LG
Life's Good

Commercial Solar Explained

A step by step guide

LG Solar

Check out: LGenergy.com.au or
call LG Solar direct on 1300 152 179

Contents

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Why this Guide?

Solar systems can differ widely in quality, sophistication and future performance resulting in a wide range of financial and environmental outcomes.

This guide has been developed for interested owners of commercial buildings ready to consider solar together with procurement managers of larger private and government organisations.

It will outline the steps required to purchase a quality solar system and explains the issues and considerations to be taken.

It has been written to achieve the following goals:

- Help maximise financial savings;
- Improve overall asset value with a strongly backed system;
- Offset future energy price increases;
- Create an environmentally positive impact, through the generation of renewable energy and CO_2 abatement over the system life.

1.1 Getting appropriate advice

In the case of large and complex projects such as shopping centres, logistic warehouses, cool rooms etc. the scoping, sizing and modelling work is best done by a professional such as an experienced independent solar consultant (ISC) or solar engineer. For smaller and less complex projects the solar company should be able to undertake the full assessment and installation process.

LG Solar can assist you in securing such services by contacting us via **solar.sales@lge.com.au** or by calling LG Solar Direct on 1300 152 179.

We work with a range of approved solar companies and independent energy consultants Australia wide and can guide you in the right direction to start your solar journey.

Key Tip

A commercial solar system purchase can be complicated for the inexperienced. Therefore learning as much as possible about the process and the traps is advisable. An energy consultant or experienced solar installer can help you in the process.

LG Solar commercial partners are reputable companies capable of installing some of the most complex solar projects. To find out more information about the companies we recommend please visit the LG commercial partner finder at **lgenergy.com.au**

02

Solar Project Stages

It is important to understand the different stages of a solar system project so that the right decisions can be made at the right time. This staged and considered implementation approach will increase the chances of a successful project outcome.

2.1 Concept design and system size

During this stage an assessment of the energy needs and drivers of a solar project will be taken into consideration in order to match these with site conditions, existing electrical infrastructure, system location and space requirements.

It is very important that the existing electrical infrastructure and grid connection is assessed for suitability and capacity for a solar connection. For a roof mount system, a structural engineering check needs to be conducted to ascertain the suitability of the roof to take the extra weight of the system. As for ground mount systems, a geotechnical assessment will be required. A more detailed list of compliance requirements, standards, regulations and approvals required to install commercial size solar power systems is presented in the next section.

In order to determine the appropriate system size, it is important to highlight that each business has unique needs and energy consumption patterns that may vary daily, weekly or present seasonal patterns. For this reason each system needs to be tailor designed after an energy assessment has been completed.

This energy assessment should include a detailed analysis of existing energy usage and predictions of future electricity needs. The final assessment will deliver energy modelling to maximise the full benefits of any solar system and this may include battery storage. The next chapters will explain in more detail how energy modelling is performed.

Key Tip

Each business has unique needs - for this reason each system needs to be tailor designed taking into account the specific site and the local energy assessment.

LG bifacial panels

2.2 The bidding process

Usually with large projects, the client, after project scoping and determining all requirements, issues a Request for Quotation (RFQ).

This process would be best managed in partnership with an Independent Solar Consultant (ISC) to ensure a competitive quote and outcome. The ISC can assist with analysing the completed submission.

The analysis includes specific criteria such as the products and warranties offered by the solar company, project delivery plan, price and system performance.

In addition, previous experience in delivering similar projects, detailed lists of inclusions, long term support, output warranties and so on should be part of the assessment.

The next chapters will explain in more details what "Tier 1" means and how a system performance estimate works and the traps that could be linked to it.

Key Tip

In order to minimize risk, it is best if the components and expected system performance are clearly specified in the tendering document.

This will ensure the proposed solution is assessed based on the investment vs system performance and not only based on upfront cost.

Most tenders only specify "Tier 1" products, leaving room for inferior product with costly long term consequence.

2.3 Hidden cost factors when installing solar

2.4 Building the solar system

Once the tendering process is completed it is time to start building the solar system. The winning company will need to submit a request to connect the system to the grid and ensure all compliance and technical requirements are well covered before attending the site for installation.

At the end of the construction stage the Distribution Network Service Provider (DNSP) may attend the site for inspection and will energise the system, providing the installation was done according to requirements. At this point the system will be in full operation.

In the case an ISC was appointed to manage the project, it is also their responsibility auditing site safety aspects, managing quality control and ensuring proper staff training and system documentation occurs before completion and handover.

It is also important to develop an appropriate monitoring and maintenance schedule for future years, to ensure the most beneficial long term outcome.

2.5 Project stages to achieve a long term beneficial outcome

STAGE 01

Starting off
- Long term goals
- Purchase drivers
- Desired outcomes
- Get expert help

STAGE 02

Planning
- Scope the project
- Size the system
- Financial modelling
- Permits

STAGE 03

Procurement
- Develop specifications
- Gain quotes
- Compare quotes
- Select winning tender

STAGE 04

Engineering
- Detailed design
- Obtain approvals
- Compliance check

STAGE 05

Installation
- Warehousing/logistic
- Safety aspects
- Quality control
- Construction

STAGE 06

Commissioning
- Start-up procedure
- Training staff
- Manual handover

STAGE 07

Ongoing Operation
- Maintenance regime
- System monitoring
- Performance analysis

STAGE 08

Outcome
- Successful project
- Satisfied client
- Risk managed
- Maximised benefits
- WIN WIN

03

System requirements and financial modelling

Most customers seek to purchase a tailor-made solar system to match energy demands. This is achieved through detailed energy consumption information and modelling against solar generation to ensure the appropriate system size is installed.

3.1 What solar system will benefit my business most?

While a top quality solar system might cost a little more upfront, it usually delivers more energy generation each day which results in higher savings on your energy bill.

For this reason the financial returns are typically to be better than cheaper solar systems which generates less energy and therefore lower savings. Another benefit of investing in a top quality solar system is the long term reliability and increased value of your premises with a bankable asset.

Companies investing in a low quality solar system with the intention of replacing it in around 10 years will soon find out the cost of energy generation is higher than grid electricity when the opportunity cost of capital is taken into consideration.

Unfortunately this approach increases the amount of waste generated by poor quality components as more solar panels are discarded and often not even recycled. This is also a poor environmental outcome.

Key Tip

The long term financial benefits of a commercial solar project depends on determining

- the optimal product to use,
- solar system size and design,
- the delivery method.

The product choices such as which solar panels and inverter technology to use are crucial to ensure the best project outcome.

LG NeON® 2 have 12 wire bus-bar with excellent temperature performance and a 25 year product warranty. They are LG Solar's most popular panel in Australia.

3.2 Working out system size via performance modelling and interval data

In order to determine the financially optimum size of a commercial solar system there needs to be an evaluation of the current electricity usage pattern as well as future energy needs.

This means a detailed current energy consumption and load data analysis should lead to the development of a performance model for the solar system.

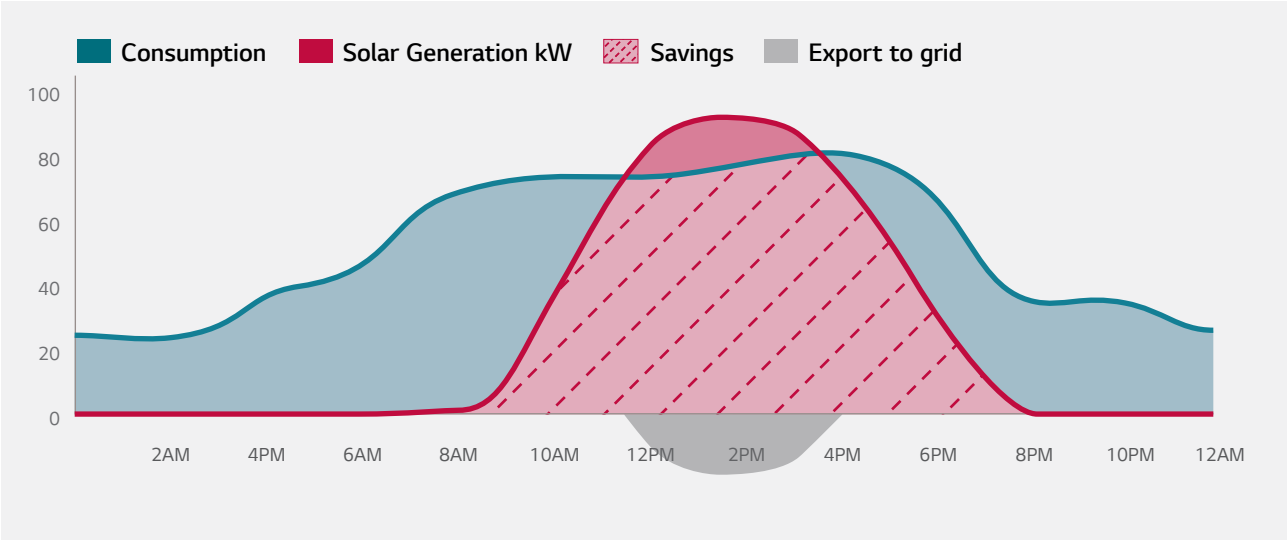
In most cases this consumption data, known as interval data, can be obtained from your electricity retailer.
The data shows electricity consumption in 30 minute intervals and details the patterns and changes over each day, week, month and season.

