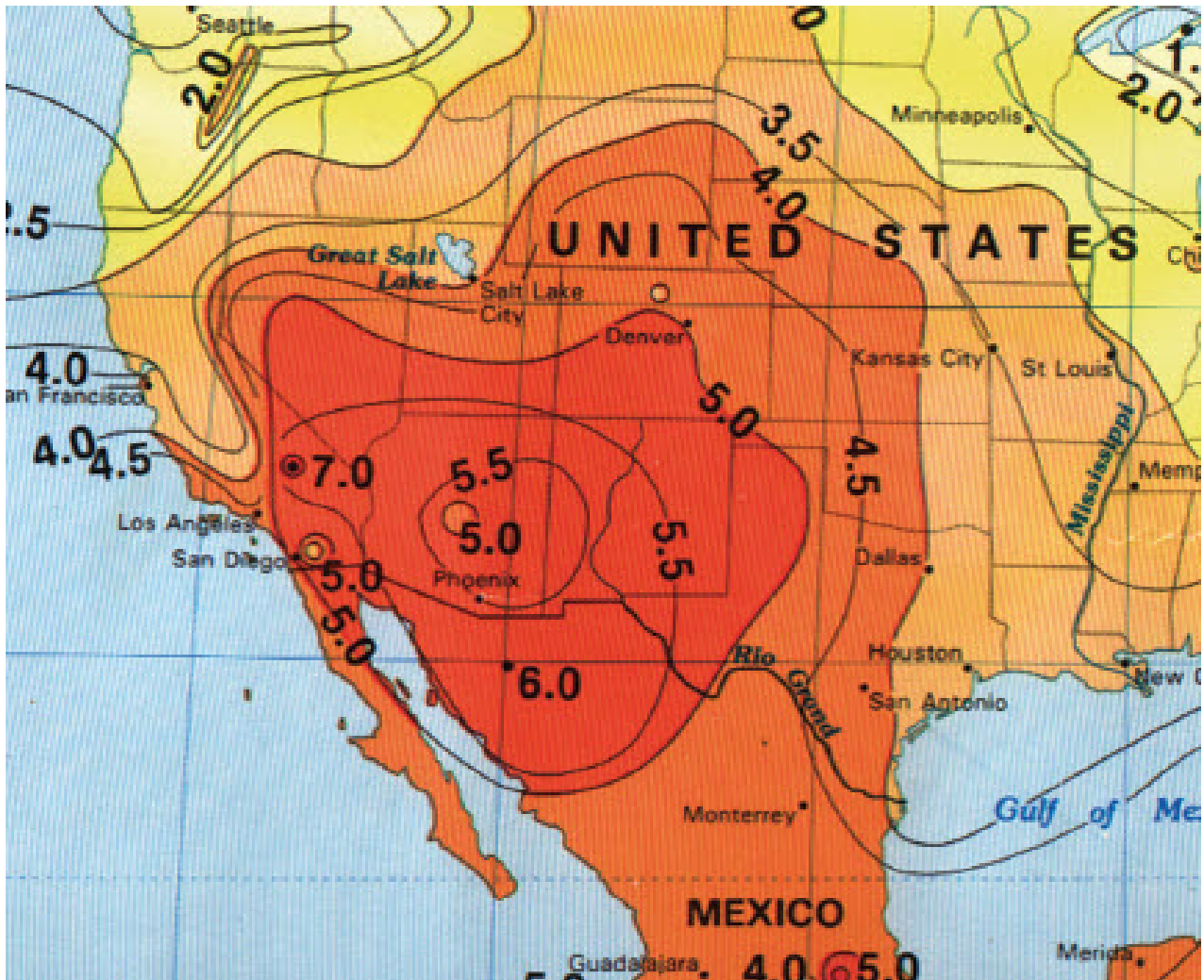


# Live Safer with Solar

Using Solar Energy for  
Emergency Preparedness,  
Disaster Mitigation,  
Disaster Recovery and  
Safer Living



Solar Insolation (Radiation) Map

**A Solar Living and Preparedness Handbook**

# A Note on Using Solar for Emergencies

In the year before Hurricane Katrina, Florida was hit by 4 hurricanes. Power outages throughout the state were widespread. Numerous Floridians turned to gas powered generators to keep their refrigerators and lights operating. Sadly, many negative results occurred as a consequence.

