

**a**dypau group

architecture, engineering & environment

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## CONCEPT

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### IDEA

UTILIZATION OF NATURAL RESOURCES, NO FOSSILS, INEXHAUSTIBLE AND CLEAN.

- Are....?

### NEED

REDUCE EMISSIONS TO THE ATMOSPHERE OF CO2 AND THE COSTS OF GENERATION OF ELECTRICAL ENERGY.

- Why use them....?

### POSSIBILITIES

ALL OF THESE ENERGIES ARE BASED ON THE USE OF NATURAL RESOURCES SUCH AS: water, air, SUN, EARTH, ... IN THE CASE OF SAUDI ARABIA, WE HAVE A TREMENDOUS AMOUNT OF HEAT.

- What fuel used ....?

### VIABILITY

THE MAIN PROBLEM THAT ARISES IS THE NEED FOR HIGH SURFACE AREA NEEDED TO IMPLEMENT THESE SYSTEMS OF POWER GENERATION. IN THE CASE OF SAUDI ARABIA, THERE IS AN AMOUNT LARGE AMOUNT OF LAND OCUPABLES.

- Difficulty to implement....?

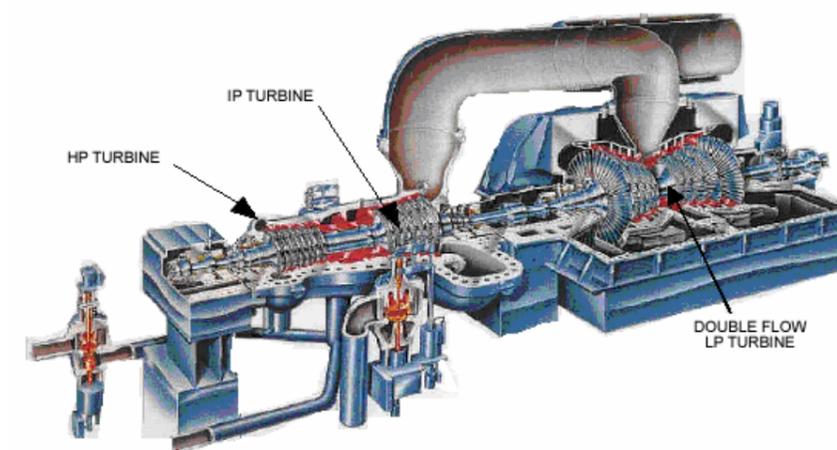
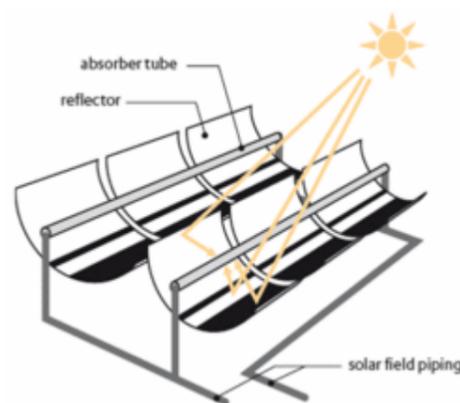
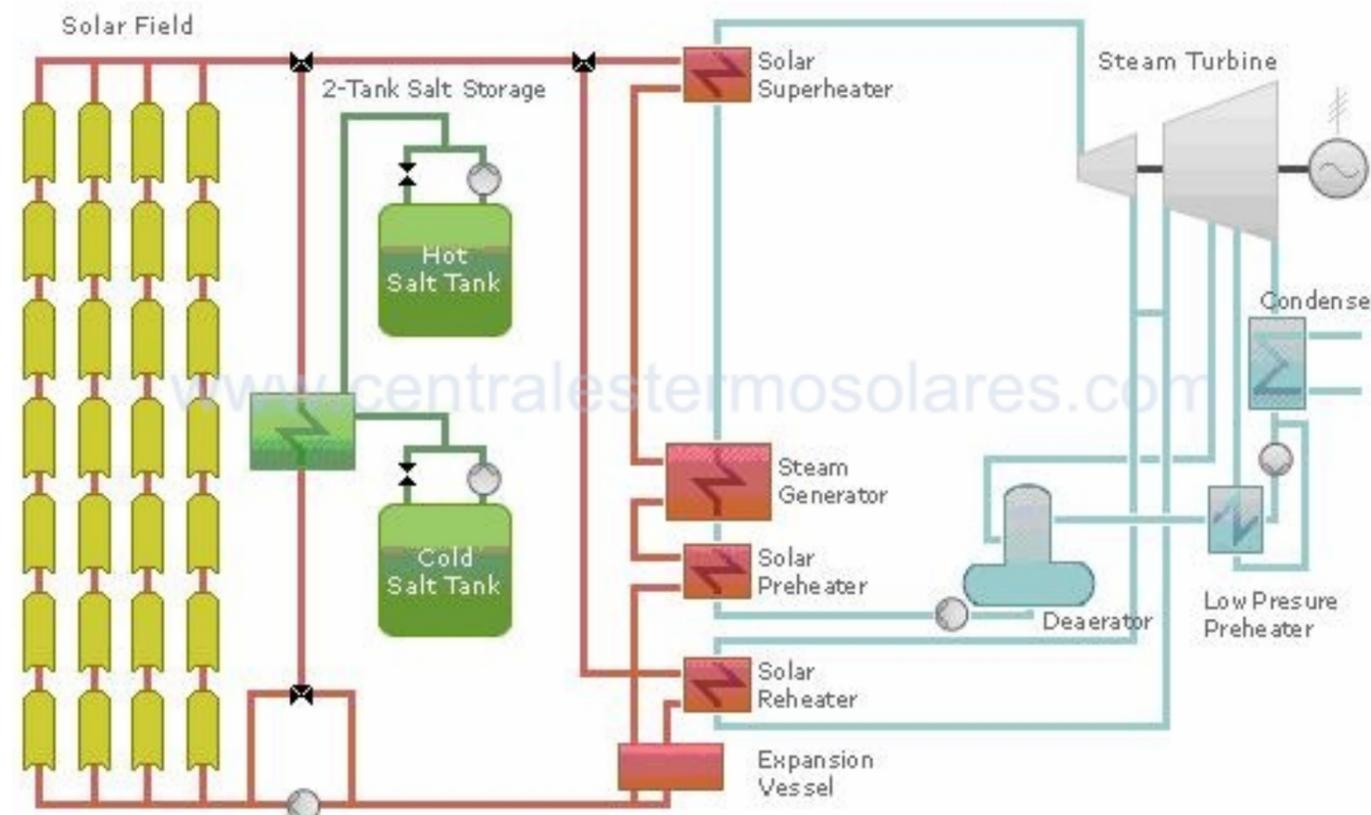
THANKS

## PRODUCTION OF ELECTRICITY THROUGH COLLECTORS CYLINDER-PARABOLIC AND STEAM TURBINE

The technology cylinder-parabolic its operation is based on the follow-up to the apparent movement of the sun so that the rays are having an impact perpendicularly to the surface of catchment, and in the concentration of these rays incident solar receivers in a few tubes of high thermal efficiency located in the focal line of hubs.

