Sustainability and sustainable development

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Editor

NAWA
POLISH NATIONAL AGENCY
FOR ACADEMIC EXCHANGE

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AKADEMICKIE
PARTNERSTWA
MIĘDZYNARODOWE

eISBN 978-83-8211-074-6

https://doi.org/10.18559/978-83-8211-074-6

PUEB PRESS
POZNAŃ UNIVERSITY
OF ECONOMICS
AND BUSINESS

Sustainability and sustainable development, pp. 251–256
https://doi.org/10.18559/978-83-8211-074-6/IV6

6.

SUSTAINABILITY IN RENEWABLE ENERGY BUSINESSES

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Abstract: The sustainable development goal 7 (affordable and clean energy) seeks to ensure that energy is clean, affordable, available and accessible to all (SD Goals, https://unstats.un.org/sdgs/indicators). Replacing fossil fuel-based energy sources with renewable ones, which include: bioenergy, direct solar energy, geothermal energy, hydropower, wind and ocean energy (tide and wave), would gradually help the world achieve the idea of sustainability. Renewable energy technologies provide an excellent opportunity for mitigation of greenhouse gas emission and reduce global warming through substituting conventional energy sources (Panwar, Kaushik, & Kothari, 2011; Owusu & Asumadu-Sarkodie, 2016). Nevertheless, investment costs, as well as political environment and market conditions, have become barriers preventing countries from full utilisation of the potential to improve the quality of air or water.

The aim of the chapter is to initiate discussion on the importance of renewable energy as well as its environmental and society-related health aspects. Two short case studies presented in the text allow to describe projects concerning solar installations. In the first case, it is educational institution investing in thermal solar panel systems to supply heat for domestic hot water. The results of research conducted by Filho et al. (2019) on a small sample of universities from around the world indicate that in more than half of them, only a small share of energy consumption comes from renewable sources, whilst the European Union policy has identified promotion of energy efficiency in buildings, including educational ones, as a key objective of its energy and climate policy (EPBD Recast, 2010). In the second case study, thoughts on photovoltaic systems installed to supply buildings with electricity are contained and the problem of public resