SOLEC
SOUTH AFRICA

A Complete Guide to Residential **Solar Power in South Africa.**

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Chapter 1:
Definitions

Alternating Current (AC)	Electric current that reverses direction multiple times per second at regular intervals. Voltage and current changes polarity at a fixed frequency – 50Hz in South Africa. Most residential users of electricity require alternating current (AC)
Direct Current (DC)	An electric current flowing in one constant direction, distinguishing it from alternating current. Direct current is generally converted to alternating current for practical use as most modern uses of electricity require alternating current. Batteries and solar panels are examples of DC power sources.
Dedicated Supply	A section of the grid or utility network that exclusively supplies a customer.
Embedded Generator (EG)	Electrical generator interconnected with the municipal network. It operates in parallel with the network and is synchronised with the supply from the grid.
Embedded Generation Installation	A legal entity that operates any generating plant that is connected to the service provider's network. It includes all types of connected generation such as co-generators and renewables.
Small-scale embedded generator (SSEG)	An embedded generator with a generation capacity of less than 1000kW (1mW).In South Africa, a solar power system is the most common technology type used as a small-scale embedded generator (SSEG). Wind, biogas, hydropower and diesel generators connected to the grid are also forms of embedded generation.
Grid limiting	An SSEG installed in such a way that export of excess power is limited or prevented by throttling the inverter power output. When excess power is prevented it is also known as "reverse power flow blocking".
Grid-tied	An SSEG (such as a solar system) which is connected to the utility grid. Export of excess energy onto the municipal electrical grid is possible when the EG is grid-tied. You would need a bidirectional meter and authorization from your municipality.
Off-Grid	An EG that is physically separated and isolated from the utility's electrical grid. Export of the energy into the utility grid by the generator is not possible.
Hybrid System	A Solar system that runs on solar power and/or mains power, with the ability to store energy in a battery bank for later use.
Inverter	A device converting direct current (DC) to alternating current (AC) at a voltage and frequency that can be used to power an AC system.
Load profile	In a power system, a load profile is a chart depicting the variation in demand or electrical load over a specific time. It is also referred to as an energy load profile.
Reverse power flow	The flow of energy from an embedded generator into the utility grid due to power generation exceeding the consumption at the particular generation site.
Reverse power flow blocking	A device preventing the flow of power from an embedded generator back into the municipal grid.
Utility	The electricity distribution service provider responsible for the electricity supply and grid infrastructure to which consumers are connected. Eskom and municipalities are both the responsible authorities for electricity supply.
Utility network (national grid)	The interconnected network of distribution of high voltage (HV) & low voltage (LV) power lines , EG, SSEG, transformers and equipment which covers all voltage ranges. It is the property of the municipality and supplies customers with electricity within that particular municipal distribution area.

Chapter 2:
Benefits of Solar Power in South Africa

2.1 Environmental Benefits

- Solar power generates clean, renewable power from the sun.
- It produces zero greenhouse gas emissions, resulting in a reduced carbon footprint around the world.
- Solar energy, unlike fossil fuel, dramatically reduces air pollution which contributes to a cleaner environment and reduces the effect of global warming.

2.2 Financial Benefits

- Solar power has long-term value because of its long lifespan. The rather large initial financial capital for the installation of solar power is mitigated by the long-term savings on electrical bills.
- By investing in a solar system, one can save on the ever-increasing cost of electricity.
- Tax incentives are available for those who own a solar power system.
- Energy saving features can give your property more appeal when comes on the property market. Although at this point it does not seem to have a significant impact on the resale value, it will most definitely do so in the near future, especially with regards to the continuous load shedding by Eskom. There will be no downtime in working hours and dramatic savings on your electricity bill as a result of hybrid solar power.