This interval data can be used to undertake detailed modelling so that future output of the solar system matches as closely as possible with your electricity demand.

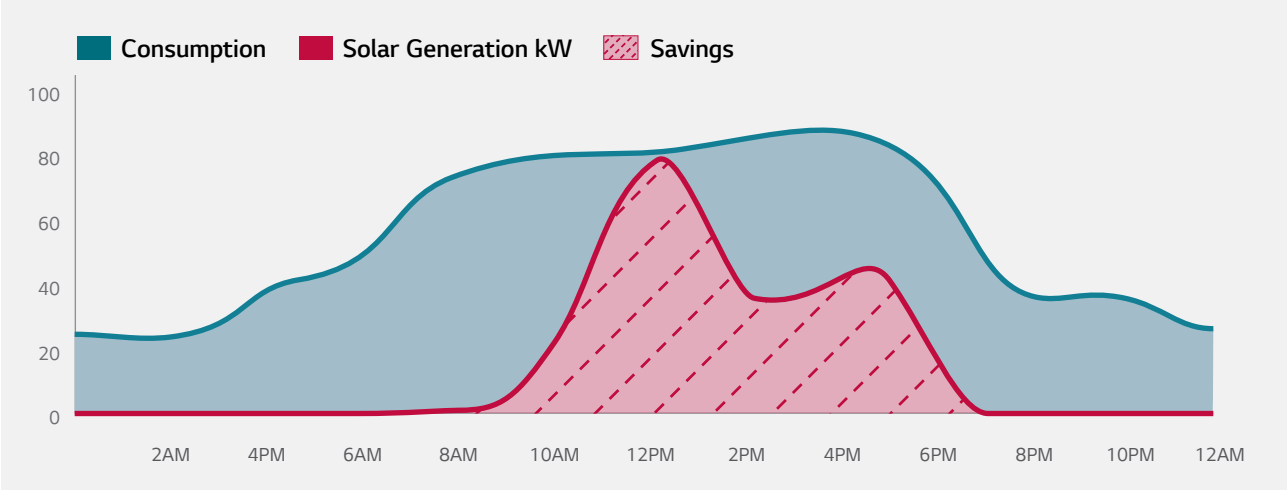
This is important because if the system is oversized (too big), you would have invested in electricity production which can not be utilised. If on the other hand the system is designed too small, then you have not maximised the full savings potential.

An ISC or experienced engineer can assess your business energy needs. The final recommendation can be presented as per graphs below.

Sample Summer Day - Sunny



Sample Winter Day - Cloudy



3.3 Financial modelling

A financial modelling exercise takes into account solar panel degradation over time, future replacement costs for failed panels and inverters, maintenance costs and potentially changing electricity tariffs in the future.

Simple payback calculations are often used by solar installation companies in their quotes. This is a method applied in the residential consumer market as a simple way to represent financial value. There are however several limitations with this simplistic method which could add risk to a project.

Key Tip

LG Solar product warranty includes panel replacement and labour support for commercial projects.

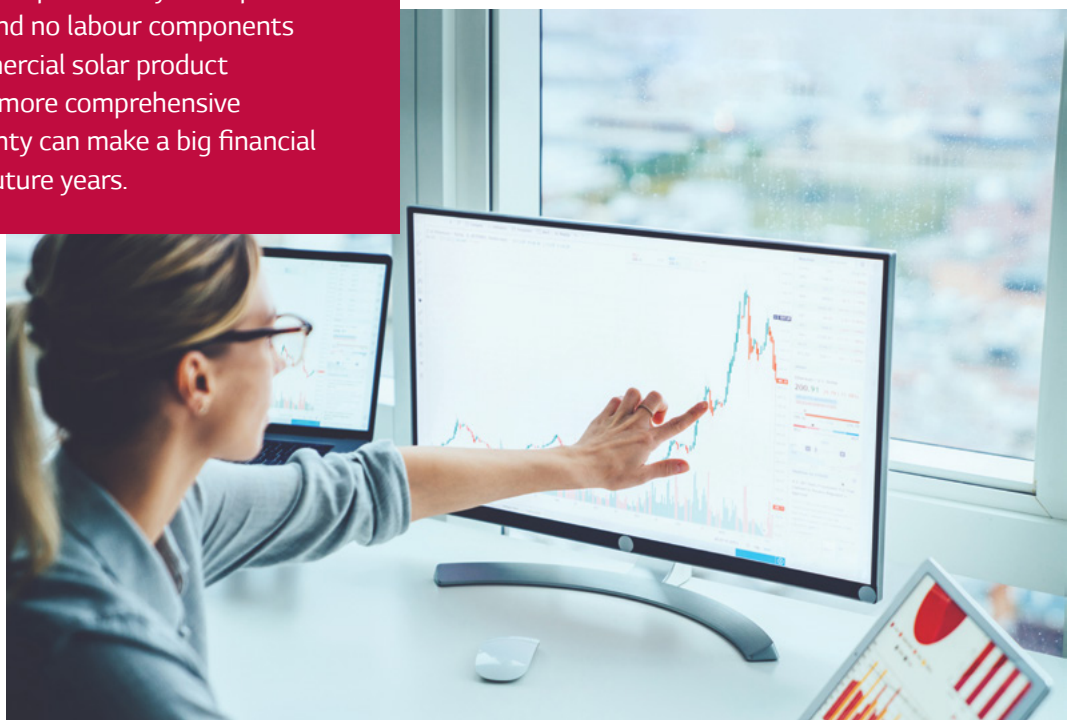
Many competitor panels only offer panel replacement and no labour components for their commercial solar product warranty. This more comprehensive product warranty can make a big financial difference in future years.

3.3.1 The simple payback method

Using the simple payback period method considers only the upfront capital cost to implement the project divided by the first year revenue once the project is up and running.

A simple payback period indicates how long it takes for the project to "break even". There are limitations to this method as it does not take into account solar panel performance degradation, the lifespan of panels, the replacement labour costs in case of early failure and inverter replacement costs or maintenance of the system.

Note: The panel warranty of many cheaper panels only covers the actual physical panel to be replaced but not the re-installation.



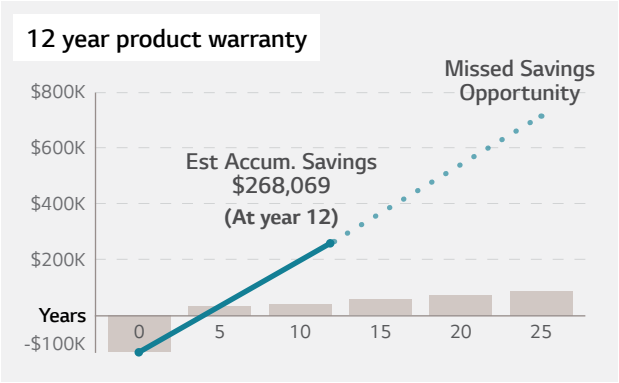
3.3.2 The Net Present Value (NPV) method

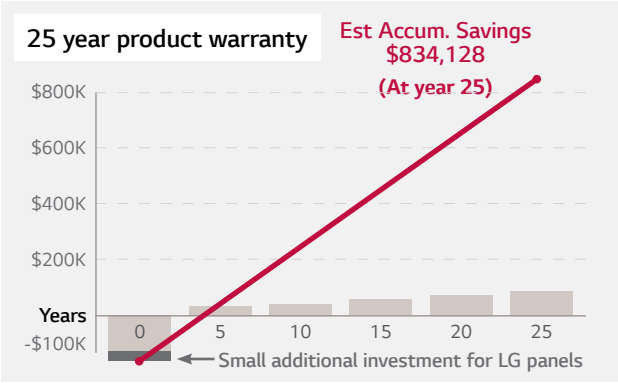
Under the net present value method, all cash flows, both project revenue and costs of are considered, for the life of a project. The value of future cash flows get adjusted to reflect their value in the present day.

