

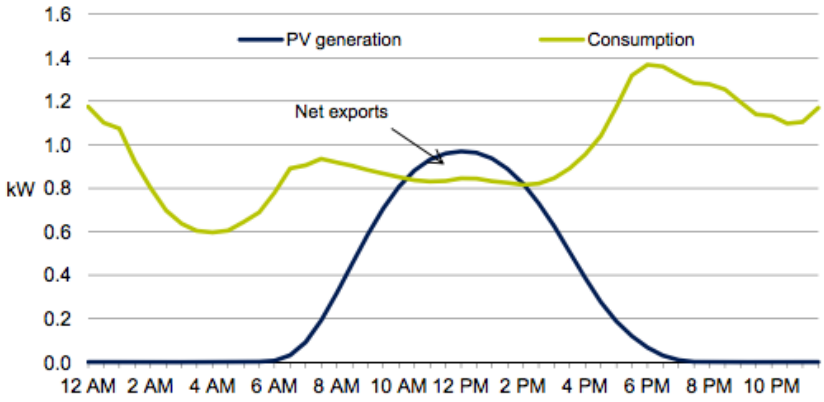
to fluctuate with demand at a wholesale level, so retailers are looking to reflect that at retail level. It is feared TOU rates may eventually fluctuate hourly or even more frequently, and that Feed In Tariffs (FITs) may follow suit. Obviously, a smart meter or time-of-use meter is required for retailers to bill on TOU.

Controlled load tariffs - (Tariff 31 or Tariff 33) often the cheapest rates, are intended for appliances like electric hot water systems that can run overnight or in off-peak times - usually, though not necessarily, 10pm - 7am. There is usually an additional controlled load meter and an additional supply rate. This may not be as useful after solar is installed and timers used to maximise daytime generation.

Demand tariffs - have plans with demand charges added on top of the usual energy rates. Demand is a measure of how intensely you use electricity at a point in time. It may be charged for highest or average demand in a period of time. Previously mainly seen in commercial contracts, retailers are increasingly "offering" these to small customers who have smart meters. Demand charges increase the actual cost of energy per kWh, increasing the apparent rate by 10% or more. To calculate their effect, total all energy charges and demand charges then divide by the total usage. Then compare with, and transfer to, other plans or retailers if cheaper.

Feed in tariffs - (FIT) are the price the retailer pays for excess generated solar energy exported to the Grid. It is important, *where possible* (as you will need historical smart meter data), to determine the impact of lower energy rates versus higher FITs, and vice versa, and to change plans if necessary.

getecologic.com



You may be attracted to a high FIT once you have solar, but if you are not exporting much, a lower energy rate may be better. If you are only just installing solar, the difficulty is obtaining your daily load profile data to be able to determine the time of day you use electricity to calculate the likely self-consumption versus import versus export ratios. Ensure you use your new solar data to review whether you have chosen the best plan at the beginning. It is likely (certainly in residential cases - check the T&Cs for BC contracts), that you will be able to change plans - or retailers, should you find, with hindsight, that you did not choose the best plan.

ii. Commercial vs residential

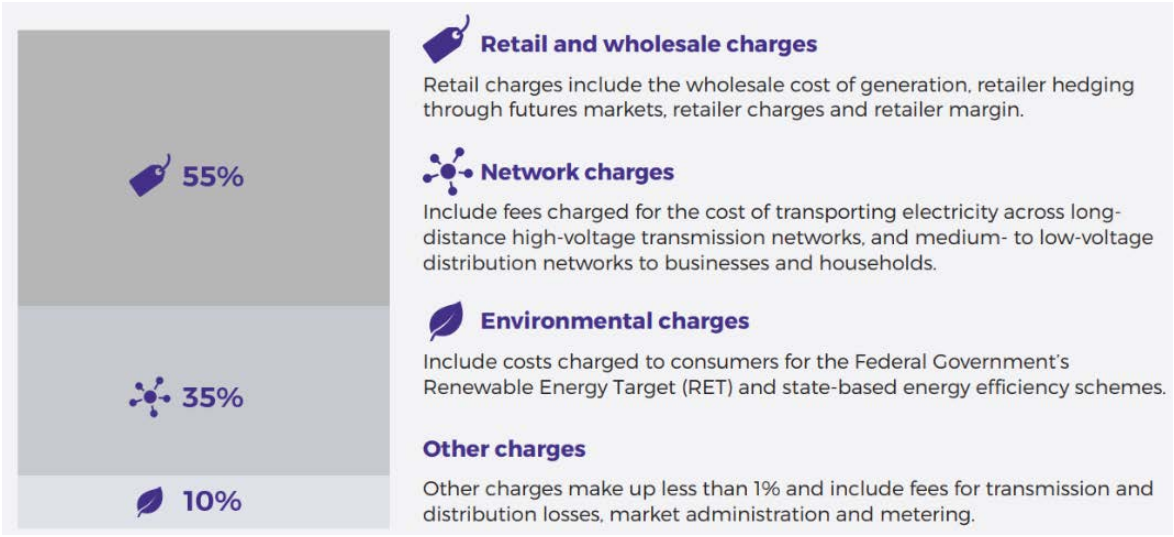
1. **Flexibility -** be aware that a commercial electricity contract may not be as flexible as residential contracts. If the BC has a commercial Electricity Supply Agreement (ESA), make sure you read the T&Cs. You may find there are financial penalties if changing plans or retailers - or even for just ***reducing Grid usage due to installing a renewables project*** - particularly for larger customers, who are not covered by the DMO.

2. BC volunteer committee members should not be expected to have in-depth knowledge of this area, but nor have your BCMs. You just need to know from whom to seek advice. Your BCM may be able to refer you to

brokers or advisers. Be warned, “independent” agents may receive different deals or commission from different providers, and therefore may not be impartial.

3. Please read the T&Cs on any Letter of Authority (LOA) you are asked to sign on behalf of the BC. They may grant an exclusivity to a broker, limiting even the BC’s freedom to negotiate an agreement directly itself, even with its incumbent retailer. They may include a commission or fee even if you do not place a contract through the broker. ***BCMs themselves have been known to sign these LOAs without express authority from the BC committee and have got themselves in difficulties. Please bear this in mind.***

4. **Larger commercial -** if the BC has an Embedded Network (EN) or is considering converting to one, it may become no longer be a small customer, and may become a “large market” customer. Due to the fact that ESAs for large usage customers separate the individual elements comprising the network and environmental, supply, demand, and energy charges. It is often difficult to be able to compare one offer against another, particularly if you cannot access historical time of use and demand data. Without having such historical data, it is very hard to project the true cost of energy per kWh, to set owner energy rates and cover the gate meter bills, when comparing EN supply offers for example. See the following section on off-market power supply options.



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6. Strata power supply options

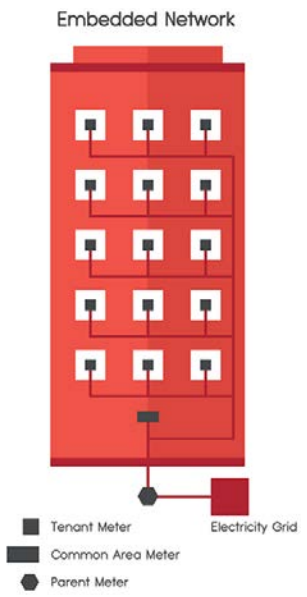
Most residential electricity meters are “on market”, i.e. connected to the Grid. Owners have the power to choose from numerous retailers. Many communities (including Bodies Corporate) have private networks or Embedded Networks.

a. On market

Each owner is responsible for its own electricity supply and could benefit individually by installing solar directly to their own meter (if permitted). Just so for the BC which can install solar to the Common Power (CP) meter, reducing common power overheads.

A more financially rewarding and equitable solution could be the BC installing solar connected to (some or) all owners’ meters, as part of a community-wide project. This has the potential of reducing owners’ electricity costs or creating a revenue stream to benefit all owners.

A BC can on-sell solar power to occupiers thus diverting revenue away from electricity retailers and into the BC’s funds, to reduce pressure on levies, or finance future building renovations, for example.



b. Off market (Embedded Networks)

In some sites (typically apartment blocks, retirement villages, caravan parks, resorts and shopping centres) the electrical wiring is configured in such a way as to enable the owner of the site to sell energy to all the occupiers based there. This is called a private, or embedded network (EN). The site owner outsources the responsibility to manage the network to a commercial operator (ENO). In most cases, the ENO is also an electricity retailer, or alternatively buys energy from a retailer, to on-sell to the occupiers.

i. <u>Structure</u>

1. An EN serves multiple premises or connections. The ENO manages the network infrastructure, ensuring supply, and sets the rates charged for those in the EN.
2. A site usually has one “gate meter” and each occupier (or owner in a BC environment) has a “tenant meter”. Only the gate meter is “on market”. The tenant meters sit behind the gate meter, effectively not connected to the Grid (i.e. they are “off-market”). The tenant meters all receive electricity from the same electricity retailer.
3. Historically, wholesale prices have been much cheaper than retail prices - one of the main advantages of an EN. Another advantage is that with only one (gate) meter connection to the Grid, the Grid retailer only charges one daily supply charge.
4. The ENO does the work of maintaining the network, metering and billing (including reading meters, calculating, creating, sending and chasing bills, and managing owners joining or exiting the EN (due to sale of a Lot or otherwise), disconnections, reconnections, etc). That is its business. It recovers its costs through daily supply charges, and also makes a profit by the mark-up they charge on imported electricity on-sold to occupiers at higher energy rates.

If the BC is the ENO, or controls the ENO, then it makes or at least shares that profit or saving.

ii. Agreements

1. The Installation of Works Agreement (IWA) provides for the ENO (who usually sets up the network, meters, etc) to recover its initial set-up costs (the "Works Fee"), via daily "metering" or capital repayment charges. The ENO essentially divides the cost of the installation by the number of connections and the number of days in the agreement (often 10yrs). Alternatively, the BC can pay the Works Fee at the outset and avoid the finance charges included.

2. The ENO charges for the provision and maintenance of the EN infrastructure, plus the billing of occupiers, through daily supply charges. Often the ENO is also an Electricity Retailer, registered to sell electricity from the Grid. At the time of the set up of the EN, the ENO will provide an Electricity Supply Agreement (ESA) either from themselves if they are a Retailer, or from another Retailer. These two agreements (IWA and ESA) are usually separate and often valid for a different number of years.

3. At the expiry of an IWA, the site owner (the BC) has paid off the ENO's installation charges over the IWA period, usually between 5 and 12 years. They can also pay the Works Fee off early via a lump sum. These early payback figures were usually calculated by simply dividing the set-up costs by the years remaining in the IWA agreement.

TIME OF PAYMENT OF WORKS FEE	DISCOUNT AMOUNT
From the Completion Date to that date which is 13 months later (Discount Period 1)	**100%** of the works fee
From the day after Discount Period 1 until that date which is 12 months later (Discount Period 2)	**88%** of the works fee
From the day after Discount Period 2 until that date which is 12 months later (Discount Period 3)	**74%** of the works fee
From the day after Discount Period 3 until that date which is 12 months later (Discount Period 4)	**58%** of the works fee
From the day after Discount Period 4 until that date which is 12 months later (Discount Period 5)	**22%** of the works fee
At any time after the end of Discount Period 5	**0%** of the works plus $1

4. However, some payback figures set in an IWA are unrepresentative, unreasonable and, arguably, "unconscionable" contract clauses. They attempt to tie the site owner into an unreasonably long agreement (e.g 50% repayment remaining after 15yrs, plus automatic renewal clauses). In many cases with BCs, the property developer has agreed the deal with the ENO (with whom they have a relationship) and often the BCM, before there are any owners in the BC. The IWA is often simply novated (replaced with a new contract) between the ENO and the BC. The Lot owners "inherit" it without a choice.

Number of years after the commencement of this Deed that the Body Corporate terminates this Deed	**Reduced Value**
Up to 10	Installation Value
Between 11 and 12	90% of Installation Value
Between 12 and 13	80% of Installation Value
Between 13 and 14	70% of Installation Value
Between 14 and 15	60% of Installation Value
Between 15 and 16	50% of Installation Value
Year 16 to termination	Subject to valuation by independent accredited valuer.

5. Having paid off the IWA (on term expiry, or early), the BC can then own the network, can choose another ENO or become the ENO, and outsource management of the EN to an EN Manager (ENM). If the ESA has also expired, it can agree a new ESA with a Retailer, whether the incumbent Retailer or otherwise.

6. The Retailer provides the electricity to the (on market) gate meter. The ENO runs the network infrastructure, ensuring electricity supply to each tenant meter (either themselves or via a Retailer) and billing the occupiers for the electricity they consume, as well as the daily supply charges.

iii. Regulations

1. Owners of Lots within an EN must be given the opportunity to 'opt out' of the EN. In reality, there is no physical movement of meters; the ENO simply puts that Lot's meter "on the market". That owner can then purchase electricity from any Retailer, rather than the EN Retailer. It is rarely advantageous to an owner to do so, but provision for this opt out is required by law, to protect freedom of choice.

2. An ENO needs to Register the network and its Retail licence or Exemption with the Australian Energy Regulator. There is no charge to do so, though there is work involved in registering both as a retailer and either setting up or transferring an existing EN.

3. A BC can register a Retail Exemption and act as an onseller (limited to onselling electricity to Lot owners within the scheme), should it wish to act as the ENO. It has to comply with obligations under the Regulations and outsources the management and compliance role to a third party supplier - an EN Manager (ENM). There are risks involved, as well as rewards. See more details under Section 13 - Legal compliance, below.

iv. Advantages

1. The main two benefits of an EN are that the ENO can charge:
    a. less supply and metering charges as there are less connections to the Grid (i.e. just the gate meter).
    b. historically lower rates per kWh than an owner attached to the Grid (i.e. on market) pays individually, due to economies of scale. The ENO either sells, or buys and on-sells electricity at wholesale rates from another Retailer, after adding a margin between wholesale rates and the rates charged to occupiers (and the BC for the CP).
2. The ENO does the work of maintaining the network and billing (including reading meters, calculating, creating, sending and chasing bills, as well as managing owners joining or exiting the EN (due to sale of Lot or otherwise), disconnections, reconnections, etc). That is their business. They cover their costs and make their profit by the mark-up they charge on what they buy electricity for, versus what they on-sell it for, as well as in their supply rates.

    If the BC is the ENO, or controls the ENO, then it makes or at least shares that profit or saving.

v. Disadvantages

It is all about control, flexibility and freedom.

1. There is much less financial benefit to a BC to install solar when it is not the ENO, or working with the ENO. ENOs generally bill owners for their electricity consumption regardless of whether that power comes from solar or the Grid. The ENO may blend and reduce its energy charges slightly (but still has to make a profit). Installing solar is another opportunity for an ENO to make a profit and, as well as tying the BC into another 10+ year agreement. That is perfectly reasonable: commercial ENOs are in business to make money, but *if the BC is paying for the installation of solar* (as opposed to the ENO), it should benefit from the savings or revenue. Some ENOs will share control, work with the BC and achieve a positive result for both. Others, not so much.

2. The ENO puts a margin on the wholesale rates. When the BC is the ENO, it can go out to tender for rates from multiple Retailers and it saves the margin added by the ENO.

3. If the ENO is also the Retailer, how likely is it that they will be able to pass on the best energy rates to the BC? The ENO Retailer is playing both sides of the fence - the Retail arm trying to make money setting its energy rates, and the ENO arm trying to make a profit from its margin on those energy rates. It is crucial for BCs to obtain multiple quotes from Retailers, to ensure they are getting the best rates for owners. They can get the best rates from the best quotes if they have the freedom of choice at the Gate meter.

4. The ENO decides the cost of electricity to the owners/occupiers. The BC as ENO could buy electricity cheaper, then on-sell it for more (as ENOs do). The savings made can offset the Common Power bills, reducing overheads and hence pressure on levies, for all owners. Once the solar installation has been paid off, savings or revenue can then be applied, either to reduce occupiers' electricity costs, or reduce owners' levies, or 'bank' the money to pay for future renovations. Solar installation is one of the only building renovations that *earns* money, rather than just *costing* money.

7. How to choose which solar for strata model

a. Usage

It is worth stating the obvious that the first consideration is the amount of electricity your scheme uses, either solely in the common areas (common power "CP") as an overhead of the BC, or over the whole site including each owner. A solar installation should be based on the known (historical) or reasonably anticipated (future) usage needs. Such future needs may be wanting to heat a swimming pool, or to charge electric vehicles, for example.

The most common solar for strata model is the most simple: one connected to the CP meter (Model 1, below). Solar electricity reduces the amount of electricity having to be imported from the Grid. Any excess solar generated, but not consumed, is exported to the Grid, attracting a (usually modest) Feed in Tariff (FIT) for each kilowatt hour exported. The solar energy reduces the electricity costs/overheads in the BC Administrative Fund (AF). Solar energy is not "free", certainly not initially. The BC must consider the initial capital expenditure (from the Sinking Fund "SF") and the operational expenditure of maintenance, monitoring and metering costs (from the AF). Over the years solar energy will cost you nothing and can actually raise revenue.

Many people consider solely the payback in years (and calculate a Return on Investment (ROI) from that), but it must be remembered that solar is likely to continue to generate energy (and savings or revenue) for 20+ years. It is short sighted to look *solely* at the initial payback. Remember too that the cost of Grid electricity continues to rise, and is likely to do so for the foreseeable future, effectively increasing your solar savings/returns.

b. Generation

The most common residential solar installation is 6.66kW of panels on a 5kW inverter. In Queensland, Energex automatically approves installations limited to 5kW. Such installations usually come with a 5kW export limit, though that is not automatic: Energex can refuse to allow any export at all, though this is unusual. The STC (Small scale Technology Certificates), otherwise known as government, or solar "rebates", are only available where the total panel generation is less than 133% more than the inverter size (actually phrased as the inverter must be no less than 75% of the panel generation).

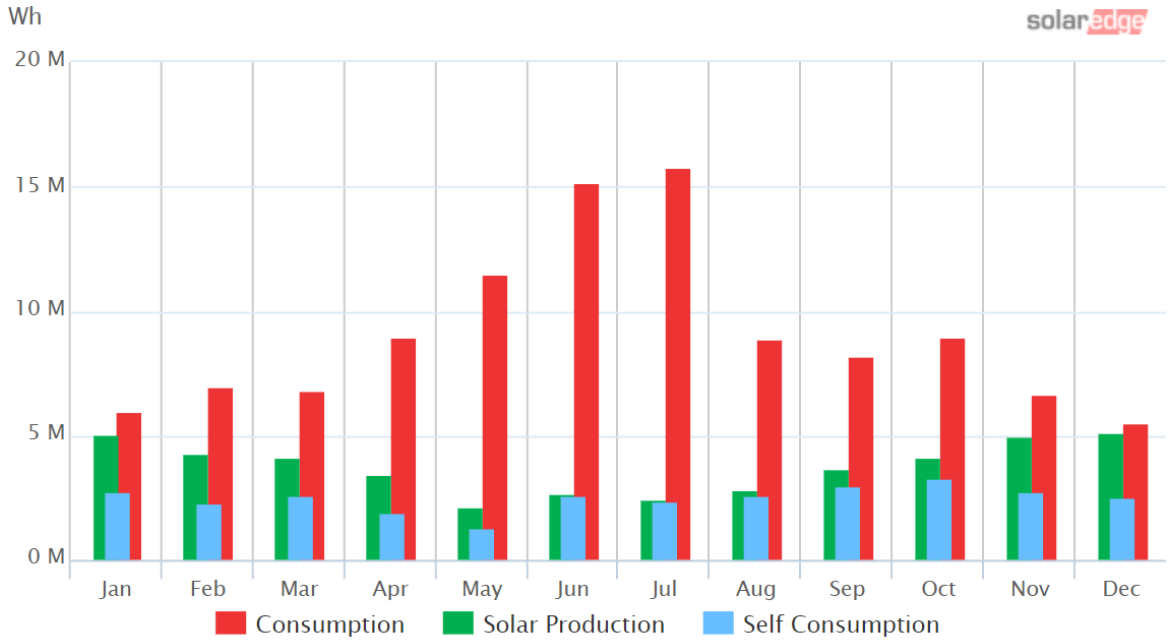
Using the (fairly conservative) thumb rule of 1,400 solar production hours a year for the Sunshine Coast, a 6.6kW system would be expected to produce c9,300kWh per year. 10kW inverters (with the maximum (STC) permitted 13.33kW of panels) generate c18,600kWh/pa and there are inverters at varying incremental sizes from 10kW to 30kW (with maximum 40kWp) generating around 56,000kWh/pa.

Installations above 40kWp require specific consideration due to the additional costs of (Energex-mandated) electrical engineering and grid protection equipment, which add a further c$18,000+ to the installation costs. This is why many 30kW installations are chosen, even if slightly too small, due to the considerable jump to say 50kW inverters, before the additional grid protection costs over 30kW are worthwhile.

