HOW-TO LIVE OFF THE GRID©



by www.agua-luna.com

STOP GLOBAL WARMING
USE ALTERNATIVE ENERGY

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PREFACE

What is alternative energy anyway?

Alternative Energy or Alternative Fuels, are any materials or substances that can be used as a fuel, other than conventional fuels. Conventional fuels include: fossil fuels (petroleum (oil), coal, propane, & natural gas). Some well known alternative fuels include biodiesel, ethanol, butanol, chemically stored electricity (batteries & fuel cells), hydrogen, methane, natural gas, vegetable oil, biomass, & peanut oil.

In the year 2000, there were about eight million vehicles around the world that ran on alternative fuels, indicating an increasing popularity of alternative fuels. There is growing social interest, & a perceived economic & political need for the development of alternative fuel sources.

Since burning fossil fuels are known to increase greenhouse gas concentrations in the atmosphere, they are a likely contributor to global warming. Another concern is the peak oil theory, which predicts a rising cost caused by severe shortages during an era of growing energy consumption. According to the 'peak oil' theory, the demand for oil will exceed supply & this gap will continue to grow, which could cause a growing energy crisis starting by 2010. Lastly, the majority of the known petroleum reserves are located in the middle east. There is a concern that worldwide fuel shortages could intensify the unrest that exists in the region, leading to further conflict & war.





Biofuel

Plants use photosynthesis to grow & produce biomass, or biomatter, biomass can be used directly as fuel. Agriculturally produced biomass fuels, such as biodiesel, ethanol & bagasse (often a by-product of sugar cane) can be burned in internal combustion engines or boilers.

Biodiesel can be used in modern diesel vehicles with little or no modification to the engine & can be made from waste, vegetable, animal oil & fats (lipids). Vegetable oils can be used in modified diesel engines. In fact the Diesel engine was originally designed to run on vegetable oil rather than fossil fuel. A major benefit of biodiesel is lower emissions. The use of biodiesel reduces emission of carbon monoxide & other hydrocarbons by 20 to 40%.

In some areas corn, cornstalks, sugarbeets, sugar cane, & switchgrasses are grown specifically to produce ethanol (also known as grain alcohol) a liquid which can be used in internal combustion engines & fuel cells. Ethanol is being phased into the current energy infrastructure. E85 is a fuel composed of 85% ethanol & 15% gasoline that is sold to consumers.

Solid biomass

Direct use is usually in the form of combustible solids, either wood, the biogenic portion of municipal solid waste or combustible field crops. Field crops may be grown specifically for combustion or may be used for other purposes, & the processed plant waste then used for combustion. Most sorts of biomatter, including dried manure, can actually be burnt to heat water

& to drive turbines. Sugar cane residue, wheat chaff, corn cobs & other plant matter can be, & is, burnt quite successfully.

Biogas can easily be produced from current waste, such as: paper, sugar production, sewage, animal waste & so forth. These various wastes have to be slurried together & allowed to naturally ferment, producing methane gas. When a biogas plant has extracted all the methane it can, the remains are sometimes better suitable as fertilizer than the original biomass.

Other Fuels



Methanol (methanol economy) from any source can be used in internal combustion engines with minor modifications. It usually is made from natural gas, sometimes from coal, & could be made from any carbon source including CO2. Flexible fuel vehicles may run with a high percentage of ethanol (ethanol economy) (up to 85% Ethanol plus 15% gasoline for cold-starting vapor pressure) with no modifications.
Hydrogen

Interest in vehicles powered by alternative energy sources has been gaining traction in large part due to high gas prices & an increased awareness of global warming, which according to a recent Intergovernmental Panel on Climate Change (IPCC) report is 90% likely caused by humans.

Diesel type biofuels: Hempseed oil fuel or other straight vegetable oils, Biodiesel
Others with internal combustion, Ethanol, E85, Hydrogen internal-combustion, Ammonia, Natural gas, compressed or liquified, Autogas (LPG, LP gas, propane), Synfuel, synthetic fuels, Plug-in hybrid electric vehicle
External combustion, Organic waste fuel, Wood gas on-board gasification, Steam engine cars (like the Stanley Steamer)
No combustion, Electric vehicle, Solar cell-powered or -charged electric cars, Hydrogen fuel cell, MAGLEV with induction drive (a variety of electric mass transit), Air car working on compressed air
Some less conventional alternative fueled cars:, Nuclear powered, Solar Radiation, Sail

Ok, what is renewable energy then?

Renewable energy flows involve natural phenomena such as sunlight, wind, tides & geothermal heat. Each of these sources has unique characteristics which influence how & where they are used.

Wind power

Wind power is the fastest growing of the renewable energy technologies. Over the past decade, global installed maximum capacity increased from 2,500 MW in 1992 to just over 40,000 MW at the end of 2003, at an annual growth rate of near 30%. Globally, the long-term technical potential of wind energy is believed to be five times current production global energy consumption or 40 times current electricity demand. Wind power is renewable & produces no greenhouse gases during operation, such as carbon dioxide & methane.



Offshore wind turbines near Copenhagen

Water power

Energy in water (in the form of motive energy or temperature differences) can be harnessed & used. Since water is about a thousand times denser than air, even a slow flowing stream of water, or moderate sea swell, can yield considerable amounts of energy.

