# Renewable & Non-renewable Energy Resources

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There are nine major areas of energy resources. They fall into two categories: nonrenewable and renewable.

Renewable

Non-renewable

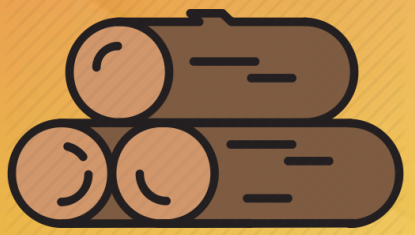
# Renewable Energy

Currently, there are many sources in the world from which you can draw energy. These include raw materials, such as oil or hard coal. However, their resources are shrinking, which means that more and more often other, renewable sources are used.

Poland is rich in renewable energy sources. However, since renewable energy resources are characterized by a large dependence on: the season, the day and night cycle, climatic and geological conditions, they can be mainly used to solve local and regional energy problems.

In our country, currently used energy from renewable sources is only 1 - 1.5%, while European countries primarily promote: the wind, then the sun and the small hydropower. Poland still does not appreciate the importance of renewable energy sources, but progress in this field has already occurred, we will only have to wait for the effects.

# TYPES OF BIOMASS



# Biomass

Biomass is the largest source of renewable Energy. According to estimates, it is about 14% of all world energy called the first one. Over 80% of this rate is used for cooking or heating, and sometimes also for transport. The basic, most important in Poland, energy resources classified as biomass include: wood, straw and biogas.

**Wood**

The use of wood as fuel material in Poland has a very long tradition. However, it is only recently that combustion technologies ensure efficient use of energy contained in it and reduce gas and dust emissions. Wood is also used at the place of their formation by the wood industry. They are used mainly for the production of heat or steam used in technological processes.

**Straw**

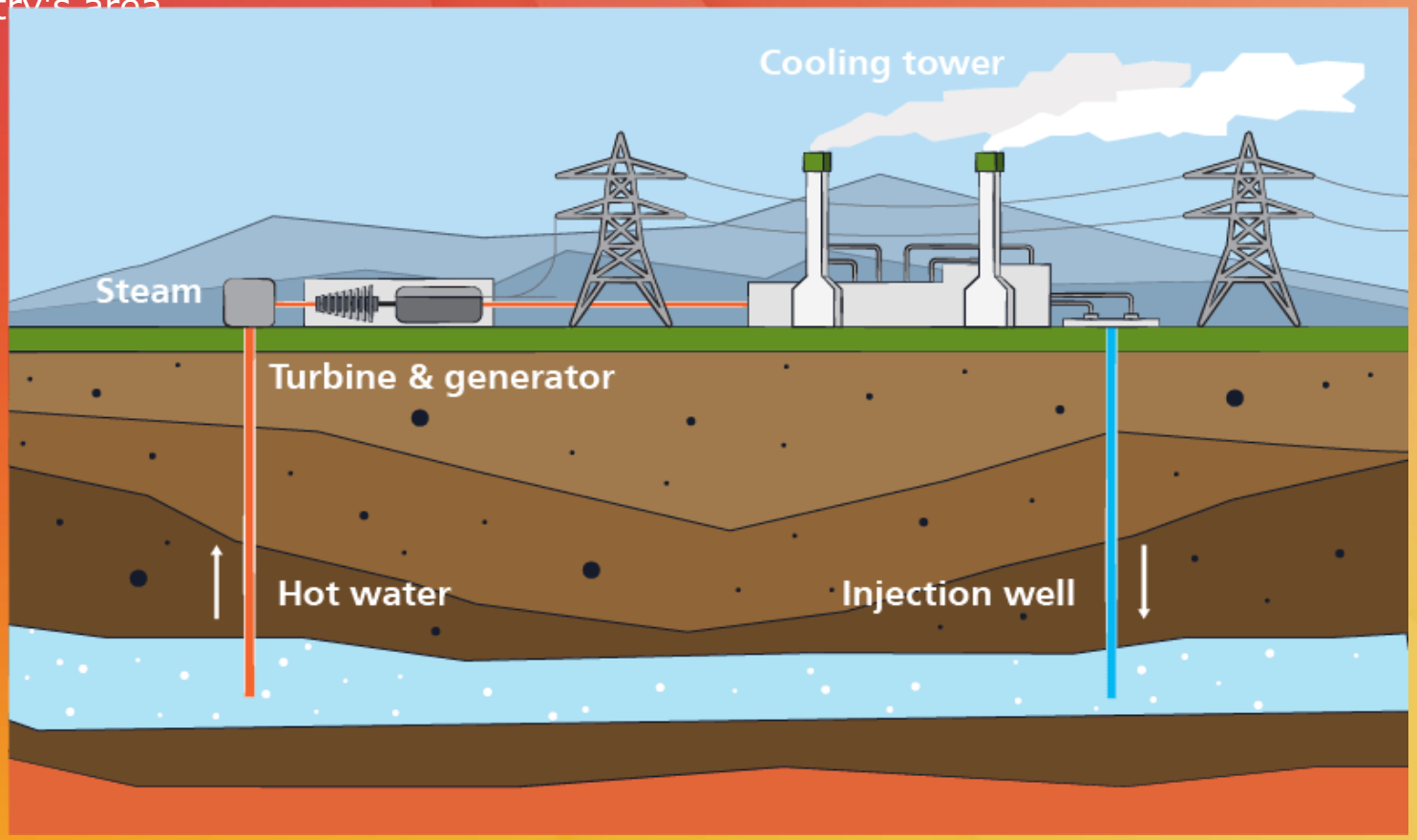
Agriculture annually produces 25 million tons of straw (mainly rapeseed and grain). It is usually used as feed in animal farms or just fertilizing fields. There are several straw-fired boilers in Poland.

