



# Renewable energy in education for sustainable development. The Polish experience



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## ARTICLE INFO

### Keywords:

Renewable resources  
Sustainable consumption and production  
Education for sustainable development  
Teachers

## ABSTRACT

In the contemporary world, which is more and more global, people have taken note of global problems. The paper presents the results of research related to the evaluation of Polish teachers' experiences working in lower secondary schools (3rd stage in the Polish educational system) in terms of education for sustainable development. Unfortunately, the research has shown that Polish school teachers are not well prepared for the inclusion of key issues of sustainable development in school curricula. They are neither aware of the need for those issues to be considered, nor take responsibility for them knowing that sustainable development is the predominant economic, social, and environmental doctrine in Europe and in the world. Teachers do not know the educational principles behind sustainable development, nor their priorities and the objective of promoting a better and multifaceted understanding of the issues which our civilization faces. Teacher training is necessary, as well as raising the teachers' awareness of the principles of sustainable development as well as changing their attitudes towards it, not only at the school level, but also in everyday life.

## 1. Introduction

Renewable energy sources (RES) (i.e. solar, wind, biomass, geothermal, hydropower) are nowadays widely being recognised as an effective response to the global issue of climate change [1–7]. Thus international environmental treaties and policies stress the need for the reorientation of countries' energy models towards the utilisation of such resources. The change of energy policy and the overall energy consumption model presumes a holistic approach which should consider and manage a series of parameters such as technology, the economy, politics, society and education.

In consequence, renewable energy (RE) sources and energy efficiency measures are viewed as resources to improve the living conditions of the population and a response to environmental issues and strategies for local and regional development. These factors have triggered the dissemination of knowledge and sociological studies to assess the preferences of societies as well as the level of their knowledge in this relevant field. What is more, their scope covers a diverse range of populations. Due to this fact, many researchers [8–12] highlight the role and essence of research in social engineering and raise awareness of the need for action in the area of sustainable development, environmental conservation and counteracting climate change.

However, it is worth mentioning that understanding the aspects of sustainable development can be approached in different ways.

Escalante et al. [12] showed that each situation of sociotechnical adequacy is a 'world' in the diversity of views, cultures and needs, potential resources, possibilities for action, available technology, installed capacities, etc. and this therefore requires the opening up of researchers and technicians to the appropriateness of the methodologies of approach.

The pace of change in the contemporary world requires constant acquisition of knowledge and its dissemination not to mention the need for change in numerous social institutions which are responsible for preparing citizens for living consciously in society. Therefore, education plays an important role in this matter, however, it is also susceptible to various social, economic and political factors, which are impossible to delimit.

The public, especially the youth, are integral elements of the initial RE implementation process. Aversion of conflict and large scale utilisation of RE resources is, in part, reliant on their positive attitude, understanding, and receptiveness to such change. This is especially true where some indirect benefits of RE might not be immediately realized by society because the benefits are only forthcoming on a long term basis, are not completely understood, and/or only realized in

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extreme circumstances. Education is a crucial element and a keystone to any nation's development; it stimulates scientific endeavour, enhances livelihoods, and injects a skilled workforce into the resultant modern job market. Indeed, in may be said that education fortifies a nation and fosters the resilience needed to comfort sudden challenges or ominous situations. Education may also instill the youth with the requisite knowledge and moral responsibility needed to better understand and solve environmental problems, especially those related to energy generation [13,14].

Renewable energy education is expected to play an important and effective role in promoting sustainable development and also contribute towards improvement in quality of life of a large sections of global population. It is necessary that policy makers are aware of the latest advancements in the field of renewable energy and appreciative of their merits and potential towards providing sustainable energy supply options to meet increasing global energy [15,16].

According to the Living Planet Report [17] the state of the Planet Earth has been given a thorough evaluation, documenting the changes in biodiversity, ecosystems and humanity's consumption of natural resources. The report announced that the state of the biodiversity of the planet is worse than it ever has been. These results show that sustainability, in all its forms: social, ecological, economic, is still a key requirement in education at all levels, from infant school, kindergartens, to lifelong education [18].

Investigating the knowledge, perceptions, as well as attitudes of the public concerning various aspects of environmental issues is of great importance to environmental education. An integrated understanding of these parameters can properly support the planning of the education for sustainable development curriculum and relevant educational materials [19].