There are many forms of water energy:

Hydroelectric energy is a term usually reserved for large-scale hydroelectric dams.
Micro hydro systems are hydroelectric power installations that typically produce up to 100 kW of power. They are often used in water rich areas as a Remote Area Power Supply (RAPS). There are many of these installations around the world, including several delivering around 50 kW in the Solomon Islands.
Wave power uses the energy in waves. The waves will usually make large pontoons go up & down in the water, leaving an area with reduced wave height in the "shadow". Wave power has now reached commercialization.
Tidal power captures energy from the tides in a vertical direction. Tides come in, raise water levels in a basin, & tides roll out. Around low tide, the water in the basin is discharged through a turbine.
Tidal stream power captures energy from the flow of tides, usually using underwater plant resembling a small wind turbine. Tidal stream power demonstration projects exist, but large scale development requires additional capital.
Ocean thermal energy conversion (OTEC) uses the temperature difference between the warmer surface of the ocean & the colder lower recesses. To this end, it employs a cyclic heat engine. OTEC has not been field-tested on a large scale.
Deep lake water cooling, although not technically an energy generation method, can save a lot of energy in summer. It uses submerged pipes as a heat sink for climate control systems. Lake-bottom water is a year-round local constant of about 4 ℃.
Blue energy is the reverse of desalination. This form of energy is in research.

Solar energy use

A photovoltaic (PV) module that is composed of multiple PV cells. Two or more interconnected PV modules create an array.

In this context, "solar energy" refers to energy that is collected from sunlight. Solar energy can be applied in many ways, including to:

Generate electricity using photovoltaic solar cells.
Generate electricity using concentrated solar power.
Generate electricity by heating trapped air which rotates turbines in a Solar updraft tower.

Heat buildings, directly, through passive solar design.
Heat foodstuffs, through solar ovens.
Heat water or air for domestic hot water & space heating needs using solar-thermal panels.
Heat & cool air through use of solar chimneys.

Geothermal energy



Krafla Geothermal Station in Iceland

Geothermal energy is energy obtained by tapping the heat of the earth itself, usually from kilometers deep into the Earth's crust. It is expensive to build a power station but operating costs are low resulting in low energy costs for suitable sites.

Potential

While currently renewable energy sources only supply a modest fraction of current energy use (ca. 14% of primary energy use), there is much potential that could be exploited in the future.

The Renewable Energy Resource Base (Exajoules a year)

	Current use (2001)	Technical potential	Theoretical potential
Hydropower	9	50	147
Biomass energy	50	>276	2,900
Solar energy	0.1	>1,575	3,900,000
Wind energy	0.12	640	6,000
Geothermal energy	0.6	5,000	140,000,000
Ocean energy	not estimated	not estimated	7,400
Total	60	>7,600	>144,000,000

Current use is in primary energy equivalent.
For comparison, the current global primary energy use (2001) is 402 Exajoules a year.
Source: World Energy Assessment 2001.

References

U.S. Department of Energy
GTA Energy, Inc.
Small-scale Biogas Use in Costa Rica

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BACKGROUND

The concept of providing for one's self isn't new. Humans have always been self-sufficient. Only in today's hectic day-to-day society do we find ourselves relying too much on others. In yester-year, a family had to kill themselves bringing the bare necessities to the home. Today the technology has changed as well as the materials, making it easier and more efficient to live comfortably independent.
Still, trying to walk YOUR path in this environment can seem impossible. Society wants us to all move as sheep, working, sleeping, eating together; drowsy drones pushing a machine for reasons we aren't aware of, yet attach to the comfort of our family. Well, how harmonious is a family without a Dad / Husband or Mother / Wife? Why? When there are other ways to *Live Life Simpler*. The Rat Race will have you believe it's not that simple. I'd have you believe it is. The truth will, in the end, be up to you. New ideas will take getting used to, changes & sacrifices need to be made creating a new world. Changing your mindset will be the biggest challenge. I will discus Alternate concepts to simplify daily activities, methods to save energy, avoiding Main Stream utilities, making *LIFE SIMPLER* by *LIVING OFF THE GRID* for several key reasons:

• When power fails, stay energized.
• Save the environment using sun & wind instead of fossil fuels.
• Control your funds. On vacation? No monthly expenses wasted.
• Expand your knowledge, challenge yourself, acquire personal satisfaction.
• *Retire Early*, with no bills to pay.
• Don't follow the Rat Race. Live for yourself.
• Tired of sending checks? Are bill collectors hounding you?
• What type of water is the city giving you? What chemicals are you drinking? Control your own water supply.
• What viruses, bacterias and bugs are coming through city septic? What will come through it in the future?

I am a 28-year-old retired structural engineer from *Boeing Aerospace*, with an extensive background in fluid and structural dynamics. That said, I disconnected from the grid for one reason. Cost. You'll find that given a few years not only will your system pay for itself, but it could actually start paying <u>you</u>. Enjoy self-sufficiency.

THE SYSTEM

There is an endless list of ways to *Live Life Simpler*. I've only skimmed the surface in this booklet. For years, I sat observing society's monstrous motion pushing its way through existence. I sought ways, tricks, loopholes, gaps, to make my life in the rapids simpler, cheaper, longer. You'll find that by thinking outside the box, without taking any shortcuts, you can create more time for your family, add years to your life while building & saving additional funds, thereby LIVING LIFE SIMPLER.

We will discuss a basic cost-effective hybrid *off the grid* system with a focus on solar, for a moderate-sized family/home in a typical area. This booklet utilizes several alternate energy components you will need to build your *off grid* system. I will provide a brief description of each, stating function, cost range and some sources for acquiring at the lowest costs. At the end add up the prices and calculate how many years it will take to pay for itself vs. how much you would normally spend on utilities. A normal system takes appx 6 years. Cut that in half with my booklet "How-to *Retire At Age 25."*

WARNING: I do not enclose any local ordinances or laws in my booklets, please check your local codes. You may even be able to sell your power back. Contact the power company, ask if they purchase excess energy.

The following 12 steps are cut directly from my book due out this summer. If you like what you read now and are looking for more (solar heating/cooling, fuel from water, build your own solar panels/wind generators), you may want to be added to the waiting list. Contact us for details.

