

THE FORMS OF PRODUCTION OF ALTERNATIVE ENERGY IN ALBANIA

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Abstract

In this article are given on alternative energy considerations, including these forms of production:

- Solar Energy (Photovoltaic)
- Wind Energy
- Biomass Energy
- Biogas
- Biodiesel

Where are given technological considerations for the application of each case in the Albanian territory.

Keywords: Renewable energy, environmental, benefits, solar energy, biomass, climate

Introduction

This study focuses on the main aspects of energy problems like industrial production, energy systems environmental character and the impact on human health and ecosystems.

Today, energy is indispensable to our daily lives.

With Energy we heat and refrigerate our homes, we use it for many transportation systems, and other things.

Energy is used in all human activities.

In the environment in which we live, we consider energy and its uninterrupted use, endless but in fact it is not.

The demand for energy is constantly growing and fossil resources are being exhausted. Their use significantly affects the system "LAND"

Fossil fuels, from which derive 90% of energy that we use, emit carbon dioxide (CO₂) during the process of burning. This gas causes warming through the greenhouse effect.

The combustion processes produces also carbon oxide (CO), nitrogen (NO), sulfur (SO₂), hydrocarbons (HC) that are the main causes of environmental pollution and acid rain.

Other advantages of renewable resources is that they are local resources, guarantee a small source for transportation, obvious economic benefits, and increase local employment.

The most common renewable energy sources are:

- ✓ Wind Energy for electricity production.
- ✓ The energy of the Sun, solar radiation is used to produce electricity or heat
- ✓ Hydraulic energy, kinetic energy and potential uses of water to produce electricity
- ✓ Biomass energy uses organic origin combustor to produce (boilers, chimneys, etc.) electricity by large plants.
- ✓ Geothermal energy uses the underground heat that produces electricity (large plants)
- ✓ The energy of the waves, the Sea waves energy is used to produce electricity.

Alternative energies are nowadays the main problem in finding and implementing these forms. For this problem, there are discussed and designed projects for locating these energy sources in the future.

Renewable energy sources have double advantages:

- Respect ecology and environment and
- Efficient in costs



Source: National Agency of Natural Resources & Google

Solar Energy in Albania:

The sun is the most important source for energy production.

All sources of renewable energy, from the geometric type derive directly or indirectly from the sun, and is defined as a great source of clean renewable energy and zero cost as raw material.

The advantages of solar energy:

- There is no cost natural materials
- There is no cost of transportation from the source
- There is no environmental pollution

The main types of solar collectors are:

- Flattened collectors
- Parabolic collectors
- Tube collectors

Thanks to the favorable geographical position, Albania has very good climatic conditions for the use of renewable energies.

The high intensity of solar radiation, has found a wider use for hot water production.

The territory of our country has an accumulated exposure to solar radiation ranging from 1200 kWh/m² mainly in the north-east, to 1.600 kWh/m² in the western area.

Much of the territory of Albania receives a solar radiation of 2200-2400 hours / year.

The number of sunny days ranges from 280 to 300 sunny days.

According to solar radiation measurements carried by the Hydro Meteorological Institute and the geographical latitude, where these measurements were made, results the solar energy potential of Albania.