It is not necessarily financially sensible to install a lot more solar than you will consume (though see later discussions on "wasting" solar). Without battery storage, it is unlikely that 100% of solar generated from one system will be consumed by one end user. This is due to the varying number of average solar hours a day throughout the seasons.

c. Variability

Usage and generation vary throughout the seasons. The chart below compares usage against solar generation of a 30kW CP system.

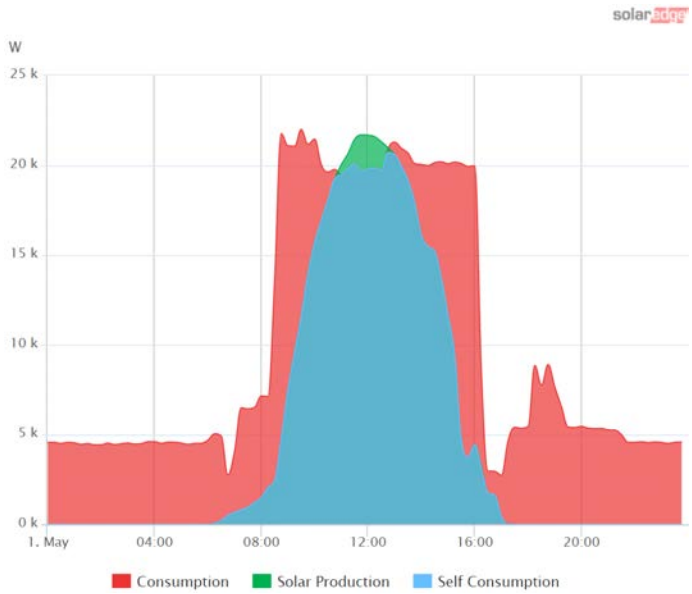


It is clear that the solar system is far too small to cover winter usage, but almost covers the summer usage needs. This system is undersized (due to a shortage of roof space). Imagine how much excess solar would be generated if the system was big enough to cover the (heated pools) winter usage. See how the summer usage halves when pool heating is not needed.

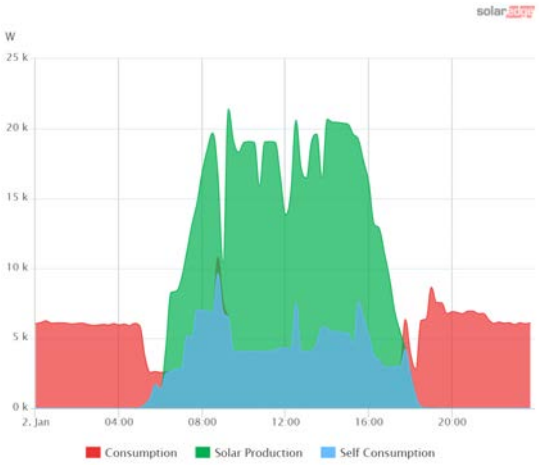
The chart above looks at monthly usage, whereas this chart looks at the daily load profile versus the daily solar generated. The timing of the pool heaters is almost perfect. Despite there not being sufficient solar to cover the usage needs, there is still a small amount of solar being generated at times where there is insufficient usage, leading to export.

As solar generation and usage change throughout the year, so too the daily profile changes according to the seasons. This chart shows a day in May.

Compare this to the chart overleaf showing a day in January. Huge generation with low usage leading to large amounts of “wasted” solar.



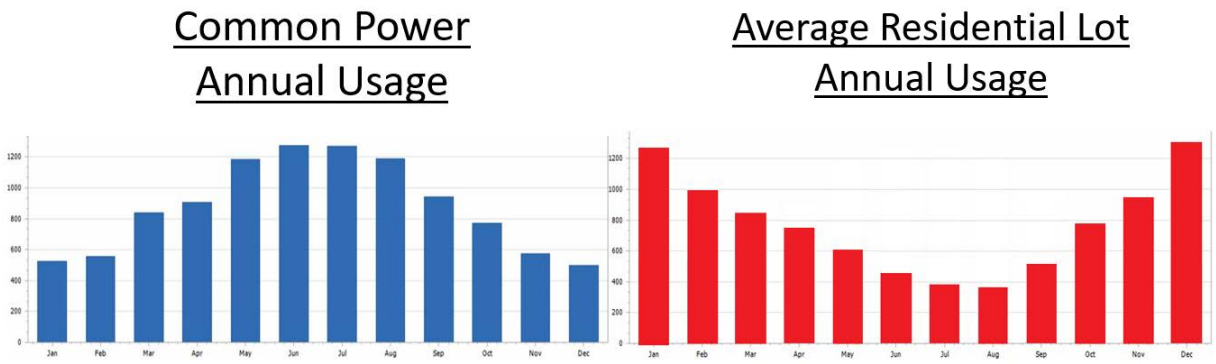
Whilst the filters, chlorinators and pumps will draw the same load through the year, factoring in heating shows how much more power is required to keep the pool warm in winter, to the same temperature as it is in summer with little to no heating.



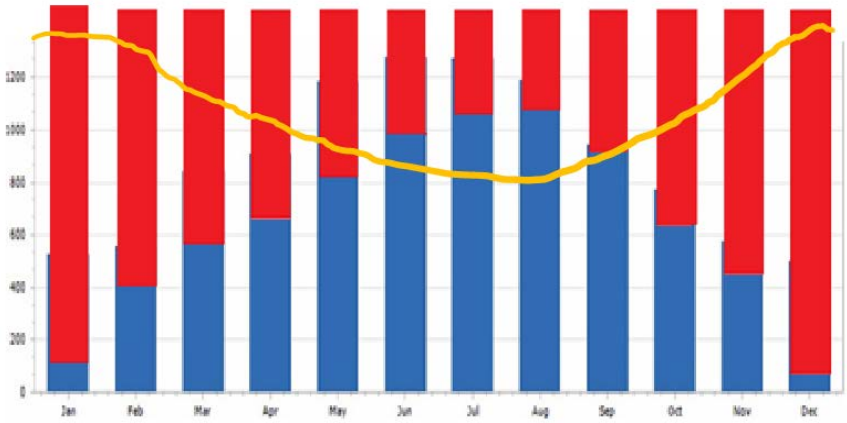
d. Maximising solar self-consumption

Whilst a CP only system (Model 1, below) is the simplest solar for strata model - and I would encourage BCs to install such systems *as a minimum* - it does not maximise the solar self-consumption. With enough roof space and a system sized to cover winter usage, there will be higher generation and insufficient usage in summer, leading to excess solar production (similar to the chart to the right). With Grid electricity costing c25c/kWh and FITs around c5c/kWh, each kWh exported rather than used instead of Grid electricity loses the potential to save (or make) 20c/kWh.

CP usage is usually *higher in winter*,but residential usage is usually *higher in summer,* as the air-conditioners are cranked up (particularly by those not paying the electricity bills - e.g. holiday guests).



A system that feeds both the CP and owners' power maximises self-consumption of the solar generated throughout the year. See chart below, *created for illustrative purposes*. Combining CP and owners' usage means that all the summer solar generation that was previously exported through the CP meter is now consumed by the (red) residential Lot usage. 100% of solar is being self-consumed (by multiple end-users). Much more efficient.



Unfortunately, there are currently limited ways to physically share solar power between meters, whether CP meters or owners or both. Allume Energy, a Victorian company, produces a relatively new proprietorial device called a SolShare 'box', that enables multiple end users, or peers, to share the total solar generated by a single solar system. It is debatable whether it is more cost effective than an Embedded Network (by far the most common way to share solar to date), due to the cost of the box, the limited number of connections possible (15) and the limited amount of solar power that can be connected to the box. However, it is a welcome technical advancement being used in smaller, higher density buildings in Australia and overseas.

allumeenergy.com

With an EN, the solar is connected "behind the meter", meaning the electricity retailer supplying power to the gate meter from the Grid does not know how much more solar electricity is being used and therefore cannot charge you for it (unless the retailer is also the Embedded Network Operator (ENO)).

If you missed it, or for more detail regarding ENs, click here to go back to the section on Embedded Networks.

e. Choosing which solar for strata model for your BC site

If your property has an existing EN, you would be looking at Model 3.

If your scheme does not have an existing EN, creating a new one is a possibility (see Model 4), depending on the physical cabling at the property. Relevant factors include space for a gate meter, cable thicknesses/capacity, location and dispersion of meters and distribution boards, as well as regulatory hurdles.

Where each owner has a meter located at their Lot, rather than them all being centrally located, it is unlikely that an EN would be feasible. In this case, like the example of the townhouse solar project at Noosa Lakes Resort (click for video), individual, on-market solar systems can be installed connected to each owners' on-market meter. The BC installs the solar and becomes the on-seller of solar power to the owners; the expenditure and solar income being shared between all members of the community scheme. That is an example of Model 2, below. Noosa Lakes also installed a Model 1.

It is not advisable to create an EN (see Model 4, below, for more detail) unless the BC will have control over installing solar onto the network and over the energy rates set. Likewise, it is not advisable to install solar on an existing EN without the BC having the same control over solar installation and the energy rates set (as described in Model 3).

Solar for strata solutions available

You are now hopefully in a better position to choose which of the models for solar for strata best fits your scheme, remembering there may be more than one. Click below for more detail of each model.

1
Common Area Power Only

2
Solar for Individual Lots

3
Existing Embedded Network

4
New Embedded Network

Solar for strata solutions available

1 Common Area Power Only

1. ‘Simple’ solar for Common Area Power only

a. Description

i. As the name suggests, this model targets the common area power (or “CP” for Common Power) only. It is not a solar *revenue* model, per se, as the impact of solar is to reduce the CP electricity bill. The solar generated on site replaces the need for as much Grid-imported electricity.

Any excess solar generated but not consumed, may be exported to the Grid. Any export credits paid by the electricity retailer (at the FIT) will be off-set against the bill. It is very unlikely that solar credits will eliminate a bill due to the disparity between energy rates charged for Grid electricity and lower FIT paid by retailers. Remember, without storage, solar can only replace the energy used during solar (daylight) hours.

ii. Of the relatively low percentage of existing solar for strata installations across the country, the vast majority are restricted to CP systems only. The solar system is connected to the CP meter and the solar benefits are solely for the CP. Even where solar is installed on an Embedded Network (EN), it is usually connected to the CP meter, reducing the need to purchase Grid electricity first. Then any additional solar generation not consumed by CP is off-set across the rest of the Lots by the ENO (usually credited at a rate 10c or so lower than the retail energy rate). See more below in Model 3 and Model 4.

iii. The reasons for the popularity of this type of installation include:

1. **simplicity -** one system attached to one meter;
2. **direct savings -** to the CP bill i.e. reduction of Administrative Fund expenses (overheads); and
3. **relatively low cost -** and short payback period (capital outlay is often recovered in 3 - 4 years).

iv. Due to the relative simplicity of this model - it not being a solar *revenue* model - most local solar installers with commercial installation experience *should* be suitable to install on BC properties. However, it may be useful to communicate to any potential installers the basic structure of a BC, and the resultant length of time usually taken to make decisions (after BC committee (BCC) meetings and, often, subsequent General Meetings). This is relevant due to the usual length of validity of a quote. BCs are notoriously slow at paying invoices too, due to the standard procedure: receipt by the BCM; onward transfer to the Treasurer for monthly sign-off (often with many

other invoices to approve); then back to the BCM for payment (often at a particular time of month, along with many other invoices). For these reasons, installers may be reluctant to work for BCs, preferring to work for residential or business owners where quicker decisions and payments of invoices may be expected.

b. Site suitability

As per Section 2 - Introduction to solar, it is important to consider where a CP solar installation may be placed. Consideration must be taken regarding:

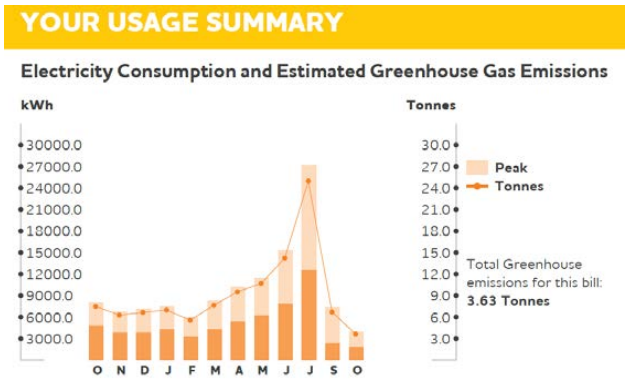
i. Location - panel orientation, gradient, shading and potential tilt racking, plus proximity of the inverter to the CP meter or CP distribution board (DB) for conduit runs and voltage losses.

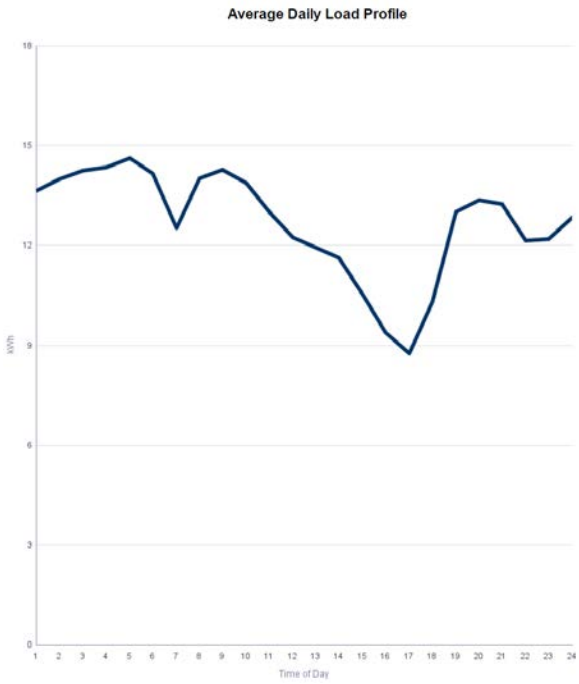
ii. Roof ownership - where Lot owners own their individual roofs, the BC may first look to install on a common area roof, e.g. a reception building, carport, pool hut, toilet or changing room. There may not be a lot of BC-owned roof space. A licence agreement could be entered into permitting the CP to utilise owners' roofs located near the CP meter or DB. To bind *future* owners, such permission would have to have to be recorded in the by-laws.

c. Sizing a system

As per Section 2 - Introduction to solar, it is important to get the balance between usage and generation. Not enough solar means more reliance on imported Grid electricity. Too much solar means exporting the excess solar electricity to the Grid, receiving less per kWh in FIT than would have been saved had the solar been used on site.

i. Historical and future usage - Access to the CP bills and usage graphs make determining historical usage fairly easy. However this does not provide the daily load profile.

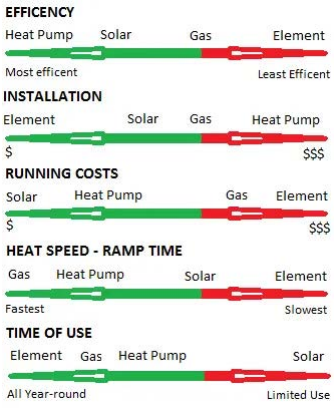




1. If the CP meter is 'smart', you can apply to Energex for detailed interval data which shows time of day usage for the common areas (usually pool and spa filters and heaters are the biggest users).

2. Obviously, without storage, solar PV cannot cover power for lights, or lifts, pumps and eV chargers used at night.

3. The interval data enables a more accurate projection of solar self-consumption. Again, it is necessary to consider reasonably anticipated future usage and how this may affect the load profile, as well as the potential addition of battery storage now or in the future.



4. Remember, also that the best way to save money on electricity is by using less, through energy efficiencies. Using LED lights, pool covers, heat exchange pumps*, etc, will reduce your usage, as will turning off lights and appliances when not in use, as well as keeping your common area AC settings to 25°C.

   **Heat pumps are far more efficient and cheaper to run than conventional heating technologies as most of the heat is transferred from the surrounding air, rather than generated. The coefficient of performance is typically around four, i.e. the energy output is four times greater than the electrical energy used to run it, making heat pumps 3-5 times more energy efficient than gas. Powering heat pumps by solar electricity makes them still cheaper to run, quickly recovering their capital investment.*

toyesi.com.au

5. Shifting or spreading your usage throughout solar hours (e.g. setting timers to solar hours for pool pumps) will increase your solar self-consumption rate. In practice, this is more easily done after solar is installed and detailed usage data (for every 30 minutes of the day) is available through your smart meter and/or inverter.

ii. Generation - Some BC sites have no pool, no heating or AC, and only minimal lighting. After replacing that with LED globes, there may be so little usage left that electricity bills would be hardly impacted by solar.

1. Otherwise, solar will still provide a financial return over the system's expected lifetime, even if the site has limited roof space available to the BC. Assuming there is a reasonable amount of daytime electricity usage for the common areas, solar for Common Power really is a "no brainer". It would be worth approaching a local installer, preferably with BC, or at least commercial installation experience (depending on the potential usage and, hence, size of the system). It is probably unnecessary to employ a renewable energy consultant to help you on this first stage. Perhaps if the BCC has obtained quotes (BC regulations require "more than one" quote, assuming a material project cost), that would be the time to have an independent expert provide advice - before putting the project to owners to vote on.

2. Unless your site has very high CP usage (and sufficient roof space), it is likely that a 30kW inverter would be appropriate, *per CP NMI connection* (National Meter Identifier, i.e. a meter). If the CP loads/circuits are naturally split (e.g. you have two pools), it may be appropriate, and financially preferable, to apply to Energex to create a second NMI, if generation of >40kWp is required. See Section 7 for more details on sizing a system to cover your anticipated solar energy needs, and the Energex requirements (and resultant costs) for systems >30kW.

3. See Section 9 below regarding government incentives - small-scale technology certificates (STCs) for solar systems smaller than 100kW, and large-scale generation certificates (LGCs) for larger systems. Assuming you approach an experienced commercial solar installer, they should be able to sufficiently advise you on these factors at this initial stage.

4. Excess solar is not ‘wasted’ energy - it will be used by someone. If all solar generated is not consumed then it will be exported to the Grid. That clean energy replaces the need for the electricity generators to generate more fossil fuel-based electricity. Your neighbours will use the exported green energy, rather than ‘dirty’ Grid energy. Certainly not a waste - a definite win for the environment.

5. In the near future, there is likely to be even more economic wins - certainly in the lifetime of your solar system - as energy use increases in the future (through eVs if nothing else). Batteries can store unused solar, to ‘extend’ solar hours into the evening peak period, and battery prices are likely to reduce over the next few years...not to mention the potential of the numerous innovations increasingly being adopted globally - see Section 10 - The near future. It is better to oversize than undersize a solar system.

Continue on to read about the other solar for strata models available, or

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Solar for strata solutions available

2 Solar for Individual Lots

2. Solar installations for individual Lots

a. Description

i. As the name suggests, this model seeks to maximise the roof space on site by installing on individual Lots, rather than just the common area roofs (such as reception and pool equipment buildings, carports, etc). In many cases, the roofs on each individual lot are common property, owned by the BC. Why not utilise the BC assets for the financial benefit of all owners, by having the BC install a community-wide solar project, using all viable roof spaces, and providing clean energy for owners?

ii. This is a solar *revenue* model. Instead of owners solely buying electricity imported from the Grid, they use solar electricity to minimise imports through the daytime, then rely on Grid electricity outside solar hours. Any excess solar may be exported to the Grid. Any export credits paid by the electricity retailer, plus the money spent on solar energy used is paid into the BC funds, as opposed to nationally- or internationally- owned retailers, thus keeping money in the local economy. It also provides a revenue stream additional to BC levies, thus reducing pressure on those levies.

iii. Whilst s96 of the BCCMA 1997 states that a BC "Body corporate must not carry on business", s200(1) of the BCCMA Regulations 2020 states that a BC "may supply, or engage another person to supply, utility services and other services for the benefit of owners and occupiers of lots if the services consist of…(c) domestic services including, for example, electricity". S200(2) also states that the BC "may, by agreement with a person for whom services are supplied, charge for the services".

iv. Accordingly, the owner must agree to pay for the solar electricity generated, by signing a Power Purchase Agreement, or other solar access licence agreement. The BC then charges the owner for solar electricity (though the owner remains connected to the Grid (with their current, or choice of retailer) to enable them to import electricity outside of solar hours). This solar revenue can, once the solar installation has been paid off, offset the Common Power bills (perhaps completely) thus reducing BC overheads, and can then be applied to reduce pressure on owners' levies. Or the BC can 'bank' the money, to pay for future building renovations, etc. Solar installations are one of the only building renovations that *earn* money, rather than just *costing* money. Alternatively, the BC could reduce occupiers' electricity costs. Communicate, collaborate and

consult with owners to ensure that the solar revenue is applied in the manner preferred by the majority of owners.

v. This solar revenue Model 2 can be installed in addition to Model 1 - a Community Area Power Only, providing sufficient roof space exists. Whilst it is better to combine the CP usage with owners usage to maximise self-consumption of a larger solar installation, under current regulations this can only be done via an Embedded Network (EN), or, with an Allume Solshare 'box' mentioned above (Section 7d), up to around 22kWp. This Model 2 - Solar for Individual Lots, is used where an EN is not feasible, due each owners' meter being located at their Lots, rather than them all being centrally located (where Model 3 or Model 4 below would be more appropriate).

b. Advantages

The reasons for the popularity of this type of installation include:

i. **revenue raising -** once the capital cost of the system is paid off, solar can generate revenue for the next 20+ years;

ii. **relatively simple installation -** one small system attached to each meter;

iii. **relatively low capital cost -** and short pay-back period (capital outlay often recovered in 4-5 years).

c. Disadvantages

The challenges with this Model include:

i. **owner sign-up -** as mentioned below in Section 14 - Communication with owners, it is important to communicate and collaborate with owners to bring them along the solar journey. That way you know the likely outcome of relevant motions at the General Meeting before the votes are in. Any contract with a solar installer regarding numbers of installations could be subject to owner sign-up.

ii. **charging owners -** if the BC is on-selling solar electricity (by the kWh), owners would receive two bills: one from the BC for the solar generated electricity, and one from their retailer for any Grid electricity used outside solar hours. The BC would also have the administrative cost of using a billing company, as well as the cost of installing solar revenue meters to provide that billing information.

