How to Re-Use and Create Renewable Energy for Creating a More Environmentally Friendly and Ecologically Sustainable City

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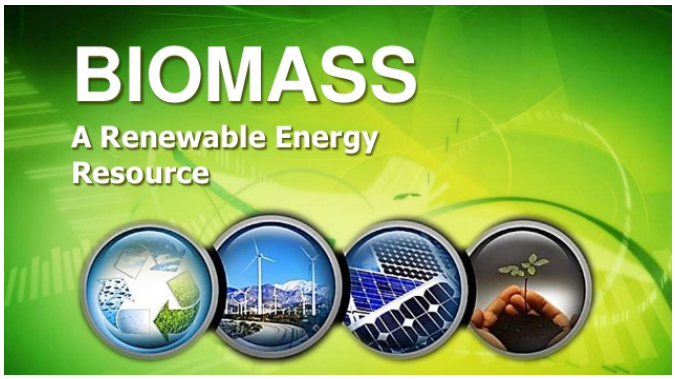
Introduction

Renewable Energy is unanimously defined as energy that is gathered from resources that are naturally renewable such as wind, sunlight, waves, tides and even geothermal heat. Renewable Energy is one of the most talked about topics in this day and age when it comes to sustainability and creating ecologically as well as environmentally friendly cities. The beauty of renewable energy is that it solves many problems that we have in our day and age such as pollution and nuclear waste because by using natural energy resources we eliminate or at least reduce the effect of pollution and also eliminate waste. With renewable energy we won't have to worry about running out of resources since they get replenished naturally with time. In fact there are many different forms of renewable energy already present and each has its own benefits and advantages.

Biomass

One of the main and mostly used forms of renewable energy is biomass. Biomass is basically using organic matter such as dead tree stumps or even living plants and converting them into energy that can be used in various ways.



An older practice of biomass is burning wood however this practice is frowned upon in the modern day since it leads to pollution due to the carbon

dioxide being released so modern practices have eliminated the amount of carbon being released. Bio mass can be used in various forms, as previously stated, it can be combusted (this is the most direct form of getting energy via biomass) or it can be converted into biofuel. Biofuel can be made by converting biomass using various methods some of which include thermal, biochemical and chemical practices. For instance, there are clean burning biofuels that serve as substitutes to gases and oils. They are different from fossil fuels, in the sense that biofuel is created through biological processes rather than using geology. Common fuels related to this method include bioethanol, that is made by a chemical change carbohydrates resulting from sugar or starch crops (such as sugarcane or corn) to form alcohol.

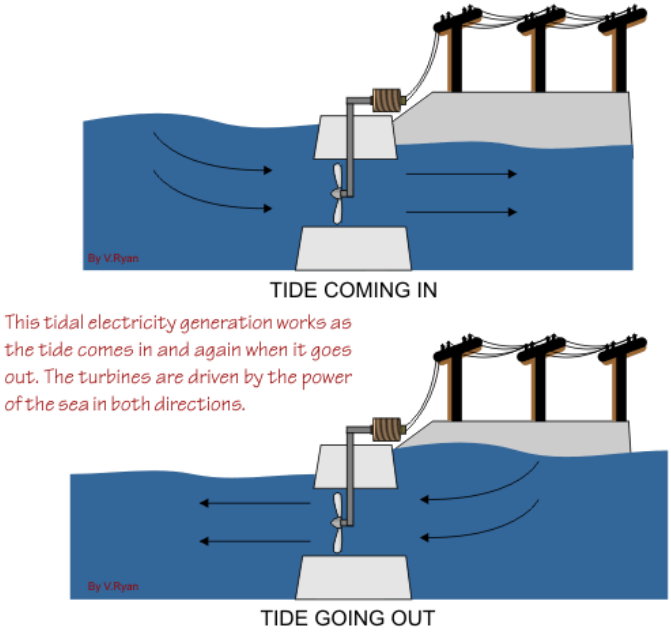
How can Biomass be used?

There are several ways of using Biomass. One efficient way of using biomass is creating electricity. We can use this method in few areas of cities where there is shortage of electricity and even in cities that are eco-friendlier and future driven. There are different methods for converting biomass into electricity. One of the simplest ways is to burn biomass directly heat water till it steams and sent it through a steam turbine which helps in generating electricity.

