RENEWABLE ENERGY

Calasancio Alicante

eTwinning

INDEX

Introduction to Renewable Energies

Hello, friends. We are the pupils of Calasancio Alicante School and today we are going to talk about a very important topic: how to take care of the environment with renewable energies.

Renewable energies are those that come from nature, such as the sun, the wind, the water or the plants. These energies are good for the planet, because they do not pollute or run out. They also help us save money and create jobs.

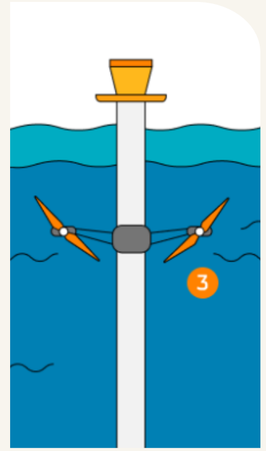
In our city, Alicante, we are very lucky because we can use a lot of renewable energies, especially solar and wind energy. There are many buildings that have solar panels on the roof, and there are also wind farms where there are windmills that produce electricity.

In this presentation, we are going to show you how renewable energies work, what benefits they have for the environment and the economy, and what examples there are in Alicante. We hope you like it and that you join us in taking care of the environment. Thank you for listening to us.

TIDAL ENERGY

Tidal energy is a clean and inexhaustible source of energy obtained by harnessing the tides or wave motion to generate electricity.

This process involves converting the kinetic energy of water into electrical energy using technologies such as turbines or tidal energy capture devices.



CHARACTERISTICS

-IT IS EFFICIENT (DESPITE ITS LOW SPEED).

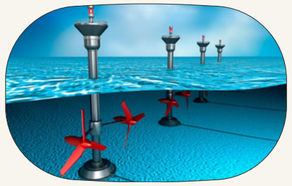
It generates electricity at low speeds, since the important thing in this case is the high volume of the water mass, not so much the speed.

-HIGHLY PREDECTABLE:

Tidal cycles are easy to predict and therefore to manage. The power that each tidal power plant can offer can be known in advance.

-CLEAN AND RENEWABLE:

It does not emit greenhouse gases.

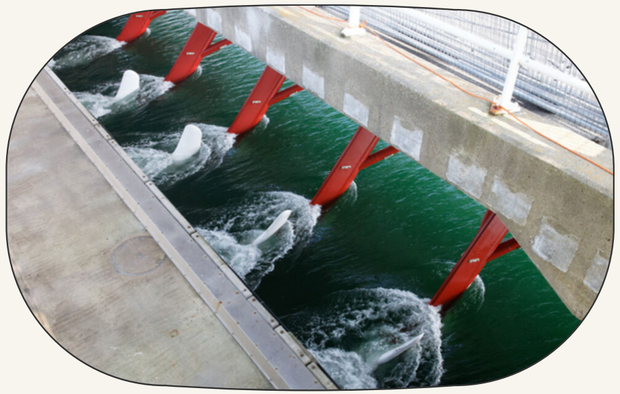


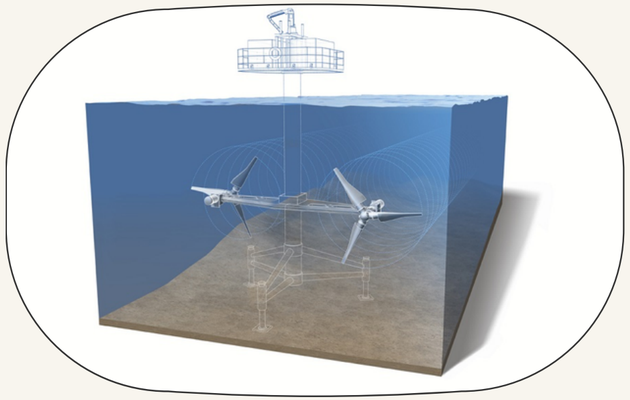
TIDAL ENERGY

IS TIDAL ENERGY SENSITIVE IN ALICANTE?