The alternative would be to have owners agree to a quarterly fee for access to the BC-installed solar. The difficulty there is having owners understand and agree the value or cost of that access before they have experienced solar at their Lots to see the economic (as well as environmental) savings. Your BCM could include a solar access cost in the Levy Due Notices.

iii. **multiple systems -** with great revenue comes great responsibility. It is true that installing and managing more BC assets results in more responsibility for the BC, or the BCC (if it does not delegate that responsibility to a third party service provider). Solar is not a "free lunch", but it can be an excellent source of revenue, even after payment of (say, billing or other) service providers. Installing multiple systems involves more effort than installing just one system, but it can create more revenue.

iv. **compliance -** for the BC to on-sell solar electricity, it must comply with Energy & Water Ombudsman QLD (EWOQ) and Australian Energy Regulator (AER) registration and exemption conditions. These are not overly onerous, but any breach of an AER exemption condition is a civil penalty provision, which cannot be avoided (or

passed on to a third party contractor, although the BC may be able to recover the costs of any penalty received due to a breach, for which the contractor was responsible). See Section 13 - Legal compliance, below.

d. Site suitability

As per Section 2 - Introduction to solar, it is important to consider where a solar installation may be placed. Consideration must be taken with regards to:

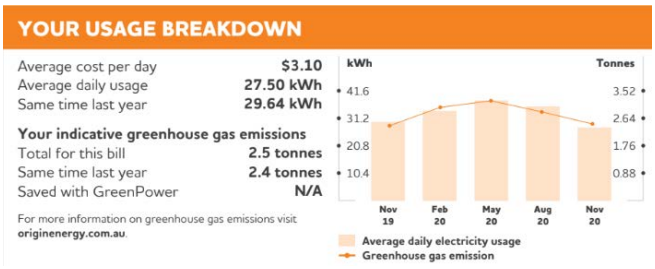
i. Location - panel orientation, gradient, shading and potential tilt racking, plus proximity of the inverter to the owners' meters or distribution boards.

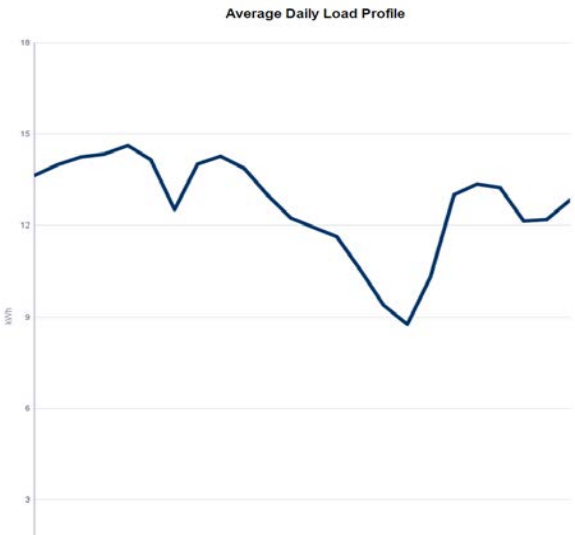
ii. Roof ownership - where the Lot owners own their individual roofs, the BC cannot install on their roofs, without permission. As the owner would have to sign a Power Purchase Agreement, or a solar access licence anyway, it is unlikely that any owner would agree to one without also agreeing to give a licence for the BC to utilise the owners' roofs for the solar installation. To bind *future* owners, any permission would have to be recorded in the by-laws.

e. Sizing a system

As per Section 2 - Introduction to solar, it is important to get the balance between usage and generation. Not enough solar means more reliance on imported Grid electricity. Too much solar means exporting the excess solar electricity to the Grid, receiving less per kWh in FIT than would have been saved had the solar been used on site.

i. Historical and future usage - Access is needed to owners bills to determine historical usage. However this will not provide the daily load profile.





1. If the owner has a 'smart' meter, you can apply to Energex for detailed interval data which shows time of day usage, which enables a more accurate projection of solar self-consumption.

2. If you cannot obtain all owners' usage data, or if you want to check your calculated average Lot usage, this data on average Australian household usage data through the seasons is often quoted.

Average Daily Consumption (kWh)

Household Size	1	2	3	4	5	6	Each Extra Person
Summer	9.9	15.3	18.0	22.7	26.6	30.5	3.9
Autumn	9.4	14.0	16.8	21.2	23.9	26.6	2.7
Winter	9.3	13.7	16.9	20.5	23.6	26.7	3.1
Spring	8.8	13.2	15.9	19.7	22.3	25.0	2.6

3. Again, it is necessary to consider reasonably anticipated future usage and how this may affect the load profile, as well as the addition of battery storage. Electricity usage is only likely to increase in the future (through eVs if nothing else), whilst battery storage prices are likely to decrease.

4. Remember, that the best way to save money on electricity is by using less, through energy efficiencies, e.g. using LED lights, and turning off lights and appliances when not in use, as well as keeping your AC settings to 25°C.

5. Shifting or spreading your usage throughout solar hours (e.g. setting timers for Hot Water Systems, etc) will increase owner solar self-consumption rates. In practice, this is more easily done after solar is installed and detailed usage data throughout the day is available through your smart meter inverter.

ii. Generation

1. Assuming owners have a reasonable amount of daytime electricity usage, solar will still provide a financial return over the system's life expectancy, even if the owner has limited roof space.

2. Unless owners have very high usage (and sufficient roof space), it is likely that 5kW - 13kW inverters would be suitable. These sized systems are the 'bread and butter' installations for residential solar installers. However, the BC is a commercial, rather than a residential, customer.

3. Solar for strata is more complex than standard residential installations and, even if the Lots are used for residential purposes, the BC would be well advised to use an installer with commercial (and preferably) BC experience. The installer would presumably be installing multiple systems (with the BC wanting a consistent "look and feel"); would need sufficient manpower; experience in installing and commissioning solar revenue meters; dealing with BC decision-making and invoice payment time frames, and would need to treat the solar project as a long-term relationship, rather than a one-off sale. It is likely the installer would be used to monitor, maintain, and clean the systems, as well as dealing with any warranty issues, future expansion for eV chargers and battery storage (remember, the solar systems' 20+ year life expectancy).

4. Remember, "excess" solar is not wasted energy - it will be used by someone. If an owner cannot initially consume all solar generated then it is exported to the Grid. That clean energy replaces the need for the electricity generators to generate more fossil fuel-based electricity. The owners' neighbours will use the exported green energy, rather than 'dirty' Grid energy. Certainly not a waste - a win for the environment across the BC property. And there will be even more economic wins in the lifetime of your solar system.

Continue on to read about the other solar for strata models available, or click to move to Choosing an Installer

Solar for strata solutions available

3 Existing Embedded Network

3. Existing Embedded Network

a. Description

Obviously, this model applies only to properties with existing Embedded Networks (EN). See Section 6 for more information on private, off-market, embedded networks.

b. Advantages of ENs

i. The main advantages of ENs, which saw a proliferation of BCs establishing them in SE Queensland 5-10 years ago, are:

1. less/lower supply and metering charges due to less connections to the Grid (i.e. just the gate meter).
2. historically lower rates per kWh than an owner attached to the Grid (i.e. on market) pays individually, due to economies of scale. The EN operator (ENO) buys electricity at wholesale rates from the retailer, then adds a margin and calculates the rates to charge the owners (and the BC for their CP).

ii. Recent huge increases in wholesale electricity prices (see Section 5) have reduced the previously huge disparity between wholesale and retail energy rates. This appears to have reduced the popularity of ENs, certainly in terms of converting established sites to ENs. It is more cost effective to install an EN at the beginning of a development of a new property destined to be a BC site, rather than to convert an existing property.

iii. Certainly nowadays a BC would not necessarily be encouraged to create an EN just to reduce the number of meters connected to the Grid, nor to capitalise on the relatively small margins between wholesale and retail energy rates. However, if the intention is to install renewables such as solar and battery storage, an EN is a very effective way of maximising solar generation by spreading the use across all end users, who may have different power requirements at different times of the day or year, as well as ***creating a solar revenue stream for the BC***. See Section 7 d. for more information on maximising solar generation across multiple end users.

iv. Chances are that if your site already has an EN, the original Installation Works Agreement (IWA) has ended and the capital cost of the installation works have been paid off. In essence, that means the BC owns the EN (perhaps subject to a notional payment of $1, per the IWA) and this should be considered.

v. It rarely is considered, as the BCC put it in the "too hard basket" and commonly remain with the status quo of the establishing ENO continuing to operate the EN. How are committee members supposed to know of the options and the ability of the BC to choose another ENO or to take over as the ENO itself? Naturally, the incumbent ENO is keen to remain in situ if making a profit and, as a result, would not advise the BC of this option. If the BC raises it, the ENO will be keen to point out the disadvantages of the BC becoming the ENO (in its stead). See below for a full discussion of the pros and cons of the BC becoming the ENO.

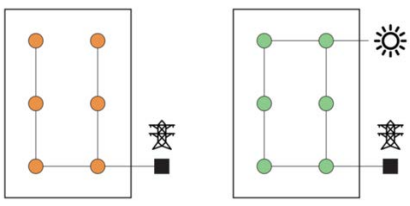
c. Disadvantages of ENs

i. It is all about control, flexibility and freedom. If the BC is the ENO or controls the ENO to ensure flexibility and a mutually-beneficial economic outcome, then the disadvantages of ENs are minimal. If not, the main disadvantage is that the BC is missing out on the opportunity to control the EN for the potential financial benefit of all owners.

ii. As discussed in Section 6, commercial ENOs recover their capital outlay, and make their profits, by the mark-up they charge on what they buy electricity for, versus what they on-sell it for (as well as in their supply rates). When the BC is the ENO, it is crucial for the BC to obtain multiple quotes from Retailers, to ensure it is getting the best rates for owners. It can get the best rates from the best quotes if it has freedom of choice at the Gate meter, and then the BC receives the financial benefit of the margin that the commercial ENO would otherwise add.

iii. If the ENO is also the Retailer, how likely is it that they will be able to pass on the best energy rates to the BC? The ENO Retailer is playing both sides of the fence - the Retail arm trying to make money setting its energy rates and the ENO arm trying to make a profit from its margin on the energy rates. The ENO decides the cost of electricity to the owners/occupiers. The BC as ENO could buy electricity cheaper, then on-sell it for more (as ENOs do). The savings made can offset the Common Power bills, reducing overheads and hence pressure on levies, for all owners.

iv. There is much less ***economic*** benefit to a BC to install solar when it is not the ENO, or working with the ENO (though, of course, the ***environmental*** benefits are still valuable). Generally, ENOs bill the owners for their electricity consumption regardless of whether that power comes from solar or the Grid. The ENO may blend and reduce its energy charges slightly (but still has to make a profit, and installing solar is another opportunity for an ENO to make a profit and, as a natural result, tie the BC into another 10+ year agreement).



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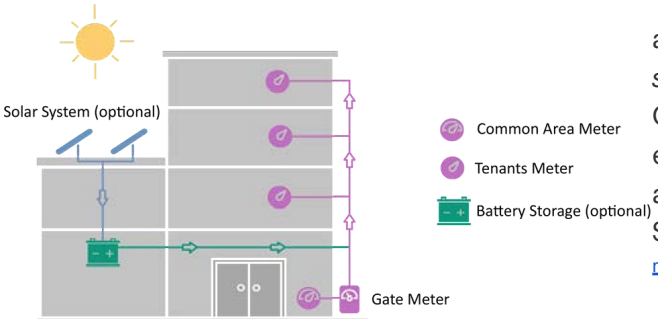
Quite rightly, ENOs are in business to make money, but *if the BC is paying for the installation of solar*, the BC should share in the savings and/or revenue. Some ENOs will share control, work with the BC and achieve a positive result for both. Others, not so much.

If the BC is the ENO, or controls the ENO, then it makes or at least shares that profit or saving.

d. Adding renewables to the EN

i. Bearing in mind the often minor differences between "bulk-purchased" wholesale rates and retail rates in the current market, you may wonder whether it is worth a BC taking over as the ENO just for the profit margin between those two rates. It may not be worth it where the BC can purchase Grid electricity at, say 22c/kWh and owners are used to paying, say 25c/kWh. The gross potential revenue is the 3c/kWh difference multiplied by the number of kWhs consumed on your site. If you have a 100 Lot resort in Queensland, your site may be consuming 800MWh/pa. Gross revenue from energy on-selling would be c$24,000/pa. Not to be sniffed at.



ii. Now consider adding renewable energy to reduce the amount of energy imported from the Grid. *Once the cost of the solar installation is paid off*, solar energy is then (almost) "free". Occupiers may still be happy to pay the same 25c/kWh for their energy. If solar replaced the need to import, say 200,000kWh across the site, gross revenue would then jump by a further $50,000/pa; owners now having to find $75,000/pa less in levies? nakedenergy.com.au

iii. These are gross revenue figures. If a commercial ENO pays for the solar and runs the EN, then naturally it will take those gross profits, less network maintenance, monitoring, metering, and billing costs (see Section 11 - Monitoring, Metering and Billing Services).

e. The BC as the ENO

i. The ENO does the work of maintaining the network and billing (including reading meters, calculating, creating, sending and chasing bills, as well as managing owners joining or exiting the EN (due to sale of Lot or otherwise), disconnections, reconnections, etc). Commercial ENOs cover their costs and make their profits by the mark-up they charge on what they buy electricity for, versus what they on-sell it for, as well as via their supply rates.

ii. The ENO decides the cost of electricity (energy rates charged) to the owners/occupiers. The BC as ENO could buy electricity cheaper from a wholesaler, then on-sell it for more: the same rate as occupiers are used to paying the commercial ENO at the moment.

iii. In addition, the BC would charge owners a daily supply charge to cover the maintenance and operation of the network, metering and billing services, at the same rate as occupiers are used to paying the commercial ENO at the moment.

iv. This solar revenue can, once the solar installation has been paid off, offset the Common Power bills (perhaps completely), thus reducing BC overheads, and can then be applied to reduce pressure on owners' levies. Or the BC can 'bank' the money, say to pay for future additions or renovations. Solar installations are one of the only building renovations that earns money, rather than just costing money. Alternatively, the BC could reduce occupiers' electricity costs. Communicate, collaborate and consult with owners to ensure that the solar revenue is applied in the manner preferred by the majority of owners.

v. This is a solar *revenue* model. Instead of owners solely buying electricity imported from the Grid, they use solar electricity to minimise imports through the daytime and rely on Grid electricity outside solar hours. Any excess

solar may be exported to the Grid, though FIT for ENs are notoriously low (2c - 4c/kWh). Any export credits paid by the electricity retailer reduce the monthly site energy bill from the gate meter retailer. The money owners spend on solar energy is paid into the BC funds, thus keeping money in the local economy, as opposed to going to nationally- or internationally- owned retailers.

vi. Whilst s96 of the BCCMA 1997 states that a BC "Body corporate must not carry on business", s200(1) of the BCCMA Regulations 2020 states that a BC "may supply, or engage another person to supply, utility services and other services for the benefit of owners and occupiers of lots if the services consist of…(c) domestic services including, for example, electricity". S200(2) also states that the BC "may, by agreement with a person for whom services are supplied, charge for the services".

vii. Owners agreed to buy their electricity from the incumbent commercial ENO. They will need to agree to buy their electricity from the BC instead, once the BC becomes the ENO.

viii. This solar revenue model combines the benefits of Models 1 and 2 above, supplying solar for both the CP and owners' usage (providing sufficient roof space exists).

f. Pros and Cons of the BC as ENO

i. If the BC takes over as the ENO, it takes on much of the liability and compliance obligations. However, the BC would contract an experienced Embedded Network Manager (ENM) to provide network management, metering, and billing services. These service providers partner with, and indemnify the BC for any breaches or penalties caused by their actions.

ii. ENMs have no vested financial interest in how much electricity is imported from the Grid (unlike commercial ENOs), as the BC controls the rates and receives any 'profit'. The ENM's business is based on the costs they charge for metering and billing. These charges were charged by the incumbent ENO within its rates (though usually without the same transparency). ENMs costs are lower as they do not receive a mark-up on the energy on-sold by the BC.

iii. Profitable commercial ENOs have little incentive to encourage a BC to take over the EN or their role as the ENO. Accordingly, they point out the responsibilities of an ENO and highlight (and sometimes exaggerate) the challenges for a BC to become the ENO. Those responsibilities are listed below, with an explanation of just how difficulty or "risky" those responsibilities are for a BC.

g. BC responsibilities as an ENO

Responsibilities	"Risk"	Response
For the gate meter/ bad debts	BC is responsible for paying the total site electricity, not just the CP.	• Yes, the BC contracts directly with the retailer. • ENM recovers BC outlay (and more) from the owners. • Bad debt from owners is unlikely - check with the incumbent ENO level of bad debt they have written off. • BC has additional safety of debt to a BC under the BC regulations.
Regulatory breaches	BC is at risk of substantial fines if in breach of regulatory conditions.	• Breach of an AER exemption condition is a civil penalty provision, which cannot be passed on to a third party. • But the BC would claim the costs of any fine due to a breach from the ENM responsible for any breach. • Breaches are unlikely - check with the incumbent ENO how many breaches incurred during the term.
Life Support Liability	Regulatory breach if failure.	• There is only a breach if the owner informs the BC of the existence of life support equipment and that is not communicated to the retailer. • Experienced ENMs are unlikely to breach a fundamental condition, which is easy to comply with. • ENMs have standard documents requesting this information sent to owners from the outset.
Hardship Liability	Regulatory breach if not available.	• Experienced ENMs are unlikely to breach a fundamental condition, which is easy to comply with. • ENMs have standard Hardship Policies communicated, and available to owners from the outset. • Check with the incumbent ENO how many Payment Plans have been entered into (and/or breached).
Ombudsman's costs	The BC would be an automatic participant (no charge). EWOQ charges the BC for any end-user/owner complaints from being billed incorrectly or treated unfairly.	• Costs (c$500) are only issued if the complainant has first tried to resolve the matter with the BC. • ENM/Billing Agent would resolve valid complaints to avoid EWOQ involvement and risk of costs. • 75% of complaints relate to billing disputes. • With owner access to Usage/Billing apps, there are no surprises when bills arrive. • With digital cloud-based metering data, billing mistakes are rare, unlike with manual read bills. • 10% of complaints relate to the quality of supply (Energex, the retailer or the ENM's responsibility). • The balance of complaints appear to relate to switching accounts or retailers and "poor attitude or service". • Check with the incumbent ENO how many EWOQ complaints they have received during the term.

h. Additional notes on BC responsibilities

i. The BC is advised to make the electricity supply agreement between itself as ENO and on-seller with the owner, rather than the occupiers. This reduces the risk of short-term tenants coming and going regularly, and leaving without paying. It also increases the likelihood of owners paying the "debt to the Body Corporate".

ii. The BC already has a direct, long-term relationship with owners, who are perhaps aware of and respect the authority of the BCM and the BC regulations more than a temporary occupier. Owners are likely to be aware of the consequences of owing a "debt to the BC", for example, punitive interest; the BC being a 'preferential' creditor, i.e. solicitor selling an owner's Lot must pay off BC debt before being able to transferring remaining sales proceeds to the owner.

iii. The ENM/billing partner and the owner will have access to accurate digital data documenting usage to date, the likely amount of the next bill, etc (on an app for each owner). The chances of disputes over the calculation of bills or meter reads therefore would be very slim. If the billing partner made an error (unlikely with digital metering), they would be able to resolve it/write off any minor sums. With monthly bills, any dispute could be quickly addressed, and the amount in dispute would not be very high due to the relatively lower usage in one month (than, say, over a quarter).

i. Summary

An EN potentially offers the following:

Opportunities

i. lower supply and metering charges due to less connections to the Grid.

ii. lower energy rates than an on-market owner, due to economies of scale (bulk-purchase of electricity at wholesale rates).

iii. a better return on investment in a renewables project, again due to economies of scale: larger solar systems are cheaper than multiple smaller systems, and

iv. a community-sized solar/battery system is not just used as an offset for the CP, but any excess solar is then on-sold to the owners at higher energy rates than would be received being exported to the Grid.