This adjustment is done via a "discount rate" that takes into account inflation, the risk of the project and the cost of capital. The present values of all the positive and negative cash flows are then summed up to determine the projects net present value.

If financial returns are assessed based on product warranty, LG is likely to deliver much greater savings in comparison to panels with say, a 12 year product warranty. As per graphs below, for a 100kW system in Sydney the payback period an LG NeON® 2 system is only a relative short period longer, but the warranty period is often twice as long and potential savings can be more than double.

Simple Payback Method Sample



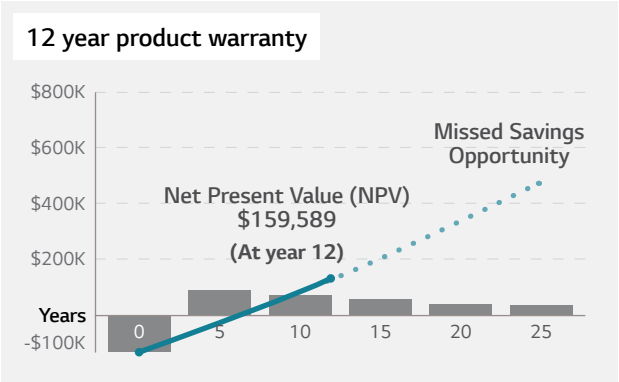


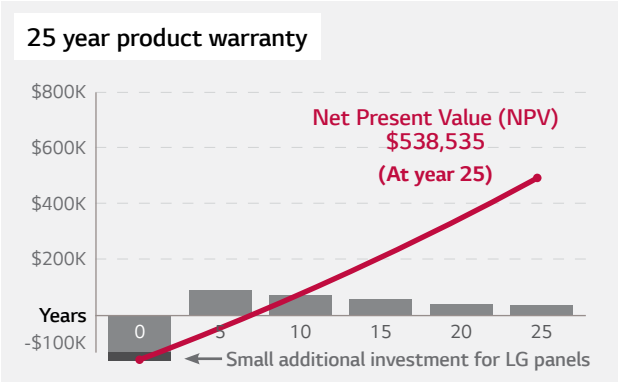
Simple Payback Method - Annual Savings Accumulated Savings, Standard Panel Accumulated Savings, LG Panel

A system which has panels with 12 year product warranty, will most likely return a lower saving than a system with 25 year product warranty panels, as the savings should only be calculated based on the product warranty years, as this is usually relative to the expected lifespan of the panels.

The solar panel performance warranty alone does not provide the same certainty as the product warranty for cash flow calculations. Once the solar panel product warranty expires the uncertainty of cash flow makes the investment riskier and less attractive.

NPV Method





NPV Method - Annual Savings Accumulated Savings, Standard Panel Accumulated Savings, LG Panel

A small additional investment in LG panels will provide the certainty of 25 year cash flow for your project, resulting in a better financial outcome. Due to LG Solar's longer years of product warranty than standard panel warranties, along with better performance and lower degradation, the LG solar panels are likely to generate more energy and for a longer period of time than standard panels. LG can assist in developing financial analysis for your project. Please contact us at **solar.sales@lge.com.au** or **1300 152 179** for more information.

3.3.3 The importance of diligence in financial assessments

The simple payback method does not take into account any future running costs to the project nor does it account for the changing value of future revenue, system breakdowns due to poor quality components or the cost of capital.

The Net Present Value (NPV) method can take all future costs into account which includes potential premature solar module failure and associated replacement costs over the project life, inverter replacements at end of their life and degradation of solar panel performance over time.

Other methods used for calculating financial returns for large commercial projects would be the Levelised Cost of Energy (LCoE), which is the cost per kWh of electricity generated, taking into account system purchase and running costs.

3.4 What to watch out for – performance modelling

There is a range of software used for performance modelling and the level of accuracy of this assessment could vary depending on the type of software used as well as the panel and inverter product specified. Other performance modelling variances could come from varying the expertise in assessing and inputting product specifications into the software as well as the accuracy of site specific information such as local weather data and installation aspects.

Due to a number of specific technological features including exclusive patents, sophisticated and stringent manufacturing process, the use of N type of silicone, LG's NeON® range solar panels will regularly deliver higher performance estimates for a project, resulting in more energy generation in comparison to less efficient panels.

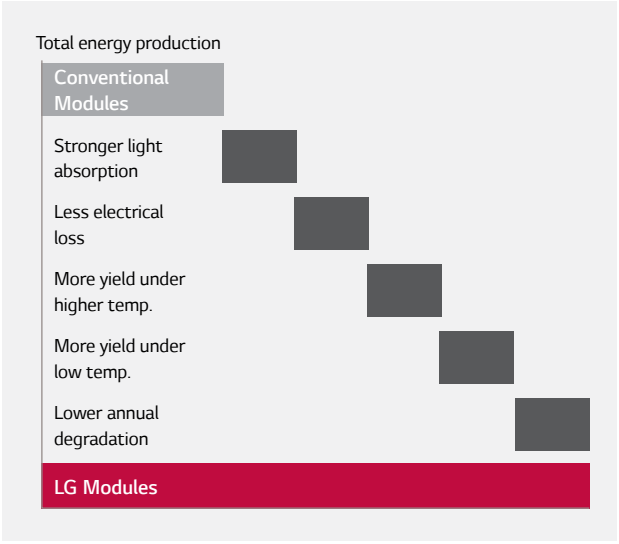
The benefits of LG panels will be extended if the solar system is coupled with high quality and high performing inverters from leading manufacturers, such as SMA, Fronius, Solaredge or Enphase coupled with modern monitoring software.

Independent parties such as Choice Magazine or DN VGL and LG solar partners are running comparison systems in Australia and overseas, some of them for many years. In these systems LG panels consistently outperform competitor modules by between 3 and 10%.

Key Tip

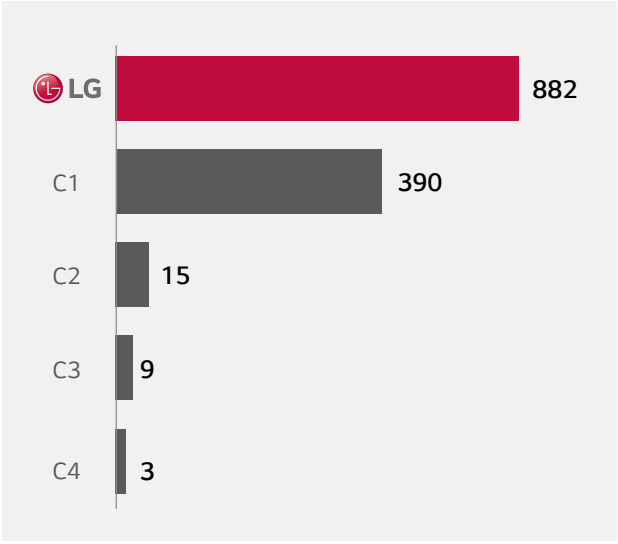
The benefit of a quality 1st approach to the project are better long term financial results.

Why LG panels can produce more electricity*



* Not to scale.

Patent applications from Tier 1 solar manufacturers**



** Period 2009-2020.

Much of the software used for performance modelling will not translate with accuracy into the real performance of LG's NeON® 2 technology. Its advanced patented technology, high quality material used in the manufacturing process and stringent quality control are some of the factors that aren't fully understood by software developers or solar engineers. In the independent test performed by DNV-GL, LG panels delivered 8.07% more energy than the performance estimates as per graph below.