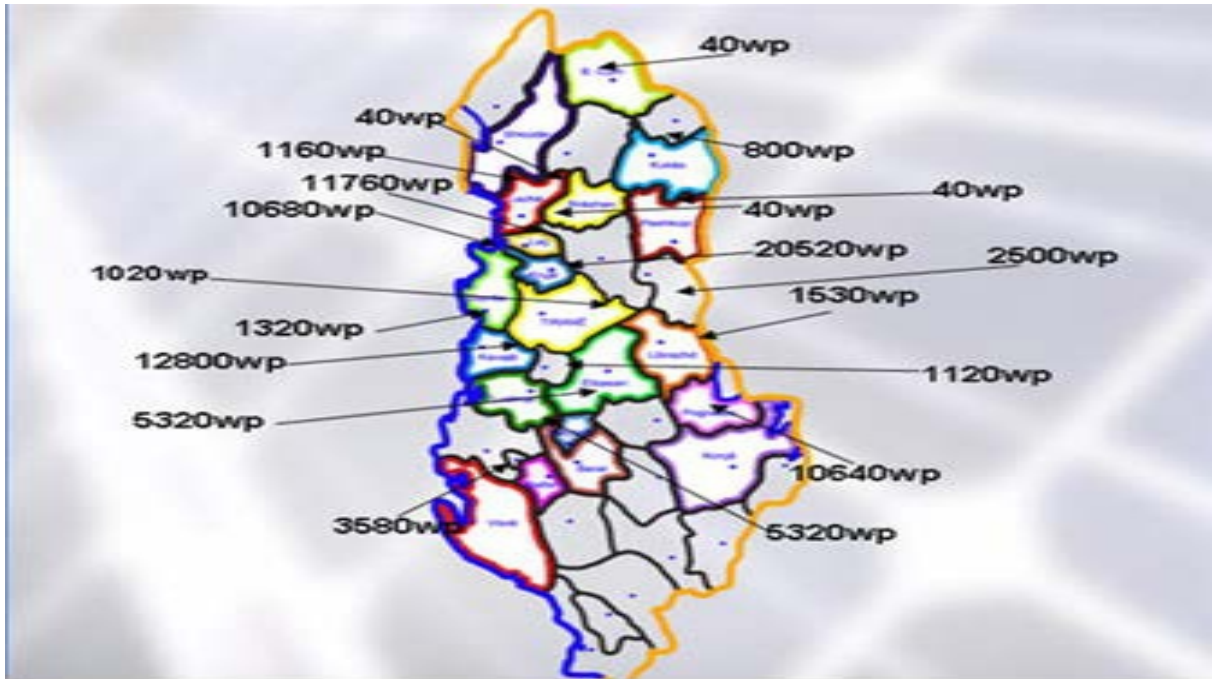
Total annual solar radiation varies from a minimum of 1.185 kWh/m² in northeastern Albania (Kukes) up to a maximum of 1.690 kWh/m² southwest (Fier). Albania has a daily average solar radiation of 4.1 kWh/m².



Source: Young Germany

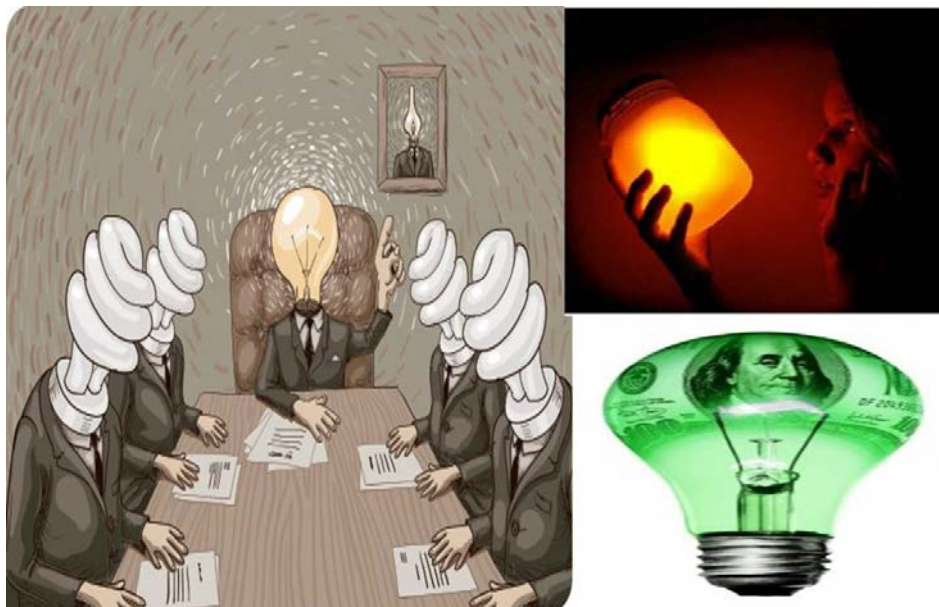
Radiation of daily average solar in Albania (kWh/m² / day):

MONTH	Shkodra	Peshkopia	Tirana	Fier	Erseka	Saranda
January	1.7	1.55	1.8	2.15	1.00	1.9
February	2.3	2.3	2.5	2.85	2.7	2.4
March	3.35	3.25	3.4	3.9	3.4	3.6
April	4.5	4.15	4.2	5.00	4.4	4.8
May	5.45	5.25	5.55	6.05	5.6	5.8
June	6.1	5.85	6.4	6.8	6.4	6.8
July	6.5	6.25	6.7	7.2	6.8	6.1
August	5.55	5.45	6.05	6.4	5.9	4.8
September	4.45	4.35	4.7	5.15	4.7	3.6
October	2.9	2.9	3.2	3.5	3.1	3.2
November	2.1	1.85	2.15	2.4	2.1	2.1
December	1.7	1.5	1.75	1.85	1.8	1.8