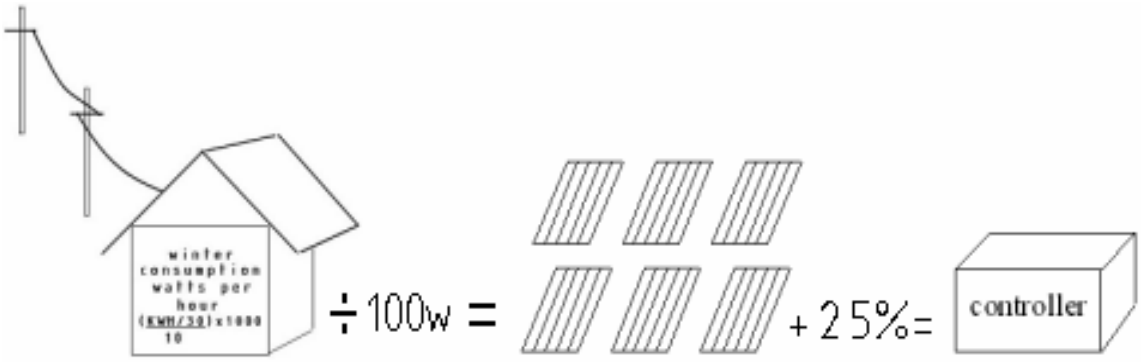


INSTALLATION

STEP 1. SOLAR PANELS: or PV panels are the key to a hybrid system., converting the sun's beams into electricity that we can use in the home. They come in many different sizes, shapes, power ranges and costs. We will focus on a 12v 50watt (4amp) panel, measuring appx 4 sq. ft. with a price range from $300-$500.

www.mrsolar.com ($340)
www.agua-luna.com ($299)

Retrieve a typical winter electric bill. You won't need a summer bill, because by building a system that runs in winter, it'll be proven for summer use where days are longer. Divide the total KWH (Kilowatt Hours) on the bill by 30 (giving you your Kilowatt Hour per day, or KWH/d consumption amount), now divide that by 10 (or the total average winter day hours in your area) (giving you KWH/h), now multiple that by 1000 (converting KWH/h to WH/h or watts)
(Figure 1).



Now that we know how many watts your systems requires, we need to know how many panels to use, along with an adequate- sized controller. For simplicity reasons, let's use a typical 50w solar panel. We will divide your final "system requirement" results from above by 50 to tell us how many panels you'll need (hourly winter consumption watts / 50).

INSTALLATION (cont)

NOTE: Size (watts and feet) of panels is a personal choice and isn't determined by any system requirements.

Mount panel/s flat (0 degree) facing south (if located in the north hemisphere). With a multimeter, measure the incoming amps (via pos cable to battery), slowly raise the top edge until the amps peak on your meter. Secure.

NOTE: If you are installing multiple panels, a pos/neg "bus bar" or "gang channel" may need to be installed.

STEP 2. CHARGE CONTROLLERS: The controller regulates actions necessary to keep your system functioning smoothly, i.e., over charge, over discharge, reverse polarity, reverse current, etc. Add appx 25% (comfort) to your "system requirement" to find the controller size (figure 1). Again, controllers come in all sizes. For now I'll quote a 35amp (420w) controller.

www.e-marine-inc.com ($119)
www.agua-luna.com ($150)

If it's an outdoor model, install it with the panel/s. If it's an indoor model, try to install it as close to the panel/s as possible. Connect the pos/neg cable/s coming from the panel/s to the pos/neg input jacks on the controller (Figure 4).

STEP 3. BATTERY BANKS: The batteries are the most expensive part of your system costing from $50 (golf cart, RV or marine) to thousands (fork lift). Batteries also come in many types and sizes. I favor the *Optima: D34/78-950* so I'll discuss it here.

www.batteryservice.com ($150)
www.agua-luna.com ($160)

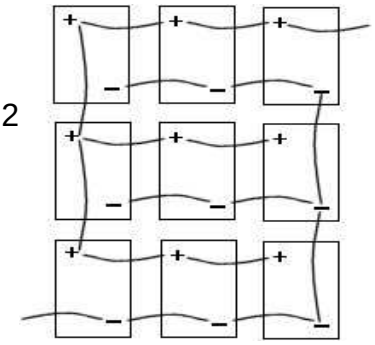
INSTALLATION (cont)

Batteries can be determined easily. If you're using a 12v system (12v panels) you need 12v batteries, you can use 12v batteries linked in parallel (Figure 2) or you can use 6v batteries link in series/parallel (Figure 3). Quantity isn't as important to figure out via formulas. Just keep one idea in mind: "If you run out of energy by morning, you need more batteries." For an average home, though, I'd start out with 12-16, and add on as necessary.

Batteries need to be stored in a well-ventilated, cool, weather- protected area. Install the pos/neg cables coming from the controller's output jacks to the pos/neg ports of a single battery in your bank (Figure 4).

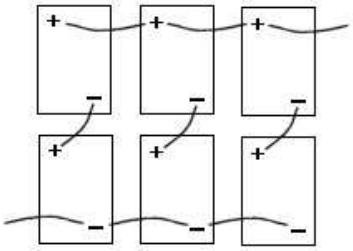
NOTE: Cable diameter is determined by the span between two devices. (Table 1) DC current travels on the outside of a wire instead of the inside, like AC. Therefore, multi-strand cable (Welding or Battery cable) is MUCH more efficient then solid.