Tidal Power

One of the many types of renewable energy is the famous "Tidal Power" energy. Tidal power, also known as "Tidal Energy", is a type of renewable energy that makes use of tidal waves to produce hydropower which is then later converted to energy for use.

Unlike the solar or wind sectors of renewable energy, the tidal power sector is actually more predictable than its counterparts. Scientists can calculate and correctly predict the way that waves move and when they hit the power turbines. The way that Tidal energy is produced is when scientists make use of the waves' back and forth movement on underwater turbines which actually creates the kinetic energy needed to move the underwater turbines to generate electricity. As the waves hit the turbines, they cause the turbines to move which creates electricity from the energy the waves bring in. The tidal power generation works as the tide waves come in and again when it comes out. The turbines are driven by the power of the sea in both directions.



There are four types of generating methods for Tidal power:

1. iTidal Stream Generator: Makes use of the kinetic energy formed by running water to power turbines.
2. Tidal Barrage: Makes use of potential energy in the height difference between high and low tides.
3. Dynamic tidal power: Uses a hybrid between kinetic and potential energies to get electricity.
4. Tidal lagoon: A circular retaining contraption that is used to capture the potential energy of tides.

Though Tidal Power has its positives, it does also have its infamous negatives. Tidal power generation has created environmental concerns on how much it affects marine life:

1. Tidal Turbines: There's always a chance of the turbines killing a sea-life organism when it's rotating to generate power, and because of this, most fish escape the area that Tidal generators are in because of the constant movement of the turbines, which affects marine life in general greatly.
2. Tidal Barrage: Installing Tidal barrages can cause several problems for the tribes of fish that live in the area. For example, it can prevent fish feeding in the area of a barrage because of the blockage caused by it. Tidal Barrages even cause massive changes within bays or estuaries which can affect large ecosystems, and at times, kill them completely).
3. Tidal Lagoon: There's always a risk of fish being hit by turbine blades while entering a lagoon. This can contaminate the water and cause several problems to the turbines.
4. Corrosion: Having underwater generators can cause harm to the nearby marine life. Since salt water surrounds the turbines, the turbines themselves are exposed to rust and corrosion. Oil leaks can happen to the generators and can leak into the environment and cause massive damage to the marine life.

How can Tidal Energy used?

Tidal energy is mostly used for producing electricity, but it can also be used for many other things such as Grain Mills. Tidal Energy has already been used widely in countries like Europe, Canada Russia etc. It can be used to make our environment sustainable because it has many advantages as it is a very predictable energy source. Ever since the beginning of times, the oceans had tides, and the water patterns or ocean waves are pretty much predictable so, this makes it easier to control the energy that these tides generate because its movement is predictable most of the times.

It is also sustainable because it costs low to operate. There is very little maintenance required.

Solar Power

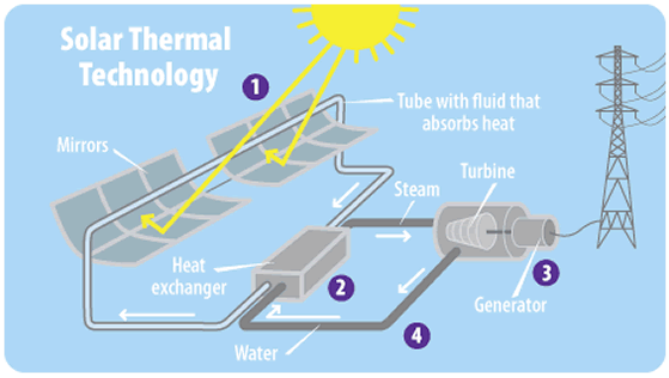
Solar power energy is the energy that is obtained from the sun which is converted into Thermal and electrical energy. Solar energy is the purest and the most commonly used source of renewable energy. Solar Energy can be used in many ways for example, producing electricity, providing light and also for industrial use.

Two main types of solar energy technologies in today's world are:

- Solar thermal energy
- Solar Photovoltaic or Electricity energy

Solar Thermal Energy:

Solar thermal system converts the sunlight into heat and this system can be used in water heater, it can be also used to make steam.



