

# POWER STATION IN POLAND

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# BASIC INFORMATION ABOUT ELECTRIC ENERGY INSTALLATIONS IN POLAND

In Poland, electricity is generated by thermal power stations, hydro and wind power stations. In January 2018, their total installed electrical power was 40,119 GW. It is a force that is generally sufficient to meet domestic needs. The most the energy is generated by thermal power stations using hard coal and lignite. The thermal power station with the largest installed capacity is the Bełchatów coal-fired power station, the second-largest coal-fired power station in the world.

There are no nuclear power stations in Poland. The only working nuclear reactor is the Maria research reactor, currently managed by the Institute of Atomic Energy. In the 1980s, the construction of the Żarnowiec power station began, however, the work was stopped at the beginning of the 1990s, mainly under the pressure of protests against nuclear energy.



# BASIC INFORMATION ABOUT ELECTRIC ENERGY INSTALLATIONS IN POLAND

The efficiency of the combined heat and power station does not exceed 46%. The most powerful power station of this type in the world is the Russian Berezovsk Power station with an installed capacity of 6,400 MW. The largest Bełchatów power station in Poland with a capacity of over 5,400 MW is not far behind.

In Poland, the first thermal power stations (steam) were created in the 19th century. They provided mechanical energy to individual stations of the machine, textile, metallurgical and mining industries, etc. The first municipal power station in the Republic of Poland was established in Radom in 1900, Second in 1902 in Warsaw. After the World War I, many power stations were planned in Poland, but the plan was not implemented. Only after the Second World War there was a rapid development of the power industry based on its own energy raw materials (hard coal and later brown coal).



# BASIC INFORMATION ABOUT ELECTRIC ENERGY INSTALLATIONS IN POLAND

Today in Poland, we have 55 CHP stations that generate 90% of our country's energy. They are fired in 60% with hard coal and 38% with brown coal. The distribution of large thermal power stations depends on three factors:

1. access to fuel,
2. the possibility of easy water collection,
3. proximity to the energy market.

Lignite-fired power stations are located next to open-cast mines. There are power stations: Bełchatów, Zespół Elektrowni Pątnów-Adamów-Konin, Turów. The coal-fired power stations are located in the Upper Silesian Industrial District, e.g. Rybnik (ROW), Jaworzno III and Łaziska. Several coal-fired power stations were located over large rivers. These are: Połaniec, Koźienice, Dolna Odra, Ostrołęka. Electricity is of great importance for the Polish economy. It is delivered to all industries. During the production of energy, exhaust gases from chimneys, including carbon dioxide and sulfur as well as nitrous oxide, are thrown into the atmosphere. Electric coal-fired power stations pose a serious threat to the environment, therefore they strive to reduce energy production in this way and transform its source into ecological energy, such as solar, hydro or nuclear power stations. However, due to the low first efficiency, the inability to build too many second and the significant cost and lack of social acceptance of the third most energy in Poland is still obtained from the burning of fossil fuels.



# WHAT IS A THERMAL POWER STATION?

Thermal power station (conventional or nuclear) - a set of devices for generating electricity using a series of energy transformations for this purpose, among which heat plays a significant role. Thermal energy usually comes from the combustion of fuel in a steam boiler. It is used for heating and evaporating water and for superheating steam. In the turbine, the thermal energy of the steam is converted into mechanical energy discharged by the shaft into an electric generator, in which it is transformed into electricity. In a power station using a gas turbine system, heat is supplied in the combustion chamber (open system) or in a heat exchanger (closed system). In a thermal power station, primary energy is usually in chemical form and is released in the combustion process:

1. fossil fuels (mainly coal or natural gas),
2. organic substances,
3. industrial or municipal waste,
4. biomass
5. biogas,
6. and others.



# WHAT IS A THERMAL POWER STATION?

Thermal energy is usually created as a result of fuel combustion, but it can come from other sources, e.g. From waste heat from technological processes, geothermal sources, solar energy. The following types of thermal power stations are distinguished:

1. steam (with steam turbines)
2. gas (with gas turbines)
3. gas and steam with gas and steam turbines as well as regenerative boiler
4. combustion (with piston engines).

In Polish power units, the steam generated is most often in a steam boiler fired with coal. Steam can be produced at nuclear power stations in a nuclear reactor, and can also be produced at CRS solar power stations. In gas and steam power stations, steam is usually produced in regenerative boilers.



