Name / title	**Teamwork/Climate Change and the Aeolian Generator**
Overview of the materials offered	The students will receive information about the history of energy in Italy and throughout the world, they will have information about different types of renewable energy, they will understand their importance at this moment of the energy crisis, they will know how to solve various current problems by looking for non-polluting and recyclable resources, they and their teachers will have a workshop from a specialist university professor. They will also learn to create a budget or procure materials through donation, trade or recycling. Teamwork, communication, knowledge from different fields can help them create technology for the future and ensure sustainability in terms of the environment and resources. Together with the teachers, they will realize the project for the wind generator, build the generator and put into operation the wheat mill (built through another project) using the energy obtained (didactic).
Source or link to the materials	https://www.eea.europa.eu/ro/themes/climate/about-climate-change https://ambasadasustenabilitatii.ro/italia-prima-tara-in-care-studiul-schimbarilor-climatice-va-deveni-obligatoriu-in-scoli/ https://engineerx.decorexpro.com/ro/eco-energy/generators/vetrogenerator-svoimi-rukami.html https://www.youtube.com/watch?v=JLC6TQn7WIc https://www.youtube.com/watch?v=QwXISU0bB8Q https://www.youtube.com/watch?v=yhdtFwXZuW https://www.youtube.com/watch?v=AckRAYQ8N48
Copyright or licence issues	In public use
Target group(s)	Teachers and students(14-18 years) from specialized technological high schools from partner countries in the project and beyond

The aim of the proposed materials	**The aim: to create a small-scale wind power generator (for teaching purposes), to show concretely that the clean and renewable energy of the wind can be transformed directly into electricity without polluting the air and the environment in which we live.** **Objectives:** **- making students aware of the importance of electricity;** **- the search for primary sources of electricity (wind, photovoltaic, hydroelectric, geothermal)** **- protecting the environment and avoiding its pollution;** **- the development of transversal skills: communication, physics, scientific reading and technical-scientific publications (wind energy, wind generator, materials, cutting-edge technologies), digital design, technical drawing, history, mechanics, electricity;** **- the construction of a didactic wind generator for understanding the transformation of wind energy into electric current;** **-consolidation of knowledge about the use of photovoltaic panels for energy production; the use of voltaic panels for the operation of the electric grain mill (built the previous year);** **- the use of renewable energy produced by the wind generator in the operation of the electric grain mill (didactic).**

Description/structure /	**Steps in making the wind generator using the teamwork.** **Execution time: 3 months;** **1. The proposal addressed to students to study the production of electricity by using renewable wind energy;** **2. Course for teachers about renewable energy with a university professor of physics; periodic meetings with the teachers (he also brought photovoltaic cells, they practically made photovoltaic panels with the students);** **3. The use of photovoltaic panels in the operation of the electric grain mill;** **4. For the construction of the wind generator, a partnership was established between two nearby technological high schools in the Umbria region: IPTIS Spoleto, IPSIA from Giano dell'Umbria, Italy;** **5. The students' study of some scientific papers and publications about the creation of a wind generator to obtain electric current;** **6. Selection of the teams from each high school that will work to build the wind generator; design and materials. The students proposed, the teachers selected, explained, suggested, corrected the students' projects;** **The group of students II-A dealt with the search and procurement of recycled materials established together with the teachers, the group II-D, the manufactured materials, for this purpose they had to take over the projects from the teachers and look for the factory, the workshop that would make them.** **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;** **8. The construction of the different components of the generator carried out by each of the two teams, supervised by the teachers; Each component of the wind power plant respected the dimensions, the shape according to a project of only that component of the power plant. Each time the students of the other groups watched the project and the achievement of their colleagues from the group of executors.** **9. The assembly of the components was done by a mixed team in front of the other students and the teachers; 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.** **10. Commissioning of the electric grain mill with the energy produced by the wind generator. Happiness and enthusiasm for success!**

Why do you suggest it? What can be used to prepare the materials?	In the preparation of the materials, we collaborate with the teachers of history, biology, mathematics, technical drawing, specialized engineers. We provide workshops about renewable energies that are non-polluting, how you can build a wind generator alone or in a team, how you can use this technology in your personal life or at a future job, as a future entrepreneur. In practice, they will use communication techniques acquired through a workshop to procure low-cost, recyclable material through donations or negotiation BENEFITS 1. Developing the skills to work and realize a project as a team; 2. Understanding and carrying out a project through technical or/and digital drawing and the importance of physics knowledge for the intended purpose; 3. The importance of recycling in the current conditions of the energy crisis and climate change; 4. The students' learning of negotiation techniques with a company that can execute certain necessary parts; 5. Teachers and students benefiting from a university course on renewable energies and how a didactic wind generator could be created 6. Involvement of each student in the team in carrying out the tasks; 7. Creating innovative solutions for the sustainability of a clean environment and obtaining renewable energy 8. The satisfaction of a job well done
STEM	Technical disciplines, physics, informatics, technical drawing, biology, mathematics education, ecology, history
Competencies	TEAMWORK, Communication

Other useful information	The working principle of the built device was explained to the students: 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 wind intensity, 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. In the case of wind generators, the decommissioning costs, at the end of the normal operating period, are minimal, as they can be fully recycled. Upper joint, milling work,the transmission shaft
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