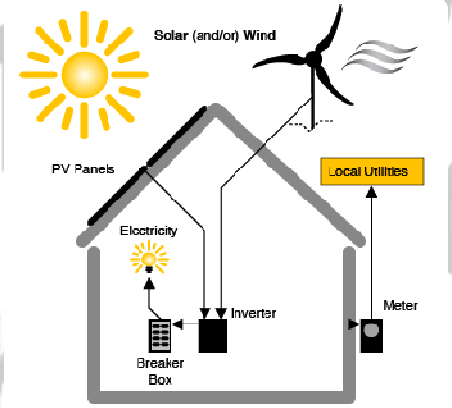
Grid-tied Alternative Energy and Shysterism

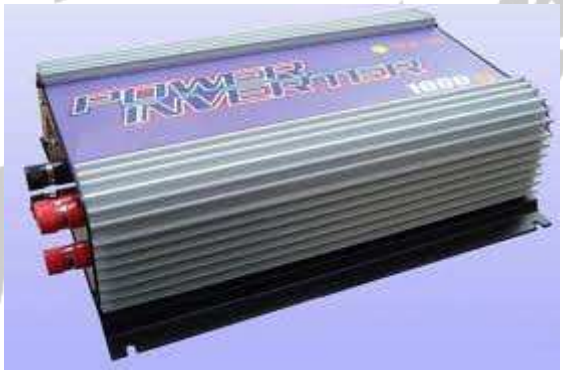
So you have invested thousands in some kind of alternative energy source and have been reaping the very small to nothing electric bill; but now the grid is down and you are still suffering the power outage blues. Well dah! That is because for some reason, (known only to the powers that be) the rules and regulations regarding independent grid-tied electricity generation think *only* of the line maintenance people and *not* about the everyday consumer/citizen.



Which means that when the grid goes down - so does your alternative energy! In fact due to Federal Safety Regulations all private energy generation, tied to the grid, MUST have a device that shuts down electrical flow when the grid goes down. This is *rightly* to protect any grid line workers from being inadvertently electrocuted. I have no problem with that.

My problem is with all these utilities and corporations wanting their Mega Bucks, Mega Profits, Mega Quickly, so that they rarely, *if ever*, tell us that we need at least one other device added to the system in order to have power during a grid outage. To top it off these shysters then charge us a 700-1000% profit price to get it!!!! In fact most states *do not require* the utilities or corporations to tell you about this. Oh if you ask outright they will, however if you don't ask, they won't tell you.

The device that these companies use to shut down any power going to your home and grid is the **Service Entrance Disconnect**, which is a device that interrupts excessive current and allows for manually or automatically disconnecting your home or business from the electric utility. It is generally a circuit breaker type "box" that is either part of your utility meter base, or is part of your main circuit panel. It could also be called your "main breaker". It is *required* by *Article 230 of the National Electrical Code* to be as close as possible to the utility meter. This 'breaker' is usually combined with the much needed inverter, that converts between electricity types.

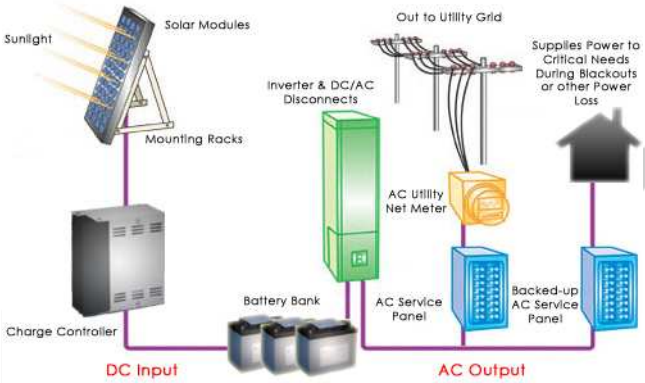


Most Inverters are designed to convert DC electricity generated by alternative sources (solar, wind, micro hydro, micro geothermal) into AC electricity which is what a home needs.

Note: If you have a grid-tied alternative energy system, most utility companies will either give the homeowner a check or a credit on their next electric bill. This discrepancy is the result of different power selling policies employed by various electric companies and various state regulations. Depending on the electric company that your house is connected to, you can either get a check or a credit. In either case, the company is *obligated* to take your excess energy.

On top of this many, if not most, utilities and companies will then charge the homeowner, at installation of the system, for the two-way meter that is needed to determine this credit or monies for the excess electricity that is 'given' to the grid.

Note: Science has yet to correct the loss of electricity that occurs during AC/DC conversion. I don't know what the particular loss figure is, however, the *total* loss from conversion of AC/DC *and* transmission (transporting the electricity across the grid) is apx 30%.