In these tubes, a fluid transmitter of heat, usually a synthetic organic fluid (HTF) is heated up to 400 °C. This hot fluid is directed to a series of heat exchangers to produce superheated steam. The energy present in the steam is converted to electrical energy using a conventional steam turbine and a generator coupled to it.

This technology can incorporate storage in order to produce electricity in hours of darkness.



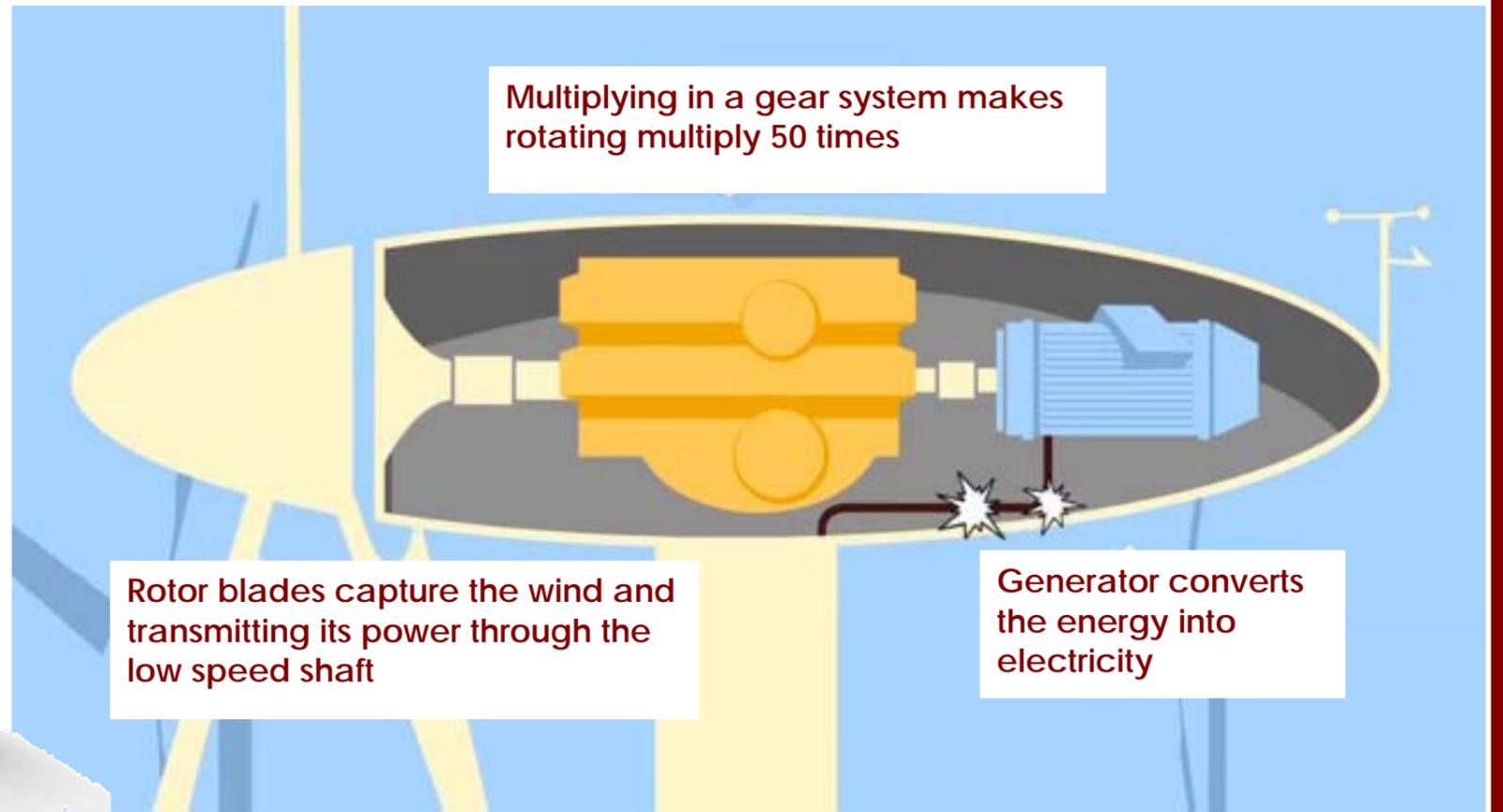
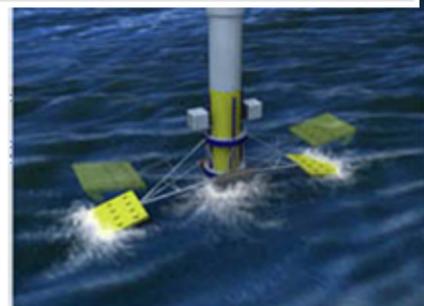
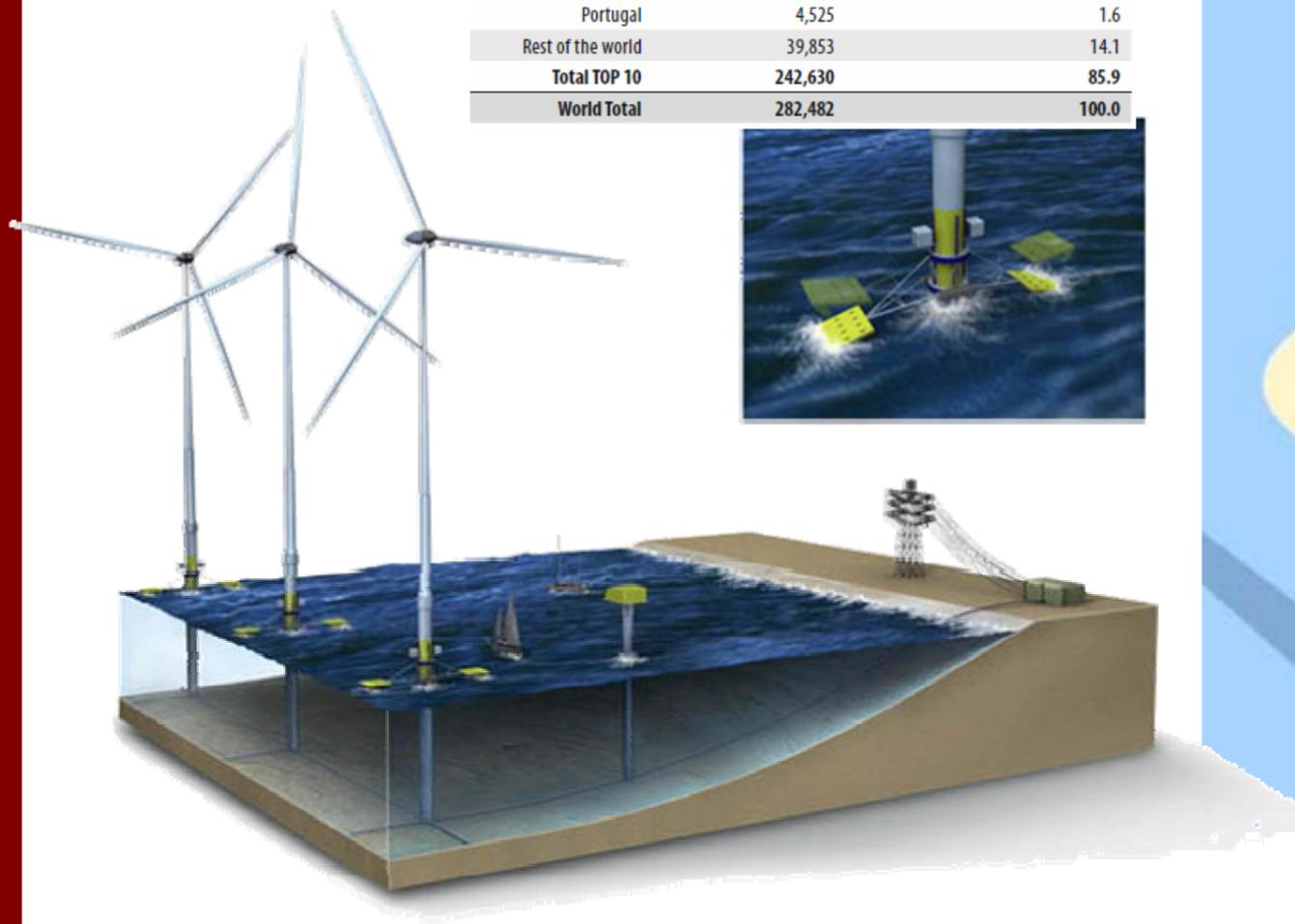
# WIND POWER GENERATION

