Cedar Solar

THINGS TO CONSIDER BEFORE SWITCHING TO SOLAR

Understand the basics of how solar works

When the sun shines on solar panels they produce DC power. Solar Panels do not work with the heat from the sun, but rather the light. A 300w solar panel can produce about 300w of energy per hour when the sun shines on the panel. Panels should face north in the southern hemisphere and should be angled correctly to maximise the hours the sun shines on them. In Johannesburg we get about 4 to 6 hours of strong sunshine (peak sun hours) per day.

In an off-grid/back-up system, the DC power is sent to a charge controller and from there to a battery bank for storage. The charge controller manages the charging of the batteries. An inverter then pulls power from the battery bank and supplies power to the loads (household appliances) when the sun does not shine. It converts 48V DC power to 220V AC power that home appliances use.

Which type of solar system do you need?

It is important to decide what you would like to achieve by switching to solar. Do you want power during load-shedding? Do you want to save on your energy bill? Do you want to live a more sustainable life? The most common systems are:

- **Off-Grid System.** This means no connection to Eskom. This is the most expensive system because you need a large battery bank to run your appliances in the evenings and/or on cloudy days. With an off-grid system, load shedding is a thing of the past because you are not connected to the grid (Eskom). You might need a backup generator (or increase the battery bank size) if there are a few days of cloudy weather. Getting off the grid completely is expensive. A full off-grid system can cost from R200 000 to R300 000 for the average homeowner. You will also need to focus on being energy efficient meaning giving up luxuries like underfloor heating, heaters etc.
- **Gid-Tied (On-Grid) System.** This means you are still connected to Eskom. For a grid-tied system, you don't need batteries. The power the panels generate is used immediately by appliances. This reduces your energy bill but does not necessarily eliminate all energy costs. Feeding back into the grid is not allowed in most of South Africa. This means you will only save money during the day. This option works best for where consumption occurs during the day (i.e., offices). Average Cost R30 000 – R100 000+
- **Hybrid System.** This system is a combination of a grid-tied and off-grid. You are still connected to the grid, but with a smaller battery bank to get you through load shedding & you will save money during the day. The system can be set up to keep batteries at 100% and then run your daily loads from the panels. This is the most popular system for South Africans and the main goal is getting through load shedding, but you are also saving money during the day. Average Price is R80 000 to R250 000.

- **Backup System.** This system does not need solar panels. The batteries are charged by the grid when grid power is available (from a wall outlet/DB Board), battery power is then used when the grid fails (load shedding. This is your most cost-effective backup solution, but you do not save money with this solution. Cost will be from about R25 000 to R100 000

It is better to get energy-efficient first

Appliances that draw a lot of power do not work well on solar systems. Your first step is to get as energy efficient as possible. This includes changing your electric geyser to a solar geyser/gas geyser. Next, replace your stove and oven with a gas stove and oven. If you use equipment like power tools & welding machines, it is best to run these on a generator and not on your solar system. Replace all your lights with LED lights. Also decide how you will use heaters in your home. Heaters can consume 2000w an hour and are not advised on an off-grid installation. In a hybrid system, some plugs can be wired for these high consuming appliances. These will still run off the grid and your other appliances off solar power. Now your installer can design a smaller solar system for the remaining appliances. This is the most cost-effective way of doing things. Get energy-efficient first, and then install a smaller system for your remaining appliances.

How much energy do you use?

The best way to establish this is to install an energy meter (SCOUT) for a week or two in your home. You will then see exactly what your total consumption and peak usage is. You will also get a breakdown between daytime and evening consumption. Your installer can very accurately design a system based on this information. This is the most accurate way to size a solar system. Alternatively, you can provide your installer with utility bills and an appliance list indicating how long you want to use each appliance every day and they can design a system according to that. This information is particularly important when sizing a solar system and will determine the number of panels needed for the size of the inverter and size of the battery bank.

Solar Panels & Shading

Is your roof facing north? A north-facing roof is the best for solar panels here in South Africa. Panels can also be placed west or east. It is important to mount your panels securely using a high-quality roof mounting system. There are different systems for different roof types the most common being tile and IBR (corrugated iron roof). Also note, any shade on panels will influence power generation quite dramatically. A little bit of shade can reduce the efficiency of a panel by at least 30%. Shading from trees, chimneys and other buildings need to be considered when designing a system.

Installer Experience

A solar system is a big investment. Make sure your installer has at least 3 years' experience and quality installations Ask for references of previous clients. Ensure the have a PV Green Card (https://www.pvgreencard.co.za/) as a credential and belongs to a solar association like SAPVIA. There are too many inexperienced installers that deliver non-performing systems and unsafe installations.

Hardware Guarantees

Ensure that you get a good guarantee on all your solar components. A good guarantee for solar inverters and chargers is 5 years. Lead Acid batteries usually have a 2-year warranty and Lithium-Ion Batteries a 7 to 10-year warranty. Most grade A solar panels have a 25 to 30-year warranty. If an

installer offers noticeably short warranties (1 to 2 years), there is a reason and the products used may be inferior.

