

# **Generate your Own Electricity: Create Renewable Energy Using DIY Solar & Wind Power Generation at Home**

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# **1. Bio Fuels - Are they Good**

As the term suggests, bio-fuels are fuels that are formed when biological matter decomposes. The bio-fuels are mostly derived from plants. Bio-fuels exist in all the three states of matter: solid, liquid, and gas.

## **Difference between bio-fuels and fossil fuels**

Bio-fuels are different from fossil fuels in the following ways:

- Fossil fuels take a million years to build whereas bio-fuels can be made extremely fast, in a matter of days.
- Fossil fuels generate huge amounts of pollution. Bio-fuels are comparatively safer.
- Bio-fuels are renewable sources of energy unlike fossil fuels.

## **Different types of bio-fuels**

Bio-fuels have been categorized into four types: first generation, second generation, third generation, and fourth generation.

The first generation bio-fuels are derived from vegetable fats, starch, and sugar, which are in turn derived from food-crops. The first generation fuels are also derived from animal fats. Biogas, bio-diesel, and vegetable oil are some examples of this type of bio-fuels.

The second generation of bio-fuels is mainly derived from waste biomass, thus making it a more balanced option compared to the first-generation bio-fuels. Different kinds of alcohols and diesel generated from wood fall into the category of second generation bio-fuels.

The third generation comprises of bio-fuels derived from algae. Algae are farmed on large scales for creating these bio-fuels. The algae fuels are extremely environment-friendly as they can easily decompose into the soil without harming it.

The bio-fuels in the fourth generation are derived by a method in which micro-organisms are raised to work with carbon dioxide to generate fuel.

## **Advantages of bio-fuels**

Bio-fuels prove advantageous in the following ways:

- Bio-fuels lessen the burden on gradually-vanishing fossil fuels.
- Bio-fuels are environment-friendly. They help reduce carbon emissions into the atmosphere.
- Bio-fuels, especially, bio-diesel prove to be very cost-effective for consumers.

## **Disadvantages of bio-fuels**

Bio-fuels are not bereft of criticism. Though beneficial for the environment, bio-fuels have its disadvantages, paradoxically in the environmental purview. Bio-fuels have received criticism for many reasons, a couple of which are stated below:

- Economists have long debated on the usefulness of first generation bio-fuels when compared to the lack of food they cause. Generating fuel from food crops makes food crops unworthy of human consumption. Some people believe that being a higher priority than fuel, food should not be farmed for making fuels but for human consumption.

- Making bio-fuels require acres of farming land, thus encroaching upon the natural habitat of plants and animals.

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## **2. How electricity is produced**

Electrical energy was one of man's greatest discoveries. It has helped build new civilizations. The large amount of electricity produced has its source in fossil fuels, nuclear fission, water, and wind. This article will explore the different methods of electricity production.

Electricity is churned out by enormous turbines. These turbines need a support to be moved. There are various ways of moving these turbines:

**By burning fossil fuels:** Electricity is produced when the blades of a turbine are moved by enormous amounts of vapour. This vapour is generated by heating a lot of water in huge furnaces. The water is heated by burning fossil fuels like coal, petroleum, and natural gas. This method releases enormous amounts of carbon dioxide in the air, thus severely polluting our atmosphere. It is important to turn to alternate methods of electricity production for long-term benefits.

**By water:** You must have heard how dams are constructed to produce electricity. A popular method to produce electricity, a water dam serves two purposes: restricting water bodies and producing electricity. Water dams use the river water to move turbines, helping them produce electricity. Electricity generated this way helps control air pollution;

however, this method of electricity production adversely affects the ecosystem in the water bodies.

Water accounts for 90 percent of the world's electricity generated through renewable resources.

By wind: Electricity is produced when wind energy is converted to electrical energy. Wind mills or wind turbines are used to churn up enormous amounts of wind energy which is then converted into electrical energy.

The latest in wind energy advancement tells us that wind energy is helping create portable cell phone chargers.

By nuclear fission: Yes, nuclear fission does not only make atom bombs, but also helps produce electricity. Nuclear fission causes a chain reaction where the element Uranium is bombarded by neutrons causing it to split. Every time a Uranium nucleus is split, more neutrons are released, causing more splits in the already split Uranium nuclei. The resultant chain reaction generates a lot of heat which is used to heat water the vapour of which eventually moves turbines to create electricity.

By bio-waste: With technological advancements, electricity is also being produced by bio-waste. Bio-gas is a typical way of generating electricity in rural areas in countries like India. In fact, a new technology evolved in the state of Bihar in India that uses human waste to generate electricity.