Key Tip

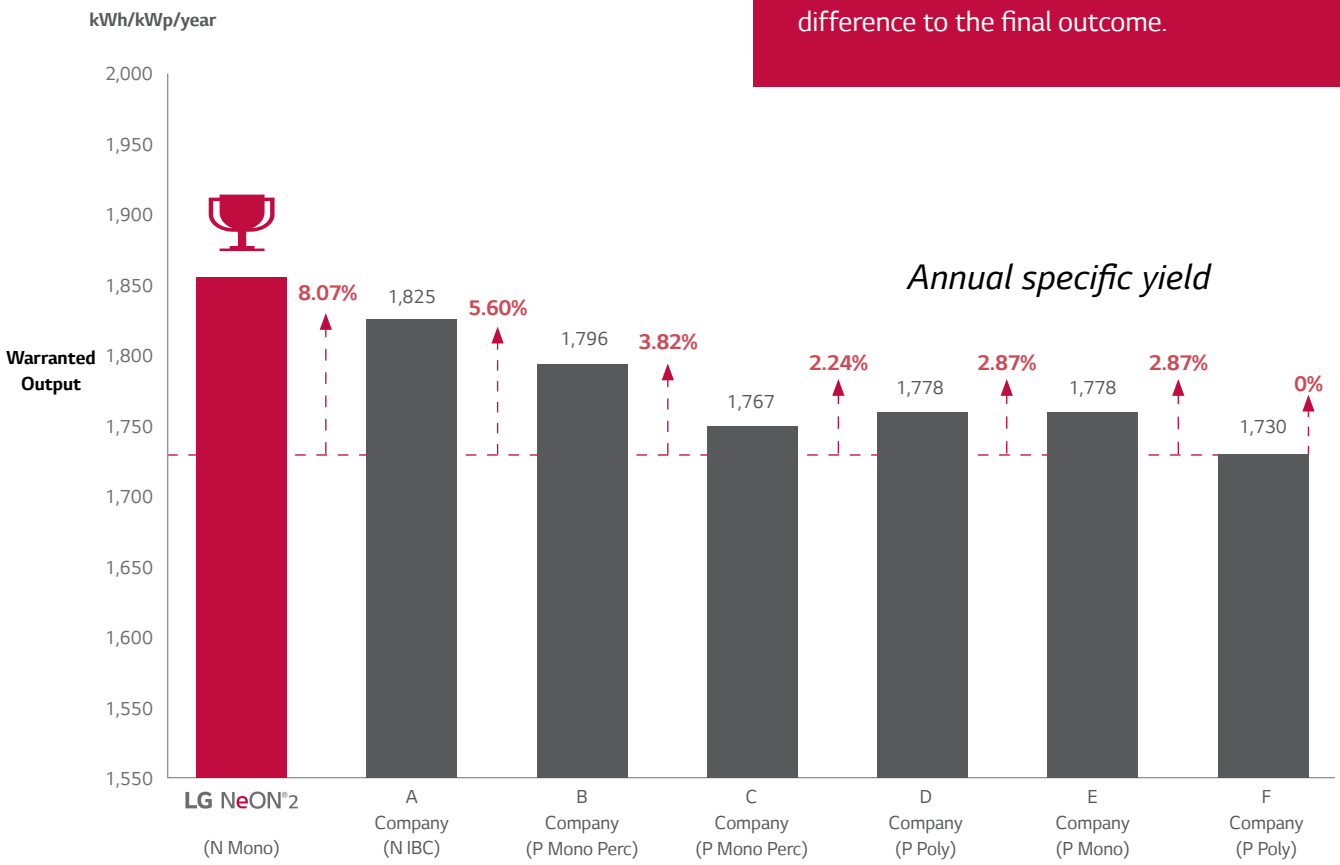
When the real life performance of the panels and inverter is taken into account to create a business case, the best performing technology will deliver better financial outcomes.

Key Tip

It is common to find solar companies overestimating low quality solar systems outputs in order to show better financial returns. Therefore, the ISC advisor you select and the products specified to be part of your solution can make a great difference to the final outcome.

Third party field test

The NeON® outperformed warranty specifications in a field performance test the NeON® 2 running for a whole year.



Project information

- Test party: DNV GL
- Test period: 12 months (2017.09 - 2018.08)
- Test bed location: David, CA, US (38.5, -121.7)
- System size: 6 modules / model
- Racking: Ground mount (30° tilt)

Test sample information

- Samples were collected by DNV GL
- Selected as competitive models in the commercial market
- Product configuration

: P Type Mono PERC : 2 / P Type Mono : 1 / P Type Poly : 2 / N Type Mono : 2

- All data was collected at the same time

04

Billing, finance and rebates

4.1 How to read your electricity bill

Electricity bills for large market customers are often complex and not easy to understand. However, for a proper financial assessment this data is important to be considered and used in the financial model by the ISC.

4.2 Energy, network and other changes

The various charges are categorised into energy, network, environmental and other. Energy charges relate mainly to the cost of supplied electricity and are charged per energy unit used (kilo Watt hours, kWh), at different times of the day. Electricity consumption during specific periods being peak, shoulder and off peak are charged at different rates.

For commercial customers network charges are often a substantial part of their bill. Network charges relate to the cost of operation of the electricity network and are partly also charged per energy unit (kWh) used at different times of the day.

Depending on your distribution network service provider (DNSP) various capacity charges are also imposed. They are called demand charges and relate to your maximum energy demand, the peak consumption, during a defined period and vary by region.

In other words, you are charged for the maximum amount the network needs to provision for you. A single large maximum demand occurred once in a month can define your capacity charge for the month or even an entire year, depending on the applicable definition in your region.

Key Tip

The potential for peak demand charge reduction is limited due to the complexity of factors involved. A solar only system could provide some reduction, but it is difficult to guarantee it. If your solar company is not explaining this complexity be cautious.

4.3 Feed in tariffs (FIT)

For larger solar systems, your electricity retailer might not offer much of a feed in tariff to purchase exported excess electricity from you, or they may offer none at all and limit the export opportunity for large systems.

It is important to understand this and consider it in the financial modelling to size a solar system to achieve a minimum amount of solar export. However, a financially optimised solar system might be sized to export electricity at certain times even with a zero feed in tariff. It may for example export energy in summer to have sufficient solar energy for self-use in winter.

An ISC or solar engineer will be able to help you navigate this challenge.

4.4 Finance options

Purchasing a solar system cannot always be financed out of existing cash flow. There are financing and leasing options and all have cash flow impacts, risk and tax considerations.

It is also possible not to acquire the solar system but have it owned by a third party who sells you the generated electricity at a set rate. This is called a Power Purchase Agreement (PPA). As with any finance option, a PPA will see a "middle man" introduced, who makes a margin. In summary the right finance solution needs to be assessed from different perspectives and you need to understand all relevant implications to make the best decision.

Key Tip

Only sophisticated financial modelling will be able to calculate the optimum solar system size to maximise your financial return.

4.5 Renewable Energy Certificates ("rebates")

Renewable Energy Certificates (REC's) can be created via the Federal Government's Renewable Energy Target (RET) Scheme. These effectively can reduce the cost of a solar power system, as they are a kind of "rebate".

Solar systems up to 100kW capacity are eligible for Small Scale Technology Certificates (STC's) which can be redeemed immediately. They therefore form an attractive discount off the upfront capex cost.

Larger solar systems (above 100kW) can be registered as power stations under the RET scheme and can generate Large Scale Generation Certificates (LGC's).

These LGC's are created monthly or annually and can then be registered and sold according to actual metered solar generation on an ongoing basis.

However, the long term LGC target in the RET has now been reached and thus the value of LGC's has decreased substantially and is predicted to be close to zero going forward. STCs and LGC rebate calculations can be undertaken by the ISC or the solar installation company.

05

Choosing the right solar panels and inverters

High performing and reliable products as well as good quality installation will secure you the best financial outcome over time and reduce any liability for your organization and the environment.

5.1 Product considerations

The longevity and thus maximised savings over future decades depends to a large degree on the selection of solar panels and inverters, as well as the quality of the installation.

The local representation and set up is an important consideration in choosing product, as long term warranty support depends on the manufacturer's long term commitment to Australia.

Since 2013 close to 400 solar panel manufacturers have left Australia, creating an avalanche of solar systems without the promised long term warranties.

There is a large variety of different inverters and panels available. While the differences are sometimes hard to identify, the bandwidth of features, performance and quality is much larger than "what meets the eye", i.e. all panels look very similar. It is a "buyer be aware" market and getting professional advice is often a wise decision.

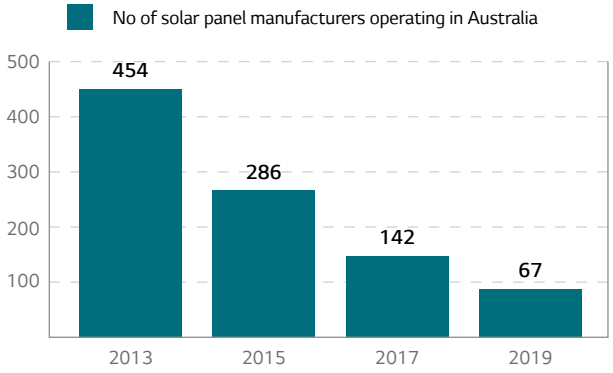
Fewer and fewer Solar Panel Manufacturers operating in Australia

The graph below show the number of manufacturers offering solar modules with 25 year performance warranty, registered by the Clean Energy Council – indicating how many have come and gone – leaving customers very exposed.