There are currently no tidal power plants in Alicante.

The most powerful plant in Spain is located in Motrico (Guipúzcoa) and has been operational since 2011. This plant has 16 turbines capable of producing 600,000 kWh per year. It has a capacity equivalent to the energy consumed by approximately 600 people.





TIDAL ENERGY

HOW TO IMPROVE THE SYSTEM?

1. Optimisation of Turbine Design: to develop more efficient and durable tidal turbines, specifically adapted to marine conditions, to improve energy harvesting and reduce maintenance costs.

2. Integration of Energy Storage: Implement energy storage systems, such as batteries or hydroelectric storage systems, to ensure constant and controlled production.

3. Research on Salt Water Resistant Materials: Develop materials that are more resistant to corrosion caused by salt water from the sea, which would extend the lifetime of tidal infrastructures and reduce replacement costs.

SOLAR ENERGY

Solar energy is a renewable energy obtained from electromagnetic radiation from the sun. There are different types of solar energy, but the most widely used is photovoltaic. This photovoltaic energy is produced by transforming solar energy into electricity through photovoltaic panels.

CHARACTERISTICS

ACCESSIBLE

Easy to adapt and install anywhere

CLEAN ENERGY

Doesn’t emit carbon dioxide into the atmosphere or produce waste

INEXHAUSTIBLE SOURCE OF ENERGY

SOLAR ENERGY

57%

IS IT PRESENT IN ALICANTE?

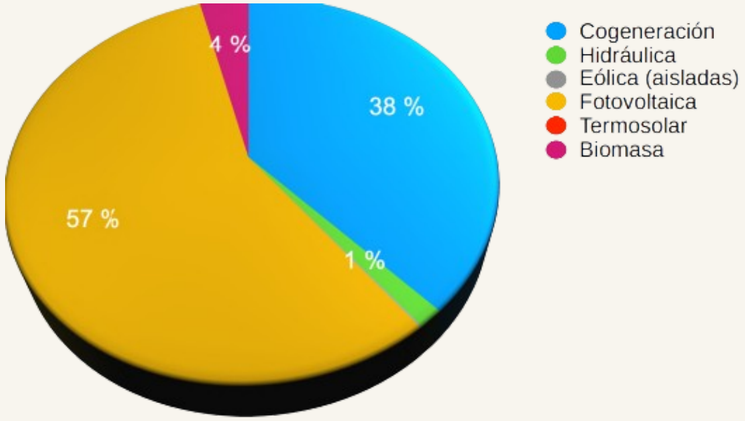
Yes, Alicante has many places that have installed photovoltaic panels that produce energy. One of these places, is our Calasancio School.

In addition, the province of Alicante has 2006 photovoltaic plants and plans to have 19 photovoltaic parks in the future.

PHOTOVOLTAIC PLANT IN NOVELDA, ALICANTE

USAGE RATE

Solar energy has a 57% usage rate compared to other renewable energies.



SOLAR ENERGY

HOW TO IMPROVE THE SYSTEM?

- *Increase the efficiency of solar panels,* through research and the development of new technologies.

- *More powerful energy storage,* through more efficient and larger scale storage systems.

- *Integration of smart grids,* enabling better management and distribution of solar energy.

Wind power

WIND ENERGY IS A FORM OF RENEWABLE ENERGY THAT IS OBTAINED FROM THE WIND, OR MORE SPECIFICALLY, FROM THE USE OF THE KINETIC ENERGY OF AIR MASSES. IT IS GENERATED BY WIND TURBINES THAT TRANSFORM THE KINETIC ENERGY OF AIR CURRENTS INTO ELECTRICAL ENERGY.

CHARACTERISTICS

Environmentally Friendly One of the most notable characteristics of wind energy is that it does not pollute. Unlike other energy sources that produce greenhouse gases by burning hydrocarbons,

Profitable Energy Wind energy is profitable. Once the infrastructure (turbines, blades and towers) is installed, maintenance costs are low. In addition, the capacity to generate electrical energy using this technique is very efficient.