**Biogas**

There are only a few farms in Poland using biogas energy from animal manure for heat production. This energy is usually used for your own needs. There are also several installations for landfill gas in Poland. They sell electricity and use heat for their own needs.

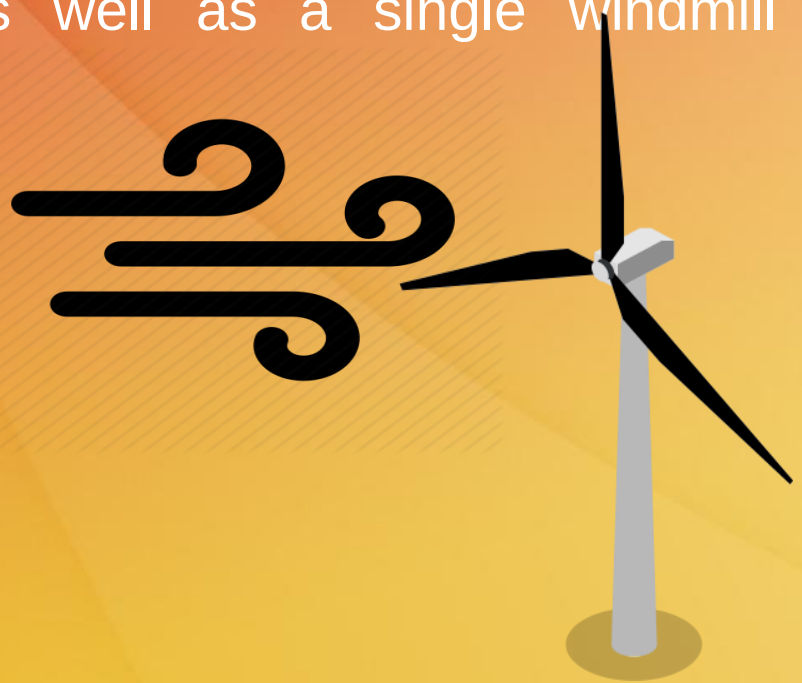
# Geothermal

Geothermal energy is one of the types of renewable energy sources. It consists in using the thermal energy of the Earth's interior, especially in the areas of intense volcanic and seismic activity. Geothermal energy has been used in Poland for over 200 years. The possibility of using this type of energy occurs on over 60% of the country's area. It comes from geothermal waters extracted to the surface. This energy is renewable, because its source is the hot interior of the globe - almost inexhaustible. In Poland, this phenomenon occurs in the Sudetenland (Cieplice, Lądek Zdrój). It is assumed that the possibility of using geothermal waters concern 40% of the country's area.



