Using Solar As A Power Back-Up Solution

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Everything is Great…Until Power Goes Out

As any long term resident of Panama is aware, the power grid in this country leaves much to be desired. Outages are frequent, and their duration, unknowable. Even in times of normalcy, the grid is, for lack of a technical term, flaky. Extended outages can turn this paradise into a virtual hell. Lighting, electronics, communications, refrigeration, air conditioning and even something as basic as a fan all become impossible.

Isn't That What Generators Are For?

In a word, yes. But before you run out to PriceSmart, think about where this is going. A generator is fine for short term interruptions, but issues like noise, fumes, and the cost of fuel become major obstacles in long term outages. Not to mention the fact you're dealing with an internal combustion engine and all that it entails.

Wonder if Do-It Center will take it back.

A whole-house propane generator, like the popular Generac series will eat up an entire 100lbs bottle in a little over one day! So, this solution is obviously only for short term outages.

One also has to deal with the logistics of fueling this thing. Storing large quantities of gasoline is froth with hazards. During a crisis, can you even get fuel?

Going off-grid with solar is a great way to get around the power problems, and many expats have chosen to do just that. With solar, you depend on no one else. There's no fuel to worry about, very little maintenance, and no having to go outside to fire up a generator.

Going Critical

For many people though, going 100% off-grid is not an economically viable situation. The upfront costs for a large system can be significant, and the payback over the long haul is not a sure thing like it is for grid-tie systems.

So, a good solution is to look at a *critical loads system*. This is where you power certain loads through solar, but leave the heavier loads like an electric oven, clothes dryer or air-conditioning to the grid.

That way, the things you can't be without: refrigerator, electronics, lighting, security, well pumps, fans, washing machine and certainly, in my case, the coffee grinder! are all powered by the solar system and will work seamlessly - regardless of grid status.

The advantage of going to a critical loads approach is that the system can be sized much smaller. Fewer panels, smaller inverter, and, most importantly, fewer batteries all make this a more affordable proposition.

A critical loads system will cost anywhere from $7500 to $12000 depending on size, complexity and needs.

Components of a Solar Energy System

There's a lot more to solar energy systems than just solar panels. The type of solar energy systems we're discussing here are made to supply power regardless of the availability of the grid. So, they are more complex, as we need to not only generate the energy, but store it as well.

The solar panels will generate the energy, this energy will be stored in a battery bank. The device that manages that process is called a *Charge Controller*. Its job is to suck as much power out of the solar panels, and pushing that energy into the batteries with as much efficiency as possible. It's a complex task as solar conditions vary constantly, and the depth of charge of the battery is always different. The charge controller actually has an onboard computer that runs a *charging algorithm* managing this whole process. So, yes, it's more complicated than charging up your cellphone from a wall outlet.

Outback Radian Inverter

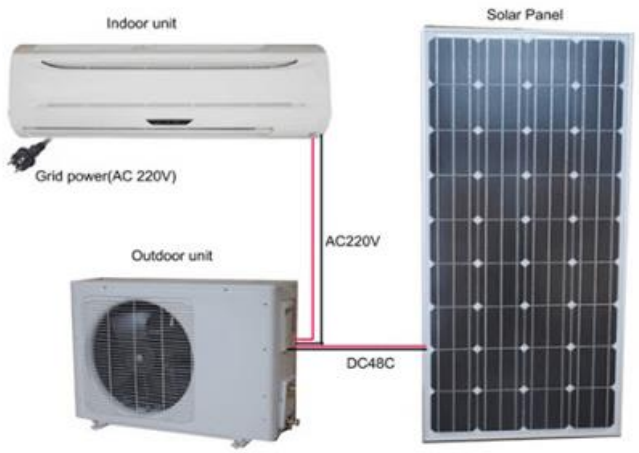
Next up, we have the *inverter/charger*. The inverter/charger gets its power from the batteries, and converts it into power that's usable by your home's appliances - 120 and 240 Volts AC. The inverter is also a sophisticated piece of electronics as it quarterbacks the supply of energy, and will also charge up the batteries from the grid if there wasn't enough sun to do a full charge. It also has nifty features like an internet interface that allows you to view your system's status remotely.

Finally, we need to talk about the most boring, but most important component of all…*batteries*. Batteries are in a way at the heart of all this. They are the most expensive component, and the most critical. A bad battery will make a great system absolutely nightmarish to use.

Rolls-Surette Makes What are Perhaps the Best Batteries in the Business.

Although many of the batteries used in solar may look like large car batteries, they are very different in their construction, chemistry and weight. Car batteries are designed to provide a burst of high energy for a short period of time, as their goal is to turn a starter motor that will start your car's gasoline engine. They are just not good at long, continuous periods of discharging. Solar energy batteries are the opposite. They are built with heavier lead plates to provide energy for longer periods of time. If you try using car batteries in a solar system you will be disappointed. After a few weeks or months the batteries will no longer hold a charge, and will need replacement. Quality batteries by companies like Rolls-Surette, Trojan and Crown will provide years of trouble-free service when properly sized and maintained. With batteries, like many other things, you get what you pay for.

Keeping Cool During Outages



Air conditioning is by far the most difficult load to power during an outage. It takes a lot of energy to reduce the temperature of a room. Sizing a solar system to power cooling loads like this quickly becomes cost prohibitive due to the battery bank required.

Solar Hybrid Split Air Conditioners may be a great way to keep cool during an outage. They are powered directly from solar panels during the day when there is enough sun. At night, they use grid power, or could be powered by the battery bank.

In Conclusion

There are many ways you can approach energy independence. Solar, particularly in Panama, is really a "no-brainer". Depending on your circumstances and budget, a solar professional can help you get the system that's right for you.

SiempreSol is based in David, Chiriqui, but works throughout Panama. More at www.siempresolpanama.com

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