Different types of sustainable energy

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Renewable energy is energy that has been derived from earth"s natural resources that are not finite or exhaustible, such as wind and sunlight. Renewable energy is an alternative to the traditional energy that relies on fossil fuels, and it tends to be much less harmful to the environment.

Solar energy is derived by capturing radiant energy from sunlight and converting it into heat, electricity, or hot water. Photovoltaic (PV) systems can convert direct sunlight into electricity through the use of solar cells.

One of the benefits of solar energy is that sunlight is functionally endless. With the technology to harvest it, there is a limitless supply of solar energy, meaning it could render fossil fuels obsolete. Relying on solar energy rather than fossil fuels also helps us improve public health and environmental conditions. In the long term, solar energy could also eliminate energy costs, and in the short term, reduce your energy bills. Many federal local, state, and federal governments also incentivize the investment in solar energy by providing rebates or tax credits.

Although solar energy will save you money in the long run, it tends to be a significant upfront cost and is an unrealistic expenses for most households. For personal homes, homeowners also need to have the ample sunlight and space to arrange their solar panels, which limits who can realistically adopt this technology at the individual level.

Wind energy is a clean energy source, which means that it doesn"t pollute the air like other forms of energy. Wind energy doesn"t produce carbon dioxide, or release any harmful products that can cause environmental degradation or negatively affect human health like smog, acid rain, or other heat-trapping gases.[2] Investment in wind energy technology can also open up new avenues for jobs and job training, as the turbines on farms need to be serviced and maintained to keep running.

Since wind farms tend to be built in rural or remote areas, they are usually far from bustling cities where the electricity is needed most. Wind energy must be transported via transition lines, leading to higher costs. Although wind turbines produce very little pollution, some cities oppose them since they dominate skylines and generate noise. Wind turbines also threaten local wildlife like birds, which are sometimes killed by striking the arms of the turbine while flying.

Dams are what people most associate when it comes to hydroelectric power. Water flows through the dam"s turbines to produce electricity, known as pumped-storage hydropower. Run-of-river hydropower uses a channel to funnel water through rather than powering it through a dam.

Hydroelectric power is very versatile and can be generated using both large scale projects, like the Hoover Dam, and small scale projects like underwater turbines and lower dams on small rivers and streams.

Hydroelectric power does not generate pollution, and therefore is a much more environmentally-friendly energy option for our environment.

Most U.S. hydroelectricity facilities use more energy than they are able to produce for consumption. The storage systems may need to use fossil fuel to pump water.[3] Although hydroelectric power does not pollute the air, it disrupts waterways and negatively affects the animals that live in them, changing water levels, currents, and migration paths for many fish and other freshwater ecosystems.

Geothermal heat is heat that is trapped beneath the earth"s crust from the formation of the Earth 4.5 billion years ago and from radioactive decay. Sometimes large amounts of this heat escapes naturally, but all at once, resulting in familiar occurrences, such as volcanic eruptions and geysers. This heat can be captured and used to produce geothermal energy by using steam that comes from the heated water pumping below the surface, which then rises to the top and can be used to operate a turbine.

Geothermal energy is not as common as other types of renewable energy sources, but it has a significant potential for energy supply. Since it can be built underground, it leaves very little footprint on land. Geothermal energy is naturally replenished and therefore does not run a risk of depleting (on a human timescale).

Cost plays a major factor when it comes to disadvantages of geothermal energy. Not only is it costly to build the infrastructure, but another major concern is its vulnerability to earthquakes in certain regions of the world.