2.3 Economic Benefits

- Solar energy provides strength to the local economy. By implementing solar energy on a wide scale, such as solar farms, it contributes dramatically to agricultural efforts. Power can be provided to remote areas and generated at a lower cost.
- New and greener jobs are created with solar energy, for instance, installers, designers and manufacturers. It also allows for people other than big corporations to succeed in the business of green energy.

2.4 Energy Independence & Reliability

- Power is in the hands of the people. It provides freedom and control over electricity supply.
- Solar energy is reliable, unlike our national power utility which subject its customers to continuous load shedding and unexpected power outages.
- Solar energy diversifies our energy supply and reduces our dependency on fossil fuels. It provides better energy security – electricity prices fluctuate. However by going solar, the price of electricity is fixed for decades to come.

Solar energy is reliable, unlike our national power utility which subject its customers to continuous load shedding and unexpected power outages.

Chapter 3:
Solar and Energy Storage Systems Explained

3.1 Components of a Solar Power System

Solar Panels

Solar panels work by absorbing sunlight with photovoltaic cells, generating direct current (DC) energy which an inverter converts to usable alternating current (AC) energy. The AC energy flows through the home's electrical panel and is distributed according to the pre-determined panel load.

Panel Mounting

Depending where your solar energy system is installed, you will need a solar panel mounting system that can handle the weight of the panels. The majority of roof-based solar panel mounts are constructed from extruded aluminium rails. There are mounting solutions for all types of areas that have good exposure to the sun's rays. These include concrete, tiled and sheeted roofs, carports and ground mounting options.

Inverter

The inverter converts the DC energy generated by the solar panels and batteries to AC energy for the AC appliances in your home.

Battery Bank

The battery bank stores all excess electricity generated by the solar array not utilised by your appliances, storing this energy for consumption either at night when your panels are no longer producing electricity or when your load demand exceeds the power generated by your panels. With a grid tied system, in the event of both the solar panel and battery capacity not being sufficient, the system can automatically use energy from the grid to make up the shortfall.

Charge Controller

If batteries are fed continuous voltage they can be overcharged. The charge controller regulates the voltage and prevents overcharging and allow the batteries to charge if and, when required.

Power Meter

Most homeowners in South Africa with solar panels are connected to the power grid even though they say they are “off-grid”. This is referred to as a grid-tied system. Even if you have a backup battery bank, it is advisable to remain tied to the grid in the event of a fault in your system, a lack of adequate sunlight for an extended period or if the load you require to be supported by your solar system alone is too high at a given point in time. The power meter measures the amount of power used from the grid. With regard to systems designed to push back to the municipal utility, a smart power meter must be installed. The smart power meter also measures the amount of power the solar system pushes back to the grid.

Net Metering, Smart Power Meter

Any excess electricity generated by your solar system (i.e. when your solar system is producing more energy than your home requires) is fed into your electric utility grid. When this occurs, your meter actually runs in reverse and therefore you would only pay for the actual electricity you use less the excess electricity generated by your solar panels. For a net power meter you require authorization from your municipality.