School education is a social experience thanks to which school-children enrich their relationship with other people, and acquire basic knowledge and skills that help them to choose their future way of life [20]. Education should be recognised by society and the state as the most crucial component and factor in the efforts that are aimed at promoting social and economic development and shaping public awareness in this respect [21]. It is school education that can contribute to creating a sustainable future for the world. Furthermore, it plays an important part in raising awareness and shaping attitudes concerning energy conservation as well as the use of renewable sources of energy for the sustainable development of society.

Education is an important first step in making this transition. Renewable energy technologies are ready to be implemented, but increased public confidence, regulatory reforms, and a system of economic incentives for development of these resources are needed to make large-scale use of renewables a reality [22].

That is why teachers have a unique role in striving to promote sustainable development. Therefore, the social role of the teacher should be redefined as such in the process of dynamic social change. The teacher should be obliged to point out directions in the transformation of the world and clarify the phenomena that occur in such a context [23]. Moreover, the teacher should not only be a translator [24] but also an interpreter [25] and a guide in the world of values [26]. In addition, through his work the teacher shapes the attitudes and values of students and as a result can influence their change in behaviour and introduce the principles of sustainable development into everyday life.

Social studies teachers can select renewable energy activities that demonstrate how the marketplace and our political system govern the way energy decisions are made. An understanding of renewable energy will be a crucial part of scientific literacy for the future [22].

## 2. Research and methods

The paper presents the results of survey research related to the evaluation of Polish teachers' experiences working in secondary schools (the 3rd stage in the Polish educational system; lower secondary

schools) in terms of education for sustainable development. The aim of the study is to determine the teachers' priorities and make an assessment of the measures which lead to knowledge dissemination on essential areas related to an environmentally-friendly education that deals with aspects of the sustainable management of natural resources, the role of renewable energy, as well as sustainable consumption (SC) and production. The research allowed us to identify the degree to which the teachers surveyed are prepared to create a willing attitude among students towards new challenges arising from the need for sustainable development.

### 2.1. Methodology

Empirical studies have been carried out by means of diagnostic survey. Such method is frequently used in the studies through questionnaires, conversation, interview [15]. Due to the objectives of the study, a questionnaire has been considered to be the most appropriate data collection technique. An on-line survey questionnaire has been a tool of the study. Male and female teachers of secondary schools, teaching at least one of the following subjects: History, Civics, Polish, English, Art and Biology have participated in the study.

Initially, a sample of 120 male and female teachers of the six listed subjects was considered to be the size of the study. Finally, a much greater sample was chosen of male and female teachers of particular subjects. The applied method of diagnostic survey allows such a methodological solution. When analyzing the obtained research results each time, 100% constituted the number of male and female respondents who gave an answer to a particular question. 873 questionnaires from male and female secondary teachers have been collected.

In the case of four out of six analyzed subjects, over 120 questionnaires from male and female teachers of each subject have been collected. Only in the case of two subjects: Art and Civics 79 and 99 questionnaires have been collected respectively. The number of these questionnaires may be due to the fact that teachers of civics very often teach history as well and they treat this subject as their primary task. Hence, there has been fewer answers concerning civics. However, art teachers constitute a minority among the teachers taking into consideration the fact that there has been a low number of hours of this subject in the teaching cycle.

The research tools have been developed by the authors of the research, consulted and accepted by the consultants on behalf of the Centre for Civic Education (*Centrum Edukacji Obywatelskiej*, CEO). The survey data have been presented in the form of statistical descriptions.

The research was conducted in 2013. The survey was made available on the Internet website. A large number of respondents who have taken part in the study allows to acknowledge the research results to be reliable, valuable, and useful for people dealing with these issues in their scientific activities.

### 2.2. The main goal of the research

The main objective of the research was to examine how teachers of different school subjects at the 3rd stage of the Polish educational system (students aged 14–16; lower secondary schools) comprehend education for sustainable development (ESD). The study was to determine whether teachers include such issues as the sustainable management of natural resources, the use of renewable energy, or responsible and sustainable consumption in the school curriculum (different subjects) and to what extent.

The teachers who were surveyed were asked about their own opinion on the sufficiency of their knowledge in the field of sustainable development, the use of renewable energy, or the sustainable management of natural resources. In addition, they were asked if they feel the need for further training in this area and to what extent.

The diagnostic survey method was used in this research based on

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