Our Future: Renewable Energy, Clean Energy

By Lisa Liu

What is **renewable energy**? Many people mistake this term for an energy source that can be reused, but renewable energy is actually an unlimited source of energy. The renewable energy sources this article will focus on are solar, wind and water (or hydro) power.

Solar energy comes directly from the sun, and it can provide us with electricity. The change from solar energy to electricity occurs in **photovoltaic cells** (PV cells), or **solar cells**. These "cells" are not like biological cells. They are a technology that contains a **semiconductor**: a material that can conduct electricity. When solar energy comes into contact with the PV cells, the semiconductor material is able to convert the solar energy into electrical energy. The electrical energy is then transported to buildings where we live or work. PV cells come in different shapes and sizes. Many look like roof shingles or big panels. Although using solar power has its advantages, such as its ability to provide electricity without polluting the environment, it also has disadvantages. It can cost a lot of money to install PV cells. However, if you install your own, you do not pay a power company for your electricity each month. Another disadvantage is that manufacturing PV cells produces toxic wastes because they are made with a material known as silicon, and silicon production creates toxic waste. Despite these disadvantages, using solar power is still very beneficial compared to using fossil fuels.

Wind energy is another renewable source of energy that can produce electricity. Wind energy is converted into electrical energy with the help of **turbines**, which are machines with blades. These machines use the **kinetic energy** (energy from movement) from winds to spin their blades, and the spinning blades change the kinetic energy into mechanical energy. As a result electricity is generated. Using wind to produce electricity is very beneficial to the environment and people, because using wind power does not cause pollution. Wind power is expected to expand greatly over the next few years.

Water energy, or **hydropower,** is also important to the production of electrical energy. Dams are constructed in rivers or streams to collect water. The body of water formed by a dam is known as a **reservoir**. Dams use the movement of water to spin the turbines. Like the wind-powered turbines, water-powered turbines also work the same way, but in this case kinetic energy comes from the movement of water. An advantage of using hydropower as an energy source is that it reduces the use of other energy sources that are not renewable, such as coal. This will also lead to the reduction in environmental pollution and greenhouse gasses emitted, because burning less coal means there are less **CO,** or **carbon monoxide** (a pollutant), and **CO_2**, or **carbon dioxide** (a greenhouse gas) released into our environment.

Of the three energy sources mentioned, only wind and solar energies are types of **clean, or green, energy**. Do you know why? There is one important difference between wind and solar energy sources and hydropower. The difference is in the environmental impact these sources of energy have on their local areas. **Clean energy** refers to energy that causes little or no harm to the environment. Using solar and wind power as energy sources can cause very minimal harm to the environment. (The toxic wastes produced to make materials for PV cells can be contained and, if properly monitored, should have little impact.) However, the construction of hydro-electric dams destroys the natural habitats of many plants and animals. This causes the displacement of animals and the disruption of their lifecycles. Many dams even displace people too! Hydroelectric dams also destroy habitats by changing the river into a **reservoir** and flooding large areas. They also block the river, which means fish and other animals living in the water have a hard time getting where they need to go. Also, dams trap organic materials (pieces of trees and other plants, and even dead animals) floating down the river. These organic materials rot and release CO_2 into the environment. Since CO_2 is a greenhouse gas, it contributes to **global warming**. Although hydropower is not a type of clean energy, using hydropower is often still considered more environmentally friendly than fossil fuels.

Most of the people in United States still use electricity from power plants that use nonrenewable energy sources, and that is not good for the environment. It might not be possible for you to turn your house into a solar powered house, or use wind to generate electricity in your homes, but you can still help.