Wind power

Is wind energy in Alicante?

Wind energy is present in Alicante. There are companies such as Elecnor 2 and the Alicante Provincial Energy Agency 3 that offer services based on wind energy installations. However, Alicante does not have wind farms

Regarding the percentage of wind energy use in Alicante, no specific data is available for Alicante. However, in the Valencian Community, to which Alicante belongs, wind energy represented 3.26% of the wind energy generated in Spain in 20225. In addition, the Valencian Community had an installed wind power of 1,243 megawatts in 2022

Wind power

How to improve the system?

1. Implementation of Small Wind Turbines on the Coast One proposal is to support the Energy Agency of the province of Alicante in the implementation of a plan for the exploitation of the wind resource on the coast using small wind turbines

2. Improvement of Measurements in Complex Conditions Another proposal is to improve measurements in complex conditions (high turbulence, vertical component, complex terrain) and reduce uncertainties, including the use of Lidar & Sodar, virtual towers, and the use of new models taking into account the sale of electricity in the wholesale electricity market

3. Taller, More Efficient Wind Turbines Renewable energy experts predict that wind turbines of the future will be taller, larger and more efficient 3. Taller turbines with larger rotor diameters allow for more energy capture 3

Biofuel/Biomass

Biomass energy is a form of renewable energy that comes from organic matter, such as agricultural, forestry and municipal waste. It is produced by the combustion, fermentation or decomposition of these materials to generate heat, electricity or biofuels.

Biomass energy has a number of characteristics:

-RENEWABLE

It is derived from renewable organic resources, such as agricultural, forestry, livestock and urban waste, which can be regenerated.

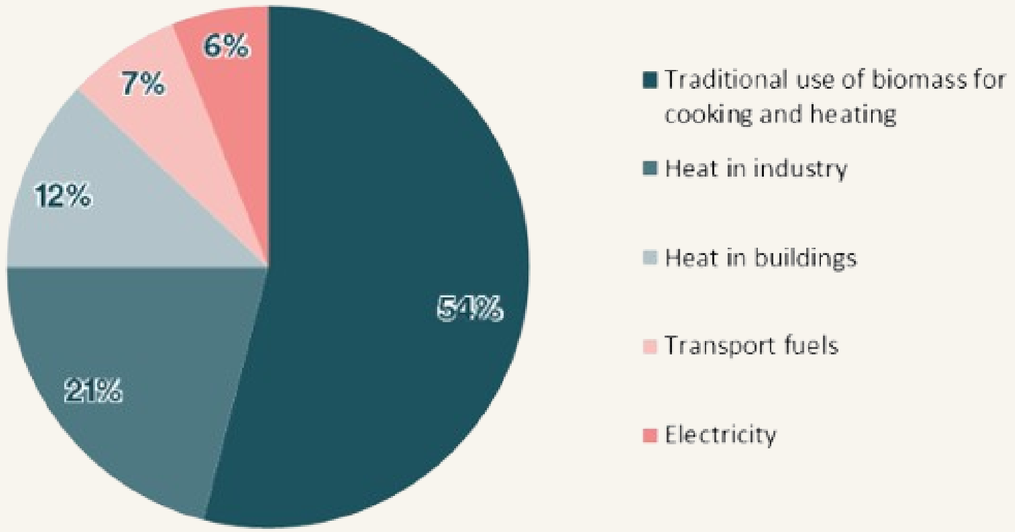
-WASTE REDUCTION

Helps reduce the accumulation of organic waste by converting it into a valuable source

Biofuel/Biomass

Is there biofluel or biomass energy in Alicante?

Currently in Alicante we don’t have any places that use this kind of energy, but in Spain we have plenty of them. The largest biomass plant in Spain was the Ence Energía y Celulosa plant in Mérida, Extremadura. This biomass plant has an electricity generation capacity of around 50 megawatts and uses mainly forestry and agricultural waste as raw material for energy production.

