

Battery Types

There are a variety of battery types that you will no doubt have on hand as an emergency source of electrical power. The most common types that you will probably have are:

- 1)Lead Acid batteries
- 2)Nickle / Cadmium, rechargeable batteries
- 3)Carbon / Zinc, dry cell batteries
- 4)Gel Cell batteries

Most likely, you are going to be placing these in storage so you will have them available for emergencies. However, each of these battery types must be handled quite differently so that they will be usable when the time arises.

1) LEAD ACID BATTERIES:

Lead Acid Batteries,(automotive and truck batteries)when charged properly can be used to deliver a usable and relatively efficient source of 12 volt DC electrical power that can not only be used for lighting, but can also be used in low to medium load power requirements in the home. However, through the use of inverters, they can also be used to power appliances and equipment that could be essential to your survival, such as those necessary for air conditioning.

Now, air conditioning involves the production of both heat and cooling. Perhaps you think that this is a waste of power since you have a fire place or a wood burning stove, but when you consider the prospect of a Natural Disaster and long term survival, you might think differently.

You have to ask yourselves:

- * Where am I going to get the wood?
- ** Is there an adequate supply?
- *** And, how long is that supply going to last?

If there should be a World Wide, Natural Disaster, you might be looking at survival on a scale of Months, Years, even Decades. Once you have used up all of the available resources around you, there may not be anymore. Even if you conserved these resources, the environmental conditions could be such, that normal vegetation may be severely affected. Not only that, but if the environment has become completely hostile, vegetation may not be able to exist at all. What are you going to do then?

Electrical power is the only viable solution to these problems because, whether you believe it or not, it is readily available. Large storage batteries can provide the necessary power you will need.

So, you go out and buy five or six 12 Volt Automotive Batteries and you place them in storage for the time when they will be needed. You have been keeping the batteries well charged so that they are properly maintained. Everything is in order. The years pass, and perhaps five or six years later, an emergency arises and you pull the batteries out of storage only to find out that they are dead. You now have 150 to 200 pounds of lead, 50 pounds of plastic, and a few gallons of Sulfuric acid. They are now useless. But, this could have been avoided.

The solution is simple.

When you go to the Automotive Store to buy the batteries, don't purchase them wet, in a charged state ready to go. This is OK if your going to put them directly in your car. Once the acid has been installed in the battery, and they begin delivering power, the life span of the battery is now established and THE CLOCK IS TICKING.

Ask the Sales Person, to give you the batteries in their dry state. With the battery, you will get a box that contains a bag of Sulfuric Acid. You might be surprised to know that the Acid is already charged with electrical power. I'm not really certain how long the acid will hold it's charge, but if there is not chemical reaction going on, it should hold it's charge indefinitely. Now, when you put the batteries into storage, they will be almost factory fresh when you need them years down the road.

Handling and Storage of the acid can be a little tricky. There are safety precautions that should be taken to prevent leaks, and spills that can be extremely dangerous, especially if your going to store it in the garage, or in the house,(which is NOT RECOMMENDED).

- A) Don't store the acid in the garage or in the house if you can help it. The acid should be stored in a shed or out-building, away from the house.
- B) Don't store the acid bags in the original box. If the bag should break or leak, you're going to to have a dangerous mess on your hands. Instead, Buy acid proof, 1 gallon or 2 gallon plastic buckets with tight closing lids. Take the bag of acid out of the box and carefully place it in the bucket. The lid should have a few ventilation holes to allow for atmospheric expansion.

*NOTE - Always wear Acid Proof, Rubber Gloves, Goggles, and Apron when handling battery acid. It is also good to wear a vapor mask to help prevent breathing in dangerous acid vapors. Even thick, dust masks will help to a LIMITED extent. Be extremely careful.

This method of storage will assure that your batteries are fresh and ready to go when the need arises. It will assure that the battery

will last for its entire working life.

2) Nickel / Cadmium, Rechargeable Batteries.