Types of Wind:

- Land:
- Offshore: is having a boom in northern europe.

The global wind is ready to meet the 300,000 MW installed in 2013

TOP 10 CUMULATIVE CAPACITY DEC 2012		
Country	MW	% SHARE
PR China**	75,564	26.8
USA	60,007	21.2
Germany	31,332	11.1
Spain	22,796	8.1
India	18,421	6.5
UK	8,445	3.0
Italy	8,144	2.9
France**	7,196	2.5
Canada	6,200	2.2
Portugal	4,525	1.6
Rest of the world	39,853	14.1
<b>Total TOP 10</b>	<b>242,630</b>	<b>85.9</b>
<b>World Total</b>	<b>282,482</b>	<b>100.0</b>



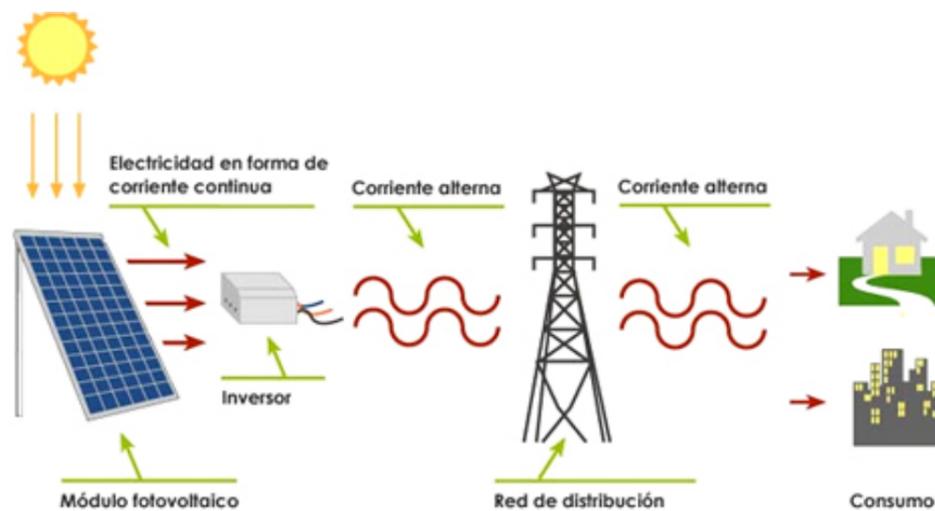
Finally transforms continuous electric energy generated for alternative energy transportation.

# PHOTOVOLTAIC PLANT

## Production of electricity from photovoltaic panels

Solar energy is captured in photovoltaic panels generating electricity (photovoltaic effect) as current. There are two types of photovoltaic plants, depending on the end use of the electricity it produced:

- **Isolated facilities**, where electricity is used for consumption of houses, buildings and even towns, because of its location, the electrical supply network implies a great difficulty and high cost.
- **Facilities Connected to Network**, in which the energy is converted into alternating current by an equipment called an inverter, and fed into the national electricity distribution network, thus obtaining, in addition to environmental benefits, economic benefits through its sale to power companies.



Solar PV has a number of features such as high energy quality, little or no ecological impact and status of inexhaustible on a human scale, which already makes it a kind of energy to consider. On the other hand, investment in solar photovoltaic and solar farms in particular, is presented as an attractive option in the medium term. Solar PV Sustainable Development also contributes to preventing the emission of CO2 into the atmosphere. Every kWh generated with solar PV prevents the emission into the atmosphere of about one kilo of CO2.

## THERMAL POWER PLANTS OF COMBINED CYCLE

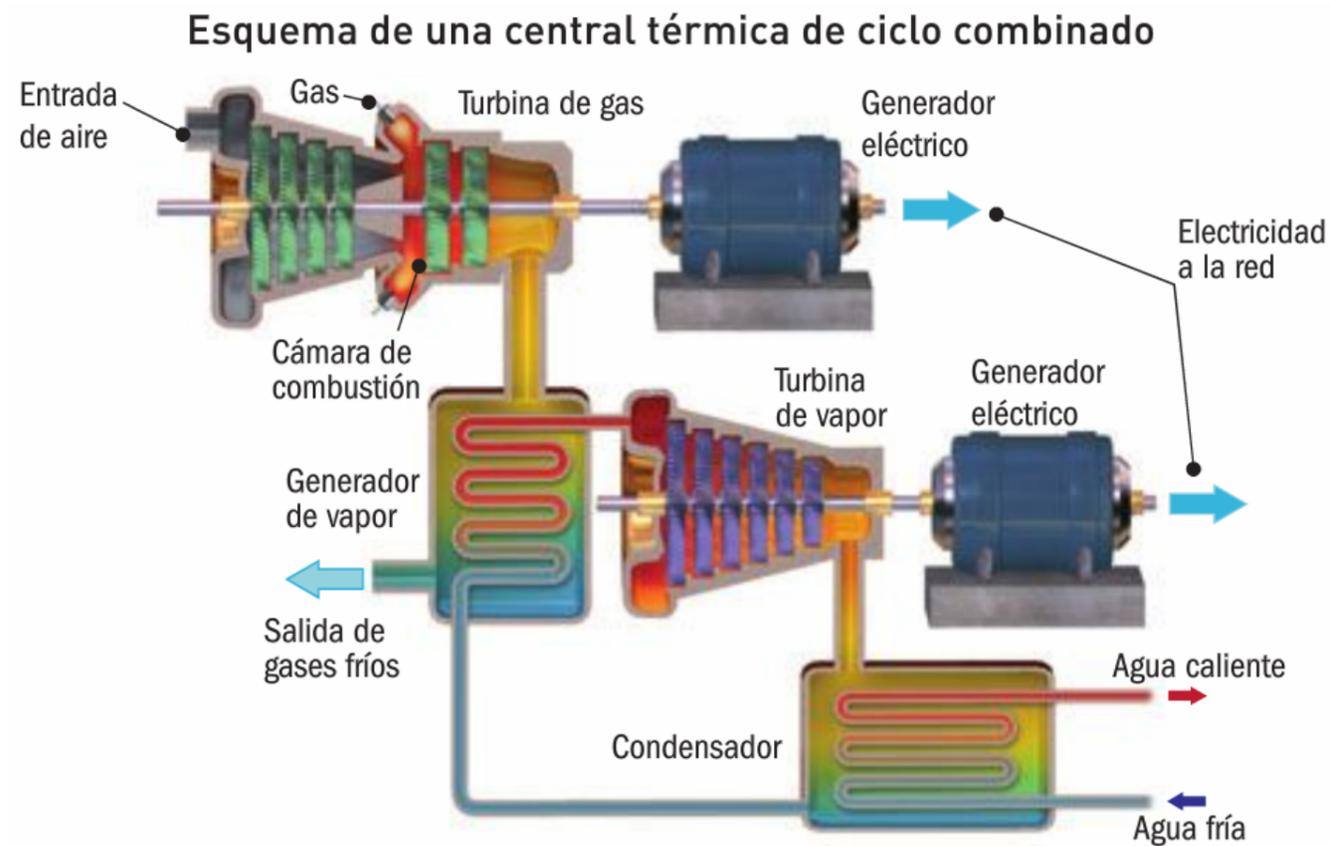
### Generation of electricity in a power plant from the use of two turbines (combined cycle)

