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ALTERNATIVE ENERGY SOURCES

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ABSTRACT

renewable energy is a hot topic nowadays. With the ever-growing number of populations, demand of energy is also increasing every day. Non-renewable sources are limited, not environment friendly and increase or decrease in production of these sources can have direct result on the inflation. It is hard to live without Energy, but it is impossible to find another planet to live in. The use of renewable energy has many potential benefits, including human beings and environment. Comparative analysis of resources and reasons why we should use more alternative resources than fossil fuels are provided in the article.

KEYWORDS

renewable resources, non-renewable resources, fossil fuels, energy, oil, natural gas, coal, solar energy, wind power, hydropower.

Alternative energy sources include non-traditional energy sources - solar, wind, geothermal energy, and so on. Renewable energy sources do not pollute the environment, help reduce greenhouse gas emissions into the atmosphere, and reduce the effects of climate change. They are practically inexhaustible, while fossil fuels will run out sooner or later. Renewable sources do not include nuclear power and natural gas, since the reserves of these resources are limited. There are different types of energy and ways to extract it. Based on our interpretation, the following types of alternative sources can be distinguished: solar energy, wind energy, hydropower, wave energy, tidal energy, hydrothermal energy, fluid diffusion energy, geothermal energy and biofuels. The methods of extraction and use of energy differ depending on the type of alternative sources. What unites them is that today they are all used much less frequently than fossil fuels, but at the same time they have great potential for development. The known sources of alternative energy used today to reduce the level of pollution produced by fossil fuels are the following:

Solar energy Solar energy or solar power can be defined as the energy that can be harvested using the Sun’s radiation under the form of sunlight, heat and all the other types of electromagnetic radiation

that are released every second by the star. Mankind has used the power of the Sun since antiquity, but only in the last decades we've started to harvest the sunlight to generate clean electricity and heat. Solar cells use the photovoltaic effect to turn the sunlight into electricity. Using a device/technology such as a solar cell to harvest the sunlight and produce clean electricity means that we are using solar power under the form of active solar energy. The concept of passive solar energy is used in the construction sector and refers to a certain position of the house and windows to allow the sunlight and heat enter every room of the house. Solar energy is not used only by humans, nature is using the sunlight as a key element in the photosynthesis process.

Wind energy- The Sun warms the Earth's surface and the atmosphere in an uneven way. The warm air weighs less and starts to go up, while the cold air is heavier and starts to go down and replacing the warm air. This air movement is causing the wind on the planet. Mankind has used the power of the wind since antiquity to sail ships (is used even today), to grind wheat and corn in windmills, to pump water and in sawmills, and today we are using wind turbines to generate clean electricity. Wind energy is known as a more practical energy source than solar power because the wind can rotate a turbine and generate clean electricity day and night, even if outside we have a sunny or a cloudy day. Wind energy is considered an alternative energy source (is clean) and also a renewable energy source (it never ends) because until we have the atmosphere here on the planet and the Sun will keep shining, the wind will keep blowing.

Hydropower known as the power of the water represents the energy generated by the fast moving water or by the falling water. Hydropower has been used from ancient times to power watermills (for irrigation), sawmills, gristmills, textile mills, trip hammers and others. In the late XIX century, hydropower has been already known as a producer of electricity, and the first commercial hydroelectric power plant was built in 1879 at Niagara Falls. In a hydroelectric power plant, the kinetic energy of the falling or fast moving water is turned into mechanical energy (rotating turbine), which will produce electricity through generators. Hydropower generates electricity today in many ways and at different scales.

- Pumped-storage hydroelectricity: during the periods of low energy demand the water is stored and pumped uphill into reservoirs, and when the demand is high or system generation is low, the water is released for electricity generation.
- Conduit hydroelectricity: water that has been already diverted for use in a water system is also used to generate electricity.
- Micro hydro: such projects are small and are usually used to produce electricity that will power isolated households, small towns or small industries.
- Small hydro: these projects are slightly larger than the previous type (up to 10 MW generation capacity), but being so small they are not using artificial reservoirs.
- Run-of-river hydropower: captures the kinetic energy of the rivers or streams, but is not using a large reservoir and sometimes not even dams.
- Conventional hydroelectric (storage hydropower): large systems using hydroelectric dams and a large reservoir to store the water.

Electricity is produced when the water is released from the reservoir and the spin of the turbine will produce electricity through the generator. Storage hydropower is providing the base load, and has the ability to be shut down and started up at short notice according to the demand of the system (at peak load). It provides enough storage capacity to operate without using the hydrological inflow for several

weeks and even months. Hydropower is generating the largest amount of alternative energy in the world. Hydropower is considered a predictable, controllable and constant source of clean energy, and is also renewable.

Biomass energy is considered a green and renewable energy source (trees regrow). The materials used to create biomass consist of wood waste, agricultural waste, plant-based materials that are used for food or animal feed, landfills, municipal and industrial waste (organic waste), green algae and others. Biomass is also used to produce biofuels such as ethanol and biodiesel, but also methane gas (biogas or landfill gas). Biomass energy releases carbon emissions while burning, but is considered a renewable energy source due to the fact that the production of waste materials on the planet is continuous. Biomass has become popular among the coal power plants because coal (a cheap but very dirty fossil fuel) can be replaced by biomass in order to turn the power plant into a producer of renewable energy.

Geothermal energy or thermal energy is an alternative energy source produced by the Earth's core and rises to the surface. The molten rock or magma is the source of the underground heat. Geothermal energy is produced by boiling water using the underground heat and the steam is collected by geothermal heat pumps. The steam collected this way, is then used to spin a turbine and with the help of the generators is producing clean energy. The geothermal resource is a reliable source of power. Geothermal energy is considered a reliable, renewable and continuous source of alternative energy, and is available almost anywhere in the world.

Tidal power energy also known as tidal power is another form of hydropower that is converting the energy of the tides into clean electricity. Today, tidal power is used at a pretty small scale worldwide, but in the future, the power of the tides will become an important source of alternative energy for humanity. Tidal power of tidal energy is considered a renewable energy source because is generated by the ocean's tides. The tides are created by the Moon's gravitational attraction and in smaller portion by the Sun's gravitational attraction.

Actually, the gravitational attraction of these two celestial objects (Moon and Sun) is interacting with the Earth's gravitational attraction and this is how the tides are created. All these sources of alternative energy are environmentally friendly (some of them release a very low amount of greenhouse gas emissions, while others are 100% clean) and will successfully replace the fossil fuels such as coal, oil and natural gas in the future, for a cleaner and healthier environment.

The energy demand on the planet is still covered mostly from fossil resources, but renewable energy projects such as large solar power plants and massive wind farms built both onshore and offshore are increasing their presence in many countries, which shows that the clean future is closer than we thought. Knowing what are the alternative energy sources used today on the planet and what will bring the future in terms of new renewable energy sources, will prepare you for the clean future that will follow.

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