

POPULAR SCIENCE ABSTRACT

The implemented project, due to its nature, will have a significant impact on the development of the scientific discipline of economics and finance, especially in the context of renewable energy sources most frequently used in rural areas in Poland. In addition, the research aims to indicate the potential of various types of renewable energy sources, whose efficiency will be increased. The cognitive value of research in the context of planned analyses will make a significant contribution to expanding knowledge in the field of eco-efficiency of energy production based on renewable energy sources. The research planned in the project will also help determine the level of ecological awareness of rural residents and help identify the most important social problems related to the location of renewable energy installations, which are not always accepted by residents, including due to interference with the landscape (e.g. wind farms) or due to fear of intense smell (biogas plants).

The purpose of the research is to identify, describe and explain phenomena and attitudes that are associated with the development of renewable energy sources (RES) in rural areas in Poland. The aim of the research is also to indicate the impact on the quality of life of Polish residents of the polluted environment through energy management, which is mainly based on hard coal and lignite. Moreover, the energy efficiency of currently used energy raw materials during energy production will be assessed. The research will indicate methods and techniques based on the use of renewable energy sources that have a lower negative impact on the environment. As part of the project, the potential of rural areas in Poland to implement RES-based solutions when generating electricity and heat will also be determined. The conditions associated with unloading the transmission network due to the departure from power engineering, a large part of which is based on a dozen or so large coal power plants, will also be indicated. The dispersion of energy production sites, on the one hand, will mean that energy will not have to be transmitted over very long distances, but, on the other hand, it may cause new situations in which continuous energy supplies will be threatened (e.g. due to the lack of wind). Conditions related to transport will be determined, indicating the possibility of partial supply of some means of transport by renewable energy sources (e.g. electric cars charged by home photovoltaic micro installations), and ecological efficiency of energy production based on various renewable energy sources will be indicated.

It is very common for rural areas (especially during the heating season) to have more polluted air than city centres. This is because in most large cities, combined heat and power plants operate, which must meet stringent ecological standards. In rural areas, however, solid fuel heating dominates in single-family buildings, which is often of poor quality. On the other hand, heating installations are often based on energy-inefficient technologies that allow the combustion of fuels at relatively low temperatures, which contribute to excessive emissions of harmful substances into the air. It should be emphasized that the share of renewable energy sources in the total energy balance of Poland should increase in the coming years. According to the National Plan for Energy and Climate for 2021-2030, Poland in 2030 should achieve a 21-23% share of renewable energy sources in gross final energy consumption. However, it should be expected that the future EU regulations will strive to significantly increase the share of renewable energy sources. Such a situation may result in the need to import renewable energy from other EU countries that will have a surplus of this energy. According to the estimates of the Supreme Audit Office, the costs of such an undertaking in Poland may amount to as much as PLN 8 billion. The relatively small share of renewable energy in Poland is caused, among others, by insufficient state support and the lack of stable and favorable legal solutions.

The implementation of ecological solutions in agriculture and industry is very important for the development of renewable energy in rural areas. It should be noted that so far no research has been carried out in Poland in rural areas that was envisaged in the project. Also, no comprehensive research has been carried out to assess the economic efficiency of various production processes related to renewable energy production using LCA (Life Cycle Assessment) analysis. Moreover, no research has been made to produce biomass-based fuels that have undergone pyrolysis.