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### 3. Living off the grid

The shortage of power, the rapid consumption of non-renewable energy, the ever-increasing demand for power supply, the daily warnings about our environment are enough signs to tell us that it's time we do something. So, what can we do? For starters, how about living off the grid? If I have startled you with that proposition, let me tell you that living off the grid not only helps the environment and helps save power; it also cuts down our electricity bill substantially. Now, that's a tangible benefit apart from all the good you will do to the world. Trust me, you will feel good doing this.

Let us first study the advantages of living off the grid.

- Reduced dependability on exhausting resources: Who wants to depend on public utilities all the time? Living off the grid helps you rely only on your resources and not the ones supplied by governments or corporations. How often have you cursed when faced with a power outage in the midst of some important work or a party? Wouldn't you like to take charge of such factors affecting your life? With alternate power solutions, you can.
- Freedom of usage of naturally available resources: How would you feel when you don't have to pay for the power you use? Wouldn't it be delightful to use as much power as you want without worrying about the electricity meter? You can make use of the abundant power available in the nature to light up your home and make your food. The solar power solutions and the wind power solutions are the answers to your power quest (well, literally!).
- Reduced power costs, helping save your money: How would you feel if the electricity bills stop coming in your letter box? The alternate power solutions give you a return on investment very soon, thus making the power supply to your home eventually free!

- Making way for a healthier environment: Don't you bless the people who planted trees years ago not expecting them to miraculously grow? They planted those trees for the future generations. Make the future of your future generations secure by giving them a greener, healthier world. Cut down on the usage of non-renewable sources of energy. Try to use water minimally. There is not much drinking water left for the next generations.

If you are thinking it is not very feasible to live off the grid, look for alternate power solutions and you will be surprised to learn that they are not only cost-effective but also extremely feasible.

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## **4. Reduce your electricity bill**

If you have been bogged by the enormous electricity bills you have been getting, it is time to take some concrete steps. You can reduce your electricity bills by following very simple steps.

This article will list some simple, easy-to-do things to reduce your electricity bill.

Limited use: Start with the room you are sitting in. If you were to take a call in another room or join your family at the dining table, would you just step out of your room without any concern for the electrical appliances in the room? If you would, stop right there, and look around. Switch off all the appliances even if you would be back in five minutes. Yes, even that will help. Every drop of water constitutes to the ocean.

Another thing to take care of here is what you perceive as an electronic appliance. Would you switch off the television set, turn off the fan, but not the light bulb? Yes, you need light, but not now when you are leaving the room. Taking care of these small things will go a long way in reducing the dreaded huge electricity bills.

Smart investments: Make some smart power investments by replacing your incandescent bulbs with compact fluorescent light (CFL) bulbs. These bulbs are a great power-saving investment.

Buy the Power Save gadget. The gadget helps monitor the power supply to your house and uses the minimum that is needed.

Home appliance usage: Most of us complain that the electricity bill touches the sky because of the number of electrical appliances they have at home. However, the electricity bill is not directly proportional to the number of gadgets you use but the way you use them. Let's see how you can avoid the typical power-wasters.

- Use the washing machine only when there is a full load of clothes.
- Keep the geyser on for the minimal amount of time.
- Keep the air-conditioner at the minimum low or high temperature, just enough to keep you off the heat or the cold outside.
- Switch off the computer monitor even when you take a one-minute break. It takes just a second to switch on the monitor again!

Yeah, you have to stick to this way of life for saving power at home and for the world.

Remember, reducing your electricity bill is equivalent to saving power, thus helping the world save power for its future generations.

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## **5. Renewable energy solutions**

With the world slowly moving to the much-dreaded energy crisis, it is important that we reduce our dependency on non-renewable sources of energy. Non-renewable sources being renewable are about to get extinct. Renewable energy solutions refer to those energy solutions that can keep churning energy without exhausting the resources. Three types of energy solutions fall into the category of renewable energy solutions: solar energy solutions, hydro energy solutions, and wind energy solutions.

Solar energy solutions: The sun's energy is the most abundant energy available on earth. Make use of this free energy. You can employ solar power solutions at home. This will not only cut down power bills but also help you contribute to a greener world. Solar power solutions comprise of solar cookers, solar heating systems, solar lighting systems, solar dryers etc.

The sun has always been a source of heat energy and light energy. With the advancement of technology, the sun's energy can be used to create other forms of energy.

The solar energy systems have many advantages apart from being cost-effective and environment-friendly. They are low on maintenance thus

saving your time and effort. Also, solar systems give you a return on investment very soon, thus making the systems free after some time. Cooking with solar energy is also considered extremely healthy. Families have started employing solar energy as a power solution at their homes.

Hydro energy solutions: The hydro energy or water energy is an effective renewable energy. One can convert the hydro energy into electrical energy to run vehicles and various electrical appliances. Hydro energy is typically generated on a large scale. It has been estimated that 90 percent of the electrical energy produced by renewable resources is produced solely by hydro power. Dams are built to help generate electricity by tapping the water power.