Reverse Power-Flow Blocking Device

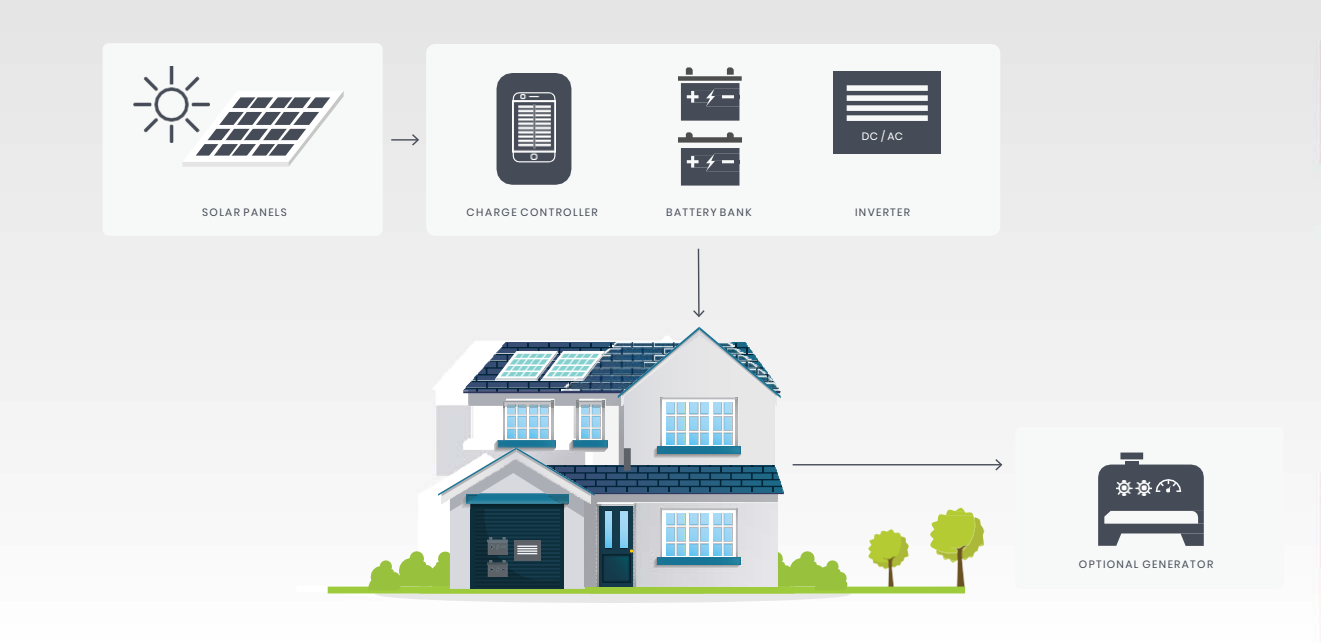
For non-feed-in systems (i.e. systems with reverse power-flow blocking), a reverse power-flow blocking device is also needed in addition to the above components. This devise prevents the flow of power from an embedded generator (solar system) back into the municipal grid.

3.2 Types of Solar PV SSEG Systems

There are four basic types of PV SSEG systems:

3.2.1 Off-Grid System

Off-grid solar power systems operate independently from the local utility grid on a continuous basis. It is installed where main power is not available or when you want to become completely grid- independent. Therefore there is no connection to the grid whatsoever and batteries are used as a base supply. In short, an off-grid system operates as follows: Solar panels generate power which charges the batteries; a battery inverter is used to convert the direct current energy (DC) to usable alternating energy current. All power is generated by the solar panels and the battery bank stores any excess power for use at night or when the sun is not shining. A back-up generator can be added to charge the batteries or supply power to the home when there is insufficient solar power generated and stored in the battery bank. In urban areas off-grid systems may be used for very specific applications such as a pool pump which is not connected to the internal wiring of the house.



3.2.2 Grid-Tied Feed-In System

Grid-tied feed-in systems can only operate when connected to the utility grid. All the power generated by the solar panels gets sent to the grid-tied inverter, which converts the direct current (DC), to usable alternating current (AC). The power generated by the solar panels is then used first and if it is not sufficient to power the home, the shortfall will be obtained from the grid. Any surplus energy generated and not needed by the home is exported back onto the grid.

Grid-tied feed-in systems can only operate when connected to the utility grid.

3.2.3 Grid-Tied Non-Feed-In System

Grid-tied non-feed-in systems cannot operate without being connected to the utility grid. The power generated by the solar panels are converted from direct current (DC) to alternating current (AC) by the grid-tied inverter. The power generated by the solar panels is then used first and if it is not sufficient to power the home, the shortfall will be obtained from the grid. However any surplus energy generated by the solar panels and not required by the home is prevented from being exported back into the grid by a reverse power-flow blocking device.

Any surplus energy generated by the solar panels and not required by the home is prevented from being exported back into the grid by reverse power-flow blocking device.