Fig 2



12v batteries link in parallel
(12v system)

Fig 3



6v batteries link in Series/parallel
(12v system)

INSTALLATION (cont)

Amps	#12	#10	#8	#6	#4	#2	#1/0	#2/0	#3/0
1	75.6	120.1	191.0	303.7	482.9	767.8	1221.1	1539.8	1941.7
2	37.8	60.1	95.5	151.9	241.4	383.9	610.6	769.9	970.9
3	25.2	40.0	63.7	101.2	161.0	255.9	407.0	513.3	647.2
4	18.9	30.0	47.8	75.9	120.7	191.9	305.3	385.0	485.4
5	15.1	24.0	38.2	60.7	96.6	153.6	244.2	308.0	388.3
6	12.6	20.0	31.8	50.6	80.5	128.0	203.5	256.6	323.6
7	10.8	17.2	27.3	43.4	69.0	109.7	174.4	220.0	277.4
8	9.4	15.0	23.9	38.0	60.4	96.0	152.6	192.5	242.7
9	8.4	13.3	21.2	33.7	53.7	85.3	135.7	171.1	215.7
10	7.6	12.0	19.1	30.4	48.3	76.8	122.1	154.0	194.2
15	5.0	8.0	12.7	20.2	32.2	51.2	81.4	102.7	129.4
20	3.8	6.0	9.6	15.2	24.1	38.4	61.1	77.0	97.1
25	3.0	4.8	7.6	12.1	19.3	30.7	48.8	61.6	77.7
30	2.5	4.0	6.4	10.1	16.1	25.6	40.7	51.3	64.7
35	2.2	3.4	5.5	8.7	13.8	21.9	34.9	44.0	55.5
40		3.0	4.8	7.6	12.1	19.2	30.5	38.5	48.5
45		2.7	4.2	6.7	10.7	17.1	27.1	34.2	43.1
50		2.4	3.8	6.1	9.7	15.4	24.4	30.8	38.8
55		2.2	3.5	5.5	8.8	14.0	22.2	28.0	35.3
60		2.0	3.2	5.1	8.0	12.8	20.4	25.7	32.4
65		1.8	2.9	4.7	7.4	11.8	18.8	23.7	29.9
70		1.7	2.7	4.3	6.9	11.0	17.4	22.0	27.7
75		1.6	2.5	4.0	6.4	10.2	16.3	20.5	25.9
80		1.5	2.4	3.8	6.0	9.6	15.3	19.2	24.3

Table 1

STEP 4. INVERTERS: The inverter will change your 12v system into 110v (typical household). Inverters come in a HUGE selection of sizes, categorized in two types: *True sine wave (TSW)* and *modified sine wave (MSW),* pricing from $50-$10,000. I will price a 1500w MSW inverter compatible with a moderate-sized home, with common appliances.

www.techbuys.net ($150)
www.agua-luna.com ($249)

To determine the size of the inverter (s) necessary, add up the power needs of the appliances you use. To do this, find the input requirements plate on the back of item, or check Table 2. This number will need to be converted from amps to watts. (Amps x Volts = Watts)

INSTALLATION (cont)

NOTE: Typically an MSW inverter is adequate for any household appliances. How do you tell the difference? TSW inverters are more expensive, but are much cleaner, making the incoming electricity from your panels almost identical to your power company's. MSW inverters sometimes have problems with charging cordless tool batteries, or computer monitors. You may need a TSW inverter or a combination of both.

Install the inverter close to the controller. Connect the pos/neg cables from the battery bank to the pos/neg input terminals of inverter. Connect pos/neg cables from your inverters 110 AC output terminals, to the main circuit breaker box, replacing the electric company's (Figure 4).

Air Conditioner	1500	Can opener	100	CD player	35
Blow dryer	1000	Coffee grinder	100	Cell phone	24
Ceiling Fan	10-50	Dishwasher	1500	Printer	100
Central vacuum	750	Exhaust fans (3)	144	PC	150
Cloths washer	1450	Food dehydrator	600	Laptop	20-50
Dryer (gas)	300	Food processor	400	Radio phone	10
Garage door	350	Microwave	1400	Satellite system	45
Heater (portable)	1500	Mixer	120	Stereo	15
Iron	1500	Range	2100	TV 25	130
Sewing machine	100	Light bulb(60W)	60	VCR	40
Table Fan	10-25	Fluorescent light	16	Cable Modem	50
Refrigerator	540	AC water pump	500	Circular saw	900
Blender	350	DC submersible pump (6hrs/day)	50	Drill (1/2)"	750

Table 2

INSTALLATION (cont)

STEP 5. WIND GENERATORS: Wind is prevalent in every region of the world, some areas more then others. The wind generator will complete the electrical part of your hybrid system. Solar panels cannot charge at night or in storms, when wind is abundant. A good wind generator is a self-contained power-charging system, with charger and controller all in one unit. You can find many types, sizes and brands of wind generators. I suggest a *Whisper* or *AirX* unit. I will discuss the *AirX Land* model because that's what I sell, and personally I believe it's the better/quieter of the two.

www.target.com ($799)
www.agua-luna.com ($700)

Install the wind generator at least 6 feet higher then anything that can pass underneath, using a 2" water pipe as a pole. Connect pos/neg cables from wind gen, to pos/neg ports of a battery in your bank (a different battery than the one connected to the controller) (Figure 4).

STEP 6. PHONE: I suggest canceling your home phone. I find you don't really need it. But for those who do, or who want something for emergencies, get a cell phone. They come with long distance (cheaper then home phone). Purchase a prepaid card-activated cell, use as needed--"whenever, wherever".

Wal-Mart Tracefone ($20 includes phone and minutes)

STEP 7. ENTERTAINMENT:
Television. Install a television antenna on the roof, enjoy FREE channels (appx. 12-20 FREE channels) (Figure 4).

www.nextag.com ($35)
Radioshack ($25)



INSTALLATION (cont)

Movies. Rent or purchase movies and shows instead of pricey satellite or cable television.