v. smart metering provides occupiers with detailed, real-time usage data, to enable them to maximise energy efficiencies and solar hours.

vi. once the capital cost of the system is paid off, solar can generate ***revenue for the next 20+ years***.

vii. relatively simple installation - one large system attached to the EN.

viii. relatively low capital cost - and short pay-back period (capital outlay often recovered in 4-5 years), and

Challenges

ix. Owners must sign-up for the BC to be the ENO/on-seller. As mentioned below in Section 14, it is important to communicate with owners to bring them along the solar journey. What reasons would an owner have to reject the BC stepping into the ENO's shoes for the financial benefit of all owners?

x. What reasons? Those listed above as being new responsibilities being taken on by the BC as an ENO.

j. Ownership and benefit of the solar installation

i. The Embedded Network Agreement (ENA) usually requires the agreement of the ENO before any equipment can be added to the EN, as the ENO is responsible for the supply of electricity and maintaining the network. Adding solar, batteries, eV chargers, etc, may have an impact on the network which must be assessed. If the BC is the ENO then it would ensure the solar installer, their electricians and/or engineers would carry out the assessment of the impact of additional equipment. The equipment will also have an impact on the amount of Grid electricity being imported.

ii. The incumbent commercial ENO may suffer a loss of profits if the amount of Grid electricity being imported is lower (unless they are stuck with an agreement where they are contracted at a higher wholesale rate than they can on-sell to owners!). There may be a clause in the ENA or the Electricity Supply Agreement (ESA), either with the ENO or the Retailer, regarding usage expectation on which rates were agreed. Some ENOs try to argue for "unconscionable" conditions that require the BC to pay them the price of the total amount of energy projected to be used through the ENA or ESA! A claim to pay them the profit that they stood to make during the period of the Agreement may be more reasonable.

iii. If sticking with the incumbent ENO, it may give approval for a renewables project, providing it controls the installation. This is reasonable where it is funding the project and recovering its outlay, right? The ENOs will often offer to install renewables, with no upfront costs to the BC, recovering its outlay over the period of a new agreement. But if the BC is funding the project, the BC should be securing a return on its investment and have an amount of control in the installation (choosing the installation size, the installers and the energy and FIT rates), right?

iv. There are many commercial ENOs competing to take over existing ENs, if you are not happy with your incumbent ENO. It is always worth asking the incumbent ENO to tender for any new agreement, alongside any other ENOs. The incumbent has the history of the network, compliance, usage needs, debt considerations, etc. As there are many ENOs out there, there are also different charging methods.

v. ENOs have been fairly slow to consider adding renewables to "their" ENs. This is because they need to find a way to continue to make money despite the site's reduced need to import Grid electricity. It is usually the BC who asks the ENO to make a proposal - they are less frequently offered unsolicited. Obtain the incumbent's proposal first, to enable you to compare it against other comparative proposals. It is likely that BC regulations will require you to obtain "more than one" proposal (depending on the likely project cost and the size of the scheme), to show you are considering the options and acting in the best interests of the owners. This is also a wonderful apology to give the incumbent when informing them that you are getting proposals from other ENOs. Perhaps keep any consideration of the BC becoming the ENO itself until after you have received the data necessary to be able to consider the alternatives.

vi. Finally, carefully examine the energy rates in any proposal and the effect of the T&Cs on the ENO's freedom to alter the energy rates during the lifetime of the agreement. An ENO may offer a cheap or "below market" rate to win the business, knowing that at the end of 12 months it can increase the rate as it likes, with the BC having committed to a 5 - 10+ year agreement. A proposal assuring that energy rates will be no higher than X% or Y cents/kWh less than the Default Market Offer (see Section 5) provides some future comfort.

k. ENO proposals

Usually fall into two scenarios:

i. Where the ENO funds the installation

1. If the ENO is paying for the installation, then it is reasonable for them to be making the profit on the solar savings/revenue, right?

2. The difficulty in an EN is that the solar electricity is usually metered only as it enters the whole network. From then on, the ENO cannot determine/meter which owner is using solar. The owner's meter will show the amount of energy consumed, but not whether it is solar or imported. The meter may show the time of use, but there is no guarantee that all daytime usage would be supplied by solar (if there is more demand than generation, Grid energy will be imported to site to supply the load demand).

3. Accordingly, ENOs often offer a blended rate for all electricity consumed. They know, historically, how much day-time electricity is used on site and can project how much of that need will be covered by solar. Say the incumbent's energy rate to owners is 25c/kWh. If 100,000kWh/pa worth of solar is going to replace imported Grid energy, then the gross "savings" will be $25,000/pa. The incumbent stands to lose the profit element of that $25,000. In addition, it has to recover the cost of installing and maintaining the solar system. It will divide - its solar outlay over the period of the new proposal (commonly 5-15 years), plus the projected cost of on-selling the anticipated Grid electricity - by the anticipated total site usage. That will give them an actual cost of energy (WAC - Weighted Energy Cost), to which they will add their profit margin and offer a blended rate of energy use at any time of day. It may be only 2c/kWh cheaper than owners were previously paying.

   If the BC were setting the rates having paid for the installation, the rate may be >5c/kWh cheaper, depending on numerous factors…but not including a mark-up on the imported Grid electricity, or the solar capital and operating expenses.

ii. Where the BC funds* the installation

**There are various finance options that come within the expression "funding" (see Section 12 below).*

1. As above, the owners' meters cannot determine whether the electricity owners consume is solar or imported. Accordingly the ENO will offer a "solar credit", or Feed in Tariff, for the solar generated. The value of this credit depends on how much of the solar is self-consumed, rather than exported. FITs for ENO export are very low: 2c-4c/kWh. If the solar generated is less than the site's daytime usage, self-consumption will be 100%, the ENO will have the generation data and will reduce its energy charges by the generation (in kWh), times the solar credit offered/agreed.

2. If the BC is not the ENO, the ENO may only permit the BC to cable the solar to the CP meter, or may permit it to be cabled to the whole network. The ENO's proposal may be to off-set the solar generation against the CP usage, or against all site usage. If there is sufficient generation, it may, in effect, cancel the CP bill/electricity overhead. However, if more solar is generated than is used by the CP, the excess solar will be 'exported', not to the Grid, but to the rest of the network to be used by any owner. As above, the solar is not

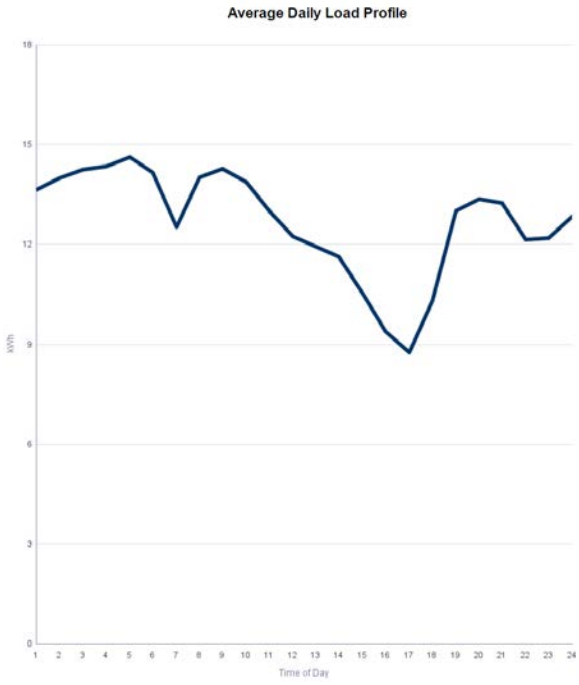
metered at the owners' meters, so the ENO cannot determine which owners used how much of the excess solar. It may therefore not offer any FIT to owners, only to the BC on the CP bill. A better option for the BC is if the ENO offers the same FIT for the whole of system generation.

3. If the BC were setting the rates, having paid for the installation, the actual cost of energy would be lower, being based on the actual costs, without adding margins. The BC could charge that lower rate to occupiers, or could charge the same as they are used to paying, and divert the solar revenue to repay the solar installation costs and reduce pressure on BC levies, etc.

Whoever is installing the renewable energy system should bear in mind the considerations in Section 2 - Introduction to solar regarding site suitability, and sizing the system. Additional EN-tailored considerations are set out below:

I. Sizing a system

i. Historical and future usage - Access to the whole site's usage from Energex is straight forward. It should even provide the daily load profile for the site. The difficulty is getting the owners' usage data.

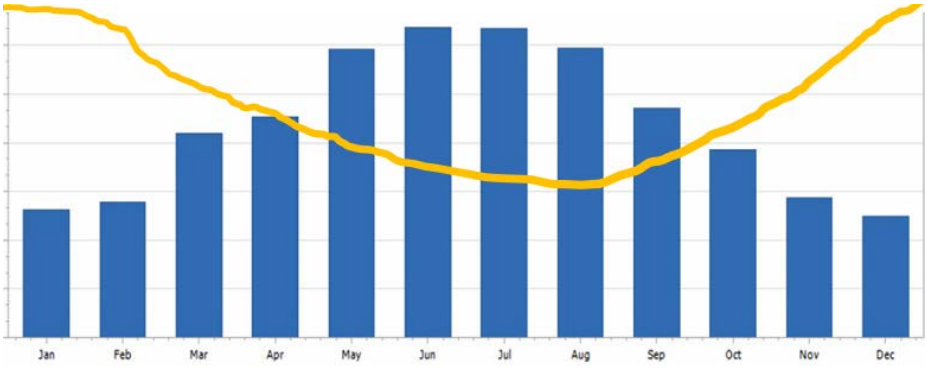


1. As the owners' meters are off-market, the data is only available from the incumbent ENO. It may be reluctant to provide the data citing "privacy issues" if it is the BC who has decided to take over as the ENO.
2. Owners' ENO bills should provide average usage throughout the seasons or months, though depending on the number of owners (or, worse still, occupiers or short-term tenants) this may be a time intensive job.
3. The CP usage data will be available from the CP's ENO bills. Deduct the annual usage from the total site (on-market gate meter) usage from Energex to determine the total and therefore average owner usage.
4. Again, it is necessary to consider reasonably anticipated future usage and how this may affect the load profile, as well as the addition of battery storage.
5. Remember, also that the best way to save money on electricity is by using less, through energy efficiencies, e.g. using LED lights, and turning off lights and appliances when not in use, as well as keeping AC settings to 25°C.
6. Shifting or spreading usage throughout solar hours (e.g. setting timers to Hot Water Systems, etc) will increase solar self-consumption rates, though in practice, this is more easily done after solar and smart meters are installed, when detailed usage data for every 30 minutes of the day is available through your smart meter and/or inverter, and on the ENM/Billing partner's app or software platform.

ii. Generation

1. Frequently the whole site (daytime) usage demand will be higher than the amount of solar electricity that could be generated by the roof space available. The benefit will be that self-consumption of solar could be as high as 100%, with the CP and every user sharing all the solar generated (though whether the commercial ENO will give sufficient credit to the BC depends on the ENO and the agreement reached).

2. If you have sufficient roof space that generation can exceed daytime usage needs, a decision must be made re. sizing the system to cover your anticipated solar energy needs. Bearing in mind solar hours and generation vary through the seasons, a balance must be struck between covering winter usage and not 'wasting' too much excess solar generated, but not used in summer.



3. Excess solar is not 'wasted' energy - it will be used by someone. If all solar generated is not consumed then it will be exported to the Grid. That clean energy replaces the need for the electricity generators to generate more fossil fuel-based electricity. Your neighbours will use the exported green energy, rather than 'dirty' Grid energy. Certainly not a waste - a definite win for the environment.

4. In the near future, there is likely to be even more economic wins - certainly in the lifetime of your solar system - as energy use increases in the future (through eVs if nothing else). Batteries can store unused solar, to 'extend' solar hours into the evening peak period, and battery prices are likely to reduce over the next few years...not to mention the potential of the numerous innovations increasingly being adopted globally - see Section 10 - The near future. It is better to oversize than undersize a solar system.

iii. Installation

1. For a site with less roof space than usage needs, solar really is a “no brainer” (BC regulations require “more than one” quote, depending on the likely project cost and the size of the scheme).

2. Solar for strata is more complex than standard residential installations and, even if the Lots are used for residential purposes, BCs are advised to use installers with commercial experience. The installer would likely be installing a commercial-sized system; would need sufficient manpower; experience of installing and commissioning in ENs; dealing with BC decision-making and invoice payment time frames, and would need to treat the solar project as a long-term relationship, rather than a one-off sale. It is likely the installer would be used to monitor, maintain, and clean the system, as well as dealing with any warranty issues, future expansion for eV chargers and battery storage, etc. (remember, the solar systems’ 20+ year life expectancy).

3. BCs would be well advised to have an independent expert provide advice on the potential of an EN renewables system, and the proposals received, whether from the incumbent ENO or another, particularly if considering taking on the ENO role itself. It is likely that the BCC would have to put the project to an owners’ vote, and it would be sensible to base BCC recommendations and motions on the advice of an independent expert, rather than just those trying to sell solar.

4. Unless your site has very high CP usage (and sufficient roof space), it is likely that a 30kW inverter would be the largest sensible size per CP NMI connection (National Meter Identifier, i.e. a meter). If the CP loads/circuits are naturally split (e.g. you have two pools or separate areas), and/or if you may need over a 40kWp or 100kWp system, it may be appropriate, and financially preferable, to apply to Energex to create a second NMI. See Section 7 for more details on sizing a system to cover your anticipated solar energy needs, and the Energex requirements (and resultant costs) for large systems. See Section 9 below regarding government incentives - small-scale technology certificates (STCs) for solar systems smaller than 100kW, and large-scale generation certificates (LGCs) for larger systems.

Click to move to Choosing an Installer

Solar for Strata solutions available

4 New Embedded Network

4. Convert to a new Embedded Network

a. Description

Obviously, this model applies only to properties without an existing Embedded Network. See Section 6 for more information on private, off-market, embedded networks.

It is appropriate for a site with multiple meters grouped in one (or more) locations, as opposed to a meter attached to the outside of each Lot or building.

b. Advantages of ENs

i. The main advantages of ENs, which saw a proliferation of BCs establishing them in SE Queensland 5-10 years ago, are:

1. less/lower supply and metering charges due to less connections to the Grid (i.e. just the gate (or parent) meter).
2. historically lower rates per kWh than an owner attached to the Grid (i.e. on market) pays individually, due to economies of scale. The EN operator (ENO) buys electricity at wholesale rates from the retailer, then adds a margin and calculates the rates to charge the owners (and the BC for their CP).

ii. Recent huge increases in wholesale electricity prices (see Section 5) have reduced the previously huge disparity between wholesale and retail energy rates. This appears to have reduced the popularity of ENs, certainly in terms of converting established sites to ENs. It is more cost effective to install an EN at the beginning of a development of a new property destined to be a BC site, rather than to convert an existing property, though it is possible.

iii. Certainly nowadays a BC would not necessarily be encouraged to create an EN just to reduce the number of meters connected to the Grid, nor to capitalise on the relatively small margins between wholesale and retail energy rates. However, if the intention is to install renewables such as solar and battery storage, an EN is a very effective way of maximising solar generation by spreading the use across all end users, who may have different power requirements at different times of the day or year, as well as ***creating a solar revenue stream for the BC***. See Section 7 d. for more information on maximising solar generation across multiple end users.

c. Disadvantages of ENs

i. The initial capital cost to set up (which is paid off, incrementally over time).

ii. The logistical and regulatory hurdles to surmount.

iii. Ensuring the BC is the ENO, or controls the ENO, to ensure flexibility and a mutually-beneficial economic outcome.

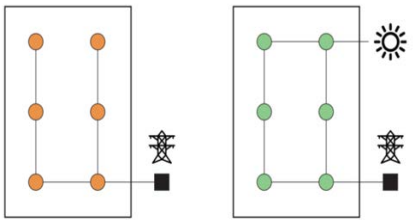
iv. The main disadvantage is if the BC is missing out on the opportunity to control the EN for the potential financial benefit of all owners.

v. As discussed in Section 6, commercial ENOs recover their capital outlay, and make their profits, by the mark-up they charge on what they buy electricity for, versus what they on-sell it for (as well as in their supply rates).

vi. When the BC is the ENO, it is crucial for BCs to obtain multiple quotes from Retailers, to ensure they are getting the best rates for owners. It can get the best rates from the best quotes if they have the freedom of choice at the Gate meter, and then the BC receives the financial benefit of the margin that the commercial ENO would otherwise add.

vii. If the ENO is also the Retailer, how likely is it that they will be able to pass on the best energy rates to the BC? The ENO Retailer is playing both sides of the fence - the Retail arm trying to make money setting its energy rates and the ENO arm trying to make a profit from its margin on the energy rates. The ENO decides the cost of electricity to the owners/occupiers. The BC as ENO could buy electricity cheaper, then on-sell it for more (as ENOs do). The savings made can offset the Common Power bills, reducing overheads and hence pressure on levies, for all owners.

viii. There is much less ***economic*** benefit to a BC to install solar when it is not the ENO, or working with the ENO (though, of course, the ***environmental*** benefits are still valuable). Generally, ENOs bill the owners for their electricity consumption regardless of whether that power comes from solar or the Grid. The ENO may blend and reduce its energy charges slightly (but still has to make a profit, and installing solar is another opportunity for an ENO to make a margin).



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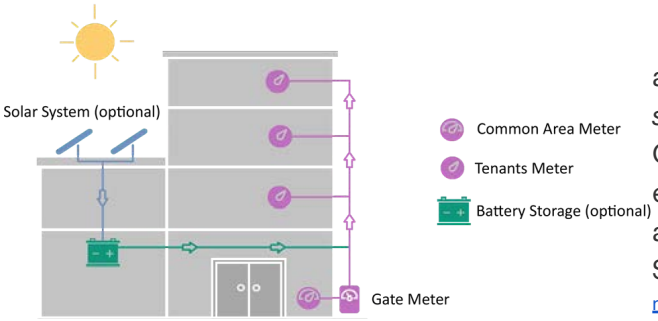
Quite rightly. ENOs are in business to make money, but *if the BC is funding the installation of solar*, the BC should share in the savings and/or revenue. Some ENOs will share control, work with the BC and achieve a positive result for both. Others, not so much.

If the BC is the ENO, or controls the ENO, then it makes or at least shares that profit or saving.

d. Adding renewables to the EN

i. Bearing in mind the often minor differences between "bulk-purchased" wholesale rates and retail rates in the current market, it is unlikely to be worth a BC embedding a network just for the profit margin between those two rates. Where the BC can maybe purchase Grid electricity at, say 22c/kWh and owners are used to paying, say 25c/kWh, the gross potential revenue is the 3c/kWh difference multiplied by the number of kWhs consumed on your site. If you have a 100 Lot resort, your site may be consuming 800MWh/pa. Gross revenue from energy on-selling would be c$24,000/pa. That might repay the CapEx set up costs.



ii. Now, consider adding renewable energy to reduce the amount of energy imported from the Grid. *Once the cost of the solar installation is paid off*, solar energy is then (almost) "free". Occupiers may still be happy to pay the same 25c/kWh for their energy. If solar replaced the need to import, say 200,000kWh across the site, gross revenue would then jump by a further $50,000/pa; owners now having to find $75,000/pa less in levies…
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iii. These are gross revenue figures. If a commercial ENO pays for the solar and runs the EN, then naturally it will take those gross profits, less network maintenance, monitoring, metering, and billing costs (see Section 11 - Monitoring, Metering and Billing Services).

e. The BC as the ENO

i. The ENO does the work of maintaining the network and billing (including reading meters, calculating, creating, sending and chasing bills, as well as managing owners joining or exiting the EN (due to sale of Lot or otherwise), disconnections, reconnections, etc). Commercial ENOs cover their costs and make their profits by the mark-up they charge on what they buy electricity for, versus what they on-sell it for, as well as via their supply rates.

ii. The ENO decides the cost of electricity (energy rates charged) to the owners/occupiers. The BC as ENO could buy electricity cheaper from a wholesaler, then on-sell it for more: the same rate as occupiers are used to paying retailers at the moment.

iii. In addition, the BC would charge owners a daily supply charge to cover the maintenance and operation of the network, metering and billing services - again, at the same rate as occupiers are used to paying retailers now.

iv. This solar revenue can, once the solar installation has been paid off, offset the Common Power bills (perhaps completely), thus reducing BC overheads, and can then be applied to reduce pressure on owners' levies. Or the BC can 'bank' the money, say to pay for future additions or renovations. Solar installations are one of the only building renovations that earns money, rather than just costing money. Alternatively, the BC could reduce occupiers' electricity costs. Communicate, collaborate and consult with owners to ensure that the solar revenue is applied in the manner preferred by the majority of owners.

v. This solar for strata model is a solar *revenue* model. Instead of owners solely buying electricity imported from the Grid, they use solar electricity to minimise imports through the daytime and rely on Grid electricity outside solar hours. Any excess solar may be exported to the Grid, though FIT for ENs are notoriously low (2c - 4c/kWh).