3.2.4 Hybrid or Island System

Hybrid systems are connected to the local grid but can also operate as an off-grid system if required.

A hybrid system consist of solar panel(s), an inverter and a battery bank. This system is normally connected to the grid but can also operate as an off-grid system if so required.

3.3 Solar Panel Types

Solar panels are constructed from an array of solar cells, known as photovoltaic cells. A standard solar panel consists of a layer of silicon cells, a metal frame, glass casing and wiring which allows the current to glow from the silicon cells. When light interacts with a silicon cell, it causes electrons to be set into motion which initiates a flow of electrical current.

There are currently three solar panels for home use on the market:

- Monocrystalline;
- Polycrystalline; and
- Thin Film Amorphous.

The low efficiency and low power output make thin film solar panels unsustainable for rooftop residential solar installations and as such only the advantages and disadvantages of polycrystalline and monocrystalline panels will be explored.

3.3.1 Monocrystalline Solar Panels:

Advantages	Disadvantages
Monocrystalline panels have the highest efficiency rate.	Monocrystalline panels are the most expensive of the panel types.
These panels are made from the highest grade-silicon.	During the manufacturing process there is a lot of wasted material due to the way the silicone is cut.
They are space efficient as they require the least amount of space compared to other types of panels.	If a solar panel is partly covered with shade, the entire circuit power output can be diminished to zero.
They tend to perform better than polycrystalline panels in low-light conditions.	
They have the longest lifespan.	

3.3.2 Polycrystalline Solar Panels:

Advantages	Disadvantages
The production process of polycrystalline is simpler and cost less than monocrystalline solar panels.	Because of the multiple (poly) cells in each panel, the electrons have less space to move and lessened productivity.
High temperatures have a less negative effect on efficiency compared to monocrystalline panels.	They have lower output rates making them less space efficient. As a result, more roof space is needed.
They are the Greener option since the wastage during the production process is less.	These panels have a slightly lower heat tolerance than monocrystalline panels.

Although technically monocrystalline panels are more effective this does not, in our opinion, reflect any underlying defects on the part of polycrystalline panels. It really does not matter whether you use a monocrystalline or polycrystalline panel – what is important, however, is that you purchase and install a good module brand that will last 25+ years. Based on the aforegoing, a consumer should not avoid installing a polycrystalline panel over a monocrystalline panel if offered a cheaper deal on such polycrystalline panel from a reputable tier 1 manufacturer.

3.4 Bloomberg's Tiers 1, 2 and 3 for Solar Panels Explained

TIER 1
Top 2% of solar manufacturers

- Vertically Integrated
- Intensive investment in research and development (R&D)
- Advanced robotic manufacturing processes
- In production for more than 5 years

TIER 2
Small to medium scale manufacturers

- No or little investment in R&D
- Only partially robotic; reliant on manual labour
- In production for 2-5 years

TIER 3
Assembly only, 90% of new solar PV

- No investment in R&D
- Assembly panels only; does not manufacture silicon cells
- Human production lines for soldering of solar cells

A tiering system has been developed by Bloomberg New Energy Finance for PV module manufacturers which is based on the bankability to cater for the transparent differentiation between such solar panel manufacturers. It should be noted that despite this categorisation of solar panel manufacturers, the tiers should not alone be used for purchasing criteria or quality guidelines and should not replace due diligence in product and manufacturer selection.

Your solar installer and/or supplier should provide proof that their solar panel modules are produced by a Tier 1 solar panel manufacturer.

3.5 Standard PV Panel Voltage

The standard voltage of a PV panel is sufficient to charge a 12V battery, rated 18V DC. It should, however, be noted that the voltage of a solar panel depends on the number of solar cells connected in a series. Therefore, the voltage output may be between 0.6V DC and 60V DC.

