

УДК 620.9:502.7

Vladyslav Maksymenko¹, Olena Syvachuk²

¹student of group E-417a, National University «Zaporizhzhia Polytechnic»

²senior teacher, National University «Zaporizhzhia Polytechnic»

RENEWABLE ENERGY SOURCES AND THEIR APPLICATION IN THE CLEAN-UP SYSTEM OF THE WORLD'S OCEANS

In today modern and past paced world the consumption of the electrical energy has been increasing annually. For this reason the scientists and engineers provide research to find a new more efficient energy sources. The renewable sources of energy are used in many branches such as heating, lighting, water supply, waste recycling and etc. But one of the most important issues that has been resolved by means of renewable energy is water cleaning systems for oceans, seas and rivers.

Energy sources that are used in oceans cleaning systems.

Sunlight is one of our planet's most abundant and freely available energy resources available. According to researchers the amount of solar energy that reaches the earth's surface in one hour is more than the planet's total energy requirements for a whole year. Solar energy is the sun's radiation that reaches Earth. When sunlight hits the photovoltaic (PV) cells inside solar panels, these cells transform solar radiation into electricity.

Wind is technically a form of solar energy. When the sun's radiation heats Earth's uneven surface, hot air rises and cool air settles. This difference in atmospheric pressure creates wind, a kinetic (motion-based) form of energy. Wind turbines capture that kinetic energy. When wind blows over the turbine's blades, its generator converts the energy of the rotating blade into mechanical power – which can then be converted into power.

These two energy sources are used in oceans cleaning systems and as any system they have pros and cons. The advantages of these sources are the following: they cannot be depleted, have low operational costs, lead sustainability as the fastest growing energy sources and provide energy to the rural areas. Disadvantages may include the inconsistent operation of power source and expensive costs for materials to manufacture panels and turbines.

Ocean pollution problems.

Over the last few decades, plastic has become an essential part of our everyday lives. From grocery bags to toys and bottles, plastic is one of the most used materials to date. However, this material is unfortunately causing a great deal of harm to ocean life, too.

A whopping 8 million metric tons of plastic is found in seas and oceans every year, which is bad news for marine species. Plastic has become a popular material because of its ease of manufacture and durability, but when this trash is disposed of and finds its way into the ocean, some products and materials can take up to 600 years to break down, posing a great risk to our oceans and their inhabitants in the process.

By 2050, it is predicted by scientists that there will be more plastic in our oceans than fish. While this problem is not going away any time soon, scientists have been working to create solutions that can slowly start to clean up our oceans and put an end to this major issue. Here are just some of the innovative techniques being used.

System 001 is a 62-mile long barrier that targets plastic debris, micro plastics and ghost nets from the gyres, also known as the Great Pacific Garbage Patch. Created by Boyan Slat, CEO of The Ocean Cleanup, this innovative design cleans up 80,000 tons of garbage located between Hawaii and California. It operates autonomous by means of PV cells and turbines that generate and feed all devices on board including radars and Global Position System (GPS). This unit has a slow-moving

design that moves with the ocean's currents to collect ocean plastic and contain debris. Once full, the accumulated plastic is removed and recycled on land.

Mr. Trash Wheel is the next unique cleaning system created by Clearwater Mills, LLC. It is an innovative water wheel that captures trash in rivers, streams and harbors, and then turns it into electricity. It can clean up 38,000 pounds of trash daily and has prevented 1.6 million pounds of debris from entering the ocean.

This technology is aimed at collecting debris and oil slicks. It uses a conveyor belt powered by solar panels to move the trash into a floating barge. When the trash reaches the barge, it is then converted into electricity. Because of its slow movement, any wildlife that comes near the machine has plenty of time to move out of harm's way.

The benefits of these systems are that they are harmless for environment and life organisms, operate autonomously, are relatively inexpensive in service, and can help provide scientific analysis and environment control.

The water cleaning systems that operate on the renewable sources of energy are now one of the most efficient and cost-effective systems. According to estimates of their creators and the examination carried out by specialists, these systems are able to clean 90% of the ocean garbage by 2040.