# Wind Power

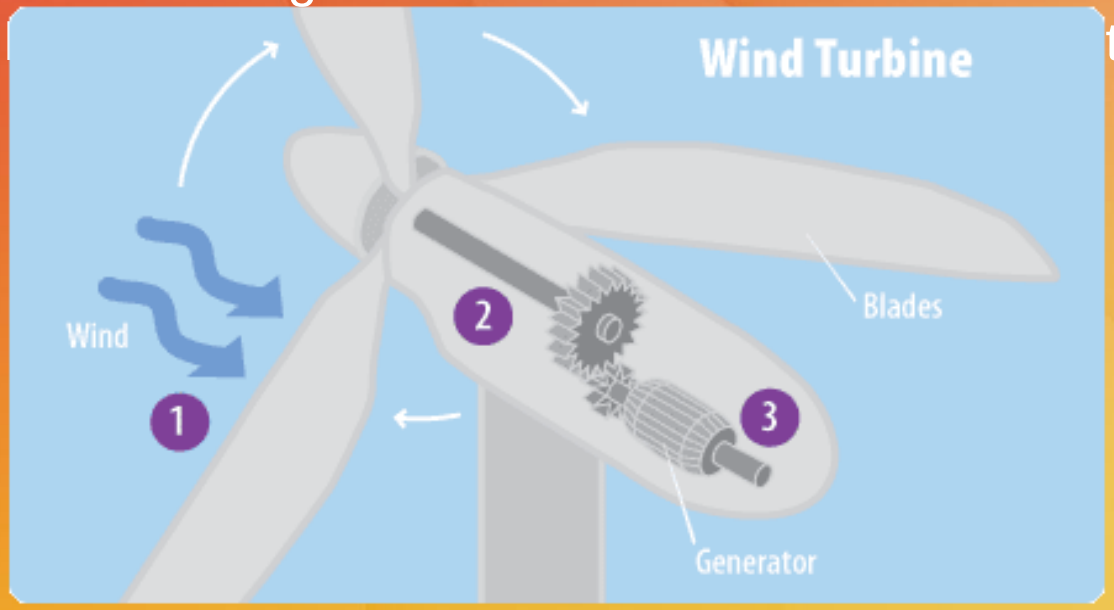
This type of power plant, in accordance with the name, uses wind power and energy. In other words, wind energy is converted into electricity. How wonderful it would be if the wind blew continuously and with a lot of power. Unfortunately, the wind has breaks at work. So before we start such an investment, we need to know where the winds are most favorable for wind farms. Energy from the wind can be obtained through a large wind farm, where a few or more windmills are installed on a specific surface, as well as a single windmill - depending on energy needs.



Wind energy in Poland has been developing since the early 1990s. According to the information available, the first windmill in Poland was erected in 1991 in Żarnowiec. The first commercial wind farm in Poland was established in the village of Cisowo,. It was launched in March 2001, and consisted of five power plants with a total capacity of 10MW. It should be noted that wind farms are varied in terms of installed capacity. They can produce power from several to several dozen MW. In order for the wind farm effect to be economically satisfactory, it should be located in a place with good or very good wind conditions. The best are found in the north of Poland and in the

# Wind turbine

Wind turbine - is a technical device that converts the kinetic energy of the wind into mechanical work in the form of a rotational motion of the rotor. Due to the design differences of the turbine in the rotor axis setting, the turbines can be divided into those with a vertical axis of rotation and propeller, with a horizontal axis of rotation. In the Polish landscape, the latter dominate. Remember that wind farms also have their drawbacks. Like any construction, the wind turbine is not quiet, it generates a certain level of noise that can be troublesome at a short distance from the buildings. Wind turbines can also be dangerous for bats and birds. These animals can not always judge them.