If we compare the daily average solar radiations (annual average) with the daily average solar radiation (annual average) of some other European countries will have these values:

- Netherlands: about 2.5 kWh/m² / day
- Denmark: about 3 kWh/m² / day
- Germany: between 3.0 - 3.8 kWh/m² / day
- France: between 3.8 - 4.6 kWh/m² / day
- South Albania: about 4.5 kWh/m² / day
- Spain and southern Italy: less than 4.6 kWh/m² / day
- Greece: more than 4.8 kWh/m² / day.



As can be seen from these comparative values, Albania should be considered as one of the countries with high potential solar radiation, thus relying on the experience of these countries, emphasize that it is necessary that even in Albania to promote the use of solar energy.

Kyoto, Be and Albania

In long terms, the use of solar radiation for water heating will significantly reduce the emission of greenhouse gases, CO₂ in the atmosphere, as one of the main causes of global warming and will contribute for her mitigation. Is there any obligation for Albania? "Albania has ratified the Kyoto Protocol, but has not reduced the emission of greenhouse gases.

Albania and other developed countries, that have historical responsibility for global warming and climate change, should be active and take voluntary commitments. Albania aspires to join the EU and, once it is part of the EU, will have to voluntarily change the status and behave like all other countries by incurring obligations to reduce emissions of greenhouse gases. Albania is also part of the UN Convention on Climate Change, UNDP project. It is important to create a renewable energy market.

The foreigners appeal to Albania “Use Solar Energy”

Albania, according to experts, is a special case because about 10-13% of total primary energy sources (TPEs), including imports, are obtained from biomass, especially firewood.

The fact that the country relies on hydropower makes it vulnerable to climate change, as observed during the recent drought. This has significantly reduced electricity supplies.

Renewable energy could be the solution to reduce this dependence, but also for macroeconomic and political security of the country, reducing the deficit of state budget.

Analysis performed by Albania and reflected in the National Plan for Renewable Energy shows that the ultimate goal is to occupy about 38% of final consumption by 12% for heating and cooling systems, 23% from renewable sources for electricity and 3% will be spent on transportation.

Wind energy in Albania

The aim of the present study is to assess the potential of wind power as an alternative source of energy, for Albanian conditions, through the data reception in some of the main areas of this source.

Identification of the potentials for these conditions of our country is seen as one of the ways of solving the problem of energy and environmental conservation.

Some statistical data records by the Hydro Meteorological Institute of Tirana, for a multiyear period, give opportunities to use wind energy in the future.

Measurements taken in Albania identify some areas of high wind speed.

Below, there is a comparative table showing the map of wind resources in Albania and locations with wind speed greater than 5 m / s also, the annual number of hours.

It is known that to produce energy in sufficient quantities, it is necessary to place Aero-generator installed to be more wind.

With an average generator, 50 m high, 600 kW potency in the presence of wind, the daily electricity can meet the need of 500 families.

Referring to our neighboring country, Greece, particularly in its south, the islands of the Ionian Sea has substantial winds for energy use, and Greece has installed wind turbines in these islands.

Greece's northern coast has broken ground, wind speed $v = 5$ m / s, at the height of 50 m, where these values match the values of wind speed on the southern coast of Albania.

The same situation is also in the regions of Italy near Albania.

By the final analysis, for different height of turbines, their different types, different surfaces Drum, performance and power, coefficient of wind speed distribution conclude that: Valley of Skavica, Plain Kukes, The area Gilavas, The coastal area of Durres, Mamurras, Fier, Lushnje, Vlora have a considerable potential of wind energy.



According to Hydrometeorological Institute Tirana we have these data:

Classification according to potential that becomes to wind energy		
Possible sources	Energy densities at 50 m height [W/m ²]	Wind speed at 50 m height [m/s]
Lower limit	200 – 300	5.6 – 6.4
Fair	300 – 400	6.4 – 7.0
Nice	400 – 500	7.0 – 7.5
Gorgeous	500 – 600	7.5 – 8.0
Famous	600 – 800	8.0 – 8.8
Magnificent	800 - 1600	8.8 – 12.0

The table shows that there are data for 50 m height where the speed of the wind reaches 6-8 m/s. In these conditions our country is one of the best possible sources with an average energy density of about 400 W/m².

