-volatility of produced resources due to the variability of wind strength;
-need to provide infrastructure for the transmission of the received electricity to the consumer due to the remoteness of windmills;

-use of expensive equipment (battery, inverter) when using small wind farms at home;

-significant noise interference

The most powerful kind of energy is considered to be geothermal energy.Its is a type of renewable energy based on the use of heat that exists in the bowels of our planet. That is, to use the heat of the inner layers of the Earth and generate energy with it [2]. This is precisely the disadvantage, because the places where geothermal stations can be installed and limited. And the geothermal power plants themselves are installed near sources of hot water.This type of energy certainly has both advantages and disadvantages.

Most countries are already striving to completely switch to clean energy sources in order to reduce harm to the world around us. After all, in the end, our descendants will live in it, so they strive to preserve it in the best possible way.

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## HISTORY OF UNCONVENTIONAL ENERGY SOURCES

**Cherba N.C., student**
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Good day, dear colleagues and teachers! I hope, that you are fine today and you are glad to listen to my report. Let me introduce myself. My name is Natalie, I`m second year student at National Technical University "Kharkiv Polytechnic Institute". I am studying non-traditional energy sources and high voltage electrophysics. The second part is difficult for me even talking about it in Ukrainian. So, as you can see on the screen, our topic today is history of untraditional energy sources. Many people know and use them, but few know how it all began. I chose the two most popular and famous sun and wind to tell about them. If you have any questions, feel free to interrupt me at any time.

First of all, I'd like to give you an overview of solar energy. Besides heating the palace with heated water; many examples of useful applications of this power were used to. For example, Archimedes used a system of "incendiary" mirrors, which burned the entire enemy fleet at Syracuse.

Solar energy began to develop rapidly in the 18th century. Then in France, insolation was used to quickly light a large fire. Let me explain more about insolation. This is concave mirrors focused reflected sun rays at a single point. This allows you to collect the energy of the sun.

The first water heater appeared around the same time in Sweden: water placed inside a wooden box with a glass lid was heated by the sun to 88 degrees.

Next step thanks to several discoveries was at the end of the 19 century, when an insolator was demonstrated to society. Let me explain, insolator is a special apparatus that, with the help of a mirror, focused the rays on a steam boiler, which set in motion a printing press.

Moving further in time, in 1954, the first silicon solar cell appeared. After only 4 years, it has become the main source of electricity for spacecraft.

In the USSR, the first industrial SPP appeared in Crimea in 1985.

Before I move on, I'd like to recap the main points. In just two centuries, people have moved from heating water in a wooden box to the first solar power plants. Next, I'll focus on history of wind energy.

One of the first stable sources of energy mastered by man was wind. Energy "from the mouth of Aeolus" was used for the first time on sailing ships.

For 200 years BC in Persia, simple windmills with a vertical axis of rotation were used to grind grain, and even earlier they were used in China.

The representative of the improved design in this direction is the Bock-type windmill with a horizontal axis of rotation.

The first wind farm, the Blyth mill with a diameter of 9 meters, was built in 1887 at Blyth's dacha in Marykirk (Great Britain). Blyth offered surplus electricity from his "mill" to the residents of Marykirk to light the main street, but was refused because they believed that electricity was "the work of the devil."

In the early 1980s, wind power began to develop in California, thanks to government policies that encouraged the use of renewable energy sources.

Let's summarize briefly what we have looked at. People have used wind power for almost their entire existence. The only thing has changed is that now wind energy is converted into electricity.

Well, this brings me to the end of my presentation. Let me just run through the key points again. Initially, solar energy was used only for heating. The emergence of a method of converting solar energy into electricity opened the way for the creation of solar stations. Speaking of wind energy first it was used to move something and now wind caused motion that is used to generate electricity. Who knows maybe our generation will be the turning point when unconventional energy sources become the main source of energy!

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