Any export credits paid by the electricity retailer reduce the monthly site energy bill from the gate meter retailer. The money owners spend on solar energy is paid into the BC funds, thus keeping money in the local economy, as opposed to going to nationally- or internationally-owned retailers.

vi. Whilst s96 of the BCCMA 1997 states that a BC "Body corporate must not carry on business", s200(1) of the BCCMA Regulations 2020 states that a BC "may supply, or engage another person to supply, utility services and other services for the benefit of owners and occupiers of lots if the services consist of…(c) domestic services including, for example, electricity". S200(2) also states that the BC "may, by agreement with a person for whom services are supplied, charge for the services".

vii. Owners will need to agree to buy their electricity from the BC, rather than their current retailers were the BC to become the ENO/on-seller. A minimum of 85% of owners need to opt in.

viii. This solar revenue model combines the benefits of Models 1 and 2 above, supplying solar for both the CP and owners' usage (providing sufficient roof space exists).

f. Pros and Cons of the BC as ENO

i. If setting up a new EN without a commercial ENO being appointed, the BC takes the liability and compliance obligations.

ii. Energex requirements to convert or retrofit a "brownfield" site to a new EN are very onerous - perhaps too onerous to be taken on by an unqualified volunteer BC committee. Whilst the BC would be able to seek rectification under contract from any electrical contractors, engineers, etc, responsible for any failures, it would be a heavy burden on the BCC. See the Retail Exempt Selling Guidelines – version 6 – July 2022, Cl 4.4 which states and the 2018 Network Exemptions Guideline, currently being updated - draft released in Oct 2022, with final submissions in Dec 2022).

iii. As a retrofit changes the way occupiers take electricity supply at a site and their supply choices, they must be consulted in advance, and have their concerns heard and addressed as fully as possible. Occupiers "explicit informed consent" to the proposed retrofit and the proposed energy agreement must be obtained. The Network Exemptions Guideline sets out the "marketing campaign" required to be undertaken. For a residential (cf a commercial) BC site, an Individual Retail Exemption (under the AER 2022 Guidelines Cl 4.4) needs to be applied for. 85% of occupiers have to agree before applying to the AER to convert the network. "Applications for exemption, as a result of a retrofit, must therefore pass a high level of scrutiny" (2022 Guidelines Cl 4.4). Hence why it is recommended that a novice BC contracts a commercial ENO to undertake the application, registration and conversion to an EN.

iv. With an existing, registered EN, the BC would contract an experienced Embedded Network Manager (ENM) to provide network management, metering, and billing services. These service providers partner with, and indemnify the BC for any breaches or penalties caused by their actions in managing the network.

v. ENMs have no vested financial interest in how much electricity is imported from the Grid (unlike commercial ENOs), as the BC controls the rates and receives any 'profit'. The ENM's business is based on the costs they charge for metering and billing. These charges are charged by commercial ENOs within their rates (though not always with the same transparency). ENMs costs are lower than most ENOs as they do not receive a mark-up on the energy on-sold by the BC.

vi. The main difficulty is the initial conversion, not the running of a successfully converted and registered network.

vii. Most commercial ENOs warn BCs against converting a site to an EN. Indeed, some commercial ENOs will not convert brownfield sites, preferring to take over existing ENs only, whether that is due to the potential costs and complexities, or their appetite for an easier role. There have been plenty of brownfield conversions and, though they are not as straightforward as setting up at the beginning of a new development, there are commercial ENOs that are happy doing this type of work.

viii. If some experienced, commercial ENOs will not do brownfield sites, an inexperienced volunteer committee may feel reluctant to attempt it. There is a 'hybrid' alternative. Some ENOs see the benefit of working together with the BC to create a win-win situation. They may offer flexibility compared to standard industry approaches, offering the BC the opportunity to use them as the ENO for a period, before then perhaps to choose taking over as the ENO themselves. Providing the ENO has the opportunity and security to recover its outlay and make a reasonable profit, it would be wise to try to deliver what the market increasingly wants: a fair share of the mutual benefits that renewable energy projects can deliver, over a number of years. BCs are unusually and ideally situated to be able to spread the financial load across its owners, and place value on a delayed return on their investment, in exchange for lower risk for all owners.

ix. The BC should outline its wants (transparency of costs, a say; some control and flexibility); what it is reluctant to accept (being excluded from financially benefiting from renewables), and what time frames or costs it is prepared to consider when inviting proposals from two or three ENOs. This approach is more likely to lead to a negotiated, collaborative and symbiotic and successful relationship with an ENO.

x. An EN is easier to operate than convert from scratch particularly for a BC with no experience. That is not to say there are no risks or responsibilities in taking over the running of an established network. Those responsibilities are listed below, with an explanation of how difficulty or "risky" those responsibilities are for a BC.

g. BC responsibilities as an ENO

Responsibilities	"Risk"	Response
For the gate meter/ bad debts	BC is responsible for paying the total site electricity, not just the CP.	• Yes, the BC contracts directly with the retailer. • ENM recovers BC outlay (and more) from the owners. • Bad debt from owners is unlikely - check with the incumbent ENO level of bad debt they have written off. • BC has additional safety of debt to a BC under the BC regulations.
Regulatory breaches	BC is at risk of substantial fines if in breach of regulatory conditions.	• Breach of an AER exemption condition is a civil penalty provision, which cannot be passed on to a third party. • But the BC would claim the costs of any fine due to a breach from the ENM responsible for any breach. • Breaches are unlikely - check with the incumbent ENO how many breaches incurred during the term.
Life Support Liability	Regulatory breach if failure.	• There is only a breach if the owner informs the BC of the existence of life support equipment and that is not communicated to the retailer. • Experienced ENMs are unlikely to breach a fundamental condition, which is easy to comply with. • ENMs have standard documents requesting this information sent to owners from the outset.
Hardship Liability	Regulatory breach if not available.	• Experienced ENMs are unlikely to breach a fundamental condition, which is easy to comply with. • ENMs have standard Hardship Policies communicated, and available to owners from the outset. • Check with the incumbent ENO how many Payment Plans have been entered into (and/or breached).
Ombudsman's costs	The BC would be an automatic participant (no charge). EWOQ charges the BC for any end-user/owner complaints from being billed incorrectly or treated unfairly.	• Costs (c$500) are only issued if the complainant has first tried to resolve the matter with the BC. • ENM/Billing Agent would resolve valid complaints to avoid EWOQ involvement and risk of costs. • 75% of complaints relate to billing disputes. • With owner access to Usage/Billing apps, there are no surprises when bills arrive. • With digital cloud-based metering data, billing mistakes are rare, unlike with manual read bills. • 10% of complaints relate to the quality of supply (Energex, the retailer or the ENM's responsibility). • The balance of complaints appear to relate to switching accounts or retailers and "poor attitude or service". • Check with the incumbent ENO how many EWOQ complaints they have received during the term.

h. Additional notes on BC responsibilities

i. When the BC is the ENO, it is advised to make the electricity supply agreement between itself as ENO and on-seller with the owner, rather than the occupiers. This reduces the risk of short-term tenants coming and going regularly, and leaving without paying. It also increases the likelihood of owners paying the "debt to the Body Corporate". Before then, the commercial ENO is responsible for credit control, but it may be preferable to set up the supply agreements in the form the BC eventually wishes to adopt.

ii. In addition, the BC already has a direct, long-term relationship with owners, who are perhaps aware of and respect the authority of the BCM and the BC regulations more than a temporary occupier. Owners are likely to be aware of the consequences of owing a "debt to the BC", for example, punitive interest; the BC being a 'preferential' creditor, i.e. solicitor selling an owner's Lot must pay off BC debt before being able to transferring remaining sales proceeds to the owner.

iii. Assuming the BC agreement with its ENM/billing partner includes provision of smart meters, owners will have access to accurate digital data documenting usage to date, the likely amount of the next bill, etc (available on an app). The chances of disputes over the calculation of bills or meter reads therefore would be very slim. If the billing partner made an error (unlikely with digital metering), they would be able to resolve it/write off any minor sums to avoid a dispute (with owner or the BC) or a complaint to EWOQ. In addition, with monthly bills, any dispute could be raised and addressed before it is repeated, and any amount in dispute would be fairly low due to the relatively low usage per month (than, say, per quarter).

i. Summary

An EN potentially offers the following, particularly with a mutually beneficial agreement with the ENO:

Opportunities

i. lower supply and metering charges due to less connections to the Grid.

ii. lower energy rates than an on-market owner, due to economies of scale (bulk-purchase of electricity at wholesale rates).

iii. a better return on investment in a renewables project, again due to economies of scale: larger solar systems are cheaper than multiple smaller systems, and

iv. a community-sized solar/battery system is not just used as an offset for the CP, but any excess solar is then on-sold to the owners at higher energy rates than would be received being exported to the Grid.

v. smart metering provides occupiers with detailed, real-time usage data, to enable them to maximise energy efficiencies and solar hours.

vi. once the capital cost of the system is paid off, solar can generate revenue for the next 20+ years.

vii. relatively simple installation - one large system attached to the EN.

viii. relatively low capital cost - and short pay-back period, and

Challenges

ix. 85% of owners must sign-up to join a new EN, as opposed to being on-market customers. As mentioned below in Section 14, it is important to communicate with owners to bring them along the solar journey. What reasons would an owner have to reject an EN if the financial benefit to all owners is illustrated?

x. At the commencement of the EN, the commercial ENO would be responsible under the regulations. Owners may be less enthusiastic for those new responsibilities listed above to be taken on by the BC as an ENO immediately. However, once the EN has shown to be running well, and the billing and compliance data has been amassed to back that up, owners may feel more confident to let the BC take the wheel.

j. Ownership and benefit of the solar installation

i. The Embedded Network Agreement (ENA) usually requires the agreement of the ENO before any equipment can be added to the EN, as the ENO is responsible for the supply of electricity and maintaining the network. Adding solar, batteries, eV chargers, etc, may have an impact on the network which must be assessed. The equipment will also have an impact on the amount of Grid electricity being imported. It is imperative that the BC is open and upfront with those ENOs being invited to tender.

ii. The potential ENOs will need to have all the planned equipment details set out, so they can calculate the energy and daily supply rates needed for them to make a profit and stay important (very important for the BC as well as for the ENO). The Retailer will also need to know reasonable expectations of usage, import and export, before being asked to commit to energy and FIT rates for a fixed period.

iii. The sharing of success between the ENO and the BC may be more attractive to the ENO if the BC is funding the project and using the profits to recover its outlay. Alternatively, with its industry experience, the ENO may be able to obtain a better price for a renewable energy installation. The BC or owners may prefer no up front costs, in exchange for taking over the ENO and solar installation at the expiry of the Installation Works Agreement (IWA). The BC has the longevity for a delayed return to still be attractive.

iv. ENOs have been fairly slow to consider adding renewables to “their” ENs. This is because they need to find a way to continue to make money despite the site’s reduced need to import Grid electricity. However, more proactive or progressive ENOs accept that customers want renewables, and their businesses must adapt to survive and develop proposals and relationships which can last many years.

v. It is likely that BC regulations will require you to obtain “more than one” proposal (depending on the likely project cost and the size of the scheme), to show you are considering the options and acting in the best interests of the owners. Perhaps keep any consideration of the BC becoming the ENO itself until after you have received initial proposals, so you have base offers from the ENOs to compare against.

vi. Finally, carefully examine the energy rates in any proposal and the effect of the T&Cs on the ENO’s freedom to alter the energy rates during the lifetime of the agreement. An ENO may offer a cheap or “below market” rate to win the business, knowing that at the end of 12 months it can increase the rate as it likes, with the BC having committed to a 5 - 10+ year agreement. A proposal assuring that energy rates will be no higher than X% or Y cents/kWh less than the Default Market Offer (see Section 5) provides some future comfort.

k. ENO proposals

Usually fall into two scenarios:

i. Where the ENO funds the installation

1. If the ENO is paying for the installation, then it is reasonable for them to be making the profit on the solar savings/revenue, right?

2. The difficulty in an EN is that the solar electricity is usually metered only as it enters the whole network. From then on, the ENO cannot determine/meter which owner is using solar. The owner's meter will show the amount of energy consumed, but not whether it is solar or imported. The meter may show the time of use, but there is no guarantee that all daytime usage would be supplied by solar (if there is more demand than generation, Grid energy will be imported to site to supply the load demand).

3. Accordingly, ENOs often offer a blended rate for all electricity consumed. They may not know the historical site usage (which requires the cooperation of each owner), so may have to rely on industry average usage assumptions. So too are they unlikely to know how much of the site's usage could be reduced by solar. It may be that the BC offering a probationary or limited period for initial energy rates set, with freedom for the ENO to review them to ensure they have not set rates too high (or too low), may give the ENO more comfort, though as the client, perhaps do not offer this freedom initially. Better to have a starting figure suggested by the experts.

4. In addition to the above predictions and projections based on limited data or industry assumptions, the ENO has another, perhaps slightly easier calculation to perform. It has to recover the costs of converting the brownfield site and then installing and maintaining the solar system. It will know the likely costs which it will divide over the period of the proposal (commonly 5-15 years). This will give an amount to be included in the daily supply charge, to ensure that their outlay is recovered incrementally. It may be that energy rates and daily supply charges are only slightly cheaper for owners than they were previously paying.

5. The BC will want to ensure it has a say in setting the rates to owners, so if the rates are even 2c/kWh cheaper than owners are used to, rather than passing on those savings (to occupiers and owners alike), the BC may wish to divert the 2c/kWh into the BC's funds, to enable earlier payback of the IWA, for example.

ii. Where the BC funds* the installation

**There are various finance options that come within the expression "funding" (see Section 12 below).*

1. As above, the owners' meters cannot determine whether the electricity owners consume is solar or imported. Accordingly the ENO will offer a "solar credit", or Feed in Tariff, for the solar generated. The value of this credit depends on how much of the solar is self-consumed, rather than exported. FITs for ENO export are very low: 2c-4c/kWh. If the solar generated is less than the site's daytime usage, self-consumption will be 100%, the ENO will have the generation data and will reduce its energy charges by the generation (in kWh) times the solar credit offered/agreed.

2. The ENO may only permit the BC to cable the solar to the CP meter, or may permit it to be cabled to the whole network. The ENO's proposal may be to off-set the solar generation against the CP usage, or against

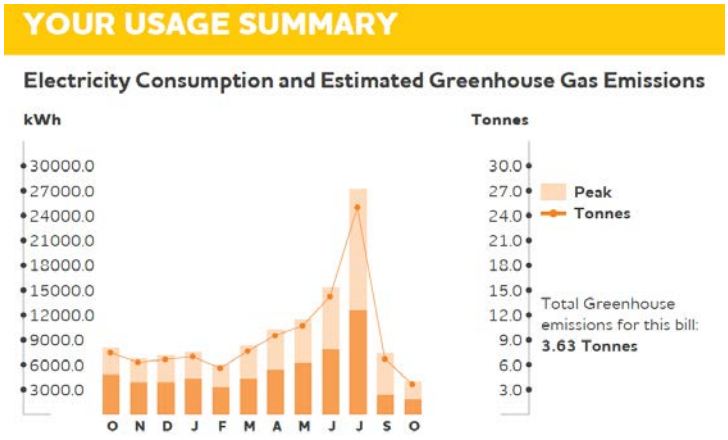
all site usage. If there is sufficient generation, it may, in effect, cancel the CP bill/electricity overhead. However, if more solar is generated than is used by the CP, the excess solar will be 'exported', not to the Grid, but to the rest of the network to be used by any owner. As above, the solar is not metered at the owners' meters, so the ENO cannot determine which owners used how much of the excess solar. It may therefore not offer any FIT to owners, only to the BC on the CP bill. A better option for the BC is if the ENO offers the same FIT for the whole of system generation.

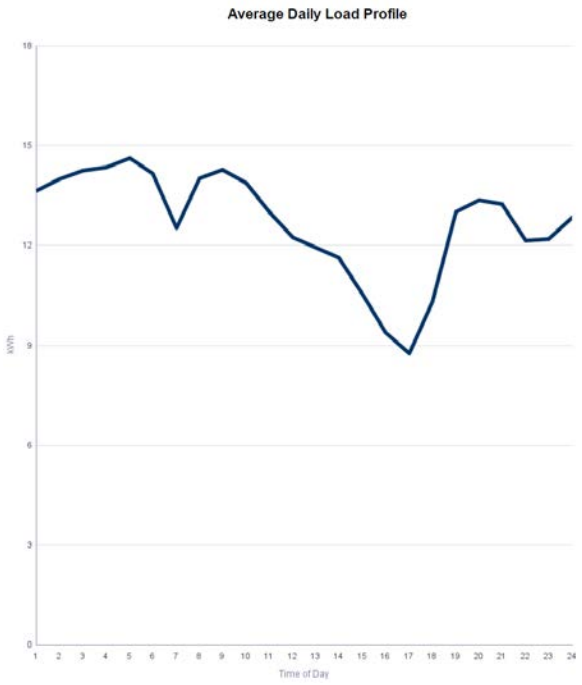
3. If the BC were setting the rates, having paid for the installation, the actual cost of energy may be lower, being based on the actual costs, without adding margins or finance during the IWA. Then again, the ENO could perhaps get the installation done cheaper than the BC.

Whoever is installing the renewable energy system should bear in mind the considerations in Section 2 - Introduction to solar regarding site suitability, and sizing the system. Additional EN-tailored considerations are set out below:

I. Sizing a system

i. Historical and future usage - Access is needed to owners bills to determine historical usage.They will not provide the daily load profile, if it even provides a convenient usage summary.





1. If the owner has a 'smart' meter, you can apply to Energex for detailed interval data which shows time of day usage, which enables a more accurate projection of solar self-consumption.

2. If you cannot obtain all owners' usage data, or if you want to check your calculated average Lot usage, this data on average Australian household usage data through the seasons is often quoted.

Average Daily Consumption (kWh)

Household Size	1	2	3	4	5	6	Each Extra Person
Summer	9.9	15.3	18.0	22.7	26.6	30.5	3.9
Autumn	9.4	14.0	16.8	21.2	23.9	26.6	2.7
Winter	9.3	13.7	16.9	20.5	23.6	26.7	3.1
Spring	8.8	13.2	15.9	19.7	22.3	25.0	2.6

3. Again, it is necessary to consider reasonably anticipated future usage and how this may affect the load profile, as well as the addition of battery storage. Electricity usage is only likely to increase in the future (through eVs if nothing else), whilst battery storage prices are likely to decrease.

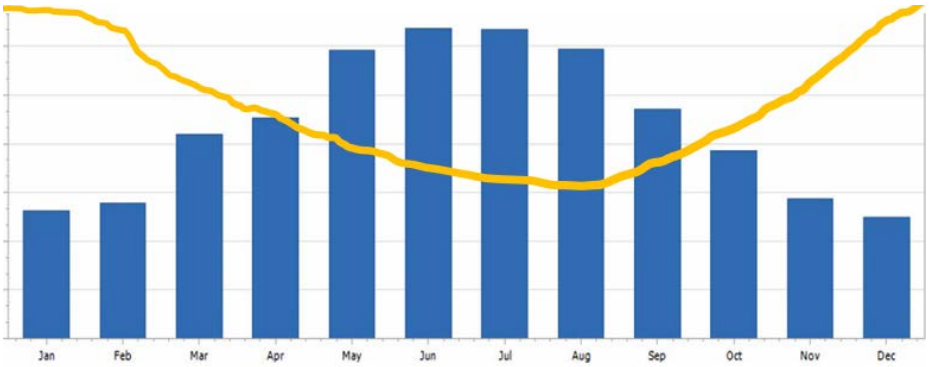
4. Remember, also that the best way to save money on electricity is by using less, through energy efficiencies, e.g. using LED lights, and turning off lights and appliances when not in use, as well as keeping your AC settings to 25°C.

5. Shifting or spreading your usage throughout solar hours (e.g. setting timers to Hot Water Systems, etc) will increase owner solar self-consumption rates, though in practice, this is more easily done after solar is installed and detailed usage data for every 30 minutes of the day is available through your smart meter and/or inverter.

ii. Generation

1. Frequently the whole site (daytime) usage demand will be higher than the amount of solar electricity that could be generated by the roof space available. The benefit will be that self-consumption of solar could be as high as 100%, with the CP and every user sharing all the solar generated (though whether the commercial ENO will give sufficient credit to the BC depends on the ENO and the agreement reached).

2. If you have sufficient roof space that generation can exceed daytime usage needs, a decision must be made re. sizing the system to cover your anticipated solar energy needs. Bearing in mind solar hours and generation vary through the seasons, a balance must be struck between covering winter usage and not 'wasting' too much excess solar generated but not used in summer.



3. Excess solar is not 'wasted' energy - it will be used by someone. If all solar generated is not consumed then it will be exported to the Grid. That clean energy replaces the need for the electricity generators to generate more fossil fuel-based electricity. Your neighbours will use the exported green energy, rather than 'dirty' Grid energy. Certainly not a waste - a definite win for the environment.