Biomass energy in Albania

Biomass used to produce energy (bio-energy) directly from burners or converted into other types of combustion, electricity or heat due to thermo-chemical and bio-chemical process.

Biomasses are:

- All agricultural products cultivation of forests.
 - Waste of agricultural and food industry wastes.
 - Algae
- All organic products derived from animal biological activity.

Among the main sources of renewable energies, biomass has an important role because it is a form of solar energy-collecting can be used, directly or indirectly through certain processes of transformation, such as bio-energy incinerator to produce thermal or electrical energy.

Biomass as energy source present a set of priorities based on their availability in the area:

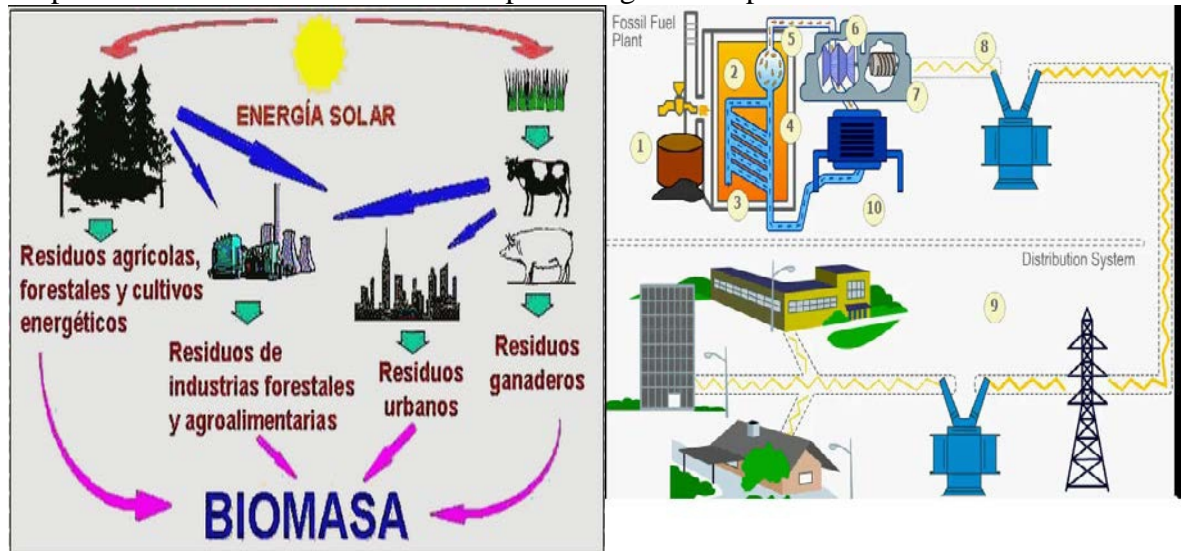
- Biomass is more abundant, found in every part of the surface of the planet, from algae, trees, or waste.
- It is renewable.

- Can easily be replaced, for example, by planting trees.
- It is easily convertible in acid with high energy, like alcohol or gas.
- It is economic.
- Production of biomass often involves regeneration of deforested lands.

Useless-utilized areas in agricultural space and create busyness of rural communities.

The energy sector in Albania is one of the most important, occupying about 10% of the GDP of the country.

In the framework of the promotion of renewable energy, has become possible to study the potential of biomass in Albania for producing electric power.



In many countries of the world already is seen biomass as an alternative source of energy that does not contribute to the increase of CO₂ in the atmosphere. Forests waste is the main source of energy for heating in our country and for cooking in many households.

According to ANFI, it appears that the capacity utilization of forests is about 2.2 million m³ of forest waste with a calorific power of 15-18 MJ / kg. In this study, the use of the forest is considered in a sustainable manner and the use of 919,000 tons per year, or 1.3 million m³, which can be produced by about 1,271 GWh per year. Urban waste in our country are one of the main problems, as their quantity increases with the increase of welfare and their processing is still in the primitive stages, thereby posing a major environmental hazard. In our country it is one of the main problems, as their amount is added to the Welfare.