Nickel / Cadmium, rechargeable batteries MUST be kept in their fully-charged state. The easiest way to destroy a Nickel / Cadmium battery is to place it into storage in an uncharged condition. If there is no electrical activity to keep the electron exchange or re-plating action going, the chemical processes in the battery will just destroy the anode and cathode metals until they are no longer functional.

Now remember, the general sales pitch regarding these batteries, is that they can be charged up to a thousand times. But, this indicates one thing, they have a limited life span. Now, you could keep them in a battery charger to keep them under constant charge, but believe it or not, this reduces the life span of a Nickel / Cadmium battery significantly.

So, What's the solution to long term storage?
STOP THE CHEMICAL ACTION OF THE BATTERY!

In order to safely place the Nickel / Cadmium batteries into long term storage, we must find a way to either STOP or Slow the chemical activity so that the normal destruction of the anode and cathode plates is reduced to a minimum. The solution is simple, refrigerate or freeze the battery. In a refrigerated state, the electrolyte becomes sluggish or inactive. It can't circulate or transfer electrons efficiently. Now, remember, the batteries must be fully charged for a complete time duration before placing them into refrigeration. Even in a refrigerated state, an uncharged battery will be destroyed or severely damaged, reducing its overall life span.

***NOTE-** Placing batteries in the home refrigerator or freezer along with edible food products is NOT RECOMMENDED. However, if the batteries are placed in Zip Lock Bags, and then placed in a tightly sealed, Tupper Ware type containers, the chances of contaminating food is greatly reduced. **DO NOT PUT VENTILATION HOLES IN THESE CONTAINERS.**

A safer alternative, if you can afford it, is to buy a small, 2 to 3 cubic foot refrigerator - freezer that are sold in most appliance stores or outlets. These are the types that we used to keep in our rooms just to have cold drinks and snacks handy. They are very small and don't eat up too much electricity.

3) Carbon Zinc, Dry Cell, and Gel Cell Batteries

In this case, the the words, "Dry Cell", tell you about the basic composition of the battery. The Dry cell is composed of a center

anode of carbon, and battery case that is formed out of zinc alloy. Filling the battery case is a substance called Manganese Dioxide. However, the battery isn't, "DRY". The manganese diode is soaked with a predetermined amount of electrolyte (either liquid, paste, or gel). I use the term, "predetermined amount of Electrolyte", because as the battery is used, the electrolyte is converted into zinc oxides and sulfide chemical by products. Once all of the electrolyte has been converted, the battery no longer supplies electricity and in essence, "IS DRYED UP". We'll get into these types of batteries and their processes in another article.

Once again, in order to safely place the Carbon Zinc, Dry Cell Batteries into long term storage, we must find a way to either STOP or Slow the chemical activity so that the normal destruction of the carbon anode and cathode plate area is reduced to a minimum. The solution is simple, refrigerate or freeze the battery. In a refrigerated state, the electrolyte becomes sluggish or inactive. It can't circulate or transfer electrons efficiently.

****NOTE-** Again, placing batteries in the home refrigerator or freezer along with edible food products is NOT RECOMMENDED. However, if the batteries are placed in Zip Lock Bags, and then placed in a tightly sealed, Tupper Ware type containers, the chances of contaminating food is greatly reduced. DO NOT PUT VENTILATION HOLES IN THESE CONTAINERS.

And again, the safer alternative, if you can afford it, is to buy a small, 2 to 3 cubic foot refrigerator-freezer that are sold in most appliance stores or outlets. These are the type that we used to keep in our rooms just to have cold drinks and snacks handy. They are very small and don't eat up too much electricity.

Conclusion

With careful storage and consideration of the types of batteries you intend to keep available, you can be assured that they will be ready to use, and at a reasonable level of electrical production many years from now. Just remember to check the batteries from time to time to make sure that their condition, or environment hasn't changed which could effect their overall performance.

Subject: Well,..You Have Plenty Of Batteries,....
Now What Do you Do?
Part Two

Well,..You Have Plenty Of Batteries,....

Now What Do you Do?