So what is this much needed self-reliant device? **The Transfer Switch.**

Transfer switches control which power *source* you are connected to and eliminate the possibility of back-feeding the normal power supply. Now get this: *generator systems* that are used for back-up (stand-by) or emergency power *require* transfer switches.

If the governments, utilities and alternative energy corporations were honest with their consumer/citizens, these would also be required for ANY grid-tied energy system too; or at least openly offered without shenanigans.

Note: Unless you are storing alternative generated electricity in a battery bank, your grid-tied system never actually feeds electricity to your home. Rather what goes on is your grid-tied electrical generation is sent directly to the grid. The utility company records the kilowatt hours (kWh) you supply to the grid and then subtracts that from the kilowatt hours you take from the grid each month to calculate your bill or payment..

Transfer Switches are available in a range of amperages and options to meet your particular application, whether you have a 30 amp residential service or a 4,000 amp commercial service such as an office building.

There are two types of Transfer Switches:

The Automatic Transfer Switch is the' brain' of a generator or alternative energy system – it does the transfer automatically when it detects a loss of power from the grid. So basically it determines whether you are connected to normal grid-tied power, your alternative power source and or generator power system.

A Manual Transfer Switch needs us humans to manually flip the switch when the grid goes down and again when power is restored. Some states have laws *against* manual transfer switches when coupled with grid-tied alternative electricity systems.

When installing a transfer switch that will supply power to your entire home, the transfer switch needs to be installed between the "*Service Entrance Disconnect*" and the main distribution panel. If your home utilizes a main breaker that's part of the main distribution panel, then you'll need to have a "*Service Entrance Disconnect*" installed, either separately, or as part of a "*SERVICE ENTRANCE RATED" transfer switch*.

Considering all the obtuse rules and regulations regarding grid-tied alternative energy systems, the easiest cheapest solution is to buy a "Service Entrance Rated" automatic transfer switch.

Underwriters Laboratories

The *National Electrical Code* requires that all manual and automatic transfer switches be UL-1008 listed by *Underwriters Laboratories* and carry the UL-1008 label. This is in annex A of the 2002 National Electrical Code. If a transfer switch meets this tough safety standard and has been certified by Underwriters Laboratories, it will carry the UL-1008 label. This label will clearly say one of the following:

- UL LISTED AUTOMATIC TRANSFER SWITCH FOR EMERGENCY SYSTEMS
- UL LISTED AUTOMATIC TRANSFER SWITCH FOR USE IN OPTIONAL STANDBY SYSTEMS
- UL LISTED TRANSFER AND BYPASS-ISOLATION SWITCH
- UL LISTED NON-AUTOMATIC TRANSFER SWITCH

If you want to run *your entire house* in case of a power outage and you have a large enough alternative energy system or generator, you need a transfer switch that is the same rating as your main breaker panel. For a home this will normally be either 100 or more likely 200 amps. The transfer switch would be installed between your main breaker (normally at the meter) and your main electrical panel. Some homes have a 400 amp service utilizing two distribution panels, in which case you'll need two 200 amp or one 400 amp Automatic Transfer Switch.

If you want to run *only certain loads* during a power outage you can install a sub panel off of your main panel and use a 100 amp transfer switch. This is a great idea if you don't have an alternative energy system or generator big enough to run everything. Some Transfer Switches even offer a “series 185” automatic transfer switch, with a built in load center, that saves space and makes installation easy.

FACT: If you want to use your alternative generated electricity during a grid outage: even if the sun is not shinning, the water is not moving, the wind is not blowing or the steam is not building up to

generate electricity, ie: even if these alternative generation sources are not 24/7; then you will need to store excess energy in something – most commonly some sort of battery grid.

Most alternative systems are either 6 or 12 volt systems and use some kind of deep cycle, solid core battery (like a boat or RV battery). There are different kinds of solid core, deep cycle battery materials: gel, lithium and liquid (Yes, liquid, I still haven't figured out why they call this 'solid core' except for the fact that there are no 'portals' to check the liquid levels), to name a few.

There are also pro's and con's to 6 volt vs. 12 volt systems. Your needs will determine which is best for you; however it is easier and cheaper to expand a 6 volt system than it is a 12 volt system.

If you are still interested in alternative electrical generation you have several methods to choose from and will have to find the best for your needs and area.



We humans have been using **water** for a long time to do our work for us. Today we have what are known as *micro* and *macro hydro water turbines* that do not require a dam be built to ensure electricity generation. Yes these generate electricity in much smaller quantities, however depending on what kind you get and the speed of the water it is in, usually several of them can keep an average 1000 square foot home with lights, frig, freezer, TV and computer going without much of a hassle.

Wind is another source that we have used for centuries. Home wind turbines (also known as residential wind turbines, domestic wind turbines, micro wind turbines or small wind turbines) harness the power of the wind in order to produce enough electricity to run the lights and appliances. They are highly recommended for rural areas where there are no high buildings to block the wind flow. There are numerous types of residential wind turbines that can be installed and connected to your main supply board within a day.