4. In the near future, there is likely to be even more economic wins - certainly in the lifetime of your solar system - as energy use increases in the future (through eVs if nothing else). Batteries can store unused solar, to 'extend' solar hours into the evening peak period, and battery prices are likely to reduce over the next few years...not to mention the potential of the numerous innovations increasingly being adopted globally - see Section 10 - The near future. It is better to oversize than undersize a solar system.

iii. Installation

1. For a site with less roof space than usage needs, solar really is a "no brainer". If the ENO is installing the solar, they will carry out the calculations and investigations, but it is sensible to have each proposal cross-checked by an independent expert. Remember, BC regulations require "more than one" quote, (depending on the likely project cost and the size of the scheme).

2. If the BC is installing the solar, solar for strata is more complex than standard residential installations and, even if the Lots are used for residential purposes, BCs are advised to use installers with commercial experience. The installer would likely be installing a commercial-sized system; would need sufficient manpower; experience of installing and commissioning in ENs; dealing with BC decision-making and invoice payment time frames, and would need to treat the solar project as a long-term relationship, rather than a one-off sale. It is likely the installer would be used to monitor, maintain, and clean the system, as well as dealing with any warranty issues, future expansion for eV chargers and battery storage, etc. (remember, the solar systems' 20+ year life expectancy).

3. BCs would be well advised to have an independent expert provide advice on the potential of an EN renewables system, and the proposals received. It is very likely that the BCC would have to put the project to the owners to vote on and it would be sensible to base BCC recommendations and motions on the advice of an independent expert, rather than just those trying to sell solar.

4. Unless your site has very high CP usage (and sufficient roof space), it is likely that a 30kW inverter would be the largest sensible size per CP NMI connection (National Meter Identifier, i.e. a meter). If the CP loads/circuits are naturally split (e.g. you have two pools or separate areas), and/or if you may need over a 40kWp or 100kWp system, it may be appropriate, and financially preferable, to apply to Energex to create a second NMI. See Section 7 for more details on sizing a system to cover your anticipated solar energy needs, and the Energex requirements (and resultant costs) for large systems. See Section 9 below regarding government incentives - small-scale technology certificates (STCs) for solar systems smaller than 100kW, and large-scale generation certificates (LGCs) for larger systems.

8. Choosing an installer

The Clean Energy Council (CEC) provides accreditation to "people who have undertaken the necessary training to design and install solar, batteries and other renewable energy systems". Despite this, there are still 8,000 accredited installers throughout Australia to choose between! It is essential that the company's staff you deal with have accreditation not just as retailers, but designers and installers too.

Advice:

a. **Relationship -** Investing in a BC solar project is a potential long-term relationship, not a one-off purchase/installation. An installer will provide an installation warranty in addition to the panel and inverter manufacturer warranties. You may have to call on them to return to site for repairs either under or outside warranties over the years. It is advisable to have those who install the system/s maintain and clean the panels. Finally, it is possible if not quite likely that, over the years, your solar needs will change. It is advisable to use the same installer to expand your system to add eV chargers, battery storage, etc.

b. **Go local -** Consider how a local company versus a possibly cheaper company based 2 hours away are likely to respond to any post-installation issues. Consider the cost to a solar business of paying an accredited solar installer for 4 hrs or more of travel, plus their time fixing the issue, as well as lost income because they are not installing a new system. How likely are they to remain in business? It is easier and cheaper for the local company to service your system. They strive to maintain their local reputation for quality instals and responsive service.

c. **CEC Designer -** Speak to the accredited designer or installer, not a salesperson. Designers and electricians are not always the best 'salespeople'. They are also paid more, hence installation companies often employ commission-based sales staff. Ensure you explain the commercial nature of the installation and request to deal with someone who will be involved in the designing and installation of the system.

   CEC accredited retailers do not have to have CEC accredited designers within the company. Choose a company that has an in-house designer. Software packages make it easy for anyone to slap virtual panels on your roof online. A CEC accredited designer will have more experience and training and will often use multiple tools to determine not only the best panel placement, orientation, optimal roofs, but also panel and inverter combinations and appropriate stringing of the panels to achieve the best results. The best ones work hard to achieve the absolute best performance from your system and think outside of the box to achieve superior results. Where the BC owns the roof, designers are not restrained to have panels on one Lot's roof going to that Lot's supply.

d. **Subcontractors -** Check that those physically installing the system on the day will be CEC accredited installers, not just non-accredited workers being subcontracted under an accredited company name.

e. **Proven Track Record -** It is easy to say that you can install a system for a BC site, but a proven track record of similar projects with corroborative testimonials is the best way to ensure you partner with a quality outfit. Remember, the installer is likely to provide a 10-year parts and labour warranty for their installation works. It is worth nothing if the installer is not around after a few years. ASIC statistics show over the last 10 years, around 75-100 solar companies cease trading *each year*.

f. **Value, not price -** Remember, this is not going to be a 2-year return on a cheap imported residential system designed to last 8 years. Cheaper companies do not plan large margins to cover return visits to resolve problems.

They want to do a job once rather than to keep spending unpaid time fixing mistakes. Getting them to return unpaid under their warranty can be difficult. Avoid the sweetness of cheapness - it soon wears off. As a volunteer BCC purchasing a BC asset projected to last 20-25yrs, ensure you make the good decisions at the beginning.

9. Choosing equipment

Introduction

> "Ausgrid data from 8000 solar PV systems shows that approximately **51.8%** are not performing to capacity"
>
> *'Performance lessons from the real world' - SunWiz 2012*

> "Sinovoltaics' quality engineers (whilst undertaking panel quality inspections for solar farms) found major micro cracks in **53.6%** of inspected solar module orders…This defect affects the power output of the entire string in a standard string inverter system"
>
> *'Purchasing PV modules? The most common defect to avoid' - De Rooij, 2019*

i. Volunteer committee members tend to have little expertise in solar and little time to devote to researching the most appropriate solar technologies. Such technologies are always advancing. How are BCCs supposed to advise on particular solar components to their owners, bearing in mind the performance issues that appear to exist in >50% of systems?

ii. Committee members do not wish to be held responsible for such choices and solar performance.

iii. Engagement of an independent, insured, impartial consultant's opinion is encouraged, to be used to support BCC decisions and recommendations to owners.

iv. A system appropriate for a residence is not necessarily appropriate for numerous Lots in a community scheme. A successful solar for strata system is one that creates as little ongoing work or concern for BCCs as possible. Yes, this means employing expert third parties and a resultant reduction in net revenue for the BC, but the net returns are still very attractive and should not be reliant on volunteers carrying out specialist work.

v. Systems that provide online monitoring platforms accessible by On Site Management, solar installers, BCMs and BCC members are very valuable. Depending on the size of the installation, those with panel-level monitoring and automatic alerts warning of underperformance are worth the investment, for security and peace of mind: knowing that the solar installation is performing as projected or, if not, that at least an expert has been notified that action needs taking.

a. Solar equipment

i. Inverters

1. Solar inverters convert the photovoltaic (PV) panel-produced DC current into the AC current we use in our homes and businesses. They are usually the size of a briefcase or suitcase and can be floor or wall mounted and kept indoors or out (though if mounted in direct sunlight their lifespan and performance is reduced, due to high temperatures).

2. Inverters come in a huge range of capacities. Most homes have 5kW – 10kW inverters. For installations over 30kW generation capacity, Energex requires Grid protection and RPEQ engineering. They may be granted a 15kW - 30kW export limit (or zero export), depending on the local distribution capacity.

3. The government's Small-scale Renewable Energy Scheme, and Large-scale Renewable Energy Target create financial incentive for individuals and businesses to install eligible equipment such as solar power systems. This is achieved through the creation of small-scale technology certificates (STCs) for solar systems smaller than 100kW, and large-scale generation certificates (LGCs) for larger systems.

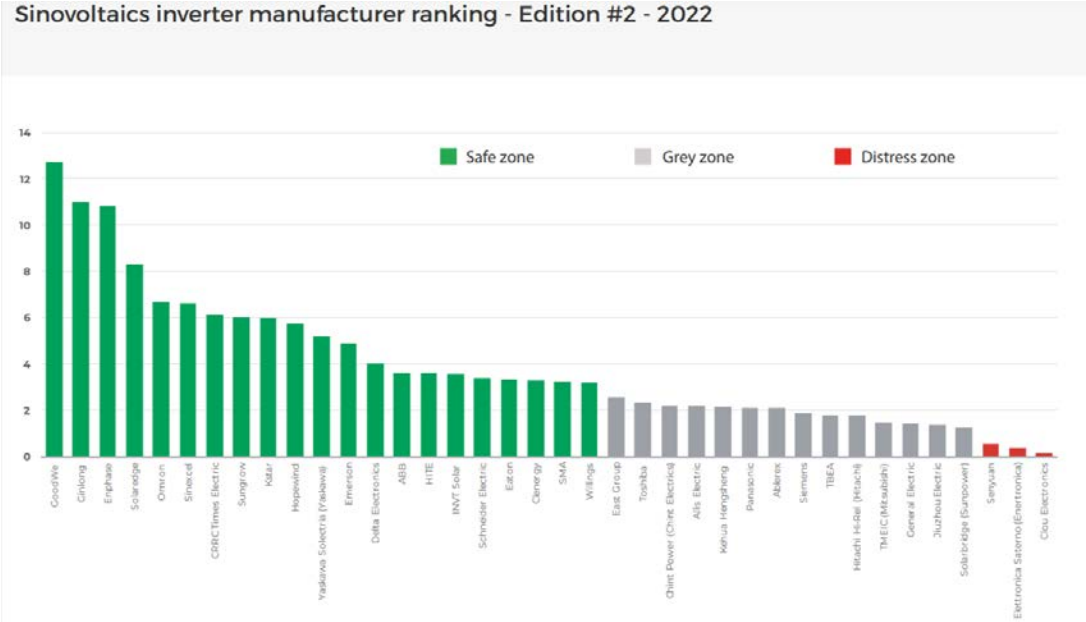
4. STCs (which reduce in value every 31 December) are provided "up front" for the system's expected power generation from the installation year until 2030 when the scheme ends. This renewable electricity replaces electricity generated from non-renewable sources.

5. Generally, customers who purchase these systems assign the right to create their certificates to an agent in return for a lower purchase price. The level of this benefit differs across the country depending on the level of solar energy typically generated in that location.

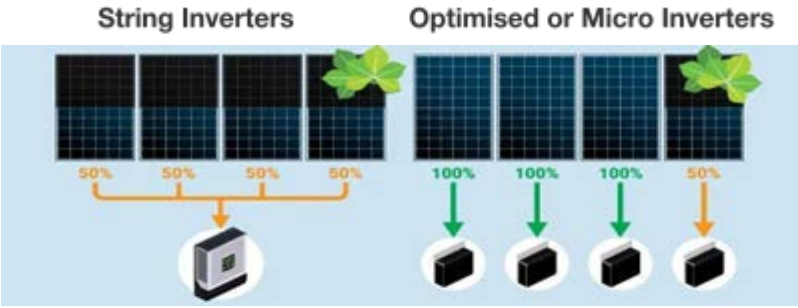
6. STCs can be created following the installation of an eligible system, and are calculated based on the amount of electricity a system produces or replaces (that is, electricity from non-renewable sources).

7. To be eligible for STC's the inverter must be able to convert no less than 75% of the panel nameplate capacity. For example no more than 6.666kW of panels on a 5kW inverter; no more than 40kW of panels on a 30kW inverter, etc.

8. BC solar projects are essentially commercial projects, regardless of whether the buildings are residential. Committees should choose ***quality*** over cost to reduce performance issues and future, avoidable investment of (volunteer) time, *though high cost does not necessarily equal high quality.*



9. *String vs Optimised or Micro Inverters*
   Most 'Tier 1' inverters are in a similar price range. An often-quoted choice is between the type of technology: string inverters vs optimised inverters vs micro-inverters.



Production - If something obstructs one panel on a string inverter, the output of all panels in that string drops to that of the lowest panel. So shade, leaves, etc can have an impact on production. Optimised or micro inverted systems cost more, but the non-soiled panels continue producing independently. This means more production, plus less frequent cleaning testing and maintenance requirements due to the minute impact of these issues across the system.

Awareness - There are pros and cons of each system. In a BC project with a large number of panels, optimised and micro inverters can provide automatic alerts when output drops and locate the exact panel/s being affected. This reduces time and expense searching for the fault. With the other systems, you may never even know there is a fault, never mind the expense incurred searching for the fault before trying to fix it. Whether the additional cost of optimised and micro-inverted systems is worth any claimed increased generation is the crucial question, with proponents on either side.

solaredge.com

ii. <u>Panels</u>

Reputable panel manufacturers with an Australian presence (alphabetical, by price)

This chart points to the relative *cost* of these reputable panels, not necessarily the *quality*.

Remember that within each brand there are panels that cost more or less, depending on quality.

1. *Performance*

   a. All panels vary in performance, and all degrade over time. They come with ***performance*** warranties that panel performance will not drop below 80% over a 25-year period. PVEL undertakes independent testing of panels.. They test their ability to withstand thermal cycling, damp heat and mechanical stress.

	2022	2021	2020	2019	2018	2017	2016
Jinko	●	●	●	●	●	●	●
Trina Solar	●	●	●	●	●	●	●
Hanwha Q CELLS	●	●	●	●	●	●	●
JA Solar	●	●	●	●	●		●
REC Group	●	●	●	●	●	●	●
GCL		●	●	●	●	●	
LONGi	●	●	●	●	●	●	
Suntech	●		●	●	●		
Adani/Mundra	●	●	●	●	●		
Astronergy	●	●	●		●	●	
Seraphim	●	●	●	●		●	

   b. Better quality panels offer better performance for longer. However, the more important panel warranty is the ***product*** warranty (25-30 years) covering defective materials or workmanship in the manufacture of the panel. This covers a faulty panel, rather than accepted panel degradation.

   c. To be able to compare apples with apples, it is important to know that most panels sold are “P-type” panels. Increasingly, newer “N-type” panels are being recommended. They are more efficient and degrade slower than P-type panels, but are more expensive. Make sure to compare like for like.

2. *Warranties*

   a. Systems with long warranties, from companies with an Australian presence and with high bankability ratings, whilst again more expensive, give a BC the best chance of a successful, long-term outcome.

   b. Inverters are typically warranted to last 5 - 12 years. Some also provide some level of labour compensation for the replacement costs. Extended warranties can often be purchased at contract stage, or can often be purchased up to a year after installation. Optimisers come with 25-year warranties. Other components such as smart meters and Isolators only come with 1 or 2 year warranties but are not very expensive and can be replaced as required as part of the system maintenance schedule.

3. *Cleaning and Maintenance*

a. Surprisingly, panels do not need cleaning that often. Rain washes off most dust, dirt and bird mess for panels at an angle of 10° or more. Over a few years, however, dust, lichen or mould build-up can occur at the bottom edge of the panels which is certainly worth removing during routine solar inspection and maintenance. Your site's panels would be >10° and would therefore not be cleaned too well by the rain alone.

b. As discussed above, optimised or micro-inverted systems suffer much less generation drop from, say, leaf debris. The cost of cleaning the panels may outweigh the efficiency increase of cleaner panels. Commercial cleaning companies offer deionised demineralised water (leaving less salt/mineral residue) but any efficiency increases are very minimal. Standard cleaning rates are around $10/panel, but combining washing with a maintenance inspection is more cost effective.

c. It is possible to clean your own panels, however the risks of working at height or electrocution or fire should be noted. The Clean Energy Council does not recommend it, advising that a solar-accredited electrician should test for stray voltage and proper grounding and test the modules' insulation resistance and earthing system before the modules are wetted.

d. Cold water on hot panels may cause thermal cycling (one of PVEL's degradation tests), so choose early mornings or an overcast day. Be aware that if your building has rainwater tanks, any mild detergent used will wash into the tanks. As to the debris and bird mess you are removing, remember the rain would wash that into your water tanks anyway.

e. String inverted systems need more frequent maintenance and cleaning to maintain efficiency, the research shows the cost of cleaning too regularly outweighs the increase in efficiency gained. It is worth a BC entering into a maintenance service contract (with the original installer).

b. Storage

This section intends to do no more than skim the surface regarding equipment complimentary to solar. Technologies are progressing rapidly and even solar installers may struggle to keep up, instead recommending those options they are familiar with. This manual focuses on solar, but includes mention of these relevant options.

i. <u>Batteries</u>

1. From the military term for a series of weapons functioning together, a battery is a container consisting of one or more cells, in which chemical energy is converted into electricity and used as a source of power. Electronic batteries are not the only type of storage of relevance to solar and renewable energy, though they are usually first to mind. The idea of storage is a combination of safe keeping and retrieval (of goods, data, energy, etc).

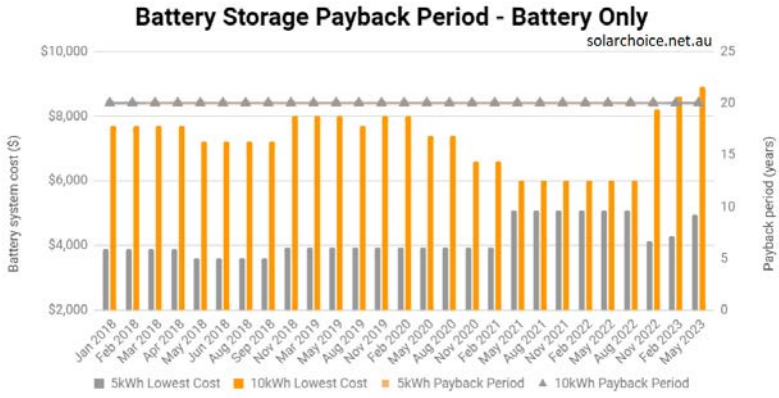
2. Battery storage is possible without solar, but, as with eV chargers, their value is severely limited without solar. Batteries store electrical energy which can be accessed at a later time. In a strata renewables environment, this is usually excess solar energy generated, but not self-consumed. Rather than exporting the excess to the Grid, for limited financial return, solar power can be stored

during solar hours and retrieved after solar hours. This effectively 'extends' solar hours to reduce the amount of Grid electricity needed to be imported in the (evening) peak hours, when energy is at its most expensive, due to demand.

3. Batteries to store solar power at home or in a small business have initially been available in capacities from 2kWh to 10kWh. Whilst batteries have been getting smaller (in size, larger in capacity) and cheaper* for the last 10 years, the industry seems to have been saying "wait for batteries to become cost effective in the next 3 - 5 years" every year since then.

   Are we there yet?

4. Whilst a standard 6.6kW solar system could 'fill' a 10kWh battery in less than two hours (in the absence of other demands) - and then *the battery is full* - the more important question is how long it would take you to empty the battery?



   Rough calculations follow:

- An average household (if there was one) would appear to consume c17kWh/day;
- With families out much of the day, perhaps only 30% of that usage need is in daylight;
- Leaving 70% usage required at night (usually in the first 4 hours after sunset, i.e. peak usage time);
- 70% of 17kWh = c12kWh;
- A 10kWh battery would be unlikely to cover your non-solar hours needs;
- With imported energy at around 25c/kWh, you'd be storing (and saving) c$2.50 of energy per day;
- c$900/pa, leading to payback of the c$8,000 battery cost of…around the same length as the warranty.

Are we there yet? For many households maybe not, bearing in mind, to add a battery to an existing system, you would already have to have a hybrid/battery-ready inverter. Or a Tesla 13.5kWh wall battery costing c$16,000? Not a great, stand alone, financial payback (ignoring the environmental wins for the moment). However, combined with solar installations (which have around half the payback), particularly using the more economical larger capacity commercial batteries, solar and storage for strata is beginning to look feasible.

What is the going return a BC is getting on any spare funds in its LTD account anyway? 4%?

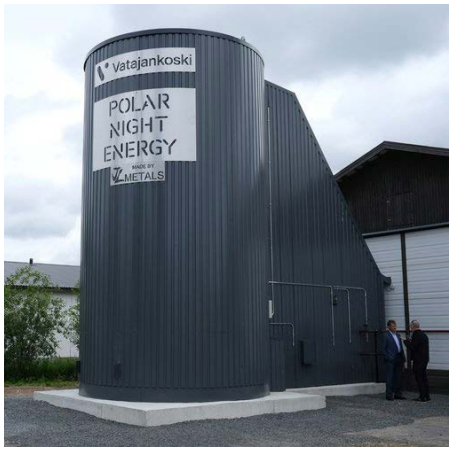
*Actually, in 2022, batteries increased for the first time 'since records began'. The rapid evolution of eVs has led to a huge demand for batteries and their raw materials and components, added to the back of COVID supply-chain issues. Despite this hiccup, BNEF predicts prices falling by a third from by 2026, as lithium prices are expected to ease, with more extraction and refining capacity coming online.

ii. Thermal batteries

1. Most houses already have a very successful thermal battery already - your hot water tank. It stores thermal energy that can be retrieved. Around 20% of average household consumption is heating water. Installing a timer (and maybe reducing the size of the element) to top your "battery" up during solar hours, rather than heating it when required (usually peak hours) is probably the most economical battery on the market. BCs would increase solar self-consumption dramatically, leading to increased environmental and economic returns.