By Falcon

Part Two

Methods Of Charging Batteries Through Alternate Power Sources

You have encountered an emergency situation that now requires basic survival measures. It's now time to pull the batteries out of storage to power the radios and lights, or whatever else you have set up as emergency power sources. For now, everything is fine. The batteries are still fully charged and ready to go. But after a while, These batteries are going to go dead. Now what do you do.

The first thing your going to consider, is throwing the 12 volt automotive batteries into the car so that the alternator can charge it. Well, this will do it, but what if there has been a global, natural disaster? Transportation has been disrupted, gas stations have run out of gas, and your down to your last half tank of gasoline. Do you really want to waste the valuable fuel to charge the batteries? Remember, once it's gone, there ain't no more!

There is no need to panic, and the answer is relatively simple if you planned ahead. The solution is to set up a series of charging systems that use renewable power. They don't have to be fancy, or elaborate, just simple and efficient. There are a number of ways that you can produce electricity.

I'm going to give you number of ideas that will help you along.

Basic tools and materials you should have on hand.
(some of this stuff might not be feasible for city folk, but do the best that you can.)

- 1) Soldering Iron, Light 40 watt, heavy 150 watt (Any type is OK)
Don't forget a good supply of matches or lighters. Fire will be necessary to heat the soldering irons, if you don't have electricity. Note, a charcoal grill is great to heat irons in. It's also great to cook on if you have a good supply of charcoal brickettes. Wood works too.
- 2) One pound rosen core solder (Not Acid Core)
- 3) Three or four 10 Ft. lengths of: (more is better)
 - a) 1/2 inch copper plumbing tubing
 - b) 1/2 inch aluminum electrical conduit
 - or c) 1/2 inch zinc coated steel electrical conduit.

4) Two or three rolls of 18 to 12 gauge wire. (wire can be stolen from appliances, extension cords, OR Christmas Lights!....Hey,...Wow! (by the way, most Christmas lights are low wattage at about 3 volts. Cut the sockets out and you can use them individually for room lighting)

* Note: I don't recommend using the blinkers unless you want to go stark, raving mad.

5) Two 5 Lb. bags of rock salt.

6) One dozen 1 or 2 gallon plastic buckets OR

Two or three rolls of heavy plastic sheet,(garden mulch plastic, with no holes, or heavy plastic, paint drop cloths.

7) Old or spare automobile fan belts,(2 or 3 recommended, preferably round and in one piece.) However,(they can be sewed back together)

8) Wheels from big toy trucks and tricycles. (make great pulleys)

9) A small volt meter or multimeter.

1) Generators

Automotive generators and alternators are fine for providing charging power. The Alternator is a little more difficult to hook up since you have to energize the field, but fairly simple. The DC generator is easier, and can be hooked up directly, with 3 amp diodes placed in the circuit to prevent reverse voltage.

Turning the generator/alternator is relatively easy,..all you need is man power, a bicycle or exercise bike.

Man power is just putting a crank on the generator and turning it by hand. This doesn't provide many turns per minute, but it is sufficient to charge smaller batteries. To charge 12 volt batteries, you need the front end, gear section from a Black and Decker Electric Drill. Just remove the long screws and pull it off. You will have to manufacture a hand crank with a shaft that will fit into the 1/4 inch or 3/8 inch chuck (A 3/8 chuck is better). The generator shaft will have to be drilled to the size of the armature spline so that the armature shaft can be inserted and fastened with set screws, or welded. You now have sufficient RPM to charge the battery. This can be tiring, however, and you might get a little CRANKY.

The bicycle is by far the easiest and best way to turn a generator or alternator. You will need a long, heavy board, preferably a sheet of 3/4 inch ply wood. Take the front wheel off of the bike, and fasten the front fork to a support structure. Be sure to block up the front fork. No sense riding down hill when you don't have to. Now, Remove the rear tire, and block up and support the rear frame of the bike so that the rear wheel is off of the ground. Now, slip a large automotive fan belt (either a "V belt", or "flat" depends on your generator pulley) around the rear wheel and securely mount the generator on the board behind

the wheel so that the belt is tight. Once you have done this, your ready to go! Of course, your not going to go anywhere, but your batteries will get charged, and it is great exercise.