Solar Photovoltaic/ Electricity Energy:

Solar Photovoltaic or Electricity energy is the process of converting the sunlight directly for generating electricity using Photovoltaic cells or solar panels. The sun's rays generate electromagnetic radiation

which hits the solar panels; the solar cells in the panels respond to the sun's rays and create a type of energy. These can be fitted on roof tops.

How can Tidal Energy used?

The Sun provides a vast resource for generating clean and sustainable electricity without harmful pollution or global warming radiation. Solar Panels can be fitted on the rooftops of the houses to help generate electricity in a sustainable manner. Solar energy can be a great advantage in areas which have no access to power cables. It is works really effectively in remote areas where generating a power line is very costly or uneasy. Solar panels can be installed in such areas and those areas will be receiving electricity as long as it receives sunlight. It is also a cheap and easy method as installation of the solar panels is really easy.

Geothermal Energy

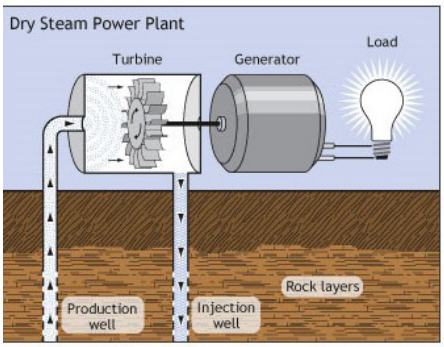
The heat that we receive from the earth is also used in many beneficial ways. Geothermal energy can be found at any place, whether they are deep wells or a shallow pile of garbage. It is basically produced from magma, which is a layer of hot molten rock beneath earth's crust. Due to decay of radioactive materials such as potassium and uranium, heat is continuously produced. The amount of heat varies; regions like "hot spots" are thin and let a large amount of heat let through. Seismically active spots are those where the water circulates either due to earthquakes or movement of magma, which results in natural hot springs and geysers. The temperature of the water through this process can be around 430 degrees Fahrenheit.

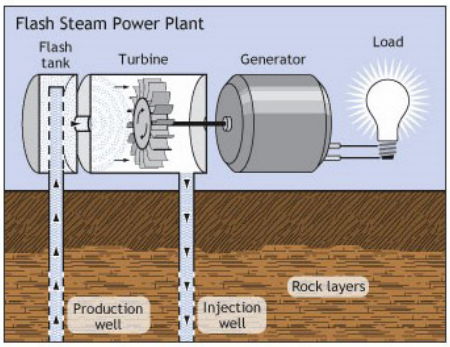
It is important to understand how the energy is captured. There are three designs for geothermal power plants. They use the heat given by earth in the form of hot water and steam. Dry steam power plant makes the steam go directly into turbine and reduce into water. It is appropriate when the source of water is coming from well as steams. In the second design, called Flash Steam, extremely hot water is depressurized into steam. For instance, if the water

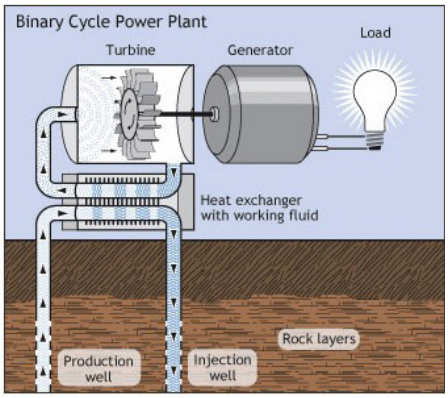
being used is of extremely high temperate, this design would work well. Binary cycle is another design which uses a part called Isobutane to convert water into steam.

One of the most interesting aspects of geothermal energy is that it can be even used directly. This can be found in even the grounds below our buildings. This emergent technology is called Enhanced Geothermal Systems. Mostly it is used for heating purposes, in greenhouse to raise plants, de-ice roads, and for aid in industrial processes as well. Countries like Iceland use more than 50% of its primary energy from geothermal resources.

Although, geothermal energy is still growing but it is a great part of having a more sustainable and cleaner system. Indonesia is one of the largest countries in the world in this aspect as it has 299 geothermal locations according to the press release from Indonesia's Directorate General of Geothermal.