During this period of widespread power outages I received many emails and phone calls to inform me of the various troubles of the people living with no grid power. This sad information came my way because of a blog that I have been keeping for over 6 years called "Solar for Emergencies" ([solarguy.blogspot.com](http://solarguy.blogspot.com)). I was told that my scant information about the safe use of solar during and after power outages could be life-saving to many families. Some of the situations residents reported were:

- \* Gas generators were being run almost constantly at most residences that were not destroyed or badly damaged by hurricane winds.
- \* Noise and fumes from the gas operated generators were everywhere causing nausea and sleepless nights.
- \* Thousands of generators were being stolen by thieves, some taken while still running.
- \* To stop theft, a few people ran their generator in locked garages with a box fan in the garage window thinking it would exhaust dangerous fumes, often with deadly consequences. I was told that entire families were killed by carbon monoxide entering the house while the family slept.
- \* Generators, after running for several hours, were refueled while the generator was blistering hot. Unfortunately for many, the flammable gasoline was spilled resulting in a disastrous situation when an uncontrollable fire caused destruction of homes and lives.
- \* Florida locals were dealing with the resultant tragedies with little or no national press coverage of the true dangers of gas/diesel driven generators.
- \* Fuel to operate the generators was often hard to find or drastically overpriced when available.

Years earlier I had learned from a survivor of Hurricane Andrew that the above negative conditions were the norm during extended regional power outages. In 1999 a fellow that came into our store related to me that after Hurricane Andrew he and his brother lived precariously for several months without power using a gas generator for electricity. He told me that he or his brother had to stay up 24 hours a day guarding the large generator that they had, even when silently locked up in the garage. He recounted that life consisted of keeping a loaded shotgun within reach with the generator in view through his open kitchen/garage door. He told me that "this was no way to live" and that "if ever faced with a similar emergency" he "would never use a noisy attention getting generator to provide power".

Because I had been in the solar industry for almost 20 years I knew that there was a safer way. I started a blog titled "Solar for Emergencies" with various posts about using different solar devices that would provide a safer environment for families and individuals before, during and after an emergency or regional disaster.



A few years later, after receiving emails and phone calls from the Florida folks, I started a personal web site titled the same as the blog providing more information and links to help people realize the tremendous value and safety of solar. During this time, [earthtoys.com](http://earthtoys.com) asked me to write a series of articles that addressed multiple ways solar could alleviate stress and inherent problems during and after emergencies or disasters. Though a little outdated, the six articles are still valuable and published on their website. The articles are linked through my Solar for Emergencies site ([solarprepared.com](http://solarprepared.com)) or the Vegas Trailer Supply website ([vegastrailer.com](http://vegastrailer.com)).

The articles are titled: 'Safer Lighting with Solar', 'Safer Cooking with Solar', 'Safer Water with Solar', 'Heating, Cooling and Refrigeration', 'Safer Back-up Power with Solar' and 'Live Safer (and Better) with Solar'. In this publication these six articles are presented along with related topics. In future releases of this booklet we will include various products with manufacture stats, most of which we have in stock at Vegas Trailer Supply.

This is not the final word, but it is my desire that it gives you another perspective to help keep your family safer in today's world.

There are many ways that solar products can be used on a daily basis and for emergencies to keep families safer. Perhaps the most important products include; SunDanzer refrigerators, low voltage solar panels to charge batteries and the popular Global Sun Oven.

Often the information and products depicted in this booklet needs updating or additions. I intend on releasing this information and make changes to the booklet as time permits. Please excuse any misspellings or grammatical errors as I believe that getting the information to families and individuals who can use it is more important than the time proofreading or rehashing would consume.

This booklet is labeled as a preparedness handbook, but it is not a complete guide. There are others who provide more comprehensive guides to emergency preparedness, but you probably won't find most of the information in this booklet under one cover in any other publication. It is meant to be an addition to your library, hopefully an important addition.