3.6 Batteries

Grid-tied EG systems do not need batteries if the home user does not intend to store excess energy and/or has an alternative energy source (like a generator) when the grid is down. A battery-only system can also be installed if the aim of the user is merely to avoid unexpected power cuts or to avoid load shedding. The battery in this instance will be charged with the power from the utility grid and kick in when the grid is down. A battery-only system is not a power saving option and will not make a difference to the user's utility bill.

A solar battery is an essential component of a solar power system, especially in South Africa given the continuous power cuts, as it stores all excess electricity generated by the solar panels. Batteries used in home energy storage are generally made up with one of the following chemical compositions:

- Lithium Ion
- Lead Acid
- Flow
- Nickel Based

In most instances, lithium ion batteries are the best option for a solar panel system, though other batteries can be more affordable. Lead acid batteries are tried and tested technology, but they do, however, have a shorter lifespan and a lower depth of discharge (DoD) than other battery types. As flow and sodium nickel-based batteries are not really recommended for home use, the advantages and disadvantages of lithium ion and lead acid batteries will be explored below:

3.6.1 Lithium Ion Batteries

The majority of new domestic solar energy storage systems use some form of lithium ion composition. They are evolving and fast becoming the most popular choice for on-grid solar battery storage for the foreseeable future. It is important to note that the energy storage system software is vital when it comes to the performance of the battery.

Advantages	Disadvantages
Lighter and more compact than lead acid batteries.	More expensive than lead acid batteries.
Almost completely maintenance free.	They require protection from being charged or discharged excessively.
They have a higher depth of discharge and as such a longer lifespan – they can handle up to 80% of discharge without negatively affecting their lifespan.	The batteries need proper management – without a quality system and software, the battery will quickly be damaged.
Lithium is very reactive and have a very high energy density – a large amount of energy can be stored.	

3.6.2 Lead Acid Batteries

Until recently, the only practical battery technology used for storing electricity generated by solar panels was lead-acid batteries. It is the same type of battery that is used in motor vehicles and has also for decades been used in off-grid energy systems. For most homeowners this is the default choice as these batteries are the least expensive and are tried and tested technology. They do, however, have a number of drawbacks.

Advantages	Disadvantages
They are tried and tested.	They take up a large amount of space and are extremely heavy.
They are cheap and powerful.	They emit hydrogen gas and are flammable when charging.
They have a high output capacity.	They have a shorter lifespan and need regular maintenance to keep them running safely and effectively
	They usually have a depth of discharge of 60%, meaning you can only use 60% of their capacity after which you will reduce their lifespan

Although more expensive, the benefits of lithium ion far outweigh the benefits of lead acid batteries:

- Lithium batteries have a longer lifecycle.
- They have a recommended depth of discharge of 80% or more, whilst lead acid batteries mostly run to 50% depth of discharge.
- Lithium batteries are more efficient.
- Higher efficiency results in the lithium batteries charging faster and as such fewer solar panels are required.
- Lithium batteries have a higher charge rate, which means they can be refilled much quicker than lead acid batteries.
- If you charge lead acid batteries too quickly, they can overheat. In addition, the charge rate of a lead acid battery gets much slower when they approach full capacity.
- Lithium batteries are more environmentally friendly; lead and sulfuric acid can be unhealthy if discarded incorrectly and contaminate solid and ground water.
- They are more compact, lighter and sleek than lead acid batteries.

Whilst the initial investment for lithium ion batteries might be more than lead acid batteries, their lifespan and performance more than make up for the upfront expense.

Although more expensive, the benefits of lithium ion batteries far outweigh the benefits of lead acid batteries.

