

SOLAR ENERGY IN THE CONTEXT OF THE EDUCATION FOR SUSTAINABLE DEVELOPMENT

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Abstract

The Center for Science Education and Training – CSET (<http://education.inflpr.ro/>) at the National Institute for Laser, Plasma and Radiation Physics in Bucharest is member of the European Comenius network SUSTAIN (<http://www.sustain-europe.eu/>) formed by 11 Continuous Professional Development providers aiming to support the Education for Sustainable Development (ESD) by using the Inquiry-Based Science Education (IBSE) approach. Science education at primary and middle school levels is merged with reflections on the connections existing between the human society development and the environment, social and economic issues. Project partners from ten countries, working in three expert groups, develop resources to assist school teachers to teach sciences in relation to ESD, in order to educate informed and responsible citizens.

From the three topics addressed in the project frame (food, energy, everyday objects) we chose to work on renewable energy related issues, with emphasis on solar energy use and energy saving. In the context of solar energy use and consumption the focus is on the design and implementation of efficient solar ovens, and on the characteristics and applications of solar cells.

The present paper refers to the learning units we prepared on the manufacture and evaluation of solar ovens under the IBSE and ESD paradigms. The paper will address: the theoretical background behind renewable energy sources and specially the solar energy; the learning module structure, the description of the procedures employed to build in the classroom three types of solar ovens; the IBSE aspects related to the design, construction and evaluation of energetic efficiency of the proposed solutions; the methods to be used for the estimation of insulating characteristics of some common materials. The learning unit is accompanied by students worksheets, teacher's tables for formative assessment, and evaluation sheets for the learning unit. In order to assist teachers to address ESD connected problems associated to the use of the solar energy, a list of questions to be debated during the lesson is also provided.

The material we prepared is intended to be used during teachers training sessions and is completed with a set of photos explaining the main steps in building the proposed solar ovens. A list of additional applications of solar energy (i.e. air and water heating, fruits drying, solar house, chemical energy generation based on solar energy, water purification) along and extensive bibliography is included into the educational module.

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Keywords: inquiry-based science education, education for sustainable development, science education in school, learning unit