“i-City”

Phase 3 – Sources and resources for powering the urban environment

SHORT-TERM EXCHANGE OF GROUPS OF PUPILS
13 – 17 May 2019
Colegio Santo Angel de la Guarda, Badajoz, Spain

PRESENTATION HELD BY “Ion Băncilă” Secondary School TEAM

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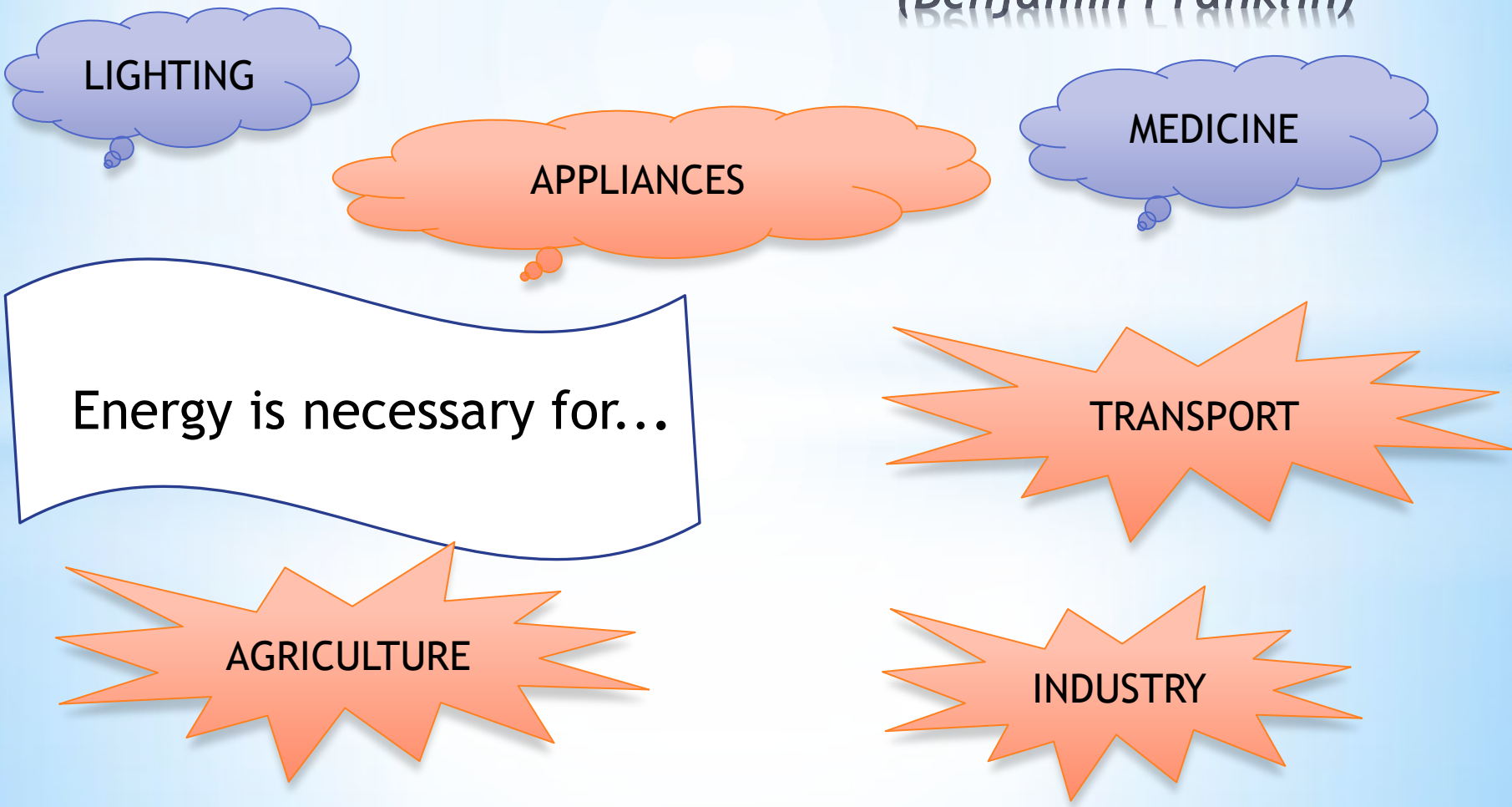
SOURCES AND RESOURCES FOR POWERING THE URBAN ENVIRONMENT

"Energy and persistence conquer all things."
(Benjamin Franklin)



WIND ENERGY…

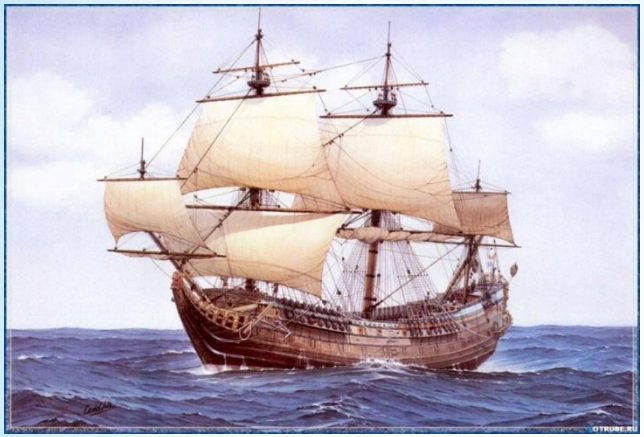
… is renewable, generated through the wind kinetic energy transfer to a wind turbine.