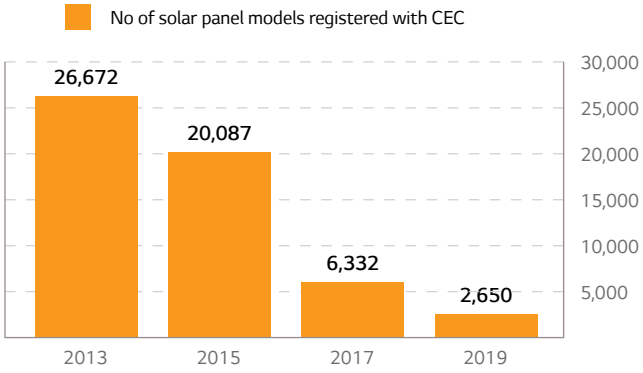
Panel models listed on CEC approved list declining rapidly

The drastic reduction of solar panel models means over 20,000 panels offered for sale only a few years ago are now not supported and have no warranty.

Reducing Number of Solar Panel Manufacturers
2013 - 2020



Vastly Reducing Number of Approved Solar Panels
2013 - 2020



The detailed assessment of the brand, company size, financial standing, holding of patents, global track record reputation, warranties, internal research and development, location of manufacturing, vertical integration (i.e. do they produce everything in-house or do they only do the final assembly) are just a few indicators a professional would use to ascertain the true level of value of a chosen solar panel or inverter.

Failed Tier 1 panels

Key Tip

The Tier 1 label is wrongly used in the marketplace as a means to promote quality assurance of the solar modules that retailers and manufacturers want to sell, when in fact the Tier 1 status relates purely to a loosely defined bankability score.

5.2 Are Tier 1 panels good quality?

Bloomberg New Energy Finance (BNEF) has developed a tiering system for solar panel manufacturers.

This tiering system is based on bankability (the willingness of financial institutions to finance six commercial solar projects in total) to create a differentiation between the hundreds of manufacturers of panels on the market.

Unfortunately this tiering system has no relationship to build panel quality or financial viability of the panel manufacturer.

To clarify the definition: Tier 1 module manufacturers are those which have provided own-brand, own-manufacture products to six different projects (1.5MW and larger), which have been financed non-recourse by six different (non- development) banks, in the past two years.

As can be seen from the definition, there is no direct link to the listing on the Tier 1 list to quality, performance, research and development, warranty, local customer support, longevity or any other important indicator relating to long-term outcomes for the solar panel customer.

Therefore, it is important to specify product based on the manufacturer history and reputation as well as local service and support. Only such Manufacturers with long term financial stability and a strong ongoing presence in Australia will most likely be there to support any future long term warranty claims.

In the words of Bloomberg New Energy Finance

> *"We strongly recommend that module purchasers and banks do not use the Tier 1 list as a measure of quality, but instead consult a technical due diligence firm."*

5.3 How "green" are solar panels?

Solar panels can be a great investment for many reasons. They save you money, but they also reduce emissions and provide environmental credentials while making you and your customers feel good about it.

However, there are differences in the environmental benefits as the energy used in the manufacturing and lifecycle process of solar systems needs to be assessed.

The energy used for manufacturing, transport and installation of a solar panel is referred to as the embodied energy in the panel and will be paid back after the same amount of energy has been generated by the panel over time. This is called the energy payback time.

In Brisbane, Australia, the average energy payback of a 380W NeON® R panel for example is approx. 1 year 15 days as opposed to a standard 330W panel which takes 1 year 4 month to create the energy to manufacture the panel, approx. 25% longer.

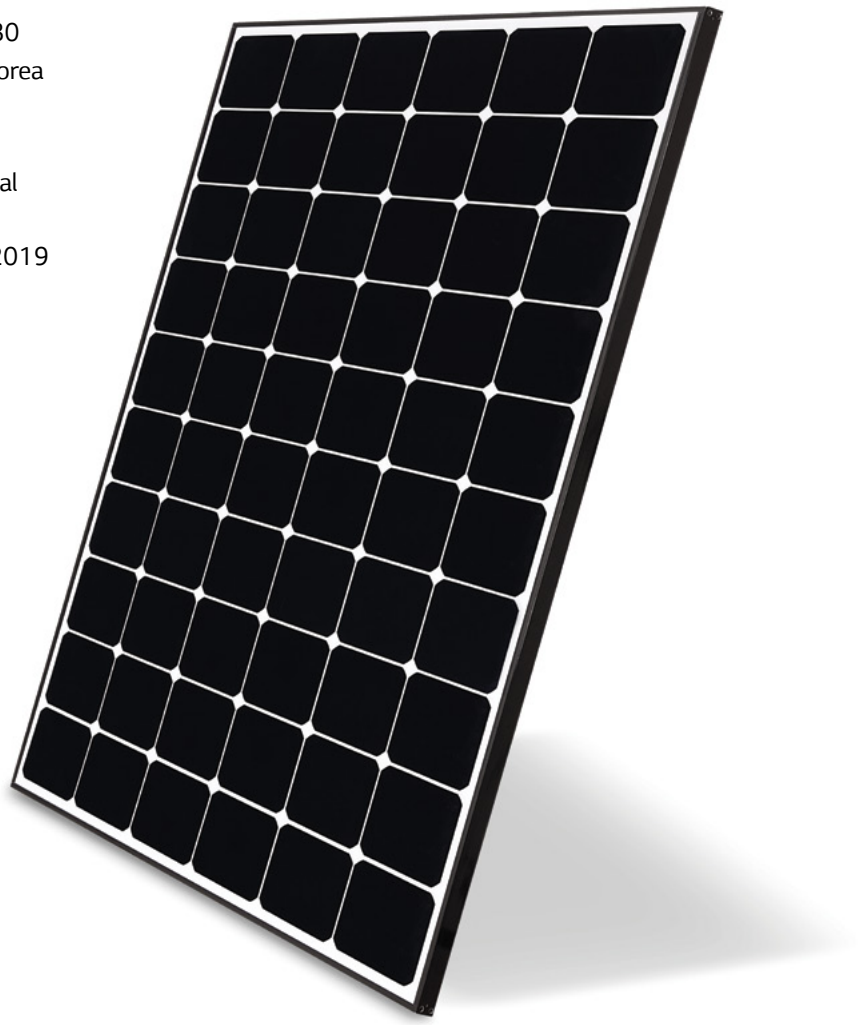
LG has recently declared to be carbon neutral by 2030 and their solar panel manufacturing plant in South Korea is powered by 30% renewable energy.

Also, LG Electronics (LG) was named one of the Global 100 Most Sustainable Corporations in the World by Corporate Knights for the third consecutive year. In 2019 LG ranked 30th up from 65th in 2017.

Key Tip

Because LG panels are also built to last longer, this means each LG panel can create more clean energy during its working life than panels designed for a shorter life span.

Therefore LG panels often generate higher environmental benefits compared to less efficient, shorter lifespan and faster degradation panels, as they use a similar amount of raw materials in the manufacturing process.



LG NeON® R - a premium panel

LG Electronics

Strong backing by a large, international and diversified manufacturer

LARGEST
Consumer Brand
operating in solar in Australia and NZ.

More than
1.2 MILLION
solar panels sold in Australia & NZ since 2010

Operations in
140 Countries

Founded in
1958

Revenue (2019)
53.47 billion USD

Global Workforce
72,600

5.4 Reliable long term support

The installation companies for commercial solar systems while giving the impression of having long experience and providing solid workmanship are only as viable as the ups and downs of the solar industry. Changes in solar rebates, feed in tariffs and lately the COVID-19 crisis have meant commercial solar installation companies have been at the mercy of economic realities.

Many, once well known, commercial and residential installation companies in Australia have already gone, leaving behind thousands of customers. Their installations languish without workmanship warranty, and potentially costly future exposure for system owners.

In addition a number of solar panel manufacturers, who in their day where sometimes one of the largest in Australia have exited the local market including Rene Sola, Hareon Solar, LDK, Munsterland Solar and German Solar. This means the relationship with a reliable long lasting component supplier such as LG panels is more important than ever to ensure long term warranty support.

LG Electronics with close to AUD $1 billion annual turnover in Australia and NZ and more than US $54 Billion worldwide is the largest player in the industry, offering a strong reliable long term product and performance warranty.

5.5 Inverter solutions and balance of systems

In terms of life expectancy, high quality string inverters will typically need to be replaced between 10 and 15 years, depending on the quality of the product as well as design aspect and maintenance activities in place. Cheap inverters may fail much earlier.

