

Climate change and renewable energy

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In the current year, continuing a path already started in the previous year, our students have engaged in the study of electricity in its various forms of production, emphasizing attention to forms of renewable energy, in harmony with the local Agenda 21, which wants to initiate young people to greater respect for the environment, without compromising socio-economic development.

Energy, a vital element, is more and more an age-old problem in Italy to which safe and immediate answers must be given. With the 1987 referendum, nuclear energy for electricity production is no longer used, but in the meantime no other alternative has been taken seriously, consequently the necessary development of renewable sources to meet a growing demand is also lacking. There are many reasons, but in particular we do not want to understand that there is no energy that does not have negative implications; every production system is accompanied by an unpleasant aspect either for the environment or for humans. The only energy that does not pollute is that which is not consumed.

Considering that there are many forms of "clean" energy, but that all together do not exceed 15% of the national need, it is inevitable to turn to the only system that produces low-cost energy such as thermoelectricity. Its impact on the environment with current technologies is bearable, it does not harm the environment more than any other productive activity. Using fuels of different types such as coal, oil, methane, etc. we are able to produce about 70% of the national electricity requirement, while we import about 15% from abroad. The European Commission, following the persistence of high oil costs, and to strengthen research, issued a directive requiring the increase of renewable energies, up to a production of 20%.



Our intention is to make people understand that it is necessary to pursue any form of production that does not pollute the environment, each system is a contribution that cannot and must not be neglected. Due to its morphology, our territory lends itself to a greater use of wind generators for the production of electricity. The great valleys that it accumulates large

amounts of thermal energy in hot hours releasing updrafts in the coldest hours, it creates favorable conditions for a constant yield, which added to the energy produced on windy days, makes the system very attractive.

Wind power plants have relatively low and quick deployment costs, and can be removed without leaving any damage to the environment. All this is not enough to make wind power a very diffuse system. The issue of environmental impact remains open. All those who oppose the wind system point out the environmental impact, but they absolutely do not take into account the fact that the energy thus produced is practically free, except for depreciation, and does not release any residue into the environment. In the era of the greenhouse effect, with the observed increase in the temperature rise of the earth's surface, we cannot always point the finger, as we have already mentioned, energy that does not create problems does not exist, it is up to us to choose the cheapest and least harmful means for the environment.

The economic aspect is of vital importance to our production system, the competitiveness of our companies is already compromised with the appearance on the world markets of quantities of products at bargain prices introduced by emerging countries led by China and India, and the cost of wages makes any comparison impossible. Energy contributes greatly to the final product cost of the manufacturing industry. Cheaper energy is also synonymous with competitiveness and therefore jobs. Summers are quite hot and dry, while winters are cold.

In the north are the Alps and thanks to them it is not very cold, the winds are less cold. In the center the climate is temperate, the summers are mild while the winters are very harsh, the Apennines, the winds are not very harsh. In the south there is a fairly mild climate with mild winters and hot summers. The vegetation is of Mediterranean type because the temperature rarely reaches low minimum values. It should also be said that in the last 30 years the temperature has increased (by 1°C or 2°C), this has led to the movement of some animal species from one place to another and to the appearance of some plant species, which now grow there where before it was impossible due to climate change.

DESCRIPTION OF THE WIND GENERATOR

Continuing the path to alternative energies, which began in the previous school year with the construction of a photovoltaic plant, this year we built a wind plant.

For its construction we used mostly recycled materials, not designed and manufactured for this specific purpose. A group of students dealt with the search and procurement of recycled materials set by the teachers, class II A, from the first school, and the group of class II D from the second school dealt with the procurement of manufactured materials, for this purpose they had to take the projects from the teachers and look for the factory, the workshop that will make them. In fact, the 360° rotation system of the plant was achieved using two brake discs of the car as a bearing; for the generator blades we adapted the propellers of an ultralight aircraft.

The second group from II A dealt with the upper joint, Fig 1



the second

group from II D took care of the work with the milling cutter: Fig 2



The third group from II A built under the supervision of the teacher, the transmission shaft.