WIND...

Wind is formed due to the uneven heating of the surface  of the Earth by the energy radiated by the Sun. 

The variable heating of the air layers leads to areas of air of various densities, a fact which, in turn, causes movements of the air.

The humankind has been using the wind energy since ancient times…

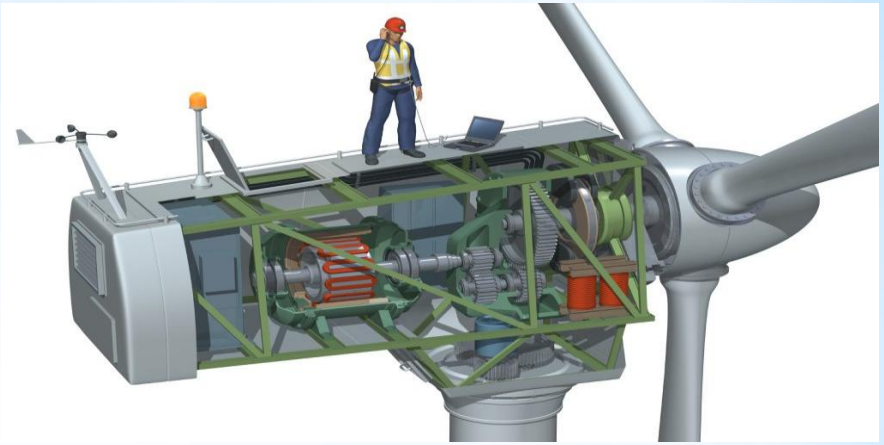


Sailing ships … transport

Wind mills … grinding, wood chopping, water pumping

Wind turbines … electricity

Wind Turbines …



… are made up of 3 main components:

1. Rotor with turbine blades
2. Rotor spindle (either vertical or horizontal)
3. Electric generator

Its functioning is SENSOR-CONTROLLED!

The blades take over the wind energy and turn it into mechanical energy, which is, in turn, transformed into electric power.

Wind Parks

The wind turbines are placed within wind parks. In order to open such a park, the following are necessary:

1. Research on the impact on the environment, on the wildlife and on the human settlements;
2. The choice of the turbine depending on the geographical and climate area. The ones of medium capacity, producing up to 1500 kW, are to be preferred.

The ADVANTAGES of producing electric power through wind turbines

1. Wind represents an INEXHAUSTIBLE and CHEAP source of energy – as long as the Sun and the Earth exist, there will also be wind.

2. Emissions are considered to be zero because they don't use any fuel. A wind turbine is only operated through wind, which makes its mechanism move.

3. They generate only little waste. The only time they generate waste is during their maintenance, which is only done once a year, to replace oil and some components. This waste is discarded in an organised manner – the supplier comes and collects the waste and discards it as environmentally friendly as possible.

The ADVANTAGES of producing electric power through wind turbines

4. They function for a long period of time. They start functioning when the wind velocity reaches 3 metres per second and only stop when the sensors indicate dangerous wind velocity which may damage the turbine.

5. The costs of rendering them inoperative are low. In comparison, the costs for rendering a nuclear power plant inoperative are very high.

6. The other resources are diminishing and about to be exhausted. Also, the nuclear energy supposes numerous risks. There is a tendency at global level to give up using nuclear power plants because of the radioactive waste.

The DISADVANTAGES of producing electric power through wind turbines

1. They can be destroyed by sudden, very powerful gust of winds if the turbine does not stop in time due to some equipment error.

2. As far as noise pollution is concerned, the opinions vary. Nevertheless, the turbines are within the legal level of noise. The degree of noise pollution differs from one producer to another and from one type of turbine to another.

3. The possibility to find an appropriate location for the wind park, able to comply with all the requirements – wind velocity in the area, distance from localities, environmental provisions (e.g. these parks must not interfere with the bird migration lanes or with the bat areas).

Did you know that ...

- the modern history of the wind energy industry started in 1979, with four companied in Denmark: Vestas, Kuriant, Nordtank and Bonus. The turbines produced at that time had a very small capacity, of only 20-30kW each?

- currently, wind energy represents the main source of alternative energy in the world, as compared to the energy obtained from conventional fuels?

- the wind turbines are SMART systems – they look for the wind themselves? There is a weather station built into the turbine which makes the turbine rotate in search for wind, which always needs to come from the front of the turbine. Also, in case the equipment detects icing on the blades, the turbine stops in order to limit its risks of self-destruction.

- the horizontal spindle wind turbines are more efficient than the vertical spindle ones, as they don't require a generator when they start operating and are activated by wind optimum intensity variations, due to the high position of the rotor?

The Romanian team would like to thank you for your attention!