The combined cycle power plant is that which generates electricity through the use of two turbines:

- A turbo gas group
- A turbo steam group

That is, to transform the fuel energy into electricity two cycles overlap:

- The Brayton cycle (gas turbine): takes air directly from the atmosphere and subjected to heating and compression to use it as mechanical or electrical energy.
- Rankine cycle (steam turbine): where the heat consumption relates to the production of building work or energy from water vapor.



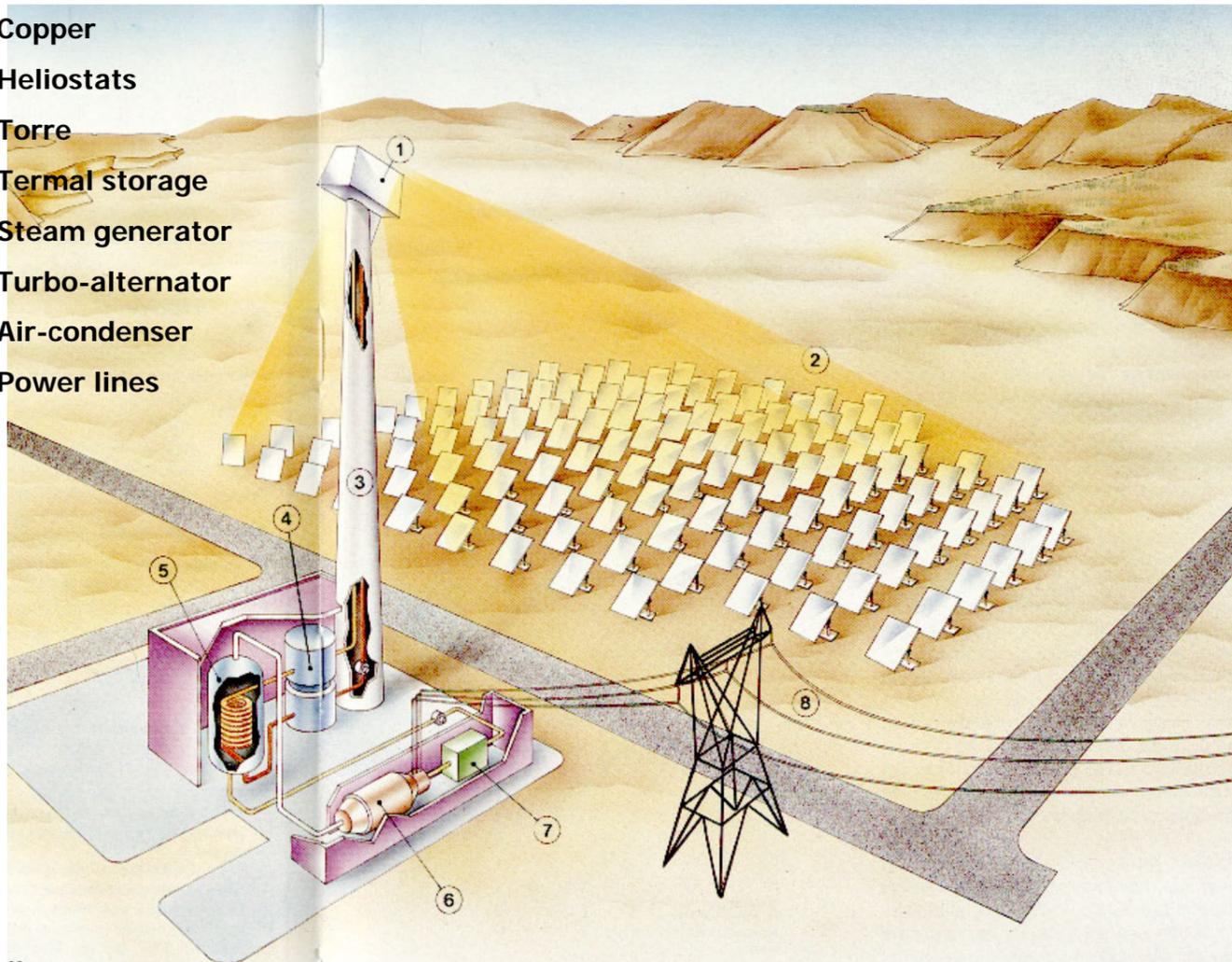
## SOLAR PLANT (SOLAR TOWER)

Production of electricity from the heat of a liquid by concentrating sunlight.

This type of plant operate as follows:

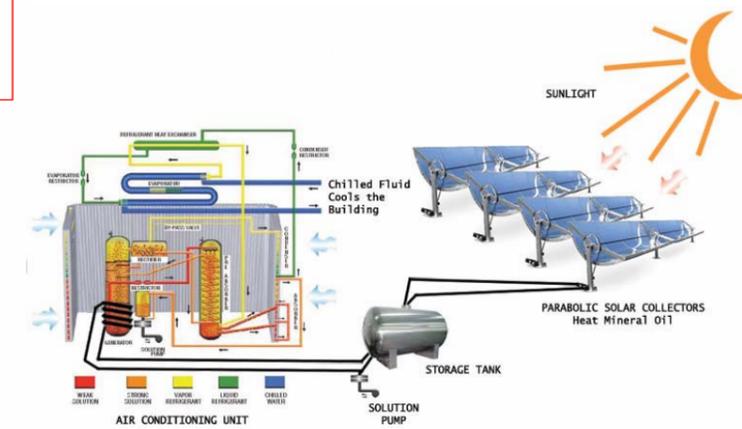
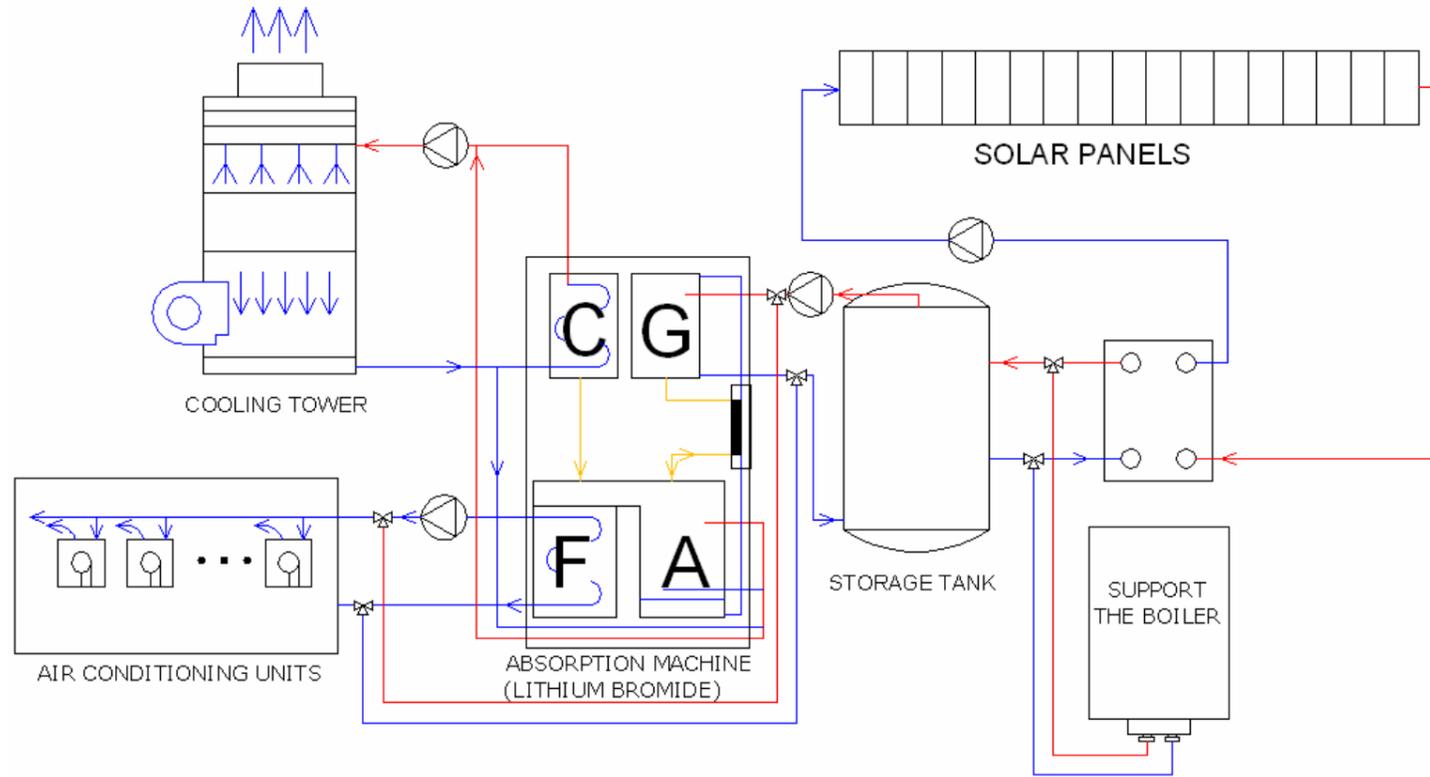
- A set of mirrors that can guide, called heliostats, reflect and concentrate sunlight on a boiler located in a tower. The boiler is heated in a specific fluid (usually water, oil, molten salt ...) that allows the evaporation of water present in the numerous pipes that are located around the boiler. The steam pressure becomes much, so it is used to drive a turbine connected to the generator. By rotating the turbine produces electricity, which travels from the generator to the transformer, which raise the voltage to transport this energy grid to consumption centers. After moving the turbine the steam is condensed back to be reused.
- Meanwhile, several guidance systems control the heliostats, to maximize solar power.

1. Copper
2. Heliostats
3. Torre
4. Thermal storage
5. Steam generator
6. Turbo-alternator
7. Air-condenser
8. Power lines

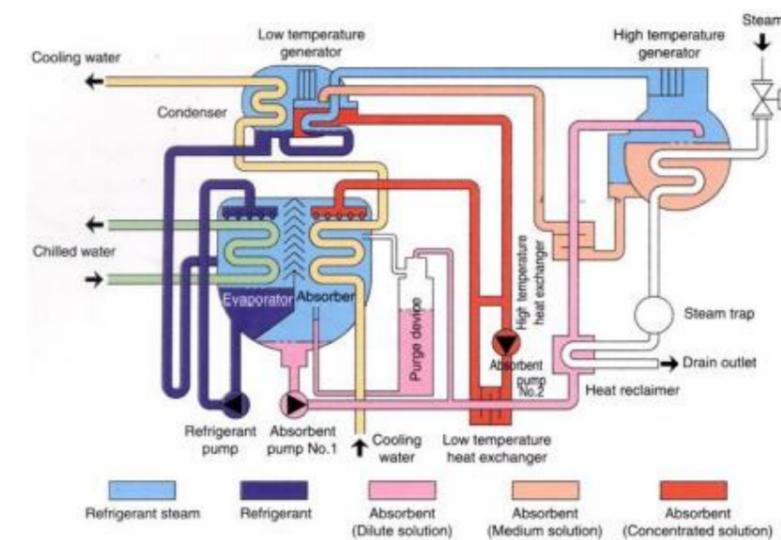


# ABSORPTION MACHINES FOR GENERATION OF INDUSTRIAL COLD OR BIG CONSUMPTION OF COOLING

The absorption machine is a heat pump, namely, it is a machine that allows you to transfer energy from one source to low temperature to another source at high temperatures with a small additional energy consumption. Unlike electrical heat pumps, the energy supplied is heat, so that they will engage solar collectors. Its operation is based on the ability of certain substances to absorb a coolant fluid.