# Hydropower

Nowadays, hydropower is usually transformed into electricity. Hydro-energy is based, to a large extent, on accumulation obtained through dams, which has an impact on changes in the local landscape. Currently in Poland, over 16% of electricity produced in technologies using renewable energy sources comes from hydropower. Most of them are small hydropower plants, most often producing energy for the needs of the local community, which decided to use the deteriorating water mill, installing in it a low power turbine, but sufficient to supply energy to a small settlement unit

However, apart from small and very small power plants, we also have large installations in Poland. The time differences in generating power plants are quite large. It is most often the case that the very information about the plans of such an undertaking - wherever it may be implemented in Poland - arouses powerful protests of local residents. Considering the lowland, mainly for the terrain of Poland, most hydropower plants are built on rivers.It is one of the methods of acquiring renewable energy.

# Solar Energy

Solar energy is a commonly available, completely clean and the most natural source of energy. It can be used locally, satisfying the demand for hot water and heat in general. The advantage of using it is the possibility of easy adaptation, especially for household purposes, although it is already known that these installations are also effective in supplying larger housing centers. Solar energy seems very ecological, clean, profitable - but is it the same everywhere? There is a lot of sunshine in particular parts of Poland.

In Poland, about 80% of the total annual sun exposure falls on six months of the spring and summer season, that is from the beginning of April to the end of September. The solar operation time in the summer period is extended to 16 hours a day, while in winter it is reduced to 8 hours a day. Clear differences in sunshine in particular seasons and weather anomalies cause the image of the solar energy potential to be disturbed. When planning such an installation, one should get acquainted with the possibilities of acquir

# Solar panels in home

- In single-family houses, solar batteries are usually placed on the roofs. They can be mounted on racks - above the roof surface or - if the roof is sloping - directly on its cover. Solar panels can also be mounted on façades, awnings, external blinds, extension roofs or free-standing constructions.

# Non-renewable Energy

- Non-renewable energy sources are all fossil raw materials that can be turned into energy. With the exception of radioactive elements, they are of organic origin. They do not renew in a short period. Their use is much faster than replenishing their resources. Non-renewable sources are primarily fossil fuels: hard coal, lignite, peat, oil and natural gas. Non-renewable energy sources in the form of fossil fuels are the basic source for industry, energy, transport and households. Non-renewable energy sources were created for many years. They will not start appearing again, because there are not enough conditions to start them that have occurred in the past




# Cruide oil

Crude oil is a characteristic liquid, taking the color from yellow to brown. It is a mixture of solid, liquid and gaseous hydrocarbons, containing also small amounts of sulfur (up to 6%), oxygen, nitrogen and metals. Now unprocessed crude oil is not widely used, it is first subjected to distillation in order to separate the individual fractions Fuel production is the main application of crude oil - it produces gasoline, diesel oil, propane-butane (LPG), light and heavy fuel oils, or aviation fuels. The second very important application of oil and its processing products is the production of plastics, such as, for example, polyethylene (PE) and polypropylene (PP). Gasoline and kerosene are obtained from crude oil in the process of fractional distillation or rectification. Crude oil is heated and volatilized vapors are separated by boiling point and condensed in special tanks. The resulting products, called distillates, are the basis for further processing as a result of which we get chemicals, detergents, waxes, paints. Crude oil is heated by many private homes as well as public buildings. Both the size of resources and the amount of oil extracted are measured [illegible] ent of 159 liters.

# Coal

Coal is a black or brownish rock. We burn coal to create energy. Coal is ranked depending on how much “carbonization” it has gone through. Carbonization is the process that ancient organisms undergo to become coal. About 3 meters of solid vegetation crushed together into 0.3 meterof coal!

Peat is the lowest rank of coal. It has gone through the least amount of carbonization.Anthracite is the highest rank of coal. Anthracite forms in regions of the world where there have been giant movements of the earth, such as the formation of mountain ranges. The Appalachian Mountains, in the eastern part of the United States, are rich in anthracite.

# Extraction

We mine coal out of the ground so we can burn it for energy. There are two ways that we can mine coal: underground mining and surface mining.

Underground mining is used when the coal is located below the surface of the Earth, sometimes 300 meters deep. Miners take an elevator down a mineshaft. They operate heavy machinery that cuts the coal out of the Earth and brings it above ground. This can be dangerous work because cutting coal can release dangerous gases. The gases can cause explosions or make it hard for miners to breathe.