Since the exercise bike is already supported by a hefty support frame, you will just have to figure out a way for the front wheel assembly to be modified to accept a fan belt. Mounting the generator is the same.

Remember, the direction you turn the generator is going to make a difference in the polarity. Negative should come off of the case ground, and positive off of the threaded pole. Again, place 3 amp diodes in the circuit lines between the battery and generator to prevent reverse voltage. Otherwise, you will turn the generator into an electric motor.

2) DC Electric Motors

Any DC electric motor can be used as a generator. It doesn't matter how big they are. All you need is a means of turning them and they will trickle charge your smaller batteries. Larger motors can be used to charge the 12 volt batteries. You can steal them out of vacuum cleaners, the kids toy and RC cars, Etc. Ordinarily, AC motors are not usable, but by placing diodes in the circuit wires, and finding a way to separate the field winding from the armature windings and brushes, you can create a relatively efficient alternator out of them. But, I'm not going to get into that in this article.

Smaller motors can be mounted to a board or frame in a circular pattern with a small rubber wheel on each shaft. Drilled into the center of the board, place a large rubber wheel on a shaft with a hand crank. Each of the smaller wheels should be in contact with the larger one. By connecting all of the motor wires in parallel, you would be surprised how much electrical power you can generate. You can also adapt it to the electric drill gear head, or bicycle. Use your imagination.

3) Galvanic Cells

This is something that most people don't think of. A Galvanic Cell is nothing more than a containers filled with an electrolyte, with two dissimilar metals acting as the Anode, and the Cathode.

The idea is simple. You can use glasses, jars, pop bottles (soda bottles for you eastern folk), plastic pails, plastic buckets, or even holes dug in the backyard lined with plastic sheet. All you need to do, is use short pieces of copper or pipe, short pieces of aluminum or pipe, and support them from a wood cover, allowing the metal to extend into the container.

You can use more than one anode element, and more than one cathode element. Just connect the anodes together, and cathodes together. You can now fill the container with a good concentration of salt water, water and Real Lemon, Lemon juice, any fruit juice, or anything to produce an acid. A friend of mine actually cut open and used old batteries in the water. It worked, marginally. But, it's better to save the old batteries. (I'll explain why in another article)

* Note: While I haven't tried it, you might experiment with a variety of household cleaners and laundry detergents. They have natural acids and emulsifiers that could act as an electrolyte. In a time of need, try almost anything.

By connecting a number of galvanic cells in series, you can multiply the voltage to what ever you require. If you use enough anode and cathode elements in each container, they can also be used as a direct source of electrical power for lights and equipment. The outdoor Pit Cells, lined with plastic can be made big enough to supply a great deal of power if constructed correctly. Just remember to cover them sufficiently so that rain doesn't wash out the electrolyte.

Periodically, you will have to clean the oxide off of the metal elements. After a while, they will corrode so badly, that they will need to be replaced. You can keep tabs on their condition by constant minitoring.

When the voltage begins to drop below 75% of it's starting value, it's time for a cleaning or replacement.

4) Solar Power

A very simple way of generating electricity for battery charging, is through the use of Photo-Voltiac Cells (solar cells). These can be smaller cells wired in series, or parallel depending on the voltage that you want, or a single, 12 volt plate array. These Solar Cells can usually be bought from some Electronics Warehouses. One Electronics supply house, is:

Jameco Electronics
1355 Shoreway Road
Belmont, CA 94002-4100
(1-800-831-4242)

Part # 106702,..12" x 12" plate, rated at 14.5 volts, 0.280 Amp, 4 watts

4 or 5 of these wired in parallel will give you approx one amp of power in normal sunlight. These will be more than enough for light power usages and charging. Just remember to put diodes between the solar cells and the batteries to prevent reverse current damage to the cells.

If you have the funds and resources, you could build a solar array that could supply you with an unlimited amount of electricity, to power inverters, or equipment in the home. Just remember, it only works during the day time hours and when the sun is actually shining directly on the cells.