# BASIC INFORMATION ABOUT HYDRO POWER STATION

Hydro power station - an industrial station that converts potential energy of water into electricity.

Hydro power stations are the most intensively used source of renewable energy. In 2014, they delivered a total of 3884 TWh of electricity, which is 16.5% of the total electricity production in the world. The largest hydropower stations have a capacity exceeding 10 GW. In Poland in 2014, Hydropower accounted for 1.4% of electricity production.

Hydroelectric power stations are a relatively cheap source of energy and can quickly change the energy produced depending on the demand. Their disadvantage is the limited number of locations where they can be built. In addition, construction there for hydroelectric stations entails the inhibition of the natural course of the river and the creation of retention reservoirs, drastically changing the environment.





# TYPES OF HYDROELECTRIC POWER STATION

1. **The Three Gorges Dam** - the largest hydroelectric station in the world. Since the electricity source in hydroelectric power stations is the potential energy of water, the amount of this energy is proportional to the amount of water that is lost within the station. To maximize this energy, high dams are built that allow water to build up. **Porąbka Dam - a water dam built in 1928-1937 in Międzybrodzie Bialskie**
2. **Pumped storage power stations** are used to adjust energy production to its temporary demand. During low energy demand, its excess is used to pump water into a tank at high altitude. At high demand, water is released and its potential energy is converted back into electricity. **Hydroelectric Power station Żarnowiec - the largest pumped storage power station in Poland**
3. **Flow power stations** do not receive additional water and do not require the creation of floods. Their power is limited by the power of naturally flowing water. During low energy demand, water flows freely through such a power station. Flow power stations operate most effectively if they are built in places where it is naturally piled up. **Hydroelectric Power station in Włocławek - the largest flow power station in Poland**



# TYPES OF HYDROELECTRIC POWER STATION

1. **Tidal power stations** use the potential energy of seawater accumulated during tides. Their power varies over a 24-hour period, but in a completely predictable manner, which allows them to be supplemented with tanks that allow them to generate energy continuously. There are also generators that draw energy from the kinetic energy of water moving during tides.
2. **Small hydropower stations** are those with a capacity below 5 MW. The division is quite conventional. Small hydropower stations are distinguished because their impact on the natural environment is negligible and therefore they are not affected by ecological controversy related to the construction of large power stations.

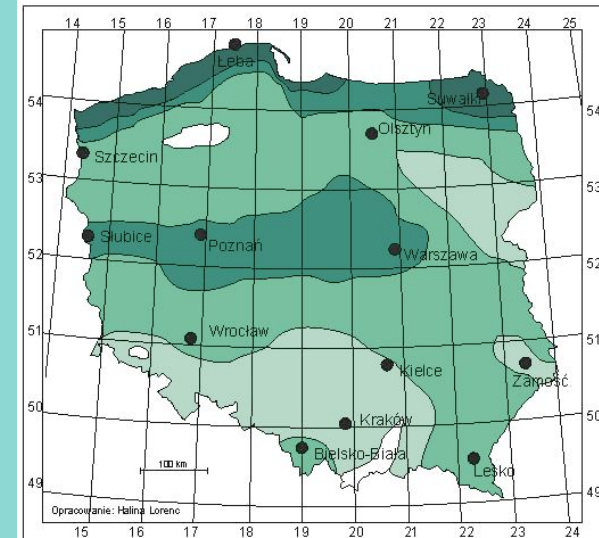
# BASIC INFORMATION OF WIND ELECTRIC POWER STATION

Wind energy in Poland - a type of energy in Poland that uses wind energy to produce electricity.

Intensive development of wind power production in Poland falls on the 21st century. Since 2015, this is the country's largest branch of electrical power engineering based on renewable energy sources. The best wind conditions for the development of wind farms occur in the north of Poland and in the central and western parts of the country.

- I. EXTREMELY BENEFICIAL
- II. VERY BENEFICIAL
- III. BENEFICIAL
- IV. LITTLE BENEFICIAL
- V. ADVERSE

Strefy energetyczne wiatru w Polsce  
Mezoskala



- Strefy:
- I - Wybitnie korzystna
  - II - Bardzo korzystna
  - III - Korzystna
  - IV - Mało korzystna
  - V - Niekorzystna

Osrodek  
Meteorologii



**THANK YOU FOR YOUR  
ATTENTION**