Chapter 4:
Operation and Maintenance of Your Solar PV System

4.1 How Does a Grid-Tied Solar PV System Work?

As shown by the illustration, here is an overview of how a grid-tied solar system works:

- During daytime, sunlight is harnessed by the solar panels and converted into DC electricity (the semi-conductor material within the PV panel performs this conversion)
- The DC energy is sent to an inverter which converted the DC electricity into usable AC electricity.
- The inverter then feeds this AC electricity into the main switchboard of your house.
- The AC electricity is used to power your home, alternatively the appliances you have selected on your load panel in the switchboard.
- If you have a battery bank, any excess energy generated by the panels and not used by the selected appliances, will be stored for later use at night or when the sun is not shining.

NOTE: Compensation for reverse feed-in is available but only in certain municipalities. From July 2017, 18 municipalities developed NERSA-approved SSEG-compensation tariffs. However the tariff for reverse feed-in varies depending on the municipality. Some municipalities have regulations for reverse power-flow blocking.

4.2 How to Achieve Maximum Output with Your Solar System

There's no benefit in having a solar panel that isn't giving you the output that makes its investment worthwhile.

4.2.1 Criteria Influencing the Efficiency and Output of a Solar System

Fill Factor

This refers to the utilisation of available surface area. The greater the surface area of a panel that is utilised, the more output you'll get. Generally, a panel can obtain about a 70-90% fill factor, and this would depend on the shape of the cells, the orientation of the panel, and the quality of the build.

Cell Grades

When purchasing popular name brand solar panels, you generally need not worry about the quality, as the popularity of the brand speaks for itself. You will usually be getting perfect grade A cells. However, if you are purchasing garage-shop solar panels, then you can't know what the quality will be, and it is very easy to get short-ganged on quality.

Maximising Light Absorption

Being able to absorb light on both sides of a cell maximises the amount of energy that can be absorbed and converted (so called bifacial solar panels). In the shade, solar panels produce significantly less power, but still a small amount. For maximum output they should be placed in full sunlight if possible.

Panel Orientation

Of course, if your solar panel isn't pointing at the sun, you won't get much output. For highest output, solar panels must be perpendicular to the sun's rays. It should further be elevated to improve the yield production of the system as it harnesses more solar radiation if appropriately tilted.

4.2.2 Most Common Causes of Damage to Solar Panels

Natural Damage

Rain, condensation, hail, lightning, twigs, leaves and dirt (or any falling debris) are the primary causes of damage to solar panels. You can use a variety of methods to protect your system: Install lightning conductors, make sure your panels are properly sealed, clean the panels regularly of loose dirt, angle your panels so that water can run down and off, and generally keep an eye on how your solar panels are doing after a big rain storm.

Bad Installations

Bad installations can lead to a multitude of problems, from micro cracks to potential-induced degradation (PID) damage, fire damage or overheating. When you are working with a solar installation team who is skimping on service or doesn't know what they are doing, chances are your system won't make it to even a fraction of its life expectancy. Saving money with your solar power system depends entirely on having the right system that is able to last as long as it is guaranteed to last for (25-30 years). With solar power, the goal should be to save money for the next 25 to 30 years, not only a small amount on the initial installation costs.

Electrical Fires

Electrical fires involving solar panels are not common, but they can happen with incorrectly installed or maintained panels. Always double-check the wiring after installation to ensure you don't have a problem on your hands.

4.3 Maintenance of a Solar Power System

Even though your panels are the most resilient part of your solar power system and have by far the longest life span of all the components, you still need to follow the best practices to ensure you achieve the longest lifespan they can provide.

4.3.1 Cleaning Your Solar Panels

Solar systems are installed in all types of climates and are designed to withstand most weather conditions. Crucially, however, especially when it comes to ensuring that your solar array is performing at maximum capacity, you should keep your solar panels clear of debris, whether from trees, birds or general dust build-up. For such debris and dust build up you can use the following to ensure your solar panels are clean:

- A leaf blower, or
- A quick rinse with a hose.

A light rain can also wash away the dust build-up on your solar panels.

4.3.2 Solar Panel Monitoring

Your solar panel monitoring system provides data on the electrical output of your system which you can track over time with a view to calculating any degradation of your panels.