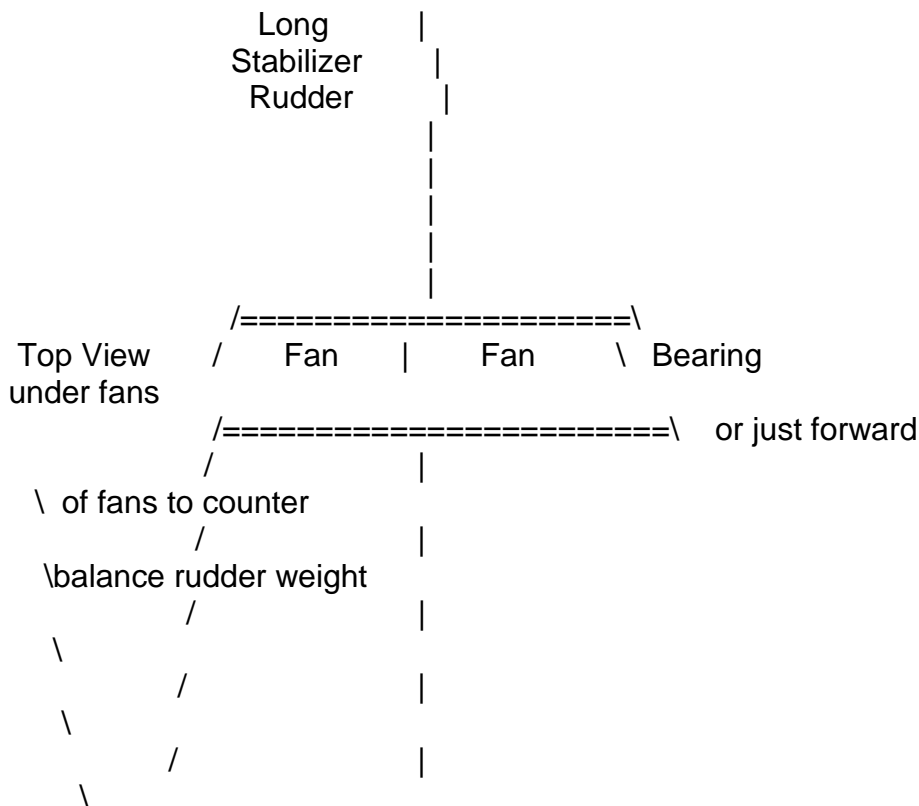
5) Wind Power

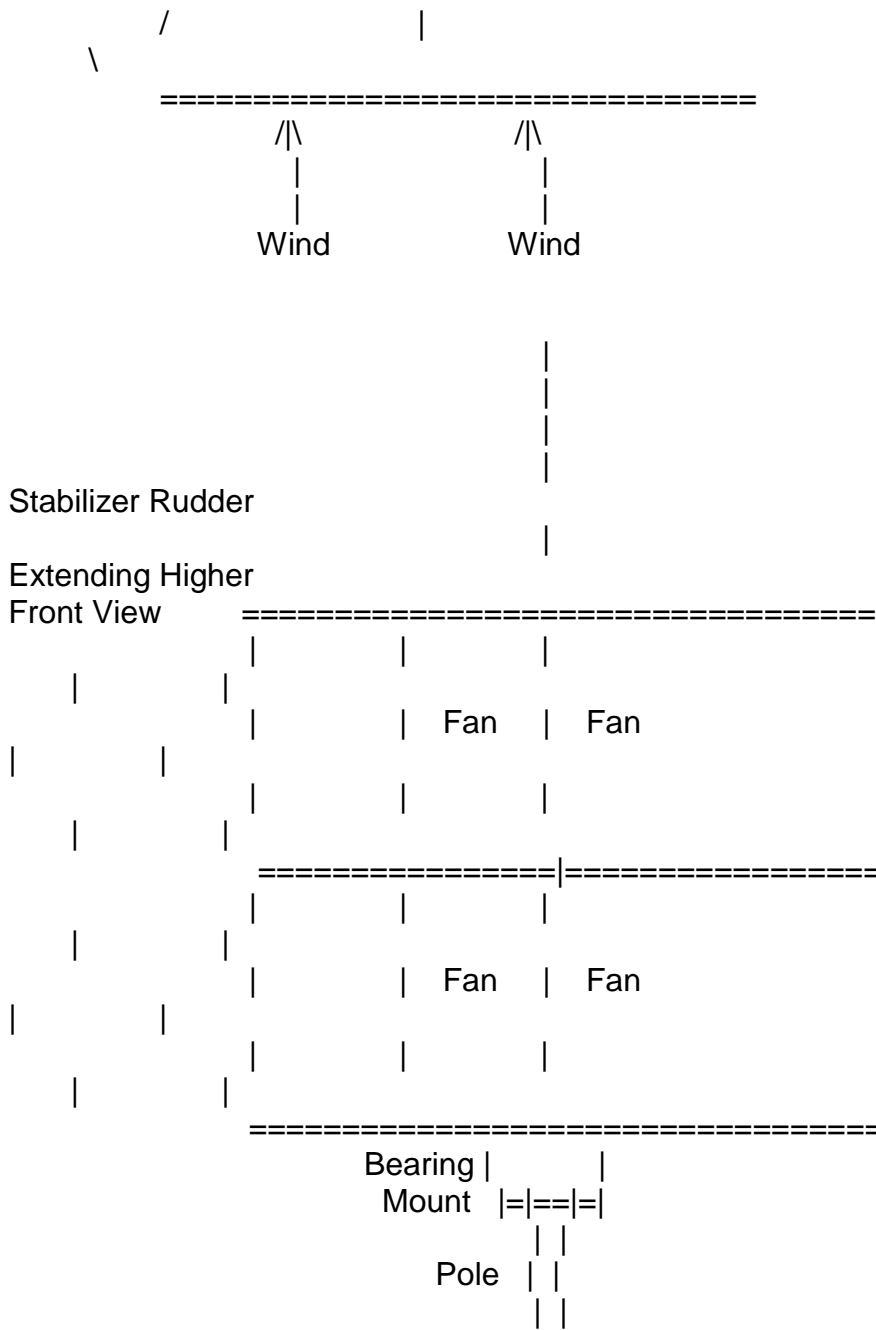
This type of power can be used to power almost any generator or DC motor just by putting a propeller or fan on the shaft. Just remember to mount the motor in a weather proof enclosure. One simple method I have found is through the use of Electronics Cooling Fans. One particular fan that I used is a Nidec, Model # TA600DC-A31694-22, 6.75" x 5.90" x 1.5". The fan is rated at 48 volts at .040 amps. Driving the fan by wind power produces between 20 to 40 volts. at .20 to .30 amps in moderate wind.

I have had no problem generating well over 12 volts on any given, windy day. Below is a simple venturi mounting system that provides better wind acceleration and fan pressure. (By the way, the larger the venturi, the more acceleration and fan speed).

The drawings below are a little abstract, but they give you a general idea of what the venturi looks like. Most of the construction can be out of pine or plywood.

The Jameco Electronics part number is: 108732 Around \$5 - \$8 each.





The fans are wired in parallel to provide a multiplied current value.

This system provides more than enough power and voltage for charging operations. While not designed to be used as a source of electrical power, more than one venturi system can be used to provide as much power as needed for electrical conversions. Just remember, this system will only provide power on windy days. One point that was brought up is the fact that weather patterns all over the world are becoming more severe.

It is possible that systems such as these may be effective should future weather patterns provide more steady winds.

Summary

These are just a few ideas that have been developed to provide fairly simple methods of generating electricity. While some can be put together using common items found around the home, some planning and material purchases are recommended so that when the time arises, you will be prepared to meet the challenge. Just remember, DON'T PANIC! Look around at your surroundings to see what is usable.

One book that I have found particularly useful is titled:

How To Make Home Electricity From Wind, Water, And Sunshine

By John A. Kuecken

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