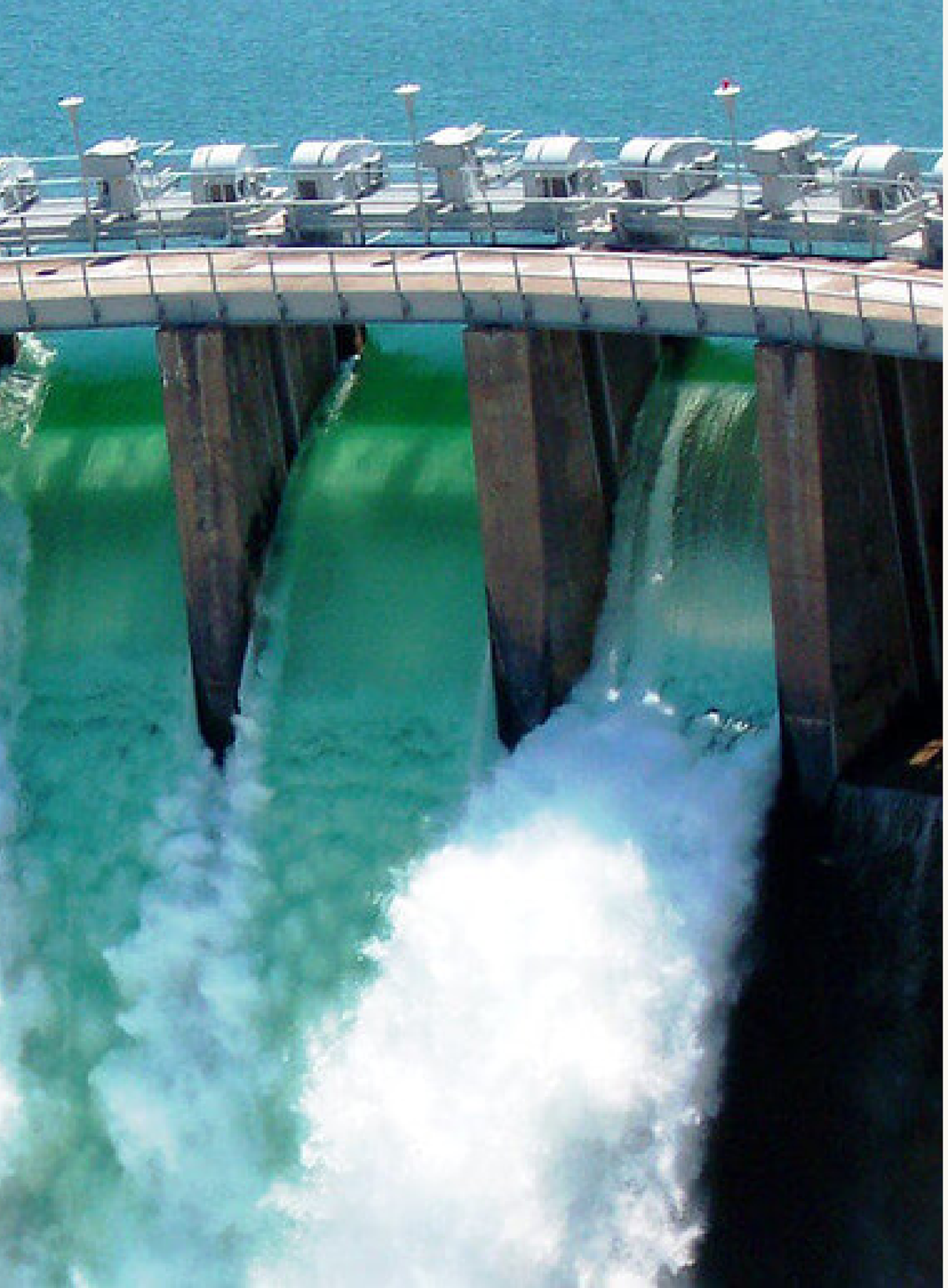


Biofuel/Biomass

How can we improve it?

