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| **Title** | **Module 7. SOLAR AND WIND ENERGY** |
| **Aims** | 1. To make the students aware of the importance of solar and wind energy in our lives;  2. To be able to identify uses of these two types of renewable energy in daily life;  3. To use the theoretical knowledge learnt and acquired within the module in practical real-life situations;  4. To be able to develop creativity by using the knowledge learnt and acquired within the module. |
| **Key competences** | **1. Linguistic competence**: researching and understanding the information; debating on the topic and reaching agreements.  **2. Digital competence**: using ICT while doing project work;  **3. Technical competence**: identifying the parameters of solar and wind energy and measuring them using specific measurement devices;  **4. Domestic competence**: learning about and using solar and wind energy at home;  **5. Civic / environmental competence:** creating a responsible citizen who uses renewable energies instead of the traditional ones; |
| **Approx. time** | 5 sessions |
| **Age** | 12-18 years old |
| **Description** | Session 1.  Initial test. Annex 1.  Sessions 2-4  Tasks. Annex 2 /Annex 3 |
| **Assessment** | Session 5.  Annex 4. Questionnaire. |
| **Teaching aids** | PC, projector, smartphone / tablet with access to the Internet, camera, whiteboard, corkboard, flipchart, dictionaries, etc. |
| **WEB LINKS** | 1. <https://www.ashden.org/sustainable-energy/ashden-guides/solar-for-the-grid?gclid=Cj0KCQjwruPNBRCKARIsAEYNXIhVv2HfC1VqrTCZl_VCEDOU_Mq4sONI0gc3yJ0I_RyNDjfp7VppPFwaAgnyEALw_wcB>  2. <https://www.journals.elsevier.com/solar-energy/>  3. <http://www.conserve-energy-future.com/various-solar-energy-facts.php>  4. <http://windeis.anl.gov/guide/basics/>  5. <http://www.nationalgeographic.com/environment/global-warming/wind-power/>  6. <https://energy.gov/eere/wind/how-do-wind-turbines-work> |

**ANNEX 1.**

**INITIAL TEST**

1. Identify five sources of energy.

fosil fuel, water, sun, wind, biomass

2.What is green energy?

It is a type of renewable, non-polluting energy.

3. What causes wind?

A. Rotation of the Earth

B. The Sun heating the atmosphere

C. Variations in the Earth's surface

D. All of the above

4. What are the best places to capture wind power?

High altitude areas and areas around oceans or seas are preferable

5. How many blades does a modern wind turbine have?

A. 3

B. 2

C. There is no standard number of blades.

D. 4

6.What is the life span of a wind park?

About 50 years

7.What are the advantages of solar energy?

It is unlimited, non-polluting.

8. What is the major element found in a photovoltaic (PV) cell?

A. Hydrogen

B. Nitrogen

C. Silicon

D. Carbon

9. Which of the following is a practical use for solar energy?

A. Heating swimming pools

B. Cooking hot dogs

C. Powering road signs

D. All of the above

10. What is a disadvantage of solar energy?

A. The amount of sunlight that arrives at the earth's surface is not constant

B. A large surface area is required to collect the sun’s energy at a useful rate

C. Some toxic materials and chemicals are used in the manufacturing process of photovoltaic (PV) cells

D. All of the above are disadvantages

**ANNEX 2.**

**TASKS**

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| ACTIVITIES | SUBJECT / AREA | LEVEL /AGE |
| 1. Search for information on conventional types of energy and renewable energies. | Physics/Chemistry | All |
| 1. Identify the advantages of using renewable energies instead of the conventional ones. | Physics/Chemistry | All |
| 1. Take photographs / make drawings / create a video to illustrate the use of solar and wind energy in the household. | Technical Studies | All |
| 1. Create a crossword puzzle which contains terms on the topic: solar and wind energy | English / ICT | All |
| 1. Using Prezi or other computer programmes, make a presentation of wind and solar energy in your region / country (also include graphs, diagrams, charts, etc. in your presentation). Don’t forget to identify the regions in your country with the highest wind speed and sun rays during the year | Geography / English | All |
| 1. Collect data on your country’s legislation on the topic of solar and wind energy | Civic studies / Economics | 15-18 |
| 1. Imagine the use of these two types of energy in the future and the benefits they will bring to the mankind. Essay – 100-150 words / 250 – 300 words | English | 12-14  15-18 |

**ANNEX 3.**

**TASKS. HOMEWORK: SOLAR AND WIND ENERGY**

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| ACTIVITIES | SUBJECT / AREA | LEVEL /AGE |
| 1. Translate into English one of the energy consumption invoices of your house. Present your work to the class. | English | All |
| 1. Make a comparison between the costs of using conventional energy versus using green energy, taking into account the monthly invoices of a household (the last six months). | Physics / Mathematics | 15-18 |
| 1. Write a short paragraph on real life situations when these two types of green energy were used. | Technical studies / English | ALL |
| 1. Create a PC presentation (you choose the programme) of the most important international names in the field of renewable energies and specify their contribution to this domain | Physics / Chemistry / Technical Studies | All |
| 1. Create a short, filmed advertisement as part of an educational campaign in which to emphasise the use of green energy | Physics / Chemistry / Technical Studies / English | 15-18 |

**ANNEX 4.**

**ASSESSMENT – FINAL EVALUATION QUESTIONNAIRE**

1. What is the sunniest region in your country?

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1. What is the windiest region in your country?

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1. What percentage of the total cost of the energy invoice of your house is represented by green energy?

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1. Does your country encourage the use of renewable energies? How?

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1. Specify two domestic situations where you can apply the knowledge acquired in this module.

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1. Who is the scientist in the field renewable energies whose work impressed you the most? Give reasons.

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1. What are the advantages of using renewable energies?

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1. What are the disadvantages of using renewable energies?

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1. Imagine the future. What will be the most frequently used types of energy in 100 years’ time?

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1. What impact could the use of these sources of energy have on the environment and on the quality of the people’s lives?

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