# Solar Survival Manual

by Jim Skau

Lights on first night in a solar home. No noisy generator, only silence.

**A few tricks of the solar trade for your benefit a a solar user.**
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Winter is closing in on us. Autumns first series of overcast days has all ready taken it's toll on the solar homes of Southern Spain, and we know that there is yet more to come. Previous winter calls to needy solar clients, urges us to address a few points on the daily usage of solar systems.

Instead of over exploiting the capacity of your solar system, you can achieve some surprising results by changing your old grid tied

behaviour. Often it is possible to reduce your energy consumption at night, when all you have is the stored battery energy.

Batteries are the weak link in all solar systems. It is the only element that truly wears, and they will need replacement after a number of years. How long depends on battery size and quality but also on how you treat them.

Here in lies the key to good solar economy! The less you have to discharge each night, the longer service life you will get.

**Keeping your battery bank cycling up in the top 30% will keep your batteries going for a very long time.**

A Smartgauge battery monitor is a crucial tool for this type of preservation. Change your use of big loads to the afternoon, and conserve the stored energy in the battery bank for minor uses at night.

By using your system extensively in the afternoon, you utilize the panels to their full potential. The solar regulator (which will slow down the charge current long before 100% charge is reached) will be tricked to pass more energy through your system this way. In fact most solar regulators will top up your battery store much quicker if you “tease” them with a load, after 80% charge is reached.

This charge level is usually reached after about 3 hours Absorption charge, once full sun has hit your panels…. That is, if your system is set up right.

**An example:**
When do you turn on the washing machine? In the afternoon, when the batteries are fully charged, and all that good energy in your panels has nowhere to go. It’s for free then!

Being away for work is no excuse, when you can buy a cheap timer to start the washing at the right time. Load your washing machine in the evening and set the timer for early afternoon next day.
Further more, if you coil up about 200 ft. of cheap black irrigation tube somewhere between the water supply and the washing machine, chances are that your wash will be a warm one.

Powered by the low winter sun, water temperatures can reach as high as 30 to 35 degrees Celsius in a black tube placed on a south sloped terrace in the afternoon, and that’s for free too.

Dirty work clothes is not a call for a costly hot wash neither. The rags can be soaked in detergent over night, or if you have the time and inclination, Let the washing machine run through the prewash the afternoon before, turn it off before it rinses and let it sit till next day for the final wash.

Other tasks that consume a lot could be power tools or downloading big data files, From the Internet.
Turn on your Internet connection mid morning and start downloading. Your batteries will be full before sunset. Don’t wait until night time with this! Preserve the energy stored in your batteries for what’s important after dark; such as light (use LED’s now available in warm white, you can actually live with), Television – if you must, (a 40″ LED TV is 45-50 Watt these days).

Use a Laptop Computer! (50-60 Watt). A stationary desktop computer is hungry (400 Watt or more) so get rid of it.

If you like to play music, use the laptop for this as well. Small satellite desktop speakers with a hidden sub woofer (bass speaker) gives surprisingly good audio quality for very little energy cost.
Logitech makes a few really good low wattage desktop speakers.

By changing your habit you will soon realize, that life is just as good and full of possibilities on a medium sized solar system, as on the grid.

**Some items you just have to part with.**
Appliances like electric kettles, toasters, hair dryer and iron (all 1.500 Watts or more) You can run mid day, if your array is more that 1.2 Kilo watt – if not restrict the use of this type of appliances to use during generator backup charging.

Massive old big Televisions or Stereos produce too big a constant load on your batteries (unless you have 2500 – 3000 Amp hours of storage in 24V!). Reconsider what you really need, and how much you will save by reducing your grid indulged consumer expectations. Less sets

you free – you'll see!

All appliances has a sticker attached on them telling what Wattage (power consumption) they consume. At night time a constant load of more than 200-250 Watts will inflict a massive drain on batteries smaller than 1000 Ah/24V.

**It is imperative that you understand the following, it's the essence of solar maintenance.**
Batteries are chemical storage units. That means that they are a bit slow in response to big loads.
The latency (delay) of the chemical process in the batteries, when you turn on something ferocious, will often result in double or more drainage of your stored energy, than the stated consumption of the appliance!

You can compare it with running a hot tap from a water storage. If you run a trickle, the water remains hot for a long time, but if you open up the flood gates it will be cold pretty soon.

**Never cut corners when you invest in batteries!**
It is logical that a larger battery bank deals more easily with bigger loads than an inferior bank. It is therefore also obvious that this part of your solar system has to be of good quality and of sufficient size.

We are all prone to under estimating our consumption, but the price you will pay for killing an inferior battery bank prematurely is devastating. You might as well have thrown your money out of the window. Battery banks are usually around 40% of the full system price – including the installation, so it is important to get this right.

**Wire your battery bank the correct way**
Should be obvious, but just in case you have any doubt. Multiple parallel batteries should be wired diagonally placing the load/charge terminals at the extreme opposite ends – never parallel with the +/- master terminal out of the same battery unit.

Do not fit more than 3 parallel battery lines. Better to upgrade your inverter to a higher voltage and fit your batteries in serial (+ to next – until desired voltage is achieved)

**Fridges and freezers**
Recently the drop in both panel prices and power consumption of the A+++ fridge/freezers has allowed us to recommend these products. It is now more economical to add a couple of panels and get a Balay (really Siemens/Bosch but cheaper) 240L fridge/90L freezer, compared to the old overpriced Butsir/Taver gas fridges.

Gas prices, as electricity, seems to be an ever increasing tax on us normal working people, so get rid of the gas fridge and go autonomous.

Your solar system is a reliable constant slow source of energy. Slow means it takes time to reproduce what you consume. You can't take more energy out than what is being stored. Try to avoid discharging your batteries below 50% capacity, this dramatically prolongs the life of your battery store.

That being said, it is also a fact that we are situated in one of the best solar regions on Earth. In Southern Spain you can live on half the size of panels, than you would have needed in the North of Europe, giving you plenty of energy to a modern lifestyle. All it takes is a bit of planning.

Finally as a solar user, you are one step ahead of the grid tied community. It is foreseeable that the hour of Truth will dawn on the high energy consuming Grid very soon. Grid power is precious and increasingly expensive.

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