Our country, produces about 0,219 to 0,307 tons / resident / year urban waste with a calorific power of 10 to 17 MJ / kg. If these wastes would be used for electricity production, they will produce about 236 GWh per year. According to statistics issued by INSTAT, Albania in 2006, has consumed 6,793,523 MWh, is approximately 1.88 MWh per resident.

From these data, we can say that 44% of the total energy consumed can be replaced by renewable biomass, contributing significantly to reducing or increasing atmospheric carbon electricity consumption per resident, from a 1.88 MWh, which consumption is low compared with other countries in the region or in the world.

The impact of systems that process renewable biomass will bring a range of positive impacts: supply of electricity, economic growth, employment growth in rural areas, reduction of import fuels, reducing of gas emissions greenhouse gases in the atmosphere, The Albanian government have an important role to play through promotional policies in the field of renewable energy, making pilot projects for construction of power generating plants from biomass.

Biogas energy in Albania

The term Biogas means a mixture of different types of gases (with most 50-80% methane) produced by bacterial fermentation, in the absence of oxygen, organic waste originating from:

- solid waste
- plants in decomposition
- residues zoo
- agro-industry waste

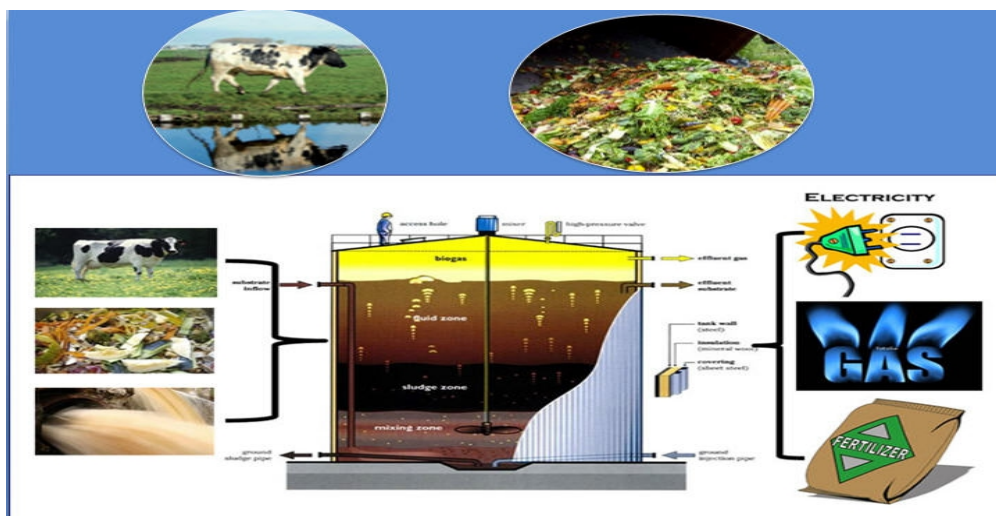
Biogas can be used:

- For burn in boilers
- For heaters
- For Cooking
- In Petrol engines

Through conversion of these substances in Biogas we obtain energy production which can be sold in the national market.



Albania is known as a country of livestock and agriculture, but also as a place with very poor rural areas. Biogas benefits contribute in economic incomes but also becoming energy self-sufficient but also for other needs such as heaters, cooking, etc..