Battery Cycles

Not all batteries are made the same. They have different life spans, and this is indicated as cycles on the spec sheets. A cycle is when a battery goes from full to empty to full. This is considered 1 cycle. When comparing batteries don't just look at Amp Hours. A 100 Ah with 1000 cycles is not the same as a 100Ah battery with 2500 cycles. When comparing battery prices calculate the cost per cycle and do the comparison. Do not merely look at the price of the battery. The cycles need to be considered.

Compare apples with apples

Research the brands to see what you are buying. A good example is cars. You get a 2 litre Tata and a 2 litre Toyota. Both have the same capacity but there is a difference in price, quality, reliability, technology, warranty and more. Research the brands that the installer suggests. How long have these brands been around? Do they offer warranties up to 5 years? Google some reviews of the products. Ask other installers what they think of brand X, or why they prefer a certain brand? In solar just like in most industries, you get what you pay for. Don't let an unreliable solar system become the new Eskom in your life.

Monitoring

You would not buy a car without a fuel gauge, speedometer and warning lights. Why purchase an expensive solar system without monitoring? It is important to be able to monitor your system to ensure it performs optimal. A good monitoring system also picks up system problems early enough before any hardware suffers damages.

What you can and can't run on a solar system.

Some high consumers will overload your solar system and shorten the lifetime and capacity of your batteries. Therefore, we do not recommend geysers and stoves on solar systems. If you have many power tools that use a lot of electricity it is better to turn these appliances off a generator. If you have appliances you are unsure of, your installer can advise you. You should be careful with higher consumers like heaters.

Safety

Safety extras include: Fuses, breakers, surge arrestors, proper grounding, emergency stop, correct cable gauges, Certificate of Compliance etc. This is usually where inexperienced installers don't know which safety measure to put in place and unreliable installers cut corners to make the system as cheap as possible. But this puts your family's lives at risk. If an installation is done incorrectly it can be extremely dangerous. It is worth paying a bit more for the peace of mind that your installation is up to code and has been signed-off by a master electrician. You need a COC for your insurance company and to be compliant.

Solar Funding

Most of the major banks offer solar loans. The loans usually fall under the personal or residential loan division at the bank. Most of these loans offer a 5 to 10 year payback period. It is best to phone your banker to find out how they structure their solar funding.

Why use Victron hardware?

We are an official distributor for Victron energy. Victron is a premium product, the reason we use Victron hardware:

- 5 Year Warranty on Victron Inverters, Solar Chargers & other Hardware. The 5 year warranty can be extended to 10 years for 10% increase in pricing on Victron hardware.
- Monitor your system remotely with the Victron VRM app.
- The fastest MPPT (solar charger tracking) on the market
- Good after sales service
- 45-year track record
- European Engineering

We know there are many products on the market less expensive than VIctron. The products do work but they are not as robust as Victron. This means you might expect more callouts after installation and the components will last 2 to 3 years. Some battery brands do not honour warranties when batteries are installed on cheaper high-frequency inverters. The cheaper brands do not offer 5-year warranties and there is a good reason why. At the end of the day you get what you pay for.

Tax incentives for companies

Source: https://www.dailymaverick.co.za/article/2019-08-19-little-known-tax-incentives-boost-business-case-for-renewable-energy

Accelerated depreciation allowances

From 1 January 2016, a little-known amendment to Section 12B of the Income Tax Act (Act 58 of 1996) allows for depreciation in the year of commissioning of the full (100%) cost of a grid-tied solar PV system of less than 1 MW used for electricity generation by a business in the course of its operations.

The capital depreciation allowances for solar PV systems greater than 1 MW remained unchanged in the January 2016 amendment to the legislation, which continues to allow full depreciation over three years. This permits depreciation of 50% of the capital cost in the year of commissioning, 30% in the subsequent year, and 20% in the third year.

The accelerated depreciation allowance for solar PV systems applies whether they are installed for the business by contractors or developers, or paid for by the business in a credit sale agreement (as defined in Section 1 of the Value-Added Tax Act) – either upfront in a single payment or in multiple payments over an extended period.

The cost of the solar PV system allowed for accelerated depreciation includes its full direct capital cost, including design and engineering, project planning, delivery, foundations and supporting structures, solar PV panels, AC inverters, DC combiner boxes, racking, cables and wiring, and installation. Finance costs are excluded.

This allowance was confirmed in a binding private ruling by SARS dated 11 October 2018 (BPR 311) in respect of an application by a private company in South Africa to clarify the deductibility of the capital expenditure incurred to install solar PV systems at a number of sites owned and leased by the applicant. The systems were being installed to reduce the company's electricity costs

I hope this document helps you to understand solar better. It can be a very intimidating decision for a homeowner. Find an installer with a good track record that you can trust. Make sure you have an accurate consumption profile of your home or business and invest in quality components. Then you will have a solar system that performs like it should.

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