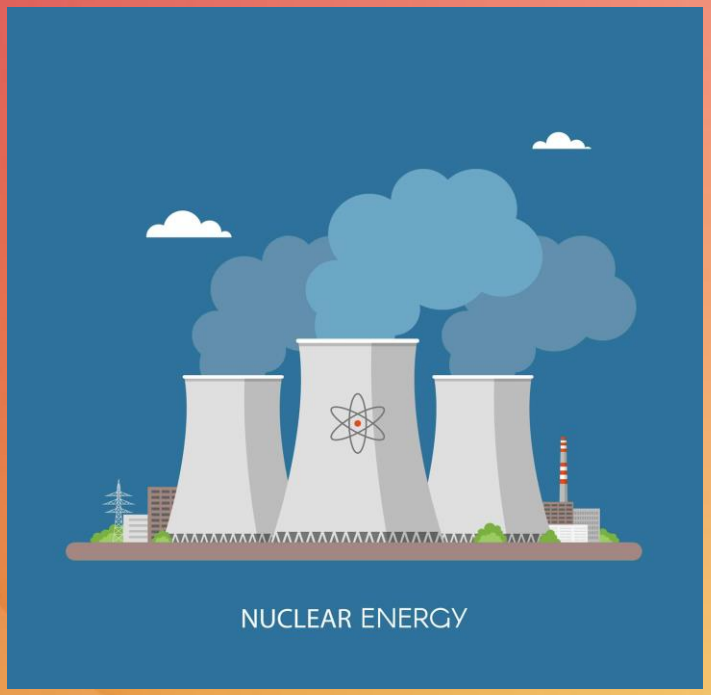
Surface mining is used when the coal is located very near the surface of the earth. To get to the coal, companies must first clear the area. They take away the trees and soil. The coal can then be cut out of the ground more easily. Entire habitats are destroyed during this process.

# Advantages and disavantages

Coal is a reliable source of energy. We can rely on it day and night, summer and winter, sunshine or rain, to provide fuel and electricity. Using coal is also harmful. Mining is one of the most dangerous jobs in the world. Coal miners are exposed to toxic dust and face the dangers of cave-ins and explosions at work. When coal is burned, it releases many toxic gases and pollutants into the atmosphere. Mining for coal can also cause the ground to cave in and create underground fires that burn for decades at a time.

# Nuclear Energy

Nuclear energy is usually considered another non-renewable energy source. Although nuclear energy itself is a renewable energy source, the material used in nuclear power plants is not. Nuclear energy harvests the powerful energy in the nucleus, or core, of an atom. Energy is released through nuclear fission, the process where the nucleus of an atom splits. Nuclear power plants are complex machines that can control nuclear fission to produce electricity. The material most often used in nuclear power plants is the element uranium. Although uranium is found in rocks all over the world, nuclear power plants usually use a very rare type of uranium, U-235. Uranium is a non-renewable resource.



Nuclear energy is a popular way of generating electricity around the world. Nuclear power plants do not pollute the air or emit greenhouse gases. They can be built in rural or urban areas, and do not destroy the environment around them.

Nuclear energy also produces radioactive material. Radioactive waste can be extremely toxic, causing burns and increasing the risk for cancers, blood diseases, and bone decay among people who are exposed to it.

# Natural gas

Natural gas is a mixture of gases from a different and unique composition, is a fossil fuel of organic origin, a gas in the Earth's crust in seams filling surfaces, sometimes under high pressure. Natural gas deposits or coal deposits. Its main ingredient is methane. It is divided into the content

Its deposits are also underground (sometimes it occurs together with crude oil). After extraction, the gas is cleaned, a specific smell is given to it (so that it is easily perceptible to us), and then it is introduced into the pipeline. Gas belongs to ecological fossil fuels, because burning methane contained in it does not cause environmental pollution (it emits only a small amount of harmful substances to the atmosphere). It is used in industry, it is also an important raw material for us: most often we use it in the kitchen with gas burners and in the bathroom for heating water and heating the whole apartment. The safe use of gas is very important.