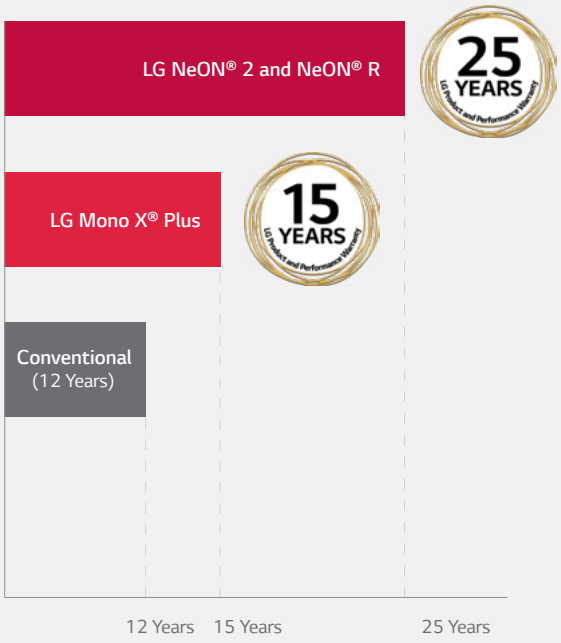
In regards to panels, this key component is usually overlooked when it comes to useful life and many projects do not allow for cost of panel replacement, even when using panels with only 10 years product warranty. Many projects will rely purely on the performance warranty which can be very limited in the event of product failure, and often is a legal nightmare to claim.

The Warrantor's 2019 Sales in Billions of US Dollars*

*2019 Annual Financial Statements of all company income - not only for solar

The larger the income level, the larger the funds backing the warranty.

Product Warranty



LG provides an industry-leading warranty covering both products and output, ensuring high efficiency and ultimate output performance. This excellent assurance is a testament to the confidence that the module provides more energy, reliability and savings over time.

06

Operation, monitoring and maintenance

While solar systems have no moving parts and are fairly self-sufficient, they are an asset and are exposed to the elements. In order to protect the daily income stream systems should be looked after and maintained, just like other company assets. Otherwise you risk that they will underperform and may decrease revenue without notice.

6.1 Regular inspections

The operation and maintenance manuals provided by your system installer should contain a schedule for regular maintenance, such as visual inspections and cleaning.

Clean solar panels can convert more light into electricity, so a panel clean might be worthwhile if they get too dirty, for example after a dust storm or bird droppings. Another consideration is dirty inverters, for instance in a dusty environment inverters can lose some cooling capacity, leading potentially to power derating and premature failure.

6.2 Monitoring and troubleshooting

An online monitoring and fault reporting system is strongly recommended. This will allow for ongoing asset management and a maintenance regime. This proactive approach will provide increased safety and helps to optimise the financial returns.

Simple monitoring solutions are inbuilt into the functionality of the inverters. More sophisticated solutions include third party monitoring systems. These different systems have various features and costs to install and potentially ongoing subscription fees. So it is best to get professional advice.

07

Compliance, approvals and certificates

A number of compliance requirements, standards, regulations and approvals need to be considered before installing commercial size solar power systems. Some of these requirements differ between States and Territories as well as between electricity distribution network service providers.

It is important to comply with these requirements to avoid delays, fines, switching off or even removal of the system.

Requirements may include:

- Development approval, building consent and environmental assessment;
- Network connection approval;
- Use Clean Energy Council approved products;
- Appropriate certification of system designer and installer;
- Registration as a power station for larger systems;
- Compliance to various Australian Standards;
- Compliance with electrical safety codes;
- AEMO performance standards;
- Certificate of electrical compliance;
- Structural integrity certificate;
- Roof safety assessment;
- A work at heights risk assessment.

Some of these approval and processes can help incur fees or require the use of specialist experts. A solar consultant or experienced installation partner facilitate the most suitable path through the approval maze.

Please check the LG case study document to gain an overview of the solutions our partners have found for projects around Australia and the world. The LG case study samples can also be found here.
LGenergy.com.au/uploads/pdf/LG_SOLAR_Panels_in_commercial_installs_Summary.pdf

08

LG Installation Partner Network

LG Solar has 90+ installation partners as part of the Australia-wide network. These partner companies can provide free advice about solar, inspect your premises and provide high quality installation services for solar and battery solutions. Most are equipped to install small and medium size commercial systems and some have the capability of delivering very large systems.

It's the quality of the installation work and the use of premium components by our partners including LG panels, inverter solutions, breakers, isolators and railing that can make a big difference when you look at factors like longevity, performance and warranty backup.

LG continuously educates its partner network via regular training to provide industry best practise and ethical behaviour ensuring solid quality of workmanship.

LG installation partners in their agreement with LG have agreed to follow relevant Australian standards, laws, health and safety practices, regulations and codes and will provide you with the information you need to make the right choice.

In selecting an authorised partner there is also a peace of mind that if one of our partners retires LG will find another LG installation company for that area to service you. This means you are not without long term support and that's a big advantage in years to come.

To find your closest LG Solar Partner go to LGenergy.com.au/lg-dealers/commercial-partners and use the partner finder. Alternatively, call LG Solar direct on 1300 152 179 to get advice and to be connected to the most appropriate LG solar partner.

09

LG Panels are multi-award winning

LG has a great product range for commercial and utility scale projects as well as residential customers. Please check our award winning technology in our product section on LGenergy.com.au

LG Warranty and Support

LG pays towards panel replacement labour for larger commercial jobs valued at over $40,000 - while many competitors do not.

The cost of pulling inferior panels off the roof, sometimes after a relative short period will need to be covered by the business owner. This can be costly and therefore will deliver unexpected long term project costs.

More than 400 panel and inverter manufacturers have left Australia since 2011.

These manufacturers promised long warranties that may no longer be available which leaves the customer exposed to risk.

LG offers a true alternative with its long term commitment to the Australian market. With more than 740 installation companies come and gone in the same timeframe, LG and its partner network truly present a safe harbour in a "stormy solar sea".

LG's 28 years of service in Australia and 62 years of existence together with the close to US $54 Billion Annual Income stream, and our high output panels create a unique offering, worth every cent.

While initially the upfront cost might be more - the overall levelised cost of warranted energy often is lower with LG, than many of our competitors.

for NeON® 2 and NeON® R

for Mono X® Plus

10

12 commercial solar quote elements to watch out for

01 > In their quote the solar installer overestimates the likely system output so that the return on investment numbers looks excellent. Nevertheless when and if the system output warranty is provided, only 80% of the likely output will be warranted.

02 > Panels sold as Tier 1 which is not a measure of quality, but marketed as a sign of quality.

03 > 25 year performance warranty sold as meaning full warranty - when it has a very low real value.

04 > Panels with a 10 or 12 year product warranty sold as being capable of lasting 25 years - when such a lifespan is unlikely.

05 > Financial debt level of the solar panel manufacturer not disclosed - and therefore the true financial risk is underestimated.

06 > Monitoring options and maintenance requirements not fully provided or included, meaning customer's capability to monitor system performance is compromised and future maintenance cost underestimated.

07 > Miscalculating the required system size via poor modelling exercise, causing a larger than required system or too small of a system being built - therefore minimising the financial opportunity.

08 > Dressing up poorer quality and cheaper components from inverters to cable trays and panels as being adequate, when such lower quality components will likely have an earlier failure.

09 > Using cheaper less efficient panels and taking up more roof space, making future system expansions more difficult.

10 > Saving money by not designing appropriate walk and access ways and clearances, making maintenance and reaching panels in the middle of the system next to impossible.

11 > Walking on panels during installation for cheaper and easy access results in a large increase of microcracks and hotspots in future years, which will lead to a system performance decline and a likely panel warranty refusal.

12 > Offering PPA at low kWh rate and installing components that won't last more than the PPA term. Once the PPA is finished the customer is left with an obsolete system that needs replacement, when he expected many more years of free solar, which he will never get.

Key Tip

Installing panels flat on the roof can be at times more cost effective than to tilt them.

However, the installation company should disclose that such an install needs maintenance to clean the panels and increases output in summer, while reducing potential output in the winter months.

FOODBANK - GLENDENNING, NSW

Designed and installed by MGA Solar & MODCOL

INDUSTRY:
FOOD

REQUIREMENTS:
Reduce power costs

SYSTEM SIZE:
300kW

PRODUCT:
LG NeON® 2 315W &
LG NeON® 2 330W

ESTIMATED ANNUAL OUTPUT:
Approx. 361,000kWh [1]

INSTALLED:
Stage 1 - 2014, Stage 2 - 2018

Estimated approx. first year savings of $90,250 [1]

Approx. 330 tonnes of CO_2 emission avoided per annum [2]

[1] The estimated first year savings were provided by the solar installer, or are estimates made by LG Electronics Australia Pty Limited (LGEAP). The estimates made by LGEAP are based on the actual system size and estimated annual output of the system in the post code of the location. We assume a flat electricity rate of $0.25, a flat feed-in tariff of $0.11, 80% self consumption of solar generated electricity Monday to Friday, and 20% self consumption on weekends. For further details on assumptions used and other solar calculators please see: https://www.lgenergy.com.au/solar-calculators.