Dollar General (1$ each)
Wal-Mart ($5 each)

STEP 8. WATER:
Catchment systems are fairly cheap at start-up and easy to pay off, especially if you live in a high rainfall area, consisting of a gutter system and storage tanks. Costs depend on average water consumption amounts.

www.agua-luna.com (3000gal tank)($1,400)
www.watertanks.com (3000gal tank)($1,400)

Water Wells is the easiest source to maintain, but may have the highest start-up costs, ranging from $1,000-$10,000 depending on required drilling depth. Because it's basically an unlimited source of water, I will use it in the installation.
Drilling service ($5,000 avg)

www.agua-luna.com 12v water pump ($40 and up)

Hire a well drilling service to locate, drill and plumb you in directly to the well, bypassing city water altogether. You will need a 12v pump but usually the drilling company handles all that as well. (If not refer to Figure 4)

STEP 9. SEPTIC:
Compost Toilets store waste in a self-contained, timed container, allowing it to turn naturally into fertilizer, which can be safely spread onto your trees etc.

www.comtoilet.com ($1,500)+toilet($270)
www.agua-luna.com ($1,500)+toilet ($300)

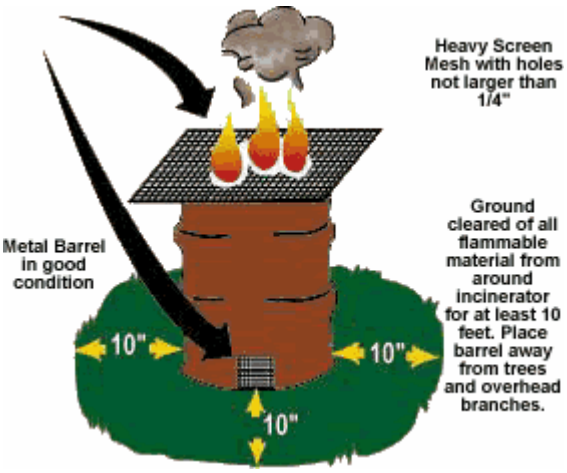
Septic Tank. IF you're not looking for such an extreme jump in waste disposal, go with a septic tank.

INSTALLATION (cont)

It can plumb directly into your existing septic lines that run to the city sewer. Because of this, I'll use it in the setup.

www.watertanks.com (1,500gal) ($1,500)

Hire a septic tank company to drill and install your tank and drain field. They will disconnect you from city septic and connect you straight to the tank. Besides yearly additives, nothing else is required. (Figure 4)



STEP 10: GARBAGE: Don't **throw away** money on a garbage service. City pickup takes your garbage and burns or buries it. You can do both yourself for FREE. (I suggest burning it for space reasons.)
Use a steel 55-gallon drum to burn daily trash. Bury or haul off anything that won't burn (Figure 4). Look around for unwanted, discarded or FREE barrels.

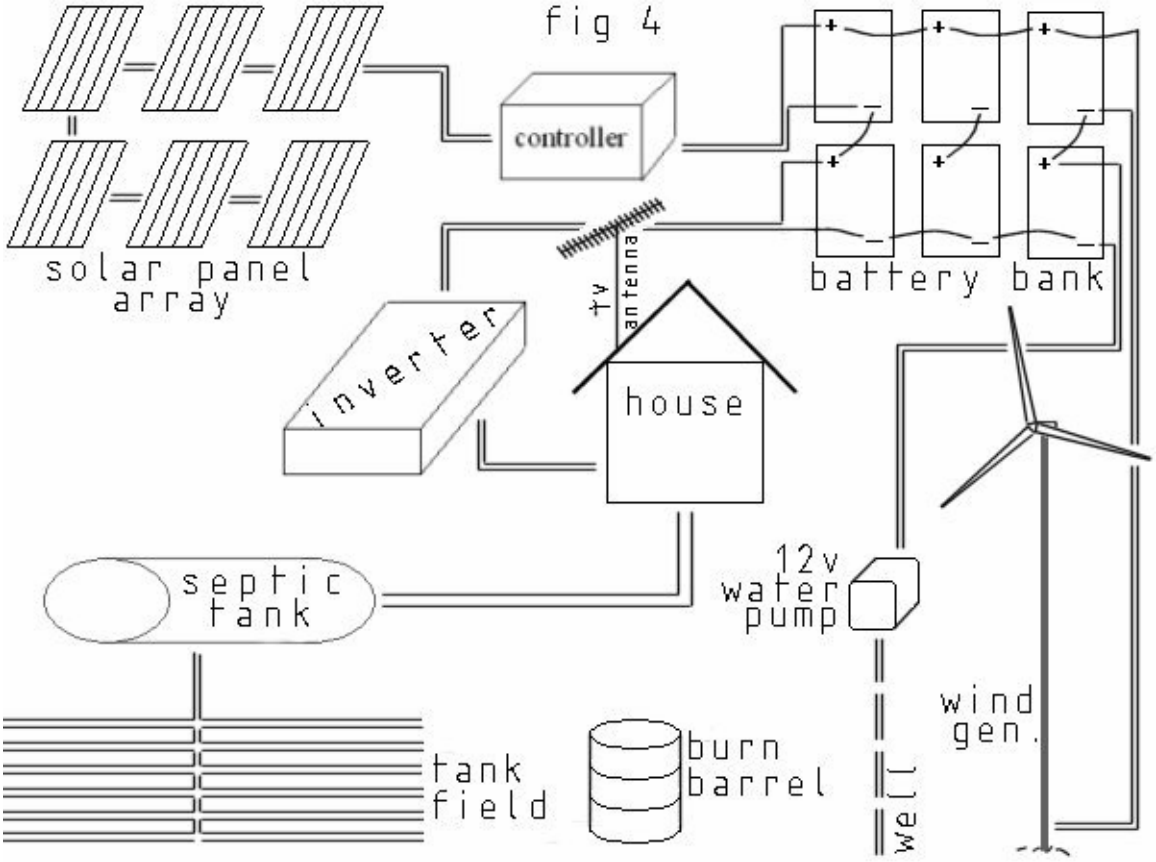
www.dgsupplies.com ($30)

STEP 11. CANCELLATION: CALL UP AND CANCEL ALL UTILITIES! (Make sure to do phone last).