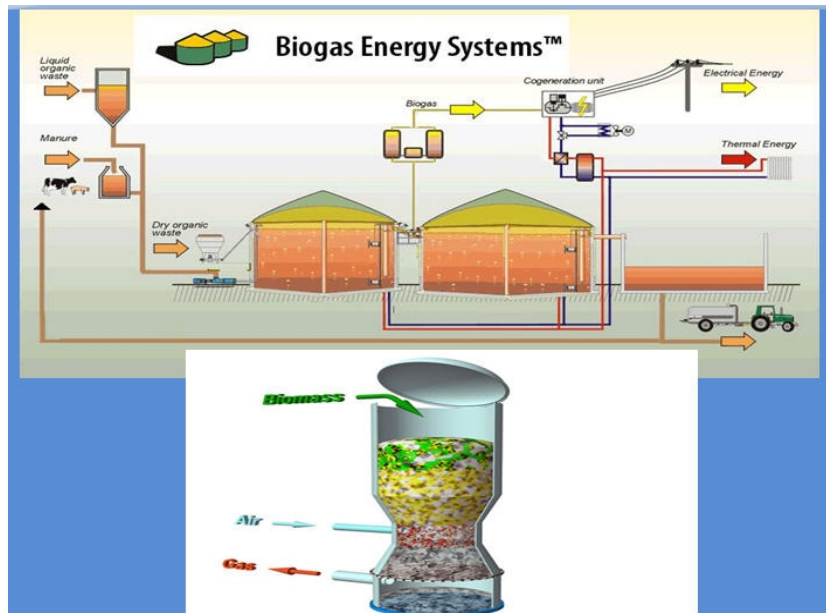
Source: American Biogas Council

Another factor beside the many positive benefits of biogas production is that residues that remain after extraction of biogas are very good materials for enrichment of agricultural, eliminating the purchase of chemical fertilizer use to enrich the soil, but also saving money.

Comparing with the other forms of energy production like wind and solar implants, is lower, but has the advantage as agricultural farms are not conditioned by atmospheric conditions.

There are two main types of implants that are widely used nowadays:

- ✓ room implants with plastic,
- ✓ rubber or gas storage biogas implants vaulted brick.



Source: American Biogas Council

Geothermal energy in Albania

Albania has thermal water sources, these sources are known since antiquity.

In Bënjë of Permet has thermal springs in the riverbed of Langarica, known at the time of the Roman Empire. Thermal sources of Elbasan are known since 1932.

In Postenan Mount, North of the Leskovik, appear steam sources, also the well-known thermal sources "Vormoner" on the river bank "Sarantaporos"

Geothermal energy is a renewable energy:

- Soil heat flux
- Hot water emanating from underground
- Balance geothermal conditional distribution:
- Fields of temperatures at different depths
- Geothermal gradient
- Heat flux density
- Tectonics and hydrodynamics of underground waters

In the first half of the twentieth century, it was observed climate warming by about 1 ° C, then with a cooling of 0.6 ° C , and is present in our day to 1.2 ° C warming , this heat is part of the global warming that is currently observe in the circle of the Earth .

A period of heat in Albania is associated with changes:

- ✓ Atmospheric precipitation regime
- ✓ Moisture
- ✓ Wind speed

Nowadays the thermal waters are used only for curative purposes of various diseases.

By some measurements data, many areas of interest represents temperature in Lake Ohrit, where the temperature measured on 4 September 1994 at 10 m depth was 23.8 ° C. In the center of the near-Adriatic Lowland, the heat flux density is up to 41.3 mW/m². Isotherm 30 mW/m². Where the heat flux density of up to 35.7 and 38.2mW/m², 50 km distance from Durres, and 35 km distance from Vlora.

In the area of Xara and Dumre of Saranda heat flux density reaches 37mW/m².

Groundwater Potential constitutes 31% of the total water potential of Albania.

Sources and geothermal water wells in Albania are located in three geothermal areas:

- a) Kruja Geothermal Area
- b) Peshkopi Geothermal Area
- c) Ardenica Geothermal Area

Besides these, there are other sources in areas which are given in the table below:

Nr	Name of source according to the zones	Temp. °C	Geographic coordinates		The debit l/sec
			Width V	Length L	
1	Mamurras 1 and 2	21-22	41°35'24''	19°42'48''	11.7
2	Shupal	29.5	41°26'9''	19°55'24''	<10
3	Llixha Elbasan	60	41°02'	20°04'20''	15
4	Hydrat Elbasan	55	41°1'20''	20°05'15''	18
5	Peshkopi	43.5	41°42'10''	20°27'15''	14
6	Ura Katiut Langaricë,Përmet	30	41°14'36''	20°26'	>160
7	Vromoneri,Sarandoporo,Leskovik	26.7	40°5'54''	20°40'18''	>10
8	Finiq,Sarandë	34	39°52'54''	20°03'	<10
9	Përroi i Holtës, Gramsh	24	40°55'30''	20°09'24''	>10
10	Postenan, Leskovik	Steam of source	40°10'24''	20°33'36''	
11	Kapaj, Mallakastër	16.9-17.9	40°32'30''	19°48'42''	12
12	Selenice, Vlorë	35.3	41°32'18''	19°39'30''	<10

In the area of renewable energy utilization, geothermal implants are those that allow higher power installed.

The principle of operation of a geothermal plant is:

Steam flows coming from underground, sent to turbine that produces mechanical energy, which is transformed into electricity energy through a generator or alternator connected to the turbine.

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