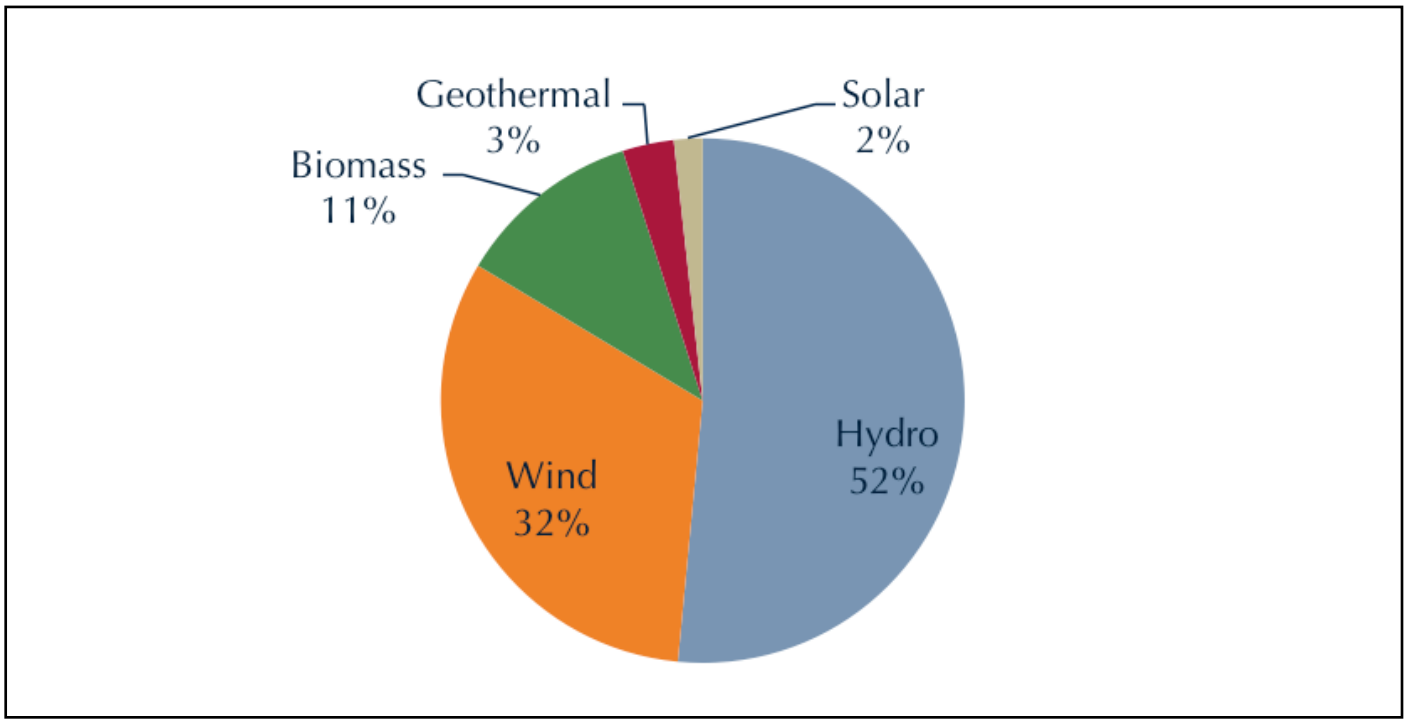
How can Tidal Energ How can Geothermal Energy be used? y used?