STEP 12. ENJOY: Relax and reap the benefits of a UTILITY- FREE life. You work hard, you definitely don't need the extra stress of irritating utility companies bothering and harassing you every month.

CLOSING: If you were to do just one of these steps, you could lower your bills drastically. Do them all and when city power fails or catastrophe hits, your family will be the only ones safe and sound, watching TV and popping popcorn. If you're planning to build a new home, incorporate this booklet, bypassing the grid completely.

fig 4


controller
solar panel array
battery bank
tv antenna
inverter
house
septic tank
12v water pump
wind gen.
tank field
burn barrel
well

RESOURCES, TIPS, TRICKS

There are several tricks to building the same size system without buying the most expensive components. Here are a few:

• Do not buy for brand names, buy for price. 50 watts is 50 watts.
• Purchase small panels. 3-15w panels can cost ¼ less than one 45w.
• **FREE PANELS**: Contact your highway dept. or dept. of motor vehicle (DMV) and ask for panels off of their retired/nonworking "highway construction carts." These panels usually only operate at 50% efficiency or less, but in most cases are completely FREE or cost just a couple bucks. You may also want to subscribe to *www.freecycle.org*. All items are given away for FREE there all the time, no strings attached.
• Contact your Dept of Energy and Resources, you may qualify for tax breaks and/or refunds. For more info visit *www.dsireusa.org*.
• Use several small inverters separated by rooms--one inverter for the kitchen, etc. This way if one inverter breaks, the whole house isn't without power, just that room. (Keep a spare controller/parts).
• To save your inverter from operating continuously, run some appliances on DC electricity (refrigerator, water heater, etc.) Many appliances now come in 12v DC and use far less energy then 110v. (If you're switching over from gas, I'd suggest going straight to DC.)
• When purchasing parts, supplies or system components, ask first about any "display" or "damaged" items. In most cases they are discounted up to 90% off because of a few scratches and/or dings.
• Buy used. Look at *www.suntrekenergy.com, www.oasismt.com, www.craigslist.org or www.ebay.com* where you may find "like new" used items, at 1/10th of their original cost. • Sell your excess energy back to the power company. Ask your power company about "net metering" or go to *www.eere.energy.gov* or *www.serconline.org* for tables and state law information.
• Check out these books and magazines for more information on *living off the grid*: "*Photovaltaics", "Create an oasis greywater", "Motherearthnews"* and my book coming out this summer.
• If you have questions, email me for FREE online consultation.

ABOUT THE AUTHOR

AguaLuna is an Off-Grid, Family Owned, 100% Alternative Energy / Fuel Run Ranch. We share / teach methods & projects that are designed / compiled & currently running (here on the ranch) with others, in the hope that everyone can accomplish some form of Self-Sustainability / Green Alternative Energy upgrade to their home or vehicle.

The planet IS being Destroyed & Global Warming is no longer questioned. Simply flip through your TV or pick up a newspaper, the subject makes headlines daily...

Global Warming
Melting ice sheets & glaciers
Floods & droughts
Great hurricanes & cyclones

Seasonal extremes
Seasonal phenomena's
Species extinction
New & resurgent diseases

These catastrophes are Natures Natural WAKE UP call & we all need to Answer It !

Advancements in technology & information make going green A LOT easier today. For example, Using Alternative Energy's like Ethanol (corn oil), Biodiesel (fry grease), Hydrogen (water), Solar Power, Wind Power, Water Power, etc., instead of polluting & harmful fossil fuels, is an extremely simple, cheap & HUGE step.

What's better then a cheaper, safer & healthier alternative to Global Warming ? The earth provides for us unlimited FREE Energy, why not use it ?

My husband & I have lived 100% Off the Grid & Bill & Debt Free on our ranch in West Texas for the last 8 years. My husband (a retired Engineer from Boeing Aerospace) has written, compiled & built every project we offer in our Alternative Energy Guides collection, which are all available for viewing / testing in our On-Site Workshop. This is why we not only believe 100% in our Alternative Energy Guide Collection, but are capable to offer FREE unlimited online consultation at no extra cost, with every guide purchased, like no one else can over the Internet. We are standing by to walk you step-by-step trough ANY problems you may experience in building your own Alternative Energy items.

CLICK http://s37.photobucket.com/albums/e88/arcious/Hacienda_Agua_Luna/ to meet us & visit the ranch, where we live completely self sufficient. Let us share our knowledge & experience with you & your family.

And don't forget to check out other Alternative Energy Guides
http://www.agua-luna.com/guides.html
We've formatted them in an easy to read, step-by-step way to provide EVERYONE, ANYONE, EVERYWHERE an abundant amount of information, while having in mind all skill levels & have designed the booklets to suit each individuals needs from the beginner to the expert. Titles include...

How to build a Wind Generator
Building a Windmill
How to find Free Solar Panels
Building a Solar Panel

How to build a Solar Stove
How to Build an Arc Welder
How to Live off the Grid
Build a Solar Water Heater

DIY Biodiesel
Build a $10k 5,000sqf home
DIY Automatic Animal Feeder
Super Cooler Plans

How to Convert your car to EV
How to Run your car on Ethenal
Build an Alchohol Still
Build a Solar Panel

... & Much more, specifically written to better assist your Living off the Grid / Alternative Energy Experience.