There have been some concerns about using this energy because it is supposed to adversely affect the water-borne flora and fauna.

Wind energy solutions: Windmills were in existence even in the years before the birth of Christ. They helped tow boats and pump water. Eventually, post-industrialization, they became a source for generating electricity.

Windmills and wind turbines have never been passé. Wind energy can help generate tonnes of megawatts of electricity. When employed at individual estates, it can help do away with conventional power sources. An excellent renewable source of energy, the wind energy will go a long way in promising a good future to generations to come.

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## 6. Save power at home

We all learned about the renewable and non-renewable sources of energy in school. However, we never paid much attention to the rapid consumption of the non-renewable sources of energy until recently. The world is faced with severe energy crisis now and none of us remain unaffected anymore. Should we leave everything to the governments, or can we do something to save power? The answer is simple: we can.

**Let us look at how you can save power at home.**

**Computer:** More often than not, we do not switch off our monitors even after we have shut down our computers. Keep the monitor and the computer switched off when you are not using them. Start practicing this even when at work. You will help save some more power for the world.

**Light bulbs:** You must have seen compact fluorescent light (CFL) bulbs being advertised all the time. You must have even used them at times. As a power-saving measure, start using the CFL light bulbs as much as you can. If you are thinking they are more expensive than the regular bulbs, the benefits of the CFL bulbs will prove much more cost-effective in the long turn by the amount of power they will save.

**Air Conditioner:** Set the temperature at the minimum or maximum best you are comfortable with, depending on the season. Try not to set it at too high or too low temperatures. Setting the air conditioner at reasonable temperatures helps save a lot of energy.

**Washing Machines:** Do you use your washing machine as often as you want? Do you use your washing machine even when there are not enough clothes to wash? Minimize the number of washes by washing full load of clothes every time.

**Television:** Take off the power plug of your television set when not using it. This may not sound a big deal but this tiny step will help save power.

**Geysers:** Keep the geyser thermostat at the minimum heat. You do not need to heat the water at a very high temperature or for too long.

**Refrigerator:** Bring hot food to room temperatures before putting it into the refrigerator. You can also save power by taking cold or frozen food out of the refrigerator much before the mealtime, thereby saving power in heating it.

**Car:** For an air-conditioner equipped car, pull up the windows of your car before switching on the air-conditioner.

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## **7. Solar power solutions at home**

With energy sources depleting at a rate faster than they are being built, it is only wise that we use the abundant energy available for free – the solar energy. Apart from the easy availability, solar energy helps control environmental pollution. Most of us shy away from installing solar power solutions at home thinking them to be expensive and cumbersome. You will, however, be surprised to know how easy it is to employ these power solutions. Moreover, these will help cut down your power bills. Finally, you will be delighted to know that you are doing your bit to save power for the future generations.

This article will explore the various solar power options available for home use.

**Solar cooker:** A solar cooker is a cooking utensil that uses absolutely no fuel for cooking. You can cook food for up to five people in the small box. If you are thinking that using a solar cooker will reduce your chances of spreading up a varied platter on the dining table, you will be surprised to know that you can not only boil food items in the cooker but also roast and bake! The only limitation with the solar cooker is the time it takes to cook. However, given the free source of energy it uses, this is a great option for cutting down those sky-rocketing bills and saving some power.

**Solar home lighting:** A solar home lighting system converts solar energy into electrical energy for your home. This is done via cells that are charged with solar energy. So, in the night, if you wonder how the lights are on in the house, it is because of the solar energy stored in the solar cells. You can install the solar home lighting system in your house and not worry about the electricity bills anymore.

**Solar heating system:** Installing a solar heating system in your home helps cutting down your electricity bill along with saving the world's quickly-exhausting power. If you are worried that a solar heating system will turn your sweet home into a gadget house or that it will be an expensive investment, your concerns are misplaced. Companies providing solar power solutions for homes make it a point to install aesthetically-pleasing heating systems in your house. As per as expenditure is concerned, investing in a solar heating system is wise because you get a return on your investment within 3-4 years, giving you absolutely free service after that.

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## **8. The future of electricity**

When the future of electricity is discussed, quite a number of thoughts come into mind. Let's look at a few of such ideas.

### **Electricity will be wireless!**

Wouldn't it be delightful to see no wires in the house even with an uninterrupted supply of electricity? Will the future see wireless supply of electricity? Apparently, it will, according to industry experts. Last year, a team at the Massachusetts Institute of Technology conducted a wireless electricity experiment successfully. This dream has never been far-fetched, and with the success of wireless electricity experiments, this dream will soon come true. So, it is not very far that we will see electrical appliances charging themselves off air!