We can improve biomass energy with different actions:

1. **More efficient technologies**: we can develop and adopt more efficient biomass-to-energy technologies and these technologies can increase energy efficiency and reduce pollutant emissions.
2. **Research and development**: Investing in research and development to improve biomass production, treatment and utilisation processes can improve organic waste management.
3. **Sustainable resource management:** promoting sustainable agricultural and forestry practices that minimise the environmental and social impacts of biomass production can increase respect for the rights of local communities that depend on natural resources.



Hydraulic energy

Hydropower is a type of energy that takes advantage of the movement of water. Sometimes also called water energy, it allows electricity to be obtained thanks to the use of the kinetic and potential energy of water currents or waterfalls.

Advantages:

- It is indigenous, so it avoids importation from other countries
- It does not produce pollution since it does not generate heat or polluting emissions.
- Allows water to be stored for irrigation and other emergency uses
- Dams regulate the flow of rivers, preventing flooding in the lower parts of the course.

Disadvantages:

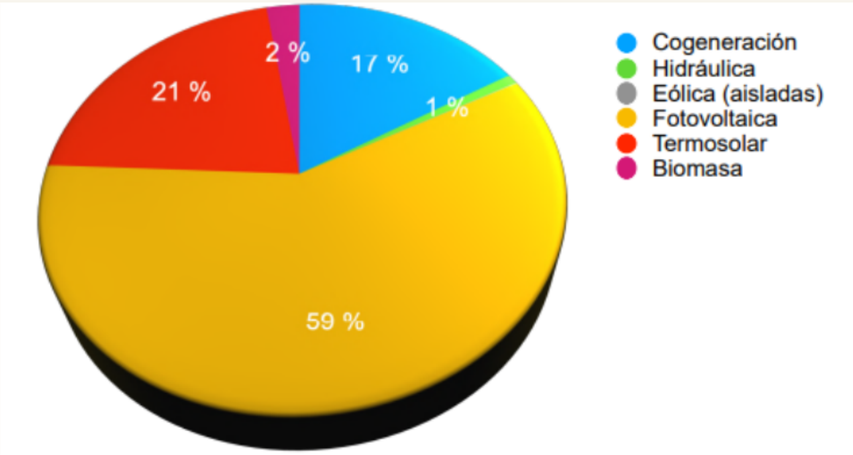
- Its performance depends on weather conditions.

Hydraulic energy

Is there hydraulic energy in Alicante?

Alicante is not known for having significant hydroelectric facilities, the region can take advantage of other renewable energy sources more suitable for its geography.

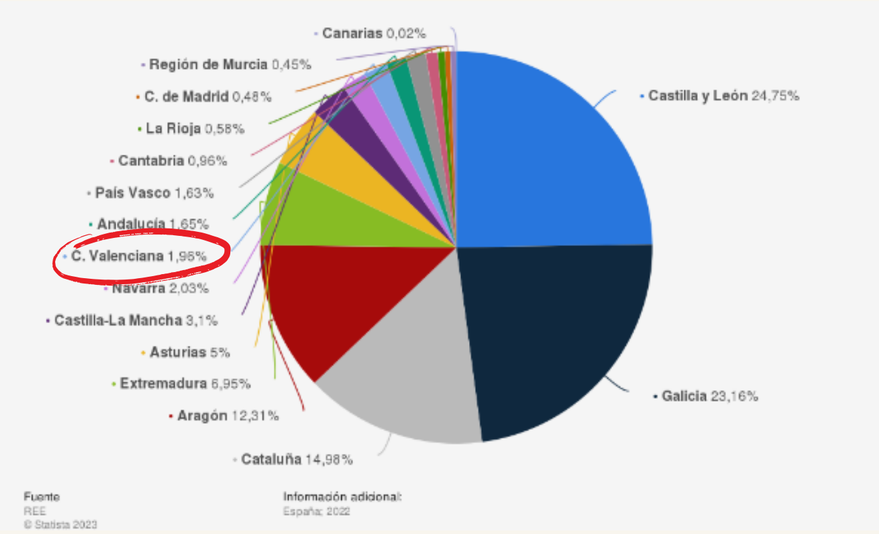
There are some sites such as: Hidráulicas Mutxamel SI, Hidráulicas Aspe,



Percentage of use in Alicante in relation to all energies

Hydropower is the main renewable source in the world, since the great availability of water allows for high performance. Currently, it covers about 20% of the world's electricity demand.