[2] The estimate for CO2 emissions avoided assumes that the entire electricity output of the system is consumed and the emission factor used is the weighted average for all Australian States based on the calculator available at carbonneutral.com.au. For more information, please see: https://carbonneutral.com.au/carbon-calculator/.

FOODBANK - GLENDENNING, NSW

Designed and installed by MGA Solar & MODCOL

BACKGROUND

Foodbank is a non for profit organisation which acts as a pantry to the charities and community groups who feed the people in need in our community.

The company operates with approximately 90 employees and over 3,000 volunteers.

LG employees regularly volunteer with Foodbank as part of the company's volunteer program.

CHALLENGE

The challenge of the project was to help cut the company's electricity running costs in the NSW distribution centre, and to increase the sustainability of the organisation.

Foodbank also required the ability for the system to expand to battery storage system if required in future.

SOLUTION

With this in mind, the client required a 300kW system on a tight roof and some spare space allowance for future expansion. LG recommended the 315kW LG NeON® 2 solar panels.

Although Foodbank operates from a large purpose- built warehouse, future plans for a battery storage system meant that roof space needed to be preserved. The LG NeON® 2 panels have a high efficiency output per m2, which made them the ideal option to help offset a substantial proportion of the organisation's energy consumption.

In 2018 an additional 50kW of LG NeON® 2 – 330W were installed on the spare roof space.

KEY REQUIREMENT

Design and install a solar system to reduce running costs with future expansion capability.

WHY WERE LG PANELS CHOSEN

MGA Solar and MODCOL recommended LG solar panels for their proven performance and reliability.

LG NeON® 2 models have been involved in a number of comparison tests, in a watt per watt comparison, against many other brand panels and are consistently amongst the best performing panels. The LG NeON® 2 panel generates more power per square metre, and is able to deliver more electricity per square metre than a standard panel of the same physical size.

BLUEWATER LEISURE CENTRE - COLAC, VIC

Designed and installed by Urban Renewables

INDUSTRY:
RECREATION (GOVERNMENT)

REQUIREMENTS:
Reduce the existing electricity bill and overall carbon footprint

SYSTEM SIZE:
98.64kW

PRODUCT:
LG NeON® R 360W

ESTIMATED ANNUAL OUTPUT:
Approx. 132,000kWh [1]

INSTALLED:
June 2018

LG panels were recommended for their warranty, power generation per square metre, performance, and high quality.

Estimated annual savings on electricity usage fees approx. $25,000 [1]

Approx. 120 tonnes of CO_2 emission avoided per annum[2]

BLUEWATER LEISURE CENTRE - COLAC, VIC

Designed and installed by Urban Renewables

BACKGROUND

Bluewater Leisure Centre is a multipurpose aquatic and recreation centre that has been in operation since 1974. The centre is operated by Colac Otway Shire Council and provides first class leisure and recreation facilities.

The facilities feature a number of pools, spa and steam room and a gymnasium offering numerous fitness options. A three-court basketball and multi-sports stadium, a cafe and meeting rooms for the community to hire.

CHALLENGE

The centre has a very high power consumption to keep all the pools, gymnasium equipment and other facilities running constantly.

Urban Renewables was engaged to design, plan and install a solar system for the Leisure Centre with the aim of reducing power costs and the carbon consumption footprint.

Due to the restriction of roof space available, Urban Renewables worked with the Council to conduct a roof structure assessment to create a design that would deliver the greatest energy production and best return on investment.

SOLUTION

The Urban Renewables team recommended the LG NeON® R 360W as the best suitable product to maximise energy production. The high efficiency LG NeON® R 360W panels allowed the team to install a 98.64kW system rather than an 84kW size other many competing panels would have allowed due to the restrictions with the roof space.

The system was complimented with Fronius inverters and monitoring system.

Urban Renewables designed, installed managed the project from start to completion.

KEY REQUIREMENT

Reduce significant power costs and cut the centre's carbon footprint.

WHY WERE LG PANELS CHOSEN

LG panels were recommended for their warranty, power per square metre, performance and quality. The 25 year warranty applies to parts and labour as well as on the performance which is longer than for many competing panels.

LG panels have high efficiency, producing more power per square metre, the NeON® R 360W are warranted to still achieve 87% of rated output after 25 years, compared to 80.2% for many competing panels. The annual degradation rate is 0.4% compared to 0.7% for many competing panels.

1 The estimated average annual electricity usage are estimates made by LG SolarTM. The estimates made by LG SolarTM are based on the actual system size, estimated annual output of the system in the post code of the location with degradation of rated electricity production of 2% in the first year and 0.5% in subsequent years, as well as a lifetime of 25 years. We assume a flat electricity rate of $0.25 per KWh, a feed-in tariff of $0.11 per KWh (with annual increases of 2.5% per annum). Based on the industry the end-customer is in, we assume 80% self-consumption of solar electricity generated (e.g. for end-customers in the manufacturing industry we assume 80% self consumption from Monday to Friday and 20% on weekends (with corresponding 20% and 80% being exported into the grid), while for leisure based clients we assume 80% self consumption everyday and 20% being exported into the grid). We do not apply a net present value discount on the estimated annual electricity usage savings. Of course actual annual electricity savings will vary on a wide-variety of factors including installation conditions, usage and self-consumption patterns, actual hours of sunlight, electricity rates, feed in tariffs, increases in electricity rates as well as other factors. For further details and other solar calculators, please see: https://www.lgenergy. com.au/solar-calculators.
2 The estimate for CO2 emissions avoided assumes that the entire electricity output of the system is consumed and the emission factor used is the weighted average for all Australian States based on the calculator available at carbonneutral.com.au. For more information, please see: https://carbonneutral.com.au/carbon-calculator/.

MEYER TIMBER - PENRITH, NSW

Designed and installed by Modcol

INDUSTRY:
MANUFACTURER

REQUIREMENTS:
Keep electricity costs down

SYSTEM SIZE:
99.2kW

PRODUCT:
LG NeON® 2 A5 400W

ESTIMATED ANNUAL OUTPUT:
Approx. 148,000kWh [1]

INSTALLED:
January 2018

Design and install a high efficiency solar system to reduce power costs.

Estimated annual savings on electricity usage fees approx. $26,000 [1]

Approx. 140 tonnes of CO_2 emission avoided per annum[2]

MEYER TIMBER - PENRITH, NSW

Designed and installed by Modcol

BACKGROUND

Meyer Timber was established in 1975 in Dandenong, Victoria and is one of the largest timber wholesale operations in Australia.

The company's belief is that success is measured by the quality of customer service, and as such they pride themselves in providing outstanding customer service.

Meyer Timber is a clean energy friendly company and is leading by example whilst lowering costs of electricity to the company's expenses over time.

CHALLENGE

Meyer Timber Penrith operations have a large quantity of machinery on site running during the day. Concerned with increasing prices of electricity, the company conducted their own research and decided to implement a strategy to reduce the costs of electricity. The company partnered with Modcol to design and install a high efficiency solar system to reduce their power costs.

Whilst the roof of the premises faces 0 degree north, the challenge for Modcol was to design the layout around the translucent panels on the roof split into many sections.

SOLUTION

Modcol recommended the LG NeON® 2 400W panels. A quantity of 248 NeON® 2 panels were installed on Meyer Timber's roof allowing space for the existing translucent panels to illuminate the working space below.

The system was completed using SMA Tri Power inverters and Solar Analytics monitoring system to create a very long lasting top of the line quality system.

KEY REQUIREMENT

Design the system on a structured challenging roof via the lighter than average LG panels.

WHY WERE LG PANELS CHOSEN

LG panels were recommended by Modcol and chosen by the customer due to the reputation as a premium product with high quality and performance. LG panels have been recognised as innovative and cutting edge by industry experts increasing confidence in the quality and performance of the product. LG NeON® 2 panel generate more power per square metre, this panel is able to deliver up to 16% more electricity per square metre than a 280W panel of the same physical size.