### **Consumers will have complete control!**

Industry experts believe that in future, your power supply will not be dependent on the electricity department but on you. You will have complete control on how you want the power supply to reach your place. You may not be required to pay the mandatory amount when you are vacationing around the world, shutting off the house. Experts see a variety of control options for consumers in the future. Now, whether this future is in the next ten years, or twenty, or a fifty years is not known, but what is known is that the future will see the consumers in control of what they use.

### **Electrical energy will be clean!**

Do you know that the remains of electricity production emit enormous amounts of carbon dioxide in the air? The future of electricity is perceived as green and clean. Given the concern for the environment, the electricity in future will make use of renewable sources of energy, leading to a clean environment. Currently, electricity is produced mostly by consuming fuels that are on the verge of being extinct.

### **All things will be electric!**

OK, we have already seen electric cars and electric shavers, what else will the future see? May be, electric shoes! Combs, toothbrushes, watches, glasses, even clothes may become electrical gadgets. If these sound far-fetched ideas, visit the futuristic shops at Akihabara in Japan for a glimpse of the future.

### **There will be no outages!**

More than anything, consumers look forward to seeing a future with absolutely no power outages. Alternate power solutions promise to take us into a future that has no power interruptions. With increased dependency on power for everything, consumers need to have an uninterrupted supply of power.

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## **9. The Worlds energy crisis**

The world is gradually marching towards a severe energy crisis, what with an ever-increasing demand of energy overstepping its supply. We have

always known that the energy we use everyday is not unlimited, yet we take it for granted. Oil, gas, power, even water has limited availability. Yet, we have not taken enough precautions to deal with a possible energy crisis. When I say 'we', I am not referring to the governments but to all of us, the common people.

Oil and gas have already become too expensive, and with each passing day, they are moving towards being extinct. Some ignorant people think that energy crisis is a myth. They fail to see the big picture. There have been three major energy crises so far – the 1973 oil crisis, the 1979 energy crisis, and the 1990 oil-price hike, apart from several regional crisis.

Prices have been rapidly increasing for the last five years, thanks to the ever-increasing demand and the increasing shortage of energy resources.

### **How soon will it be all gone?**

Are the cynics right in saying that we are making a mountain of a molehill, or is the energy crisis for real? Picture this: We have already exhausted 50 percent of the available oil. At the current rate of consumption, the rest of the oil will finish in 32 years! Imagine if the rate of consumption increases! We all know it is bound to increase. So, even the present generation will face an acute energy crisis in the later years, let alone future generations.

### **What are we doing about it?**

Are we equipped to face the impending energy crisis? What can you and I do to tackle it? For starters, we need to understand the importance of energy in our lives and stop taking it for granted. We have to minimize the use of oil, gas, electricity, or any other fuel. We cannot afford to waste

any available energy. It is also important to spread awareness about limited availability of energy resources. Simple things like joining a car pool, switching off car engines at traffic lights, and minimizing the use of gas and oil in everyday activities will help a long way in crisis-readiness.

### **What are the alternate energy options?**

As a responsible world citizen, start looking for alternate energy solutions like solar energy and wind energy. Employing these alternate power solutions is extremely feasible and cost-effective. You will not only cut down your power bills but also contribute to a better future of the world.

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## **10. Wind power solutions at home**

With the world's ever-increasing demand of power being more than its supply, it is about time that we take concrete steps to save power. Apart from being conscious about the usage of power and water at home, one can employ pollution-free and cost-effective power solutions at our homes. Solar power solutions and wind power solutions are the two of the most efficient solutions that can replace the conventional power solutions employed at our homes.

These solutions can help you combat power outages, reduce your electricity bills, and also help the environment.

This article will explore the cost-effective wind power solution that you can employ at home.

Wind power solutions work best when the following conditions are met:

- You have a house or farmhouse spread over a big area. Typically, wind power solutions are employed in areas that spread over an acre.
- The average wind speed in your area is around 11 miles per hour. If you stay in a place that has little wind flow, your system will not work. Consult an expert before installing the wind power solution at home.
- You need to draw water from external sources. You can install a wind power system even when you do not need to draw water from outside. However, if you need to draw water from outside on a regular basis, a wind power system offers the best solution.
- Your house needs a lot of uninterrupted power supply. Combating those power outages is easy with the pollution-free wind power systems. You need no longer worry about a break in your work because of a power uncertainty.

A typical wind power system comprises of a tower and five blades to churn out wind energy. The length of the wind tower varies depending on the location of your house. You may need a longer tower if you are in low-wind zone; you can work with a shorter tower if you live by the beach. Using a wind generator, this wind energy can be converted into useful electrical energy to be employed at home for running various electrical appliances. You can even store the power generated for later use, making wind generators more efficient than convention power systems.

If you are confused with the wind power jargon, here's a piece of information for you. The terms, wind mills, wind turbines, and wind generators are used to refer to the same machine.

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