If your solar system is underperforming for whatever reason, the repair or cleaning costs, depending in your solar installer, can be covered by opting for a solar maintenance package. Besides covering the repair costs, such packages also have several other benefits, some of which include:

- Site Visits
- Pest Control
- Solar Panel Cleaning
- Checking Electrical System
- Maintaining Solar Inverters

Installing solar power is a large upfront investment and proper maintenance is paramount to keeping your system functional for a long period of time. All-in-all, maintaining your solar panels is easy if you have a good warranty, good insurance and your panels are kept free of dirt and debris build-up. It is advisable that you have your solar system inspected by an experienced and qualified solar contractor at least once a year.

4.4 Typical Guarantees and Warranties for the Solar PV Components

A well-designed solar power system which is properly installed by a reputable installer and regularly maintained can last for 20+ years and in some instances solar panels can even last for 30+ years. Inverters and batteries, however, normally have a lifespan of approximately 10 years, but can last for longer is a quality product is properly installed.

The following periods per component are normally the typical warranty periods, but it could very well differ depending on the specific supplier and/or the solar installer:

Solar Panels:

- 10-15 year product warranty
- 25-30 year performance warranty

Inverters:

- 2-5 year product warranty
- Extension of warranties can occur at an additional cost

Mounting Structure:

- 5-10 year warranty

Batteries:

- 2-15 year warranty

4.5 Anti-Theft Options for Solar Panels in South Africa

In certain regions of South Africa, the increase in the theft of solar panels has become a serious concern for owners or potential buyers of solar power systems. The following solutions can assist in the safeguarding of these system components:

- Alarm systems which can include beams, trip wires, camera surveillance and/ or electric fencing.
- Installation of optical fibre cables throughout all the installed panels – any movement or disconnection will result in a trigger alert.
- Panels can be installed out of sight if possible and with due regard to the desired efficiency and output of the system.
- Permanently affixing the panels with steel glue or welding the actual mounting structure.
- Specific bolts can be used that require a very unique method and unique tools for loosening.

A well-designed solar power system which is properly installed by a reputable installer and regularly maintained, can last for 20+ years and in some instances solar panels can even last up to 30+ years.

Chapter 5:
Factors to Consider when Choosing a Solar Installer

Deciding on a solar installer can be the most challenging part of your solar buying process. You may find yourself in unfamiliar territory when buying a solar power system for your home. Are you purchasing quality equipment? Will the system perform and meet your electricity requirements? Will the system be installed correctly? These are very important factors when choosing your installer to enable you to make the switch to solar power with confidence.

Factors

5.1 Verify Business Performance

Double check previous work performance by looking at customer testimonials and perhaps even contacting previous customers. Does the installer have substantial prior experience in solar installations? If so, did it offer end-to-end installations, or only carry out a few of the steps?

5.2 Licensing and Qualifications

- PV GreenCard;
- Wireman's license;
- SAPVIA registration; and
- Certificate for working at heights
- Registration with Commissioner in terms of COIDA (Compensation for Occupational Injuries and Diseases Act.

5.3 Product Quality and Installation Techniques

- Ensure that the solar panels you purchase have a Certificate of Compliance with the IEC standard. IEC standards are the international version of SAB standards and are a good indication of the quality of panel you're being offered.
- All inverters used must be compliant with NRS-097-2-1 and certified as such. It is advisable to only purchase a unit that already has the appropriate certification as uncertified inverters are nor legally allowed to be connected to the grid.
- Research battery options. Batteries used in home energy storage are generally made with one of three chemical compositions: lead acid, lithium ion, and saltwater. In most instances, lithium ion are the best option for a solar panel system, although other battery types can be more affordable.

  Specialised solar installers will be able to customise your solar design to fit in with your architectural needs or building materials.

5.4 System Cost Breakdown

When you receive a quotation for your solar system, the estimate should list the price of each component individually and other costs, such as labour, mounting and the like should be itemised.