1 The estimated average annual electricity usage are estimates made by LG SolarTM. The estimates made by LG SolarTM are based on the actual system size, estimated annual output of the system in the post code of the location with degradation of rated electricity production of 2% in the first year and 0.5% in subsequent years, as well as a lifetime of 25 years. We assume a flat electricity rate of $0.25 per KWh, a feed-in tariff of $0.11 per KWh (with annual increases of 2.5% per annum). Based on the industry the end-customer is in, we assume 80% self-consumption of solar electricity generated (e.g. for end-customers in the manufacturing industry we assume 80% self consumption from Monday to Friday and 20% on weekends (with corresponding 20% and 80% being exported into the grid), while for leisure based clients we assume 80% self consumption everyday and 20% being exported into the grid). We do not apply a net present value discount on the estimated annual electricity usage savings. Of course actual annual electricity savings will vary on a wide-variety of factors including installation conditions, usage and self-consumption patterns, actual hours of sunlight, electricity rates, feed in tariffs, increases in electricity rates as well as other factors. For further details and other solar calculators, please see: https://www.lgenergy. com.au/solar-calculators.
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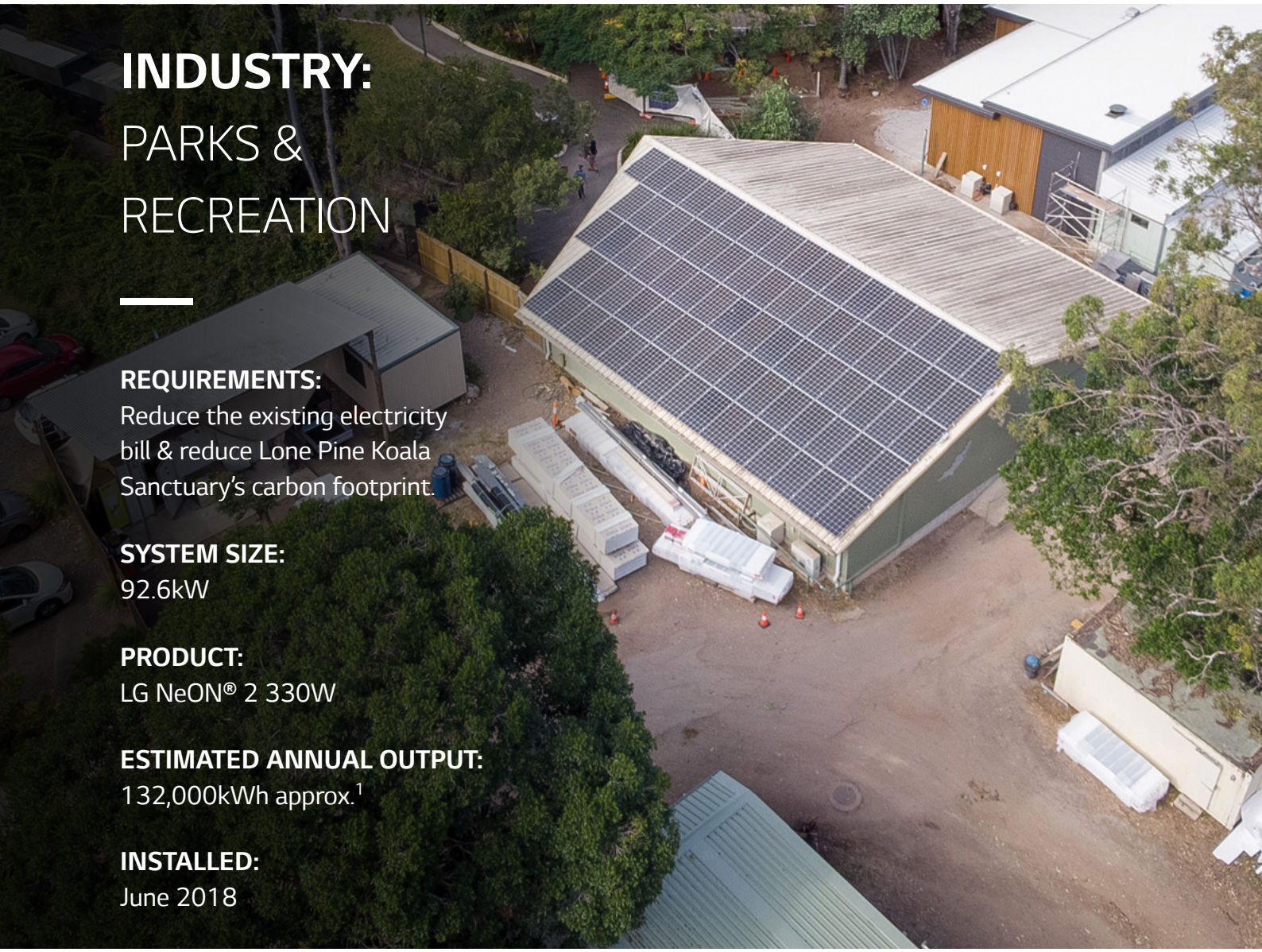

INDUSTRY:
PARKS & RECREATION

REQUIREMENTS:
Reduce the existing electricity bill & reduce Lone Pine Koala Sanctuary's carbon footprint.

SYSTEM SIZE:
92.6kW

PRODUCT:
LG NeON® 2 330W

ESTIMATED ANNUAL OUTPUT:
132,000kWh approx.[1]

INSTALLED:
June 2018

> **"Wildlife organisations should be leading the movement to environmentally friendly energy options."**
>
> Robert Friedler – General Manager, Lone Pine Koala Sanctuary

Estimated annual savings on electricity usage fees approx. $23,000 [1]

Approx. 130 tonnes of CO_2 emission avoided per annum[2]

BACKGROUND

Lone Pine Koala Sanctuary has been operating since 1927, and is a destination for local and international guests to not only see native animals, but to also connect and learn. Lone Pine aims to have visitors leaving feeling empowered to make positive changes in their daily lives to help protect native wildlife habitats.

Lone Pine is committed to maximising the positive environmental and social impacts of their operations, with the ultimate aim to become energy independent. This is being achieved through water and energy efficiency, biodiversity, communication and planning. Through cooperation with employees, suppliers and guests, they aim to set a new standard in environmental welfare management. Lone Pine strongly encourages all businesses to switch to alternative energy sources as it is a profitable option that has positive environmental outcomes.

CHALLENGE

This new facility is surrounded by a lot of trees thus posing a lot of shade onto the building and therefore onto the panels.

Removal of trees was not an option as they form part of a wildlife corridor for native wildlife as well as the sanctuary's environmental strategy.

The centre also experiences blackouts which are a problem for the 'Koala Biobank' fridges, which store invaluable koala genetics and need constant power. This needed to be taken into consideration in the overall design of the system.

Springers Solar was tasked with the design and installation of a highly reliable, quality system with long warranties and high performance.

SOLUTION

A suitable system size based on the Sanctuary's load and return on investment was determined to be 92.6kW. Panels selected were LG 330W NeON® 2 panels due to their quality, high efficiency, long warranties and performance. Due to the shade Enphase micro inverters were chosen. Tesla powerwall units were installed to provide back-up power for the 'Koala Biobank' fridges in case of blackouts.

WHY WERE LG PANELS CHOSEN

The LG 330W NeON® 2 panels were chosen due to their quality, long warranties and performance. LG and other companies, including the Australian consumer organisation Choice have been involved in a number of comparison tests of the LG modules against many other brand panels. LG NeON® 2 panels are consistently one of the highest performing panels in these tests.

The LG NeON® 2 panels have a lower degradation of electricity production than many competing panels as the panels age. This is due to the low LID level, because of the use of N type treatment of the cells which uses phosphorous as a replacement for Boron. LG NeON® 2 panels offer a 25 year product and performance warranty which includes parts and labour compared to the 10 year manufacturer's warranty offered by many other manufacturers.

1 The estimated average annual electricity usage fee savings are estimates made by LG SolarTM. The estimates made by LG SolarTM are based on the actual system size, estimated annual output of the system in the post code of the location with degradation of rated electricity production of 2% in the first year and 0.5% in subsequent years, as well as a lifetime of 25 years. We assume a flat electricity rate of $0.25 per KWh, and a feed-in tariff of $0.11 per KWh (with annual increases of 2.5% per annum). Based on the industry the end-customer is in, we assume 80% self-consumption of solar electricity generated (e.g. for end-customers in the manufacturing industry we assume 80% self consumption from Monday to Friday and 20% on weekends (with corresponding 20% and 80% being exported into the grid), while for leisure based clients we assume 80% self consumption everyday and 20% being exported into the grid). We do not apply a net present value discount on the estimated annual electricity usage savings. Of course actual annual electricity savings will vary on a wide-variety of factors including installation conditions, usage and self-consumption patterns, actual hours of sunlight, electricity rates, feed in tariffs, increases in electricity rates as well as other factors. For further details and other solar calculators, please see: https://www.lgenergy.com.au/solar-calculators.
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This document was prepared in collaboration between LG Solar and Independent Solar Consultant Enesol. Enesol's experts are experienced industry pioneers in renewable energy and specialise in independent engineering and consulting advice tailored to their clients' needs.

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For further information or to find an Authorised LG Partner please see: **LGenergy.com.au** or call **1300 152 179**

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