> **Note:** *For the best savings we Highly Recommend our Feature 40+ Package. It contains over 40 Alternative Energy / Live off the Grid Booklets for the price of just 5. The 40+ Package will kick start you into your NEW Alternative Energy Life Style & will guide you to help us STOP GLOBAL WARMING.*

Because our life style here at agua-luna.com Ranch is 100% Lived Off the Grid, we are familiar with the Day-to-Day aspects of Self Sustainability & how simple it is to actually make the conversion. No one else can offer that.

If you're interested in making your first GREEN steps with our help, we offer a number of affordable options. First take a tour through the site, then check out our instructive Alternative Energy Guides, & if going green sounds good to you, sign up to join us here on the ranch & take part in our On Site Workshop or Online Workshops, gain experience in our Internship Program during one of many Sustainability Projects, catch an Alternative Energy Seminar in your area or simple stay in one of our cozy 100% Off-Grid Cabins, experiencing nature's stress free landscape & what Living Self sufficient / away from society's rat race has to offer.

Because agua-luna.com is a non-profit, 100% Alternative Energy Green Off the Grid run Ranch. All purchases & donations go strictly to costs incurred & future expenses in providing the newest Eco minded projects & information to a larger array of people, in the hopes of helping as many as possible in making some form of Green conversion.

About the Agua-Luna On-Site Self Sufficiency Workshop…

The following procedures are recommended for both first-time enrollees and those who have already experienced a seminar or have previously taken a course/s with agua-luna.com:

AguaLuna Ranch in Far West Texas is an Off-Grid Eco orientated and Green run Ranch, dedicated to creating learning communities for on-going professional sustainable development. Members of the agua-luna.com On-Site Workshop, who are driven by all things environmentally friendly, work to teach others Green and Alternative ways through hands on courses. We invite you to sign up for our Summer Workshop and make the conversion now.

AguaLuna Workshop Information

The Workshop will consist of a series of lab and on-site based tutorial lectures and projects covering alternative energy and / or self sustainability, including past, present, and future applications and techniques, particularly in its application in making the Environmentally Greener conversion.

The workshop will be held on-site at the AguaLuna Ranch. See dates, fee's and course topics at www.agua-luna.com

The Workshop is intended for first-timer enrollees or repeat offenders who are motivated to make an environmental difference in their own lives and in the lives of those around. Travel and accommodations information is available upon request agua-luna@lycos.com Local / primitive camping accommodations, on the Ranch, may be provided at no charge, upon request, to participants for the duration of the workshop.

Participants earn their Green Certificate certifying their knowledge of the latest in "green" building practices, technologies and techniques.

The topics will address economic, ethical, environmental and social aspects of some form of self sustainability and / or alternative energy. Specific topic based projects will be taught and carried out by attendees in a hands-on safe environment. Each of the workshops will feature a 1 week (4 hr/day) eco based component, entirely devoted to some form of Alternative Energy Concepts and is meant as an introductory course to the world of Green living.



Next Step: Download and Fill out the work-shop sign up form by clicking http://www.agua-luna.com/workshop_form.pdf or send an email to the address below requesting the form. Feel free to include any information you feel pertinent.
Send completed applications to:
agua-luna@lycos.com
or
AguaLuna
Hc 65 276 G
Alpine Tx
79830

AguaLuna Workshops

Alternative Energy Concepts Workshop
$480 per week (fee covers all project materials and lab costs)
This workshop course is directed towards the average person who wants to gain a basic knowledge of Alternative Energy. Participants will learn Passed, Current and Future Energy and fuel resources, alternative fuel and energy options, alternative fuel and energy conversion, and more. Participants and Instructors will prepare and perform theoretical, lab and on-site presentations, examples and projects, leading the learning experience.

Home Small Scale Hydrogen Generation Workshop
$480 per week (fee covers all project materials and lab costs)
This workshop course focuses on the basics of Small Scale Hydrogen Generation and how it can be applied safely in the average Home, vehicle and daily use. The basic technical knowledge and skills in this workshop will be useful in helping family and consumers better understand and incorporate Hydrogen as a safe fuel, limiting if not extinguishing their need for fossil fuels. Hands on electrical and chemical Hydrogen generation will be featured. Participants and Instructors will prepare and perform theoretical, lab and on-site presentations, examples and projects, leading the learning experience.

Self Sufficient House Construction Workshop
$480 per week (fee covers all project materials and lab costs)
This course is designed for any interested in specific techniques and construction methods, utilizing natural or eco friendly materials. The focus will be on material properties in their relationship to different locations, climates and accessibility, but other topics relevant to both environment and human health / need will be covered. Specific topics include different methods in working with and building homes out of Adobe, Cob, Pole, Rock, Papercrete, Recycled materials, Rammed earth, Hay bale Cordwood, Underground and their ecologically-friendly impact on the terrain. Participants will work in the lab as well as hands on through activities and case studies to improve their knowledge and skill in building sustainable / eco friendly, green homes.

How To DIY Wind Generator I Workshop
$480 per week (fee covers all project materials and lab costs)
This course is a workshop focused on the basics of Wind Generations and how it can be applied to the home. The basic technical knowledge and skills in this workshop will be useful in helping the consumer better understand Wind technology as a useful form of electricity and how it will affect their need for alternative energy. Laboratory investigations, instruction and projects will give participants experience with energy extraction and transformation, conversion, practicality, incorporation, maintenance, and more. The course focuses on history, theory, environmental need for, and home applications of the wind turbines as a viable source of needed electricity, with several small hands-on projects carried out. This course is a pre-request to help understand "Practical Wind Generator use and construction" which will be covered in the "How To DIY Wind Generator II Workshop"

How To DIY Wind Generator II Workshop
$480 per week (fee covers all project materials and lab costs)
This advanced workshop is only open to those who have attended one of the previous "How To DIY Wind Generator I Workshops". Attendees will learn how to prepare, construct and install advanced Practical Wind Generators for home or business use. Activities will include parts description and location, generator construction, How to Build your own blades, pole raising, wiring, battery banks, inverters, and more. Participants will prepare and perform preparation lab activities in class, carrying out the remainder of the project in an on-site construction environment.