2. Water is not the only useful thermal battery matter. Other materials (such as rock, ceramics and sand) can be super-heated using solar power, to then heat swimming pools (for example) out of solar hours. In 2022, the first commercial sand-based thermal energy storage system in the world started operating in Finland. With an 800,000kWh (8MWh) capacity, it should be able to take the chill off most pools. It pales in the shadow of the Swedish water-based 2,600MWh system, installed in a power plant in Germany, also in 2022 (utilising 56 million litres of water heated to 98°C).

   Where the major public utilities lead, the competitive market often follows…



energy-storage.news

c. eV chargers

This section intends to do no more than skim the surface regarding equipment complimentary to solar. Technologies are progressing rapidly and even solar installers may struggle to keep up, instead recommending those options they are familiar with. This manual focuses on solar, but includes mention of these relevant options.

So, what are you going to do with all that stored power? Perhaps you will need it to cater for those electric vehicle (eV) drivers who think they are driving 'green' vehicles. Unless they have battery storage, trickle charging their eVs overnight will use ("dirty") Grid electricity. (Charging an eV from a battery is not the smartest approach due to energy losses during the power transfer).

i. eV chargers are an excellent offering for holiday guests, or visitors to commercial BC properties. They can increase usage and a return on investment if used in solar hours (and still if outside solar hours, if charged sufficient a rate). Installing this resource would also reduce the carbon footprint of each vehicle (compared to a conventional unleaded vehicle) by 3.85 tCO2e/pa.

ii. Before investing in electric or thermal batteries, think about how many owners or guests are driving eVs to your property - if not now, then certainly within the lifetime of your solar installation. The uptake of eVs is significantly increasing around the world. Car manufacturers such as Alfa Romeo, Audi and Jaguar, state they will *only* be making eVs within the next four years. Mercedes projects that, within two years, 50% of their global sales will be eVs. If all eV drivers are environmentally smart enough to only charge in solar hours, will your site have enough excess generation left to be stored in batteries?

iii. Sizes

Like batteries, there are many different eV chargers. Instead of kW***h*** capacities like batteries, chargers come in kW sizes, as well as AC (single-phase or three-phase), or DC. If you think owners and guests will have the patience to trickle charge their eVs from a mains plug (for 40 hours), fine. However, a 7kW charger will top up 50% of a 50kW car battery in under 4 hours, 100% overnight. A 22kW charger is around 3 times faster. Those wanting superchargers would be better placed looking for alternative commercial sites, rather than BC sites.

iv. Smart options

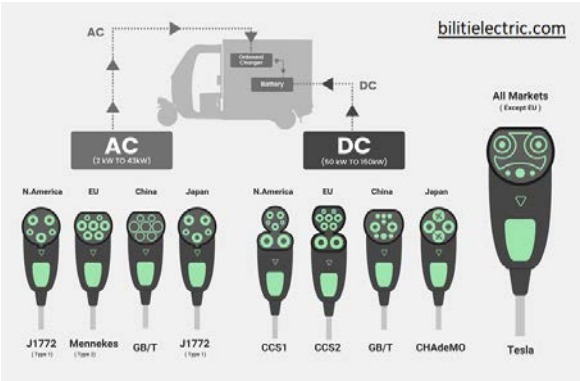
If you think your TV or phone are smarter than you, look what eV chargers can do.

They can charge when you plug in, regardless of whether solar power is being generated, or they can charge only when excess power exists, they can share or prioritise the available load, 'schedule' you for later, put you on hold if you are in no rush and let you know when you are fully charged. They do not make coffee or serve you cocktails by the pool whilst you wait, yet. There are also multiple 'charging' ($ as in billing) options enabling you to on-sell your power to owner-drivers, or give it away free to entice guests…

Ensure your charger is Open Charge Point Protocol (OCPP) compatible, to enable addition of smart software later, as required. Billing options and dynamic load balancing ability to to prevent overloading would be advisable for BCs, as a minimum.

v. Compatibility

Independent charger manufacturers have an incentive to ensure their chargers work efficiently with as many car brands as possible, hence are preferred over car-branded chargers. Whilst many of these chargers *can* charge a range of other manufacturers vehicles, they have little incentive to ensure they update their software or to respond quickly to requests for support if their chargers are not working on another car brand. (It is also essential to ensure that the charger can handle the heat of Australia, assuming most chargers will be installed outdoors. This factor therefore rules out many European-made chargers).



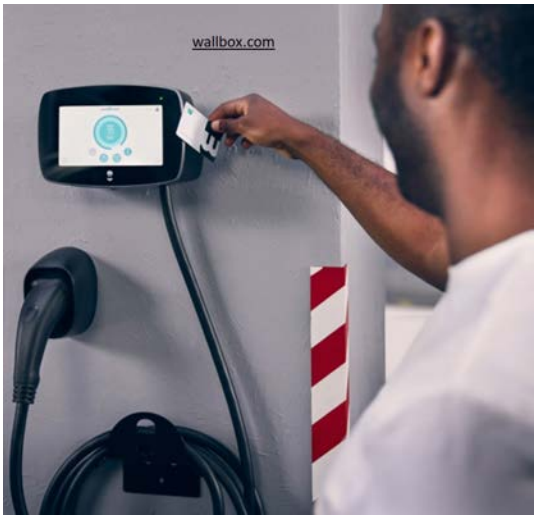
It is not just the software though. There are a plethora of different connectors differing due to current type, charging speeds, car manufacturers, models and regions. Debate continues as to universality plug technology. Nor is it just the connector, care must be taken to ensure the correct charging cable to avoid overheating and cable fires. Type 1 plugs are the standard on Asian cars; Type 2 on European (and Tesla in Australia). Type 2 (Mennekes) plugs are used for AC charging and both the CCS and CHAdeMO for DC charging. Watch this space…and ensure those suppliers tendering for your installation explain and warranty the compatibility of their cables and connectors.

vi. Costs

Installation - Tesla has been known to provide 7kW chargers free of charge to BC sites to encourage adoption and increase charger availability to their customers. But, even free chargers come with installation costs (both cabling in preparation, and installation and commissioning of the charger itself) which will vary due to factors including location and distance from the nearest power source, cable capacity, WiFi network availability and wall or ground mounting. It is crucial to have your electrician determine the load capacity of your system to ensure safety and enough power to keep the lights on the building whilst a car is charging…

Subscription - for the app to enable public billing can cost >$1,000/pa.

Prices - With so many variations available and with the focus of this manual primarily on solar, suffice it to say, for a wall-mounted, water *resistant* (IP54 or better, IP65), three phase 22kW charger, $2,000, plus, say around $1,000 installation and commissioning - say $3,500 would be a reasonable budget figure. Whereas an Ocular IQ Commercial Dual Port Tower could cost you from $13,000 upwards.



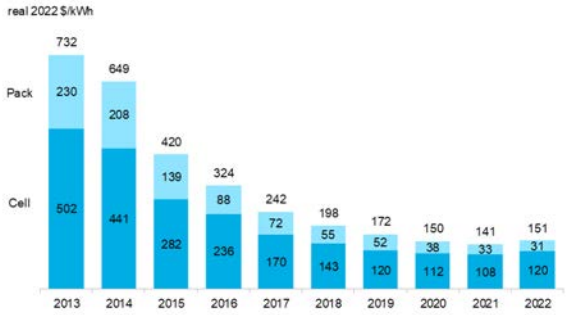
10. The near future

This is just a glimpse into the future, well, nearer than that; the present future? There will no doubt be plenty more developments in the lifetime of your solar system. Electricity usage is only likely to increase in the future (through eVs if nothing else).

a. Battery storage

i. BloombergNEF's annual Battery Price Survey for 2022 illustrated the first rise in lithium battery prices since it commenced tracking in 2010, due to rising raw material and battery component prices and soaring inflation. Despite this, BNEF predicts prices falling by a third from 2022 to <$100/kWh by 2026, as lithium prices are expected to ease (from next year) as more extraction and refining capacity comes online.

Figure 1: Volume-weighted average lithium-ion battery pack and cell price split, 2013-2022



Source: BloombergNEF. All values in real 2022 dollars. Weighted average survey value includes 178 data points from passenger cars, buses, commercial vehicles and stationary storage.

ii. Battery technology continues to develop at a pace, with multiple raw materials being trialled and adopted. In addition, with the increase in use and development of eVs, portable or exchangeable batteries, or cells, may provide a new approach. In Taiwan, there are more battery swapping "ecosystems" than petrol stations, enabling electric scooters to "refuel" in seconds (400,000 times a day) using a more developed "swap and go" system to that of gas bottles in Australia. Imagine one of the battery banks powering your BC property, whilst charging swap and go eV battery cells.
gogoro.com

Getting larger…

b. V2H & V2G car batteries

First you could charge your car from your house, next you will be able to run your house (the H in V2H) from your car battery. Use your eV battery, charged by your solar panels, to power your Lot during after solar, peak hours when electricity prices are higher - a much more practical and economic way of energy storage, compared to home battery costs. An eV has around 5 times more battery power than a standard wall battery. Should the BC be funding owners' eVs instead of looking at stationary battery storage! And then combining them all together would virtually provide a power plant.

Next will be V2G(rid), when you will be able to share/sell your eV's battery power to the Grid, at a profit…

Getting even larger…

c. Community batteries

i. As the name suggests, store solar power to be shared by multiple end users across a community. They are all the news, with the government committing $200 million to roll out 400 batteries across the country, delivering more “affordable and secure solar power” via The Community Batteries for Household Solar Program.

ii. To date, most community batteries are owned and operated by power networks, but community and industry groups, businesses and Councils are being encouraged to investigate and adopt community batteries whose benefits include helping:

- maximise the use of renewable energy a community produces with its solar panels
- change the traditional Grid network by creating mini independent networks *(as distinct from the current one large Grid, vulnerable to storms and floods)*
- the Grid become more sustainable and more environmentally friendly
- make battery storage/renewable energy available to people who otherwise wouldn’t be able to afford it by spreading the costs and benefiting from economies of scale.

They will no doubt become commonplace in BC communities in the near future - certainly within the lifetime of your solar installations. In the Noosa Shire, ZEN Inc. and Noosa Shire Council are both actively involved in expanding the availability of community batteries in the region.

Noosa Community Batteries

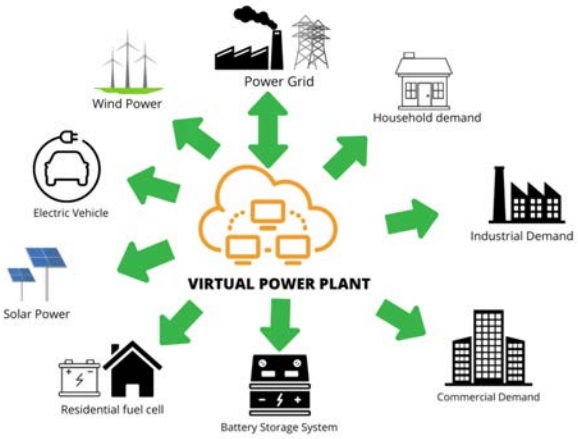

Community battery plans

zeroemissionsnoosa.com.au/news

As big as it gets…

d. Virtual Power Plants

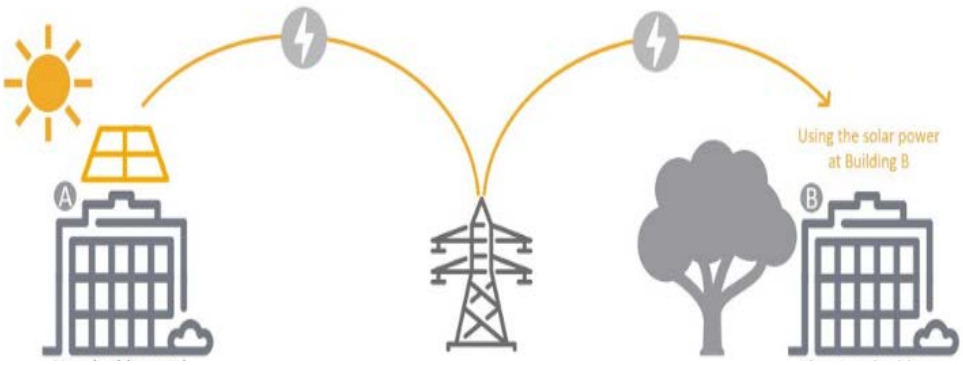
i. A VPP, as the name suggests, is not a real power plant. In essence, the central control room of traditional fossil fuel power plants is replicated through the use of software. A “virtual” power plant is created, consisting of a network of individual distributed energy resources, such as solar and batteries, located in different places.



ii. Those with batteries share their stored clean energy on the network, enabling more people to benefit from renewables. Through aggregation in a VPP, these systems may then be able to participate in trading in the electricity market and providing network services and grid support. To date retailers and governments are the main proponents. Unsurprisingly in the early stages, there is a focus on environmental (including relieving pressure on the Grid, sharing renewable vs fossil-fuel based power, etc), rather than economic benefits to consumers, whilst the retailers make money to be able to fund their investments in research and development. Either way, the benefits of a virtual network not requiring geographical proximity are exciting. VPPs will also assist the development of P2P trading.

e. Peer-to-Peer trading

i. Electricity is a commodity. As time-of-use (TOU) energy rates and TOU FITs become more wide-spread, so too does Peer-to-Peer (P2P) trading of "excess" solar.



P2P energy trading allows electricity consumers with solar to directly sell their excess to other local consumers across the electricity network, rather than just settling for the basic FIT offered by the electricity retailer. Using blockchain technologies enables consumers to place a bid on the blockchain and let sellers turn it into a trade - and vice versa.

ii. It may be a bit early in the piece for BCCs to want to get into buying and selling the BC's excess solar on "the market", but there are already plenty of marketplaces, software platforms, service providers willing to do it for you - and take a cut of the profits, naturally.

Who knows, soon people may be using Gumtree and eBay, ffiver and Airtasker, or maybe uBer electricity "drivers", or AirBnB my solar panels?

11. Monitoring, Metering and Billing Services

To maximise the return over 20-25yrs, and to avoid headaches for volunteer committee members, it is worth contracting responsibilities to professional service companies.

a. Monitoring

i. Some inverters have reasonable monitoring capabilities, though as discussed, string inverted systems are affected by a single panel drop. It is possible (for an extra c$1,000) to install additional solar analytics which indicate whether the whole string is operating within 'acceptable' parameters. It is often difficult to determine whether your system is performing as it should be until after say 12 months of data has been obtained. Remember >50% of systems are under-performing, unbeknown to the purchasers - to what extent is often unknown.

ii. Optimised and micro-inverted systems provide panel-level monitoring, detailing performance as well as errors (and their location and impact). Some even send automatic alerts when systems are not performing to standard. These alerts can be sent to the installer, On Site Management or BCC members or 'solar champions'. It all depends on the size of the installation and the time you are willing to invest.

b. Metering

i. If the BC is simply installing solar connected to the Community Power meter, an inverter-based solar-monitoring system that reports how much solar has been generated may be sufficient (although determining self-consumption rates is important in the effort to achieve energy efficiency).

ii. If the BC wishes to on-sell electricity it needs more than an inverter alone can provide. Even if owners/occupiers agree to pay for electricity based on inverter data, there is nothing to stop them refusing when they learn their legal rights. Previous cases have ordered the repayment of all electricity revenue to date and, once other owners find out, they may be encouraged to do the same.

iii. 'Retail grade' NMI pattern-approved meters must be installed to be legally able to on-sell. Installed, these can cost around $750-$1,000 per meter. They may also need a SIM card (and hence a data plan) to communicate the data to the cloud. This annual data charge may be another operating expense deducted from gross revenue, though is often included in the metering service charge.

c. Billing

i. Your BCM can process Levy Notices, but it is unlikely they have the technology and experience to scrape the cloud for solar usage data and turn it into electricity bills. Billing service companies provide meter reading, billing, payment collections, customer help desk, arrange connections and disconnections, record-keeping and monthly, quarterly and annual KPI reports and reconciliation - worth the $11-$15 per bill per month. Again, this OpEx cost needs to be deducted from gross revenue to determine a net return.

12. Finance options

If there is insufficient cash in the Sinking Fund to pay outright for any system, the BC has the following options:

a. Special Levy

Is the 'cheapest' option, requiring all owners to agree to contribute additional levies in one (or more) year/s. There is, unfortunately, no way to have just some owners agree to pay a Special Levy. Without having to have your BCM calculate the exact figure, determine the approximate Special Levy by simple division of the likely cost by the number of Lots (ignoring any differing entitlements).

b. Strata Finance

Is often available (May 2023 rates c10%).

i. A strata loan is an unsecured loan between the lender and the Body Corporate. It does not attach to an owner, nor the lot, and it does not transfer with ownership change. This is why the rates are high.

ii. Loan repayments are incorporated into quarterly levies.

iii. Loan periods are commonly up to 10 years.

iv. There are no penalty fees for early repayments.

v. Affordability is based upon forward looking budgets of the scheme.

vi. Large deposits in the Sinking Fund (SF) at current deposit rates do not make as much financial sense.

vii. Future interest rate rises should be addressed in the SF Forecast.

c. Alternative Funding

May be available via companies such as the solar installer, ENO or billing partner. This is often simply rolled into the quoted cost of the installation works (though specified in the contract) and is usually around similar interest rates to *strata* lenders.

d. PPA Providers

A PPA Provider may finance the installation and maintenance of solar and even batteries (either behind the solar installer, or independently) over a range of "tenors" (periods) between 2 and 12+ years, for "no money down" by the BC. The BC pays off the installation by paying the PPA Provider a set amount (commonly between 12c-18c/kWh for solar generated). They maintain the system during the tenor, before ownership transfers to the BC. After this time the solar power generated is "free" (save for maintenance and other OpEx costs, such as monitoring, metering and billing, as above).

13. Legal compliance

Those familiar with the strata environment will already be cognisant of the myriad of BC regulations. If the BC is looking to on-sell electricity, in an on-market model, or through an Embedded Network, the various AER 'retail' regulations add a further layer of complexity.

This Manual does not constitute legal advice. The writer intends to give a general description or overview of some regulations which may be relevant to your scheme. He is not providing legal advice. He is, however, advising that you seek professional legal advice on the potential ramifications of a solar project for your BC property. Money can be saved by providing precedent wording to be checked, adapted or adopted and signed off by your legal advisers, remembering a precedent is a slave, not a master. Savings can also be made by choosing the right legal adviser, experienced in both BC and AER regulatory compliance. These are rare, but are recommended over your "usual" BC advisers if they do not have a proven track record (ask them!) in overseeing solar installations, PPAs, licensing agreements, etc.

Whilst this section may be quite dry, it is critical. Apologies for the absence of pretty illustrations to break up the text.

a. BC Regulations

i. BCMs are in the best position to advise their BC clients on BC regulations and to know when they ought to seek legal advice or confirmation. However, the solar for strata subject is a new area and, particularly with solar *revenue* models, new and innovative thinking may be required. Not all BCMs are comfortable or experienced in these areas - again, as with solar installers and legal advisers, do not be afraid to ask your BCM if they have specific, relevant experience - a proven track record, before deciding how much reliance you can place on their (rather than lawyers') advice.

ii. Obviously, the BC must ensure they comply with BC regulations when planning and implementing a renewable energy solution. As mentioned in Section 15, communication and consultation with owners is key. Try to take all owners along on the solar journey with you. Not every owner needs to vote in favour, but an owner disgruntled through feelings of a lack of consultation can be a thorn in the project's side, leading to additional work, stress and delays, which *could* otherwise have been avoided (though there is always one, right?).

iii. BC committees (BCCs) have spend limits over which they must obtain owners' authority at a General Meeting. To avoid the additional costs of an EGM by getting your ducks in a row long in advance of an AGM. Contrary to popular belief, the BCC does not have to have multiple, valid (in length of time for acceptance) quotes down to the very last electric screw, before recommending a motion to owners. The BCC must act reasonably and in the best interests of owners. The BCC is the elected "management board" of the BC "corporation". Owners should not expect to be involved in every last decision, but should trust the BCC, allow them to do the research and then decide if they are convinced by the BCC's recommendations. If those recommendations are based on thorough research and the professional (insured!) advice of a third party expert, owners should have little to be concerned about.

iv. Spending Motions

1. Simple spending motion wording follows, to cover a multitude of situations, to grant the BCC power and some freedom when making final, and fine decisions. The BCC does not want to have to return to owners because the price or availability of 'widgets' has gone up by 5%, nor because the planned cable conduit colour does not look as good as a last minute alternative option (of a similar price, but different colour).

   "Pursuant to s149 of the Body Corporate and Community Management (Accommodation Module) Regulation 2008 as amended, the spending discretion of the Committee is increased to $XX,000 inc GST and contingency for the purpose of {solar*/ renewable energy*} works".*

   *Obviously, amend to fit your scheme's Module and to best describe "the works".