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*Please note that this is a draft version of a larger publication of the same title due to be released in the future. This booklet is pre-released to get this information to people in a timely manner because of the current negative economy.*

*This version has been adjusted to fit a loose leaf binder. Future versions may not be in this format but will include more pages of detailed solar product information, charts, diagrams, plans, glossary and related items.*

*Most items mentioned in this booklet can be found at Vegas Trailer Supply or can be special ordered.*

*There may be mistakes and misspellings. I would be grateful if you would bring any you see to my attention.*

*Let's keep in touch!*

*Michael*

## Types of small solar systems:

The smallest solar systems are simply a "battery maintainer" that keeps a battery from losing its charge. Large systems include larger solar photovoltaic (PV) panels that will re-charge a battery after it has been used (put under a load). The larger and more expensive the panel, and other components, the more power you have to use. Systems needing to run typical household appliances can cost tens of thousands of dollars. Smaller emergency backup systems to run a light or a small TV can be very inexpensive.

PV panels have a positive and a negative connection, just like a battery. The two wires are hooked to a controller, which stops the battery from overcharging, and then hooked to the deep cycle battery. The positive wire must have a fuse in the line. This fuse protects the circuit (wire) from any shorts or pulling too much current which could melt and burn the wires.

Multiple panels and multiple batteries can be hooked together. Proper wire sizes and controller sizes must be used. Larger systems need a code approved disconnect switch installed.

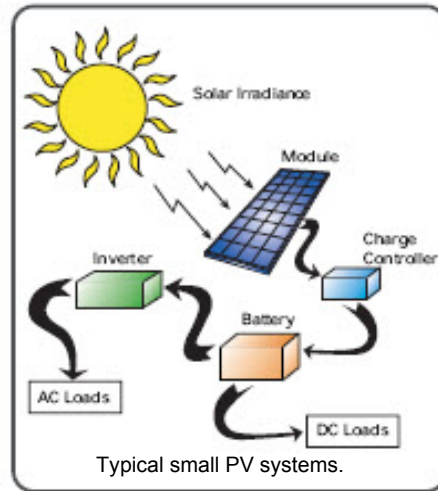
An inverter is a device that turns 12 volts DC into 120 volts AC current. Household appliances are 120 VAC. Inverters come in large and small sizes. Proper attention should be made when sizing and installing an inverter. Small inverters can plug into a 12 volt cigarette lighter but often the wire size in the lighter plug is too small.

When considering a portable solar system for emergencies, attention must be made that the panel is well supported, the battery is in a vented container and all connections are proper. I like to use a small insulated ice chest to put the battery in. This can be vented, wired and a 12 receptacle installed very easily. The cooler provides protection of the battery so that the sun doesn't hit the battery directly. It also stops the accidental dropping of a metal tool on the battery terminals which could produce a fire or explosion.

Small backyard systems can be installed safely that can be used as lighting for an outside kitchen or landscape lighting then used as an emergency system if needed. Larger systems that are attached to your house or are grid connected require a solar electrician to design and install.

Panels can be installed on poles or ground mount racks, and should have a lightning arrester in the line. Roof mount racks must be designed and installed by professionals.

Controllers come in different sizes, according to the amount of current being produced by the panels. The typical RV or cabin uses more expensive wall mount controllers that have digital monitors built in.



This maintainer will keep 2 deep cycle batteries from losing their charge or run one small light for about an hour a day. A larger panel will run a small SunDancer refrigerator and provide about 2 hours of light a night. Adding more panels will produce more power.



**Pole Mount & Ground Rack**



**Lightning Arrester**



**Controllers**



Controllers can be small or large, in-line or panel mount with digital meter.



### 12VDC Accessories

12 volt accessories include extension cords, outlet receptacles, "Y" pigtails, etc. These devices can not be used with high power appliances.



### Inverters: 12VDC to 120VAC

Inverters can be small or large with a wide variety of features. To save battery power try to use the smallest inverter that will do the job. Most installations require a post mount disaster fuse.



**Inverter Cables**



### Portable Power Units

Self contained units are available that will accept multiple charge sources, including solar and provide limited amounts of 12 volt and 120 volt power for emergencies.