5.5 Site Assessment and Site Plan

Before installation begins, a site assessment, which is usually free of charge, should be performed and a site plan should be provided which will indicate the layout of the system components in your home.

5.6 Production Estimate

The installer should provide you with an electricity production estimate for the particular solar system based on average weather for the year. You can compare your average electricity usage with the production estimate to confirm that you are satisfied with the system output.

5.7 System Monitoring

Is vital that understand how you should monitor the system output as it can help make you more aware of your installed system's performance. The monitoring system offers information about energy generation and consumption, optimising energy usage and alerting you when any solar panels are damaged. It will either be a display on the inverter and/or can be tracked on the web or by downloading the system monitoring app on your smartphone.

5.8 Request an Original Electrical Certificate of Compliance (CoC)

Any electrician registered with the Department of Labour who performs the installation must supply you with a CoC after he has carried out the installation and completed the required tests and checks.

5.9 Post-Installation Maintenance

Ask your installer about recommended system maintenance and whether there are any packages available to purchase with the installation of your system. At the very least, the installer should give you guidance on how to maintain your system to ensure optimal performance.

5.10 What are your warranties and guarantees?

Make sure you obtain all warranties and guarantees on offer, both for the installation as a whole and for its components (solar modules, inverters, structural system). Double check if there are any differences between the manufacturers and the installers warranties and guarantees.

Ensure the solar panels you purchase have a Certificate of Compliance with the IEC standard. IEC standards are the international version of SAB standards and are a good indication of the quality of panel you're being offered.

Chapter 6: South African Solar Tax Incentives

There are a few tax incentives that deal directly with renewable energy. Some specifically mentions solar energy.

The South African government, the energy regulator and Eskom have previously had several criticisms directed at them for not encouraging solar use and storage. But a recent amendment to the Income Tax Act introduces some fantastic incentives for solar power installers. These tax incentives are to be welcomed by companies, especially smaller business working from a residential building.

Section 12B

This section was put in place to promote the rise of renewable energy in South Africa. From 1 January 2016, Section 12B provides for an accelerated capital allowance in respect of certain assets owned and used by a taxpayer in the generation of electricity fork, amongst others, solar energy. The allowance falls under the capital allowances for:

- Property;
- Plant; and
- Equipment

Criteria for Qualifying

A claim can only me made in respect of these assets used by the taxpayer for his trade in the generation of electricity from:

- Wind power
- Solar energy
- PV solar energy of more than 1 megawatt
- PV solar energy not exceeding 1 megawatt
- Concentrated solar energy
- Hydro power not exceeding 1 megawatt

The improvements to the abovementioned assets, as well as the foundation or supporting structure are also subject to the stipulated allowance.

For taxpayers to qualify for this incentive, they must meet three strict requirements:

- The plant, machinery, implement, utensil or article must be owned by the relevant taxpayer claiming the deduction (or purchased by it under an instalment credit agreement).
- Such plant and machinery must be brought into use for the first time by that taxpayer.
- Such plant and machinery must be utilised by the taxpayer in the course of trade in the generation of electricity from the specified renewable energy resources.

For the foundation or supporting structure to qualify for the deduction, the following requirements must be met:

- The asset concerned must be mounted or affixed to the foundation or supporting structure.
- The foundation or supporting structure must be an integral part of the particular asset.
- It must have been brought into use on or after 1 January 2013.
- The lifespan of the foundation or supporting structure must be limited to the lifespan of the asset affixed or mounted to it.

How Much Can You Deduct?

For all PV assets not exceeding 1 megawatt, a 100% deduction of the cost of the asset will be allowed if it was brought into use on or after 1 January 2016.

The benefits of solar energy are numerous and long-lasting, given that the majority of your costs can be claimed back from the taxman. With this in mind, if you can save money and make money, going solar has never made more sense.

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