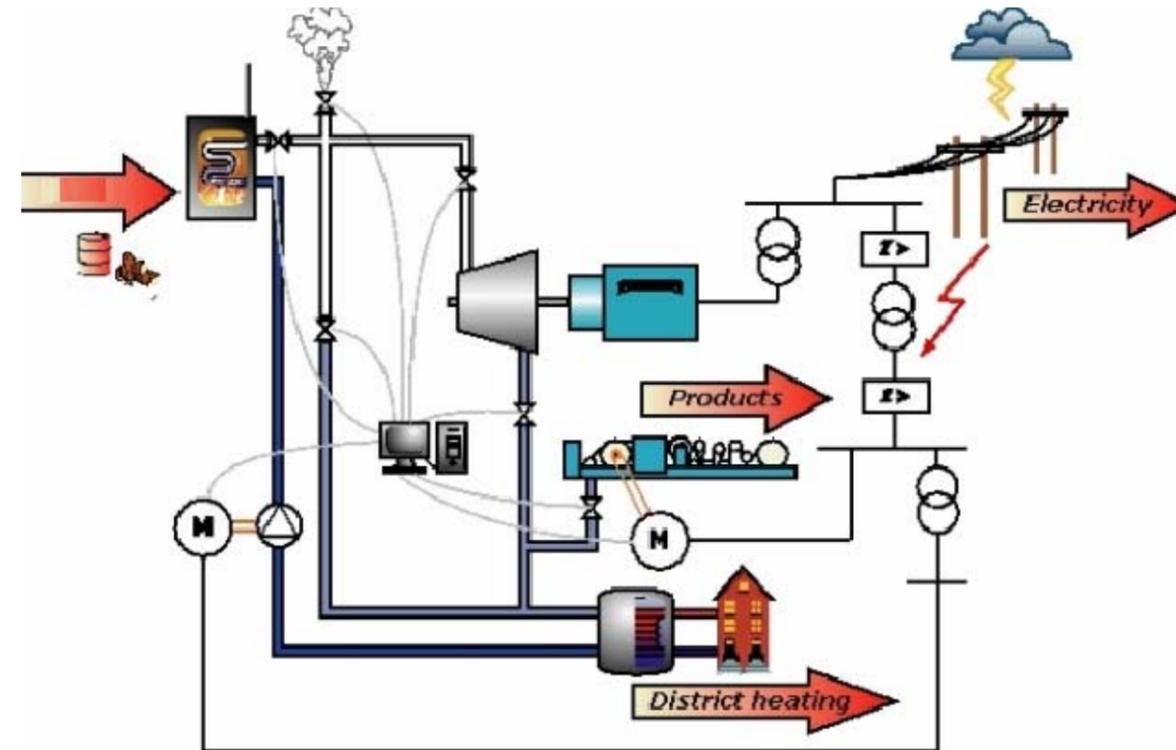


Absorption chiller flow diagram



## COGENERATION PLANTS

Cogeneration means simultaneous production of two types of energy, electricity and heat. The simultaneous production assumes that it can be used simultaneously, which implies closeness of the generating plant to consumption, as opposed to the conventional system of electricity production in thermoelectric plants independent, where it is also clear heat, but this is not used and should be eliminated to the environment. The heat generated can be used for industrial processes, or to generate cold through absorption machines.



## BIOMASS WASTE

This type of biomass used organic waste coming from the activities of people.

Using different methods:

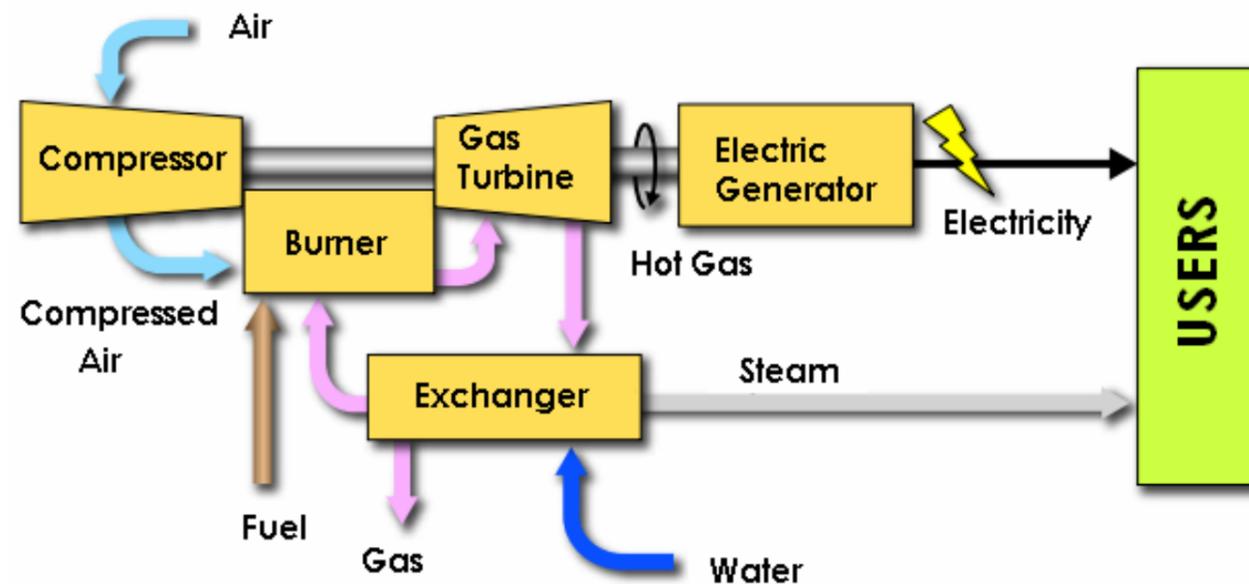
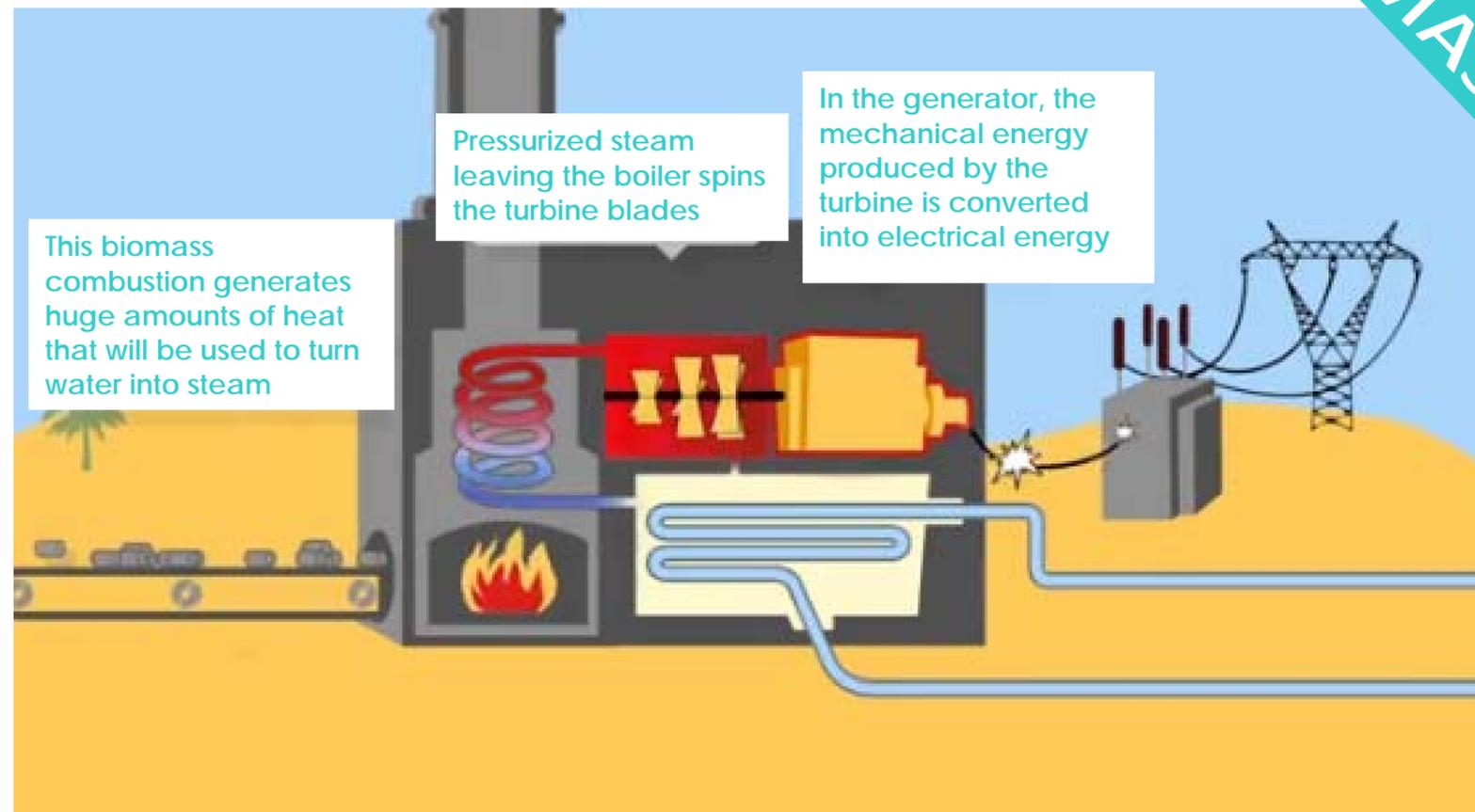
- Thermochemical methods.
  - o Combustion
  - o Pyrolysis
  - o Gasification
  - o Co-firing
  
- Biochemical methods
  - o Alcoholic fermentation
  - o Methane fermentation

They produce different types of energy:

- Thermal energy production
- Biogas production
- Production of biofuels:
  - o Bioethanol
  - o Biodiesel

The drawback, however, is the contamination.