In Alicante, the data as such is not available, but 1.96% of the hydraulic energy generated in Spain was produced in the Valencian community, the eighth community that produces the least hydraulic energy.

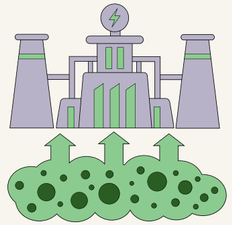


Hydraulic energy

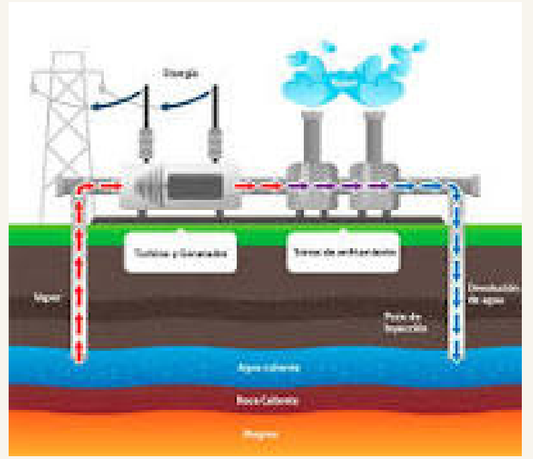
Improvement proposals

- Develop more efficient technologies for the capture and conversion of hydraulic energy.
- Optimize dam design to reduce environmental and social impacts.
- Investigate smaller, more modular hydropower systems for locations with limited water resources.
- Improve energy storage methods for use when demand is high.
- Integrate hydroelectric energy with other renewable sources to generate energy more constantly.

Geotermic energy

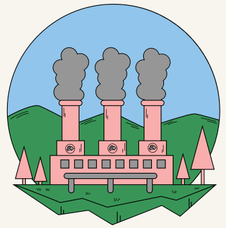


Geotermic energy is a form of renewable energy that is obtained by taking advantage of the heat stored inside the Earth. The Earth contains a significant amount of heat in its core, and this heat is transferred to the surface in the form of thermal energy. Geothermal energy harnesses this internal heat to generate electricity or provide direct heating.



Some characteristics are:

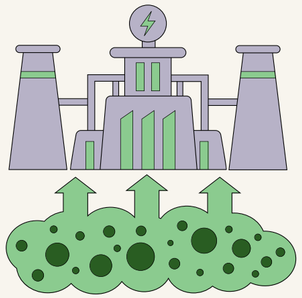
- It is renewable and Sustainable.
- It has Continuous availability.
- It has a variety of applications.
- has Low Greenhouse Gas Emissions:



- Moderate Environmental Impact
- Initial and Operating Costs
- Independence from External Climatic Factors

- Geothermal Power Plants
- Geothermal Heating and Cooling Systems
- Dependent Geographic Location

