

## SUSTAINABLE ENERGY

### **Анотація**

*Розглянуто відновлювальні джерела енергії та охарактеризовано різну її різновидність.*

**Ключові слова:** відновлювана енергія, альтернативні джерела енергії, сонячна енергія, ефективність.

### **Abstract**

*Sustainable sources of energy and different kinds of it are considered in this article.*

**Keywords:** sustainable energy, alternative sources of energy, solar energy, efficiency.

Around the world, 1.2 billion people do not have reliable access to electricity. That's more than 1 in every 6 people on the planet without lighting for hospitals, refrigeration for food and medicine, and clean, safe sources of fuel for cooking and lighting.

To end poverty, we need to expand access to modern energy services. At the same time, we have to tackle climate change. Sustainable energy, like solar and wind power, is a solution to both global challenges.

A natural resource depletion is crucial current environmental problems. People are waking up to the fact that our large dependency on fossil fuels is causing huge problems, and not just because fossil fuels are depleting worldwide, but primarily because the health of our planet is deteriorating

Sustainable energy is a form of energy that meet our today's demand of energy without putting them in danger of getting expired or depleted and can be used over and over again. Sustainable energy should be widely encouraged as it do not cause any harm to the environment and is available widely free of cost. All renewable energy sources like solar, wind, geothermal, hydropower and ocean energy are sustainable as they are stable and available in plenty [1]. Let us consider these kinds of energy.

Solar energy. Solar energy is the first such renewable source. It is energy derived from the sun and has been the most popular form of alternative energy for many centuries. Electricity can be generated with the help of solar energy, using photovoltaic technology or heat powered engines. Most of these technologies are able to capture the sunlight and convert it into electricity that can be stored in batteries until needed. Some of the more common uses of such renewable sources of energy is solar cooking, heating water and battery powered electronics. Solar power has also been adapted to industrial uses.

Wind energy. Wind energy has been harnessed over the last few decades by way of wind turbines. These are similar to windmills in construction and work much like regular turbines do. When the wind speed is high enough to move the turbines, electricity can be produced by the movement. Higher the speed of the wind, more the amount of electricity can be produced. This is why most wind powered turbines are found in high altitude areas or near shores with constant breeze. The potential of such wind farms combined with other renewable sources of energy is quite high in the near future.

Hydro electric (Water) Power. Another way in which the sun is able to provide us with clean energy is through water. Whether it is the currents in the ocean or the tides in the sea, all of it happens due to the sun. As of now, there a number of ways in which hydroelectric energy(water based electricity) can be captured. Dams are a common way to generate electricity on a large scale basis. The fall of water powers turbines, which are able to produce energy when they turn.

Geothermal energy. There is a tremendous amount of energy stored within the Earth that is not fossil fuels. It is known as geothermal energy. Since the Earth was formed, there has been a constant decay of minerals that were part of the make-up. Many are radioactive in nature and release great amounts of heat when they do. This heat makes it away to crust and finds a way out when cracks appear in the surface of the Earth. These are thermal vents, which release super-heated steam and boiling water. Such vents can be adapted for the generation of electrical power, providing us with more renewable sources of energy.

Biomass energy. A more rudimentary form of clean energy is biomass. This has been used in different ways by humans for thousands of years. Biomass is nothing more plants and their residues, both of which are renewable sources of energy. Plants contain energy that is stored within them during the process of photosynthesis. This energy is broken down and made usable when the plants are burnt. Biomass plants are basically furnaces that can break down large amounts of raw material. Leftover parts of crops, rotten plants, diseases vegetables and even waste wood parts are usable as raw material.

Biofuels. Finally, we have Biofuels, which are extracted from plants and crops as well. They differ from Biomass as renewable sources of energy since they are synthetic in nature and are not utilized to directly create electricity. Ethanol is the main form of biofuel, which is created by the fermentation of sugar. It is regularly blended with gasoline as a form of car fuel, since it produces lesser carbon dioxide when it burns.

Hydrogen energy. Hydrogen has tremendous energy and can be used to power homes and industries. Hydrogen is available with water and is the most common element available on earth. Water contains two-thirds of hydrogen but in nature it is found in combination with other elements. Once it is separated, it can be used as a fuel or could be used for generating electricity. Hydrogen energy is completely renewable since it is extracted from water which is available in abundant supply. It is completely environment friendly and do not leave any toxic emissions in the atmosphere. It can be produced on demand but the technology to produce it is still in early stages.

Ocean energy. Almost 70% of the earth is covered with water. Due to the massive size of oceans, this form of energy has much better potential to produce power than any other source of energy. Ocean energy can be harnessed via 3 ways: wave energy, tidal energy and Ocean thermal energy conversion (OTEC).

The energy powering our wired world is easily taken for granted. But about one in five people still lack access to affordable modern electricity for lighting or heating. Two times that number, about three billion people, still heat and cook with fuels like wood, dung, coal, or charcoal. These people suffer ill health, including some two million annual deaths, from bad air quality caused by burning such fuels in poorly ventilated buildings [2].

The following interesting facts about renewable energy highlight its growth, efficiency, and effectiveness.

1. Renewable Energy creates three-times more jobs than fossil fuels. 6.5 million people around the world work in the clean energy sector.
2. Fossil fuels get 4 times the subsidy of renewables.
3. One wind turbine is able to generate enough electricity to power up to 1,400 households.
4. If taken advantage of to its fullest extent, sunlight that beams on the earth for one hour could meet world energy demands for an entire year.
5. In 2014, China built two wind turbines per day.
6. Solar power may account for the world's main energy source of power by 2050.
7. The world is now adding more capacity for renewable power than fossil fuel generating capacity. In 2013, the world added 143 gigawatts of capacity for renewable power compared to 141 gigawatts of capacity for fossil fuels.
8. Millions of homes are already being powered by off-grid renewable energy systems. Nearly 26 million households are served by off-grid renewable energy systems, such as solar home systems, mini-wind turbines, and renewables-based mini-grids [3].

Therefore, the full-fledged switch to renewable energy is coming and it's only a matter of time before the global energy market is dominated by renewable energy choices. We're hopeful! Our planet's future and wellbeing depends on it!

#### СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

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