Biomass is the only energy source that provides a positive balance of CO<sub>2</sub>, provided that the production of biomass is made from a renewable and sustainable manner, so that resource consumption is made slower than the capacity of the Earth to regenerate. In this way, organic matter is capable of retaining during growth which releases CO<sub>2</sub> in combustion without increasing the concentration of CO<sub>2</sub>.



## GEOHERMAL

Using different source:

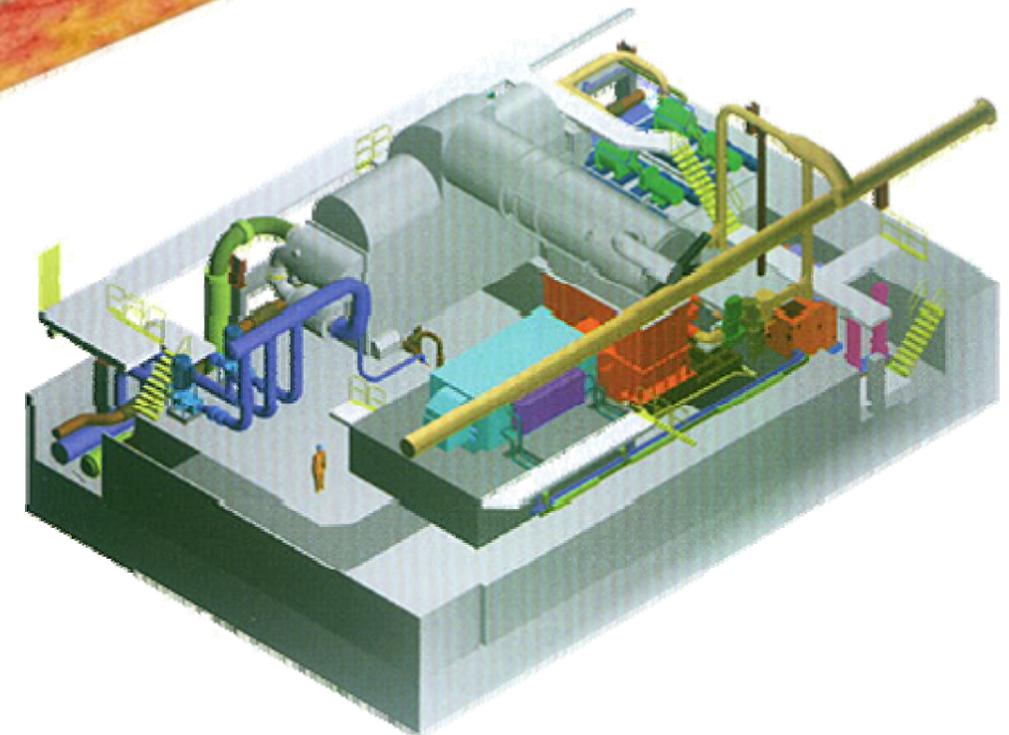
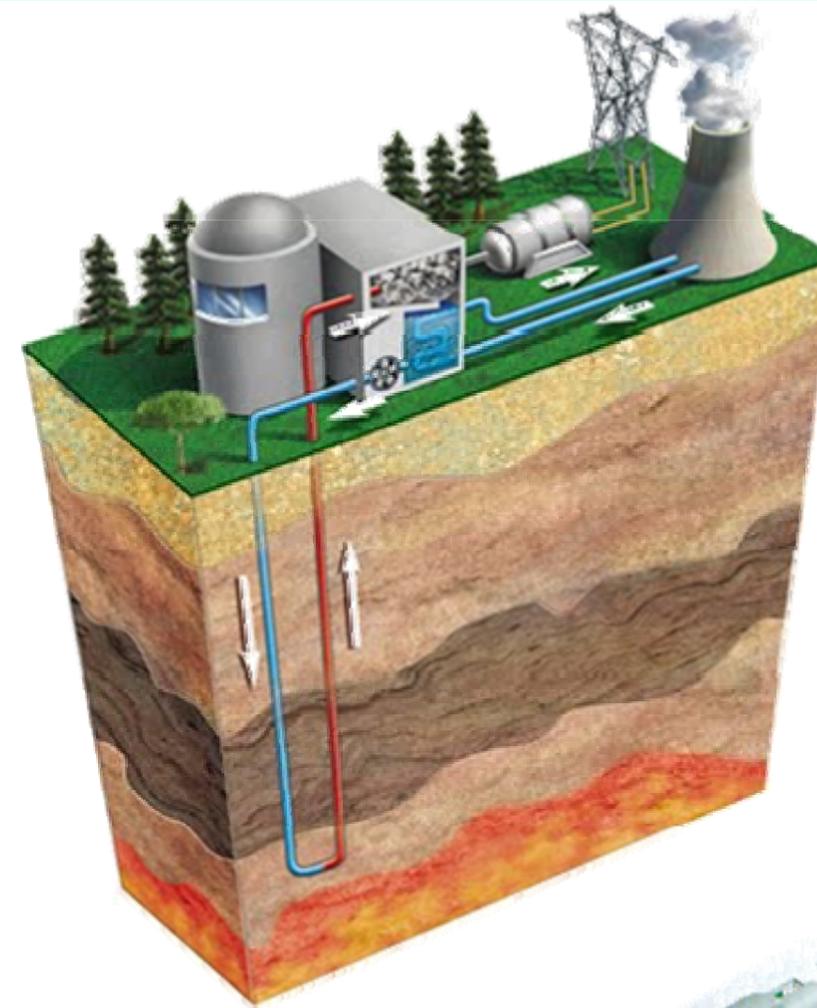
- High Temperature (>200°C at 1000m depth)
- Low Temperature (<150 °C at 1000 m depth)

They produce different types of energy:

- Hot Water
- Electricity
- Cooling with heat pump

Advantage:

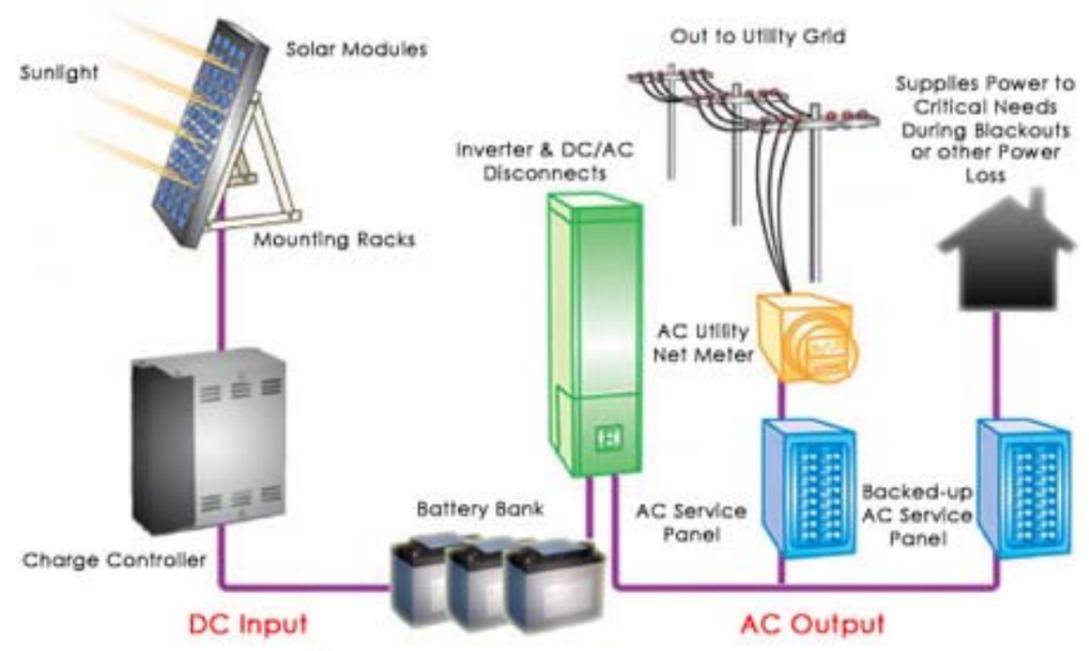
- It is a source would avoid energy dependence on fossil fuels and other nonrenewable resources.
- The waste it produces are minimal and cause less environmental impact than those caused by oil and coal.
- Great saving system, both economic and energy.
- No external noise generated.
- Geothermal resources are greater than the resources of coal, oil, natural gas and uranium combined.
- Not subject to international prices, but you can always keep national or local prices.
- The area of land required for a megawatt geothermal plants is lower than other plants. It does not require dam construction, logging, and construction of pipelines (gas or oil) or fuel storage tanks.
- The CO<sub>2</sub> emissions with greenhouse effect is less than that would be emitted to get the same fuel energy.



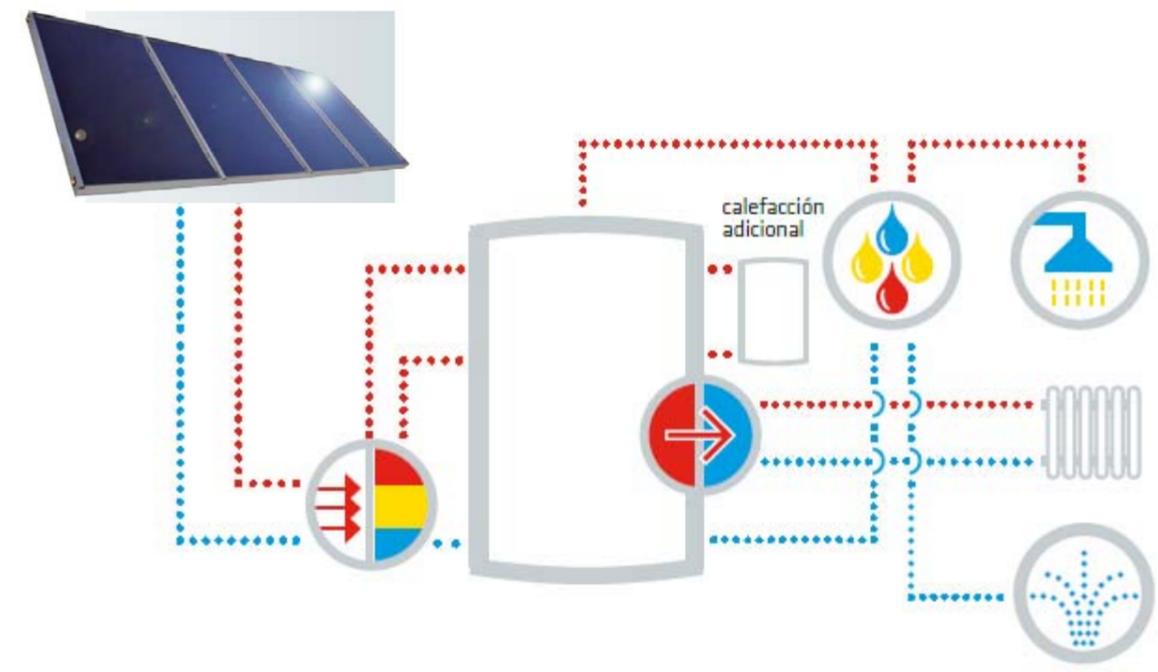
# RENEWABLE ENERGY FOR HOME

## Generating electricity for isolated homes

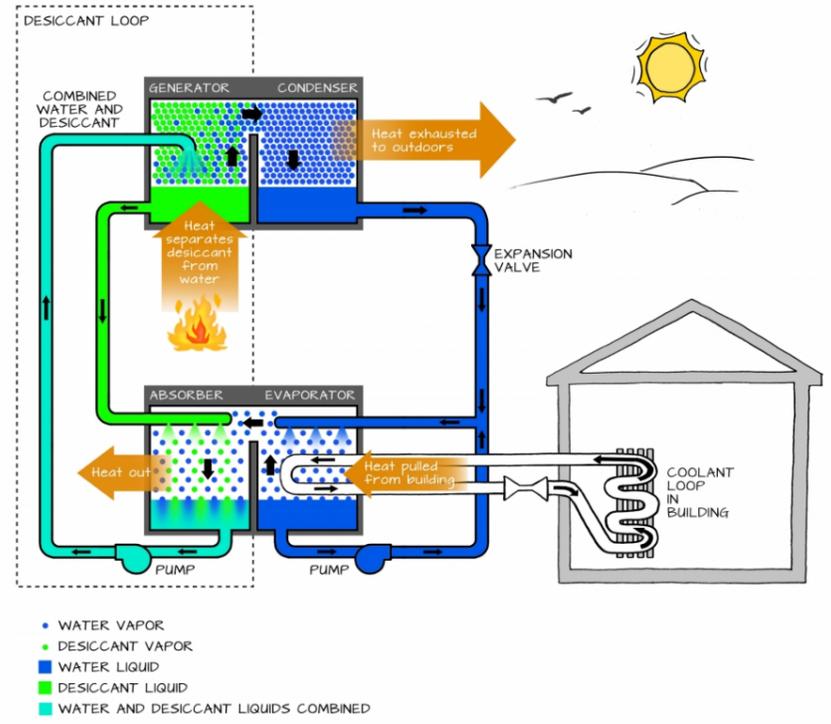
### Electric solar energy installation for home



### Solar energy for hot water



### Air conditioning by absorption machine



### Aerothermal pumps

