

THE SOLAR ENERGY THE PHOTOVOLTAIC SYSTEM

WHAT IS IT?

The Solar energy is the energy associated with solar radiation and it is the primary source of renewable energy on Earth. Through photovoltaic panels, it is transformed into electricity.

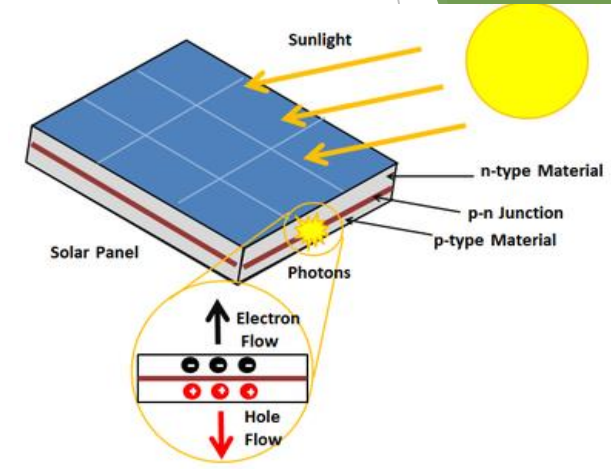


WHEN WAS IT DISCOVERED?

It can be said that the effects of solar energy were discovered by the Romans, due to the heating of the water and the greenhouse effect created by the glass but, before it was used as renewable energy, it would have been centuries.

HOW DO SOLAR CELLS WORK?

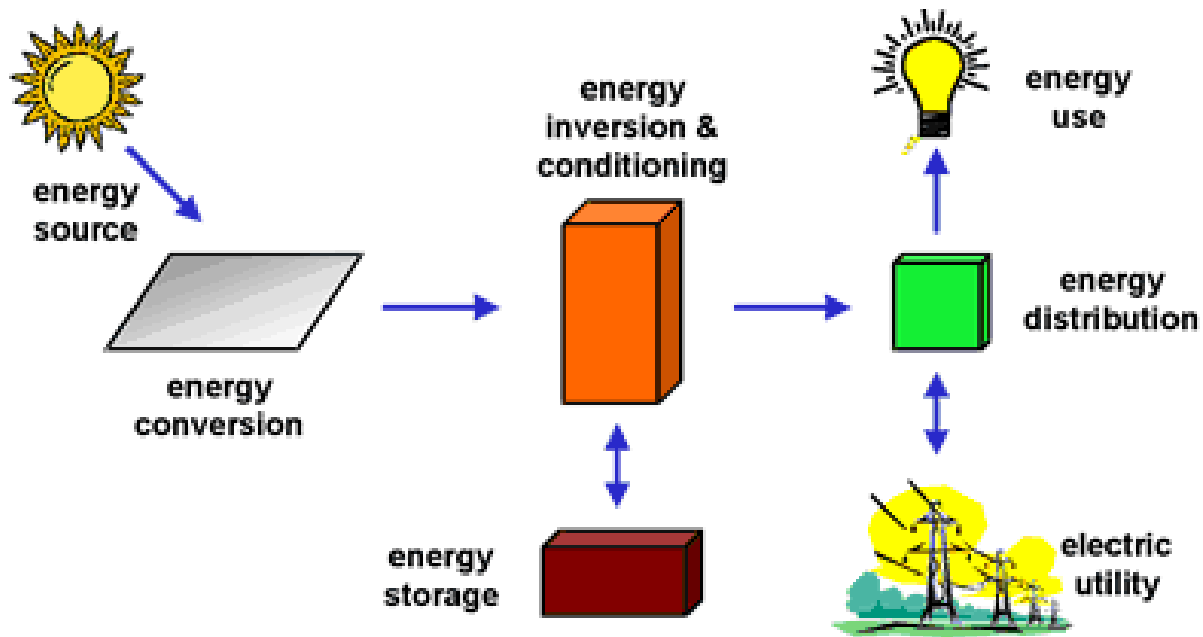
- ▶ 95% of a solar cell are made out of silicon
- ▶ Sunlight: composed of miniscule particles called photons
 - they hit the silicon atoms and transfer energy to loose electrons, knocking them off the atoms
- ▶ One side of the cell consists of boron, the other one of phosphor
 - they influence the charge of the silicon atoms
 - One side is positively charged (p-type), the other one is negatively charged (n-type)
- ▶ This creates an electric field which guides the now free electrons
 - electric current (0,6V)