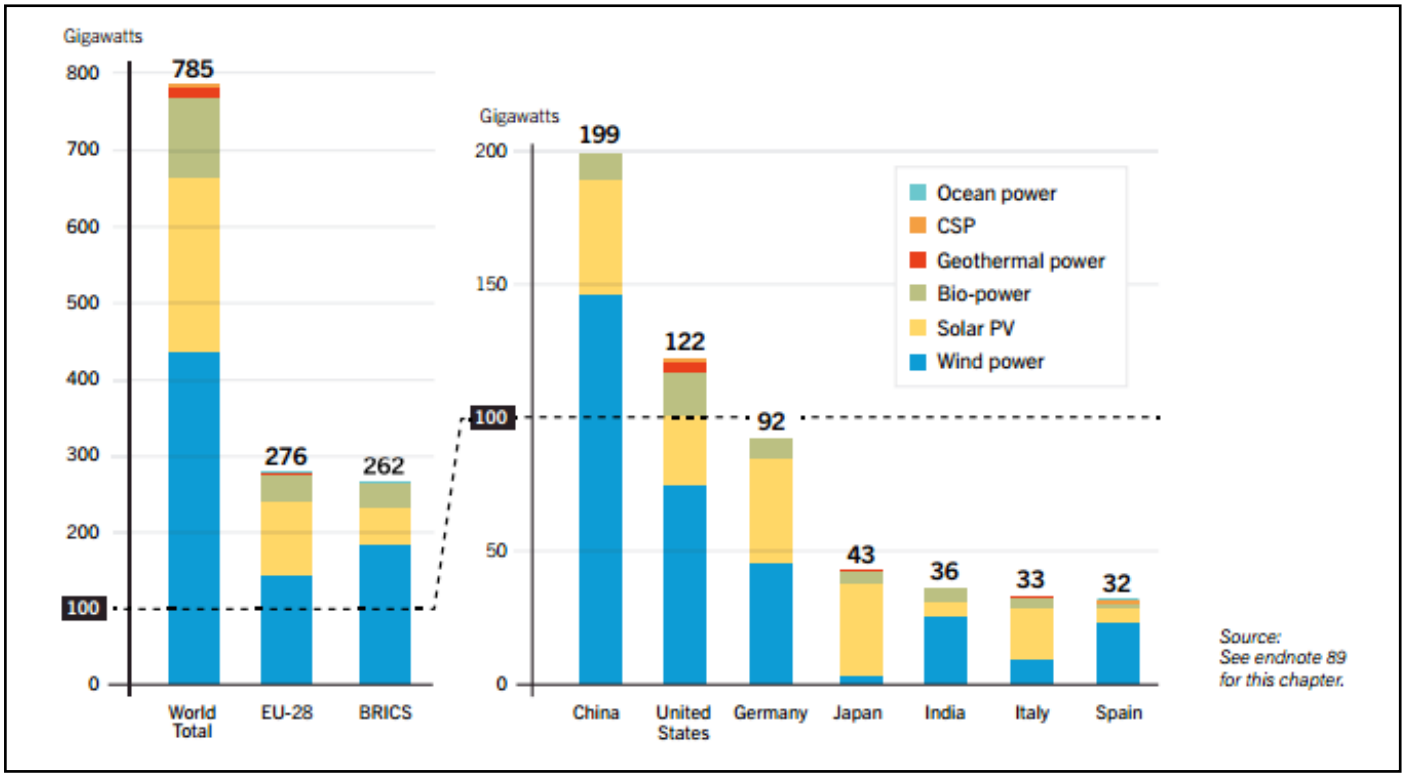
There are three ways of using the Geothermal Technologies:

1. Geothermal Electricity production, this technology is used for creating electricity through the Earths heat.
2. Geothermal Direct use, this technology can be used for producing heat directly from hot water within the earth.
3. Geothermal Heat pumps, this technology is used for heating and cooling down buildings.

All these technologies can be used for different purposes for a sustainable environment. Geothermal Energy is very eco – friendly and non – polluting method. They also do not occupy a lot of space it helps in protecting the environment. In Cities, Geothermal Power plants and underground reservoirs of steam and hot water can be fitted to generate electricity. It can also be used for cooking and heating.

The following graph shows which Renewable resource has been widely used across the world in 2013.





The data above shows that due to investments Renewable Energy many jobs have been created which not only benefits the countries ecologically, but even economically this is why we believe that Renewable Energy sources are the future and will help our planet as a whole.

Conclusion

Oxygen, Oils from Plants and Seeds, Methane gas that we obtain naturally, and many other renewable resources are present. They also shrink our need of fuels and energy from foreign powers. This form of energy is beneficial in economical aspect as well; this will result in a number of jobs. The process of producing energy from renewable resources requires less maintenance which lowers the cost. Apart from this, it will give us the non-changing energy price. As they result from natural resources so the cost will depend on the way it is created. Renewable Energy Resources are beneficial to humans whether in the environmental or economic aspects. Above discussed are just a few examples to have an idea of how different things work and are extraordinarily valuable to us. In todays' age where environment is at risk due to the results of the actions done by humans, it would be a great idea to, not at least further destroy our planet and use the natural renewable resources in a wise manner.

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