Fig 3

Work was done in small groups (2-3 students), following the project, supervised and guided by the teacher. Each component of the wind power plant respected the dimensions, the shape according to a project of only that component of the power plant. Every time the students of the other groups followed the project and the achievement of the colleagues from the group of executors. The third group from cl. II D took care of the generator Motor (direct current with lower resolution): Fig 4



The assembly of the components was carried out by a mixed



team in front of the other students: Fig 5

The operating principle of the built device is as follows: the wind orients the plant, placing it in a position parallel to its direction and, consequently, perpendicular to the plane of rotation of the propellers which thus begin to rotate at a variable speed depending on the intensity the wind, regardless of its direction. The shaft, to which the vanes are connected, through the pulley-belt system which also functions as a speed multiplier, transmits the

rotational movement to the generator which thus produces low voltage continuous electric current.

The purpose for which it was built (purely didactic), is to show concretely that it is possible to transform the clean and renewable energy of the wind directly into electricity without polluting the air and the environment in which we live.

Remarks:

1. We wanted to better understand the problem of wind energy production, the problems related to this system.

2. Several teachers from the technical area thought to make our students aware of the problem of energy in general, of electricity production, of the primary sources to be used and of the problem of environmental pollution. Later we dealt with another problem, that of renewable and clean energy sources (wind, photovoltaic, hydroelectric, geothermal).

3. To our pleasant surprise, the boys responded enthusiastically and devoted themselves to the topic by consulting books, scientific publications and the Internet, which were then collected in paper format and stored on computers.

4. In the same year, we, the teachers, participated in a series of meetings held by a university professor of physics who explained to us how photovoltaic cells work and how a panel can be made; on that occasion he gave us some photovoltaic cells which we then used to build photovoltaic panels.

5. We then researched and built suitable equipment to be powered by our panels and our wind generator, such as the water pump and grain mill we built. The images below illustrate the grain mill made by our students, powered by the voltaic panels, later also by the wind generator: Fig 6 and 7



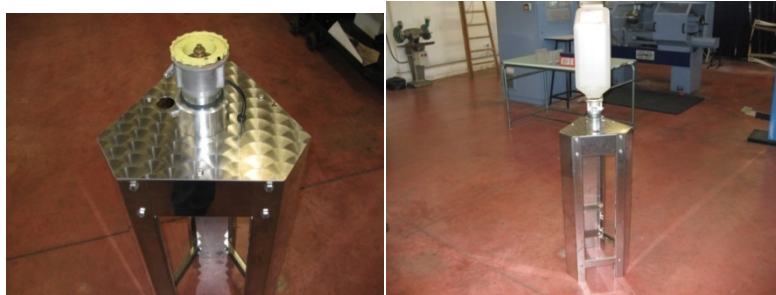


Fig 8 și 9

In this course, other subjects such as Italian, physics, history, technical drawing, information technology (computer use) were also involved and, therefore, the students acquired not only technical but also transversal skills, enriching their knowledge and professional training.

Our region, due to its geomorphology, would lend itself well to a greater use of wind generators, but the controversies caused by their installation do not allow the hoped-for use. Our friends from Giano dell'Umbria had the opportunity to talk with the administrators of the Municipalities in the Monti Martani district, all of whom are in favor of the installation of wind farms, a place where they would have become optimal, able to provide energy at low costs and with zero emissions polluting gases. Both the visual impact (very subjective) and the noise level are subject to evaluation by the competent bodies. A wind farm is "temporary", meaning it can be removed without leaving any residue in the environment, restoring the natural landscape before installation.

Given that clean energy production does not exist, we must have the courage to make the right choices for the future, guaranteeing progress and development while respecting the environment in which we all live. On the other hand, the need for energy is increasing and every human activity uses energy that we unfortunately have to produce.

We tell the politicians and environmental friends that we are worried, that it is time for choices and courage, Save the future!

Webografie: <https://www.eea.europa.eu/ro/themes/climate/about-climate-change>

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În natură se află secretul păstrării ecologice a lumii - Henry David Thoreau.