There are two basic kinds to choose from:

The pole or mast mounted; usually above tree top level (over 35' high) to catch maximum wind conditions and can generate 4-10KW power

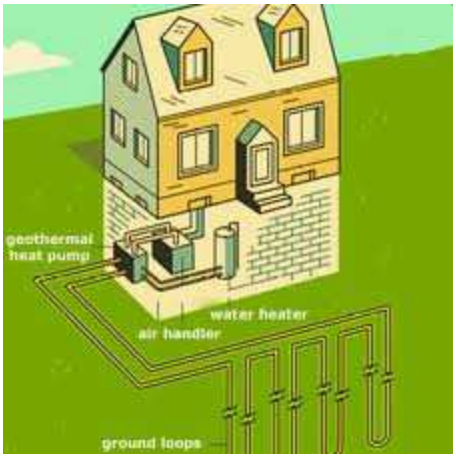
The building mounted, sometimes called vertical, which are usually smaller, they are mounted at the top of a building, are rated much lower due to their below tree top location and can generate 1-3KW power.

These are not all that popular because of manufacturers claiming much higher outputs than are actually recorded. Nonetheless, there are some efficient models, which if installed in a suitable wind catchment area, are capable of producing the reputed output.

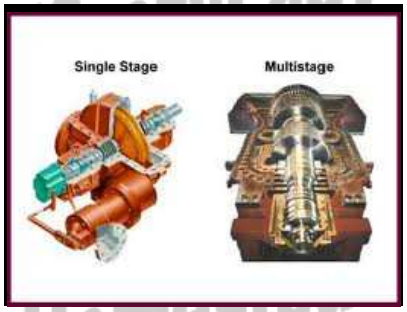
Remember, regardless of being mast or rooftop mounted, it is essential to check the available wind in your chosen location and don't rely solely on the manufacturers wind survey.

And of course we humans have long used the **sun**, even if just in the passive sense for heat.

Today there are all kinds of residential solar systems and panels to choose from and you don't have to live in a 'sunshine state' to take advantage of it!



Then there is **geo-thermal**; Humans have long used hot springs for heat or baths and with today's science even urban people can still take advantage of the geo-thermal properties of the earth as temperatures are rather consistent between certain depths.



However, relatively new to the residential market and mostly restricted to rural areas, are the small steam geo-thermal turbines used to generate electricity. These take advantage of the super heated water in hot springs to produce steam to turn these small turbines and generate electricity.

Any alternative energy system or generator, inverter and or transfer switch needs to be installed by a licensed electrician and the installation needs to be in compliance with all local and national codes. This is not a do it yourself job. Please hire a licensed electrician that will do the job right.

State by State
LAWS

Bottom line: Depending on state laws, you may or may NOT have been told that having this alternative energy tied to the grid needs a transfer switch or it will NOT be there for you if the grid goes down and most states DO NOT require the salespeople to tell you this information either. So be sure to ask about transfer switches and electrical storage options. Just keep in mind that these companies are out to not only make a profit, but make a huge mega profit off YOU, so please do your research and shop around before you spend thousands.

Some of the best information out there on home alternative energy can be found at: *Home Power Magazine* http://homepower.com/; Backwoods *Home Magazine* www.backwoodshome.com/energy.html; *Backwoods Solar Electric Systems* (more than solar) www.backwoodssolar.com/; *Generator Joe Inc* www.generatorjoe.net/; *Generator Joe* www.generatorjoe.com/

For more detailed information on your energy needs or all the different kinds of generators and fuels see:
Oh No! The Power is Out – Now What? http://weebly-file/2/2/5/0/22509786/oh_no_the_power_is_out__now_what_new_site.pdf
Energy Usage Estimations http://weebly-file/2/2/5/0/22509786/energy_usage_estimations_new_site.pdf
Fuels and Fuel Storage the Short and Long of It http://weebly-file/2/2/5/0/22509786/fuels_and_fuel_storage_the_short_and_long_of_it_new_site.pdf
Emergency Lighting and Heating, Etc. Resources http://weebly-file/2/2/5/0/22509786/emergency_lighting_and_heating_etc._resources_new_site.pdf

There are many more resources out there, however if you are new to alternative energy these are the best to start with. Once you know the basics, you will soon find the other resources. Just remember most alternative energy companies are out to make mucho bucks off you and will use every sales tool they can to get your money. Then you have all those utility companies out there that do not really want you to make your own electricity, yet alone have you profit from it, because then they can't make money off you. Next add in the federal government that has this addictive need to 'control us citizens' and they don't want to relinquish the hold they have on us through the utility companies. **So research thoroughly before you buy and be sure that if you are going to be utilizing a grid-tied system during a power outage that you have a transfer switch to do so.**

TNT