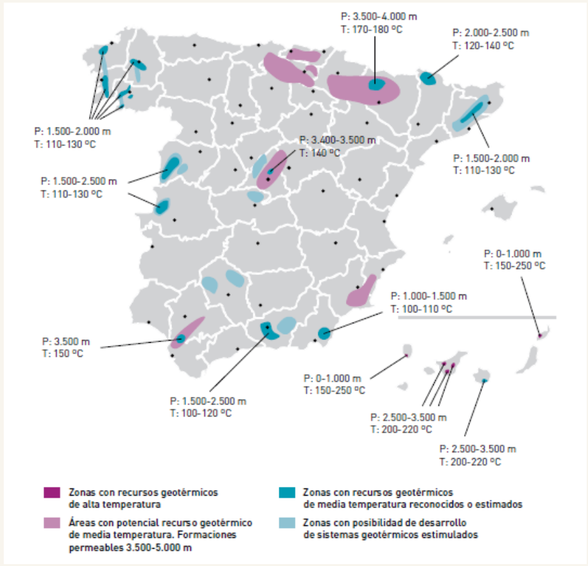
Geotermic energy

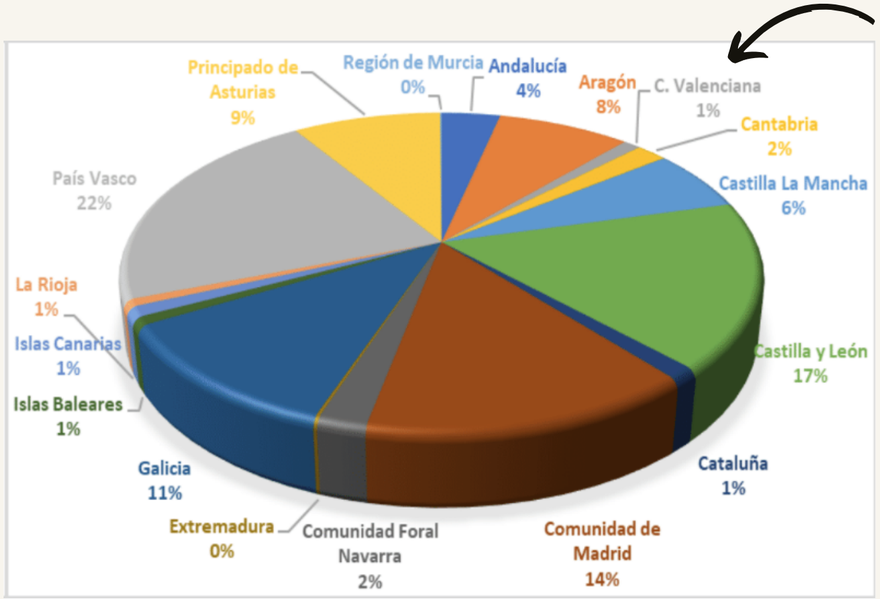


Is thermal energy present in Alicante?

Although Alicante is not known for having high enthalpy geothermal sources, there could be opportunities to harness low enthalpy geothermal energy for specific applications. Studies could be carried out for more specific information.

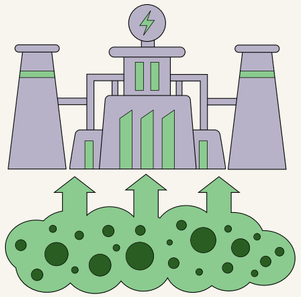
Percentage of use in Alicante in relation to all energies:





Geotermic energy

improvement proposals



1. Research and develop more efficient technologies for the extraction and conversion of geothermal energy.

2. Encourage investment in research projects to improve geothermal energy generation capacity in specific geographic areas.

3. Improve distribution infrastructure to maximise the efficient delivery of geothermal energy to communities.

Conclusion:

In conclusion, in Alicante we have several renewable energies and we have talked about them in detail.

tidal energy is a renewable energy source obtained from the tides, its efficiency is based on the use of water that is already in motion, its productivity does not emit greenhouse gases.

Solar energy is obtained from the sun's electromagnetic radiation, the most widely used is photovoltaic: it is produced through photovoltaic panels.

Wind energy is obtained by harnessing the kinetic energy of air masses. It is generated by wind turbines that transform the kinetic energy of air currents into electrical energy.

Biomass energy is produced by the combustion, fermentation or decomposition of materials to generate heat, electricity or biofuels.

Hidraulic energy allows electricity to be obtained thanks to the power of water currents or waterfalls.

Conclusion:

Where we can find them

tidal energy: we can't find it in alicante but we can find it in gipuzkoa.
solar: yes, we can find one of many in our school
wind: yes, in elecnor 2
biomass: we can't find it in alicante but we can find it in extremadura
hydraulic: we can't find it in alicante but we can find it in muchamiel

¡MUCHAS GRACIAS!