What to bring:
The weather in Texas is very volatile so bring lots of layers of clothes you don't mind destroying at work, sturdy closed-toed work shoes, sunscreen and a hat with a wide brim to protect you from the intense sun.

- Leather work gloves
- Heavy duty rubber cement gloves
- Safety Glasses
- Ear plugs
- Dust masks
- Hammer
- Utility knife

- Retractable tape measure
- Tool belt

How To Build your own Solar Panels I Workshop

How To Build your own Solar Panels II Workshop

Can't make the On-Site Workshop? Self Sufficiency Workshops are now available online. See below for details, dates and pricing or contact us at agua-luna@lycos.com.

AguaLuna Self Sufficiency Online Workshop / Course

AguaLuna's popular Self-Sufficiency Workshop courses have been updated and will now be offered starting this year online. The courses are designed for first-timer enrollees or repeat offenders who are motivated to make an environmental difference in their own lives and in the lives of those around.

The courses, taught entirely on the Internet, gives participants the knowledge, background, resources, and confidence they need to carry out alternative energy / self sufficient upgrades to their life, home and vehicles. A minimum of 15 hours online, plus an additional 15 hours of reading, writing, research, projects and taking exams is required for each course.

Participants earn their Green Certificate certifying their knowledge of the latest in "green" building practices, technologies and techniques.

All course work can be done on a home computer. Course participants will be introduced to ethical theory before moving on to evaluating self-sufficiency and alternative energy issues. The course incorporates activities on specific topics about environmental solutions, carbon foot prints, self sufficient building, and alternative energy. Course participants are welcome to use these activities in their own teaching or outreach work as long as that work is not for profit. There will be extensive online discussion with other enrollees.

Dan Martin, a retired Boeing Engineer who majored in Theoretical and Structural physics now living 100% Off-the-Grid, The Author of 10 How to DIY Self Help / Self Sufficiency / Alternative Energy Guides will be this instructor. For more information about this years course content, please contact him directly attn: Dan Martin at agua-luna@lycos.com or visit www.agua-luna.com.

Simply Download and Fill out the work-shop sign up form by clicking HERE or send an email to the address below requesting the form. Feel free to include any information you feel pertinent.
Send completed applications to:
agua-luna@lycos.com
or
AguaLuna
Hc 65 276 G
Alpine Tx
79830

For more details about the agua-luna.com workshops, please contact us agua-luna@lycos.com or call 206-333-0321, leave a message with your phone number and email.

Again, I thank you for your interest in our programs. I hope you will be able to join us this summer.

AGUALUNA INTERNSHIP INFO

The agua-luna.com Internship program is open to anyone with an interest in sustainability / alternative energy and a willingness to work hard. People of all ages and backgrounds are encouraged to sign up.

Six applicants will be chosen for each session (schedule at www.agua-luna.com). Accepted interns will have the opportunity to learn alternative eco friendly building concepts and techniques while working full time alongside the agua-luna Mentor Team for approximately 1 month to 2 months.



Internships are unpaid positions. Interns are responsible for providing their own accommodations, food, transportation, supplies, etc. or primitive camping and meals are available at no charge on-site.



There is no application deadline.

During the session interns may attend any scheduled on-site workshops and seminars. Upon completion of the session interns receive a Certificate of Clean Green Building, and the new found skills of environmental construction.

Note: All applicants will receive a response.

What to expect:
Each session will start with a brief orientation meeting at the Agua-Luna Visitors Center. This will include a small tour of the Agua-Luna Ranch, projects and potential work sites, showing a few finished projects as well as the job site where you will show up for work at 9 am the next day.

Expect to be challenged physically and mentally, to work hard and play hard. Some have found it difficult to be away from their homes and jobs for a month. Please come prepared to support yourself for the entirety of your stay. Also, please keep in mind you will be working on a construction site.



What to bring:
It is very difficult to attend an internship without a vehicle as the Taos area is so spread out. Interns have gotten by with carpooling with other interns and/or hitchhiking, but it can be a challenge.



The weather in Texas is very volatile so bring lots of layers of clothes you don't mind destroying at work, sturdy closed-toed work shoes, sunscreen and a hat with a wide brim to protect you from the intense sun. If you are camping you'll want a tent, a tarp, a campstove (open fires are ok), a sleeping bag, a five gallon water jug, a good flashlight, etc.

Tools: Having a few simple tools will make your internship more comfortable and add a wider variety of work. Here is a list of some helpful tools you can choose to bring (all tools are supplied).

- Leather work gloves
- Heavy duty rubber cement gloves
- Safety Glasses
- Ear plugs
- Dust masks
- Hammer
- Utility knife
- Retractable tape measure
- Tool belt
- Any other hand tools may be useful, i.e. a speed square, combo square, bevel square, chalk line, torpedo level, pliers, chisel as well as small power tools (drill, circular saw)

Participants earn their Green Certificate certifying their knowledge of the latest in "green" building practices, technologies and techniques.

Next Step: Download and Fill out the internship application by clicking http://www.agua-luna.com/internship_form.pdf or send an email to the address below requesting the form. Feel free to include any information you feel pertinent.
Send completed applications to:

agua-luna@lycos.com
or
AguaLuna
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Alpine Tx
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