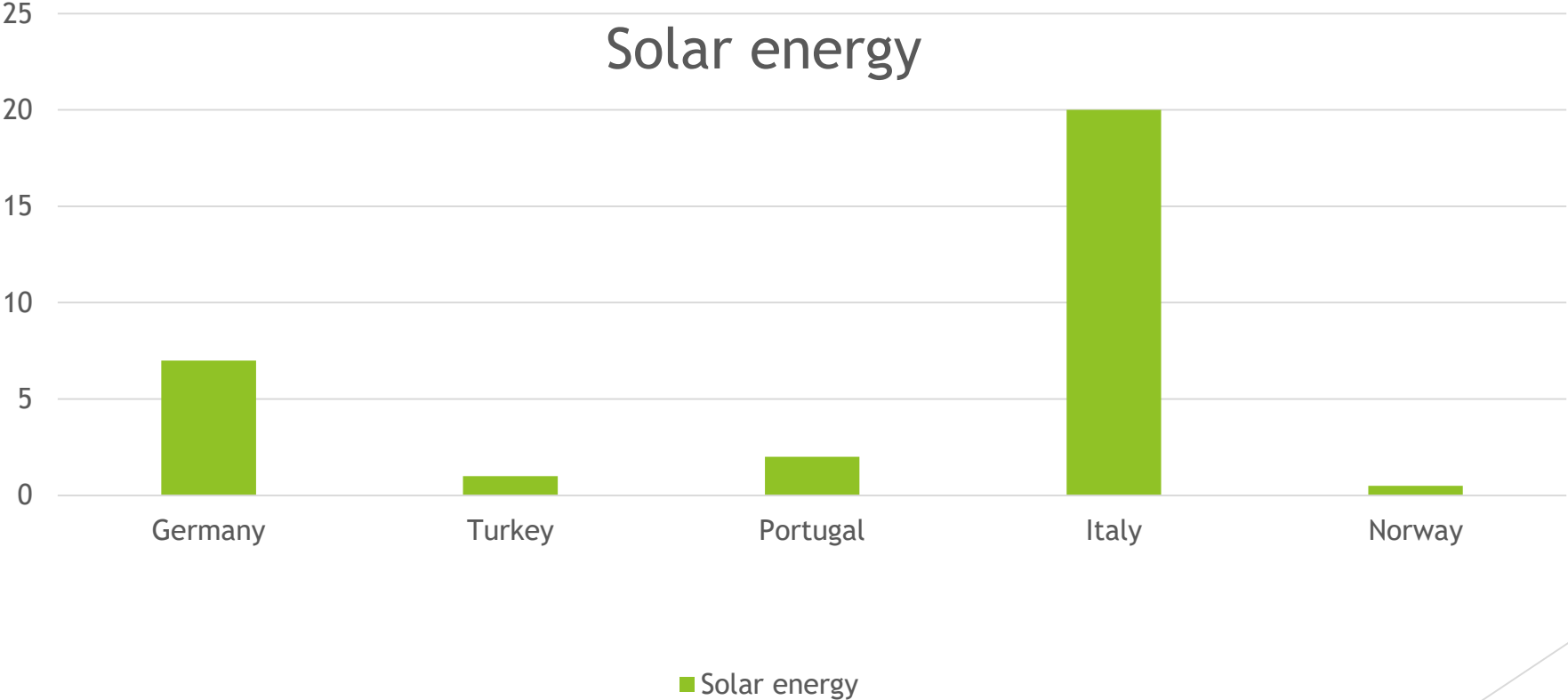
HOW A PHOTOVOLTAIC SYSTEM WORKS?

A photovoltaic system, also PV system or solar power system, is a power system designed to supply usable solar power by means of photovoltaics. It consists of an arrangement of several components, including:

- solar panels to absorb and convert sunlight into electricity,
- a solar inverter to convert the output from direct to alternating current,
- other electrical accessories to set up a working system.



PERCENTAGE OF SOLAR ENERGY PRODUCED



THE PROS AND CONS

Advantages	Disadvantages
Low maintenance cost	High installment cost
Infinite energy source	Dependent on weather
Takes advantage of rooftops	More area needed for mass production
No CO ₂ emission	Lower efficiency
Locally available renewable resource	Toxic chemicals used

POTENTIAL FOR PRODUCTION

- ▶ Norway: 15/km², least sunlight, large area
- ▶ Germany: 240/km², not a lot of sunlight, small area
- ▶ Portugal: 112/km², lots of sunlight, medium area
- ▶ Italy: 206/km², lots of sunlight, but dense population
- ▶ Turkey: 108/km², most sunlight, biggest area

CONCLUSION

The total amount of solar energy is enough for the world's current and anticipated energy requirements.

In the future, governments will have to invest more in renewable energy sources.

In order to make the use of solar energy more attractive and to increase the efficiency of the system, we have to find more efficient ways to store the energy, make solar panels cheaper, and transport it from the source to the consumer.