2. It is the Explanatory Wording in support of the motion wording that will get the motion up - and none of it should be a surprise to owners. The majority will have already made up their mind how they will vote before they receive the voting papers. Proper preparation prevents poor performance. Communicate, consult and collaborate with owners if your surveys determine any negativity, opposition or just uncertainty.

3. The Explanatory Wording can explain why the absence of a particular quote or final, definitive figure for owners to agree. Prices change. Quote validity periods expire (particularly when dealing with a BC). Owners do not need to be swamped with copies of three 20-page quotes with the voting papers, or even a 10 page renewable energy consultant's report advising which option to go with. However, those quotes and reports will be on the BC records and can be referred to. Owners can request copies (or access them via an owners' online Portal) and read them if they wish. So long as owners can see that the BCC:

   - has done the research (and shared some of it)
   - can justify the spend *limit* requested (you should aim to give owners "change")
   - shows the projected returns (economic and environmental) expected from that spend, and
   - has based their reasonable decisions and recommendations on that research and advice

   …then most owners should be satisfied (though you only need 75% of *voters*, rather than owners, depending on the size of the project and scheme), *if they understand*. It is the BCC's role to ensure they understand, that it is explained how savings or solar revenue will be made and what will be done with it; why the project is a great idea; a "no-brainer".

4. It is not that the quotes will not have been received and vetted and summarised and recorded on the BC records. It is a question of freedom and control, to enable the BCC room, time and speed to finalise designs, options, prices and contracts, pre-armed with the owners' spend authority. The work has to be done to ensure the spend limit is reasonably accurate and adequate that you will not have to return to the owners with cap in hand for another $1,000. Having that spend authority in advance gives the BCC the best chance to make the best, unhurried and (relatively) unfettered final decisions as the project progresses to installation.

v. Contract Motions

1. If contractual agreements such as to licence owners' roof areas for BC solar, or BC common areas or assets to owners, or BC to owner Power Purchase Agreements (PPA) are to be entered, legal assistance will be required. Again, find a lawyer with a proven track record whose previously drafted agreements fit your scenario. It is easier to get most lease or licence agreements passed if limited to 10 years (special resolution). Remember that the life expectancy of your solar system will exceed that, but an agreement over 10 years is only possible by resolution without dissent.

2. Ensure that if you will need to execute ENM or ENO or metering or billing service provider contracts over 364 days in duration, strictly speaking, you will need owner approval (though this requirement is observed more in breach than compliance - all standard electricity plans or contracts are for 12 months, for example). A large market ESA is likely to be for 2 or 3 years, metering or billing service agreements 5 years and ENO agreements (with or without CapEx funding) 7 - 12 years. Again, motion wording (explained by suitable Explanatory Wording) which gives the BCC flexibility is preferred if final decisions as to providers or final options or costs have not been made. Again, explaining that most quotes are not open long enough to be valid by the time it takes the BCC to receive them, action them, distribute GM Notices and hold a GM may be all the reasoning most owners need - providing, again, that they can see that the BCC has done the research and received expert advice.

3. Your BCM will have standard motion wording giving a member of the BCC the power to sign such contracts (including helpful phrasing like "subject to minor amendments", etc).

vi. Loans/funding Motions

Your BCM will be able to advise and action most of the requirements of a strata loan, and funding via Special Levies. Where an alternative funding vehicle is used, for example a PPA between the BC and a PPA provider for the funding of a solar installation both the BCM and quite possibly your legal team should ensure the T&Cs comply with BC regulations.

b. AER Regulations

The AER's own guidance is actually pretty clear and helpful (though long, expansive and dry), so this section does not seek to repeat it here, but to indicate where to find the relevant wording, if you wish to bother spending your own time on this, rather than relying on experts and legal advisers.

i. Retail Exemption

1. **Registration -** To be legally able to on-sell electricity to owners, the BC must register with the AER its retail exemption. Somewhat surprisingly, in most cases it can be done in a day. There is no application to be accepted or rejected: registration is deemed as exemption. You will soon (or later) hear if you have done something wrong.

Deemed exemption class

Class D1
Persons selling metered energy to fewer than ten small commercial/retail customers within the limits of a site that they own, occupy or operate.

Class D2
Persons selling metered energy to fewer than ten residential customers within the limits of a site that they own, occupy or operate.

Registrable exemption class

Class R1
Persons selling metered energy to ten or more small commercial/retail customers within the limits of a site that they own, occupy or operate.

Class R2
Persons selling metered energy to ten or more residential customers within the limits of a site that they own, occupy or operate.

Class R8
Persons selling electricity as a supplementary supply through power purchase agreements (PPAs) to customers who are connected to the national electricity grid.

2. **Classes of Exemption -** The Retail Exempt Selling Guidelines – version 6 – July 2022 set out 17 classes of Deemed (D) and Registrable (R) exemptions, plus Individual Exemptions, plus the imaginatively named "Other situations" (which refers specifically to the brownfield conversion Model 4 above - see more below).

3. Those relevant to BCs include D1 & 2 (possible D3), R1 & 2 (maybe 3 & 4 re. retirement villages, caravan parks, residential parks and manufactured home estates and R7 for those who commenced selling prior to 1 January 2015), and R8 (for the on-market Model 2 above).

4. Individual exemptions, unsurprisingly, apply to individual circumstances: "to the sale of energy at a particular site and/or to a particular customer (or group of customers). Individual exemptions are intended for more unusual and often one-off arrangements and allow us to tailor the conditions of the exemption to the specific situation" (2022 Guidelines Cl 4.3).

5. The "Other situation" relates to network conversions - Model 4 above. As mentioned, you will need to comply with the requirements of the Network Exemptions Guideline (2018. A 2023 Version 7 is awaited), in addition to this Retail Exempt Guideline. As a retrofit changes the way occupiers take electricity supply at a site and their supply choices, they must be consulted and have their concerns heard and addressed as fully as possible. Occupiers "explicit informed consent" to the proposed retrofit and the proposed energy agreement must be obtained. The Network Exemptions Guideline sets out the marketing campaign required to be undertaken. For a residential (cf a commercial) BC site, an Individual Exemption needs to be applied for, irrespective of whether you have the fully informed consent of all affected residents/tenants. 85% of occupiers have to agree before applying to the AER to convert the network. "Applications for exemption, as a result of a retrofit, must therefore pass a high level of scrutiny" (2022 Guidelines Cl 4.4). Hence why it is recommended that a novice BC contracts a commercial ENO to undertake the application, registration and conversion to an EN.

6. **Conditions -** Do not let the simplicity of registration of a Registerable Exemption lull you into a sense that your work ends on registration. The AER prescribes varying conditions (depending on the type of exemption you have) that must be complied with "designed to protect customers" (2022 Guidelines Cl 8.1). Failing to comply "is considered a breach of [the National Energy Retail Law 2021] and can attract significant civil penalties…A failure to comply with exemption conditions may therefore attract, for body corporates, maximum penalties the greater of $10 million, three times the value of any benefit reasonably attributable to the contravention, or 10% of the annual turnover of the body corporate" (Cl 8.2). Ouch. It is fortunate that the majority of conditions are relatively easy and simple to comply with, and that the BC would rely on an indemnity from its service providers (or, more likely, their insurers) for any breach.

7. Conditions do vary in their application to the different exemptions (very few, for example, apply to R8, the on-market Model 2 example).

ii. Network Exemption, Registration and Transfer

1. The AER warns that allowing anyone to take electricity from wiring you the BC owns, operates or controls constitutes "operating a private electricity network" which is "illegal without permission". It is clear that

Model 3 and Model 4 constitute a private network, but it is questionable whether the BC operates a private network in the case of Model 2 above, where solar is installed onto the Energex network.

2. If the BC is eligible for a deemed or registrable retail exemption it will also need a network exemption if it is operating a private network. The AER administers both the network and retail exemption processes. Although the exemptions are separate, either or both exemptions can be registered on the one AER form.

3. As mentioned above, ensure your Model 3 has been properly registered before agreeing to transfer it (and obviously ensure that the Model 4 EN is registered after jumping through all the hoops!). Network exemptions appear on the AER's Public Register of Network Exemptions. If it has not been registered, and you cannot persuade the incumbent ENO to register, you will need to get the new ENO or the BC as ENO to register.

4. There is also a Public Register of Retail Exemptions on the AER's website. Whilst you will receive a standard email when you register your exemption, it may take some time (and some badgering) before your site registration appears on the Public Register. It is worth pursuing to ensure you have evidence of the registration.

14. Commonly experienced challenges

a. Imbalance between usage and production

i. Some sites have high usage and restricted roof space.

ii. Some sites with lots of roof space and low usage.

iii. Virtual Power Plants (VPPs) and Peer-to-Peer (P2P) Trading will (eventually) assist with these challenges.

b. Compliance upgrades

i. 80% switchboards and meter panels are not compliant with today's standards.

ii. Such works should be seen as preparatory works, not simply "solar" costs.

iii. Such works are rarely included in Sinking Fund Forecasts.

iv. Difficulty obtaining quotations from contractors who are busy doing paid jobs, rather than free quotes.

v. Differences between meter locations/distances from roofs to meters.

vi. Need to compare likely CapEx costs, and long-term returns on investment, of each of the Models.

vii. Optimistic that Environmental Upgrade Agreements will (eventually) assist here (and strata solar generally).

c. Lack of control of the EN

i. Ignorance of alternatives to ENO solar proposals (which may not adequately advantage BCs).

ii. No guarantees that energy rates offered will remain competitive after the first 12 months.

iii. If the BC wants to become the EN), there are no guarantees that the network is registered or compliant.

d. Taking on responsibility

i. Some BCC members do not consider that recommending a solar/renewables project is within their duty to act in the best interests of the owners (despite recent suggestions by BCCM Adjudicators (in "Artique, 2021") that BCCs should be more "proactive". Perhaps BCC members ought to be paid if they are going to be criticised too heavily for not being "more proactive"?).

ii. Any sizeable successful solar project to date has relied on a "solar champion"; a solar enthusiast willing to lead, push, cajole, encourage and enthuse the BC to put whatever effort is required. It is helpful, though not fatal, if that solar champion is on the BCC. You can imagine how enthusiastic and encouraged such a person would be if, after all their work, the BCC decided it was not interested in a solar project.

iii. Perhaps the owners, rather than the BCC, should be asked whether they favour a solar/renewables investment, and its potential resultant savings and solar revenue?

15. Communication with owners

Whilst this advice comes towards the end of this manual, it is one of the most important factors to be considered by BCCs. You know your owner community better than anyone, however, communication with owners can be key to the success of a project. Ensure owners feel that they have been involved, consulted and collaborated with and taken on the solar journey from the beginning and you will know the results of the General Meeting before the votes are even in.

a. Ensure emails emphasise to owners that they are being communicated and collaborated with (so they realise).

b. Emphasise that the emails are coming from the BCC even if being sent via the BCM.

c. Invite owners to get involved (even if it is just chasing other owners for copies of electricity bills, etc).

d. Use 'Survey Monkey', or similar surveys, to record owner support/get owners to agree that a strata solar project is a "no brainer". The BCC would then use the results to illustrate owner support and preferences in future communications and use the survey mandate to make the rest of the detailed decisions on owners behalf.

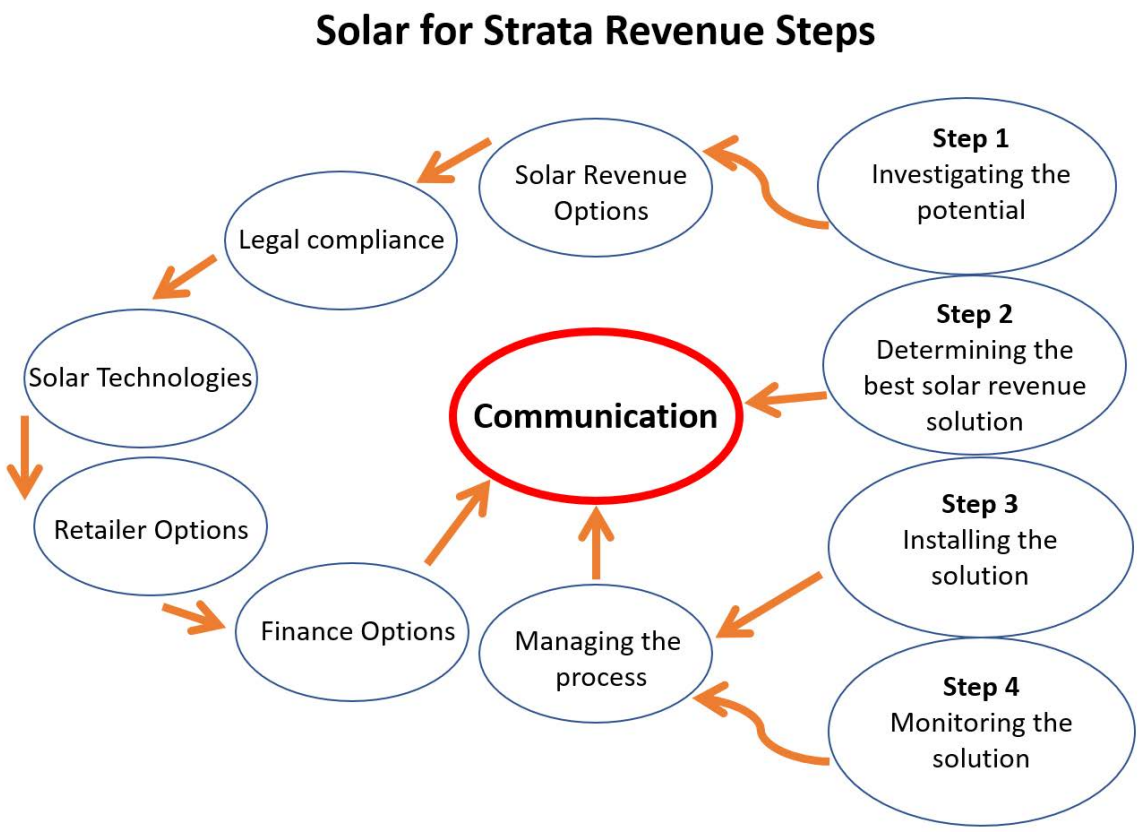
e. The BCC is elected to run the BC on behalf of and for the benefit of all owners: it is akin to the Board making decisions on behalf of shareholders. The BCC should be communicating and being seen to be communicating, even if it is not actively necessarily encouraging all owners to get involved in detailed decision-making concerning panel look, placement, installers, etc. Such projects need not and cannot involve all owners in the minutiae, in any but the smallest schemes.

f. Initial Feasibility Reports are not intended to be sent to all owners in full. They are intended to inform the BCC of the initial feasibility of strata solar to give them credence and confidence to incur costs and investigate further due to the projected possible outcomes. A second stage, fully detailed consultant's report, tailored to the property, would be needed and made available to owners to support the Committee's recommendations at a General Meeting, to seek approval of the project.

16. Next steps

Solar for strata is a complex area, but so is renovating a swimming pool or replacing rotten timbers in balconies. Volunteer BCC members should not be expected to be across the nitty gritty of the ever-changing solar scene. BCCs are entitled to rely on expert third experts to help make decisions, in the best interests of all owners. BCCs will find most owners are supportive of solar projects, particularly if there is no cost to them and particularly if there is a potential revenue stream.

For those visual learners, it is hoped that the following visual is useful - and better late than never.



Step 1 - Investigating the potential

It is unlikely that a BCC would be criticised for carrying out initial investigations into solar feasibility at its property. A Feasibility Assessment from an independent expert (rather than the electricity retailer or solar installer seeking to sell its services), with a proven track record, could be of huge environmental and economic potential for your site. A feasibility assessment would usually be based on the following investigations:

- Discussion of the BC's drivers for installing solar: environmental and economic: the aim for a sustainable tourist destination, savings on overheads and reduced pressure on levies whilst repaying finance for resort upgrades;
- A site visit to determine the layout of the site: location and compliance of meters, switchboards and distribution boards; and length of cable runs from panels to meters;
- Online consideration of potential location, size and potential generation of solar system/s;
- Modelling various solar layouts using various technologies and solar revenue options;
- Considering indicative costs for installing solar and/or creating an Embedded Network (EN), upgrading metering, data transmission, monitoring, billing, reporting, management, and maintenance.

Recommendations in such reports are usually based on limited investigations (due to cost), and reasonable assumptions that would need to be tested by further, more detailed investigations, such as roof inspections, engineering advice, etc.

Step 2 - Determining the solar for strata model

Assuming the Feasibility Assessment is positive, the BCC could obtain a full renewable energy consultancy report, which is likely to be within the BCC's spend authority. Such a report should be tailored specifically to the vagaries of the BC site, and based on site-specific data, rather than industry assumptions (such as usage data, for example). Deliverables in such a report should include:

- A site visit:

  By various experts (as necessary) to determine:

  - compliance of meters, switchboards and distribution boards; load capacity;
  - roof type, ground type and cable runs from panels to meters;
  - best solar design options.

- Impartial advice to committees regarding:

  - detailed recommended solar or solar revenue solution/s, their costs and their projected returns;
  - recommended finance options specific to the project;
  - regulatory and legal compliance specific to the project.

  …sufficiently detailed to enable the BCC to feel confident in recommending a renewables project to owners.

Step 3 - Installing the solution

Assuming the owners authorise a renewables project, it is not just a matter of getting the first solar installer available to just slap the panels on the roof. The BC may need assistance to manage the implementation of your chosen solution. Such costs, just like standard project management costs on any other building project, are effectively added to the project costs. Yet, unlike other building projects, a renewables project ***earns*** rather than ***costs*** money, even if the gross returns are reduced by expert advice and management. Where would the project be without it?

The BC may benefit from assistance with the:

- Tendering Stage - for installers, ENOs, ENMs, billing partners, funding partner, etc, writing scopes, considering and advising the tenders to put the BC in a position to advise owners as to the available solution
- Pre-Installation Stage - drafting motion and Explanatory Note wording for solar, service partners, finance, etc. to support recommendations to owners, drafting applications to the AER, considering contract terms for installers and service partners, etc, including conditions re. export, engineering, Energex applications, and PPAs; maintenance, monitoring and warranties, etc
- Installation Stage - managing the timing and installation of works; liaising with billing partners in the management of solar data and billing and with BCMs in the accounting and monitoring of solar revenue.

Step 4 - Monitoring the solution

Completion of the installation is not the end, only the end of the beginning, of the solar project. Solar should continue to deliver for 20+ years, with appropriate monitoring, cleaning and maintenance. However, the system performance, and suppliers need managing and monitoring to secure the best results.

- Monitoring Stage - calculating, reviewing and advising on solar income generation performance vs projections, energy rate options, load-shifting and energy efficiencies, solar self-consumption and export plus the resultant financial impacts, wholesale electricity pricing and retailer plan options.
- Future advice on any further stages of renewables, e.g. solar or battery storage (electrical or thermal), eV chargers, VPPs, P2P trading, etc, etc.

A renewables project is not a one-off sale, but a long-term relationship.

Summary

As seen by the length and depth of this Manual, solar for strata is a complex subject, but consider the possible returns. The BCC does not need expert knowledge or experience, but needs to know what steps may be involved in the process and what questions to ask of its experts - be they renewable energy consultant, solar designers, installers, electricians, engineers, ENOs, ENMs and other service partners.

The BCC does not have to (and is advised not to) take the solar journey alone, nor hack a new path through the woods. The trail has already been blazed, help is available and more and more solar for strata projects continue to proceed and succeed.

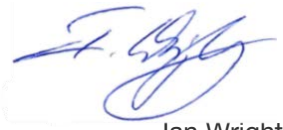
Each site, model, design and project will be different, will take different times to deliver and will deliver slightly different results and returns on investment, depending on the number of lots, roof type and orientation, age and compliance of current electrical instalments and on the site's drivers. Despite this, as a final attempt to assist (and persuade you all to champion solar for strata - for the environment, and for the economics), the draft Action Plan below covers the usual steps a BCC may take. Independent, experienced advice is available, but the decision whether to follow it is yours.

Draft BCC Action Plan

1. **Investigate the potential:**
   - Obtain a solar for strata Feasibility Assessment.
2. **Determine the best solar for strata model:**
   - Obtain a detailed, tailored solar consultant's report on solar for strata solutions
3. **Keep communicating and collaborating with owners throughout.**
4. Installing the solution:
   - Invite proposals from Embedded Network Operators, solar installers, PPA Providers, strata lenders, metering, billing and any other service partners…

   …to be put to the owners at a General Meeting.
5. **Calculate the impact of solar on the Sinking Fund Forecast and cash flow, and Admin Fund budget.**
6. **Draft motions for a General Meeting to recommend the strata for solar solution, including:**
   - Authorisation to spend, and to sign supplier agreements (electricity retailer; ENO; metering and billing provider; solar installer, solar maintenance contract; strata or PPA financing, etc).
7. **Sign-up to the agreements authorised at the General Meeting.**
8. **Keep communicating and collaborating with owners throughout.**
   - Deliberately repeated from 3. above.
9. **Monitoring the solution.**

*Any solar is good, environmentally, but why not make all BC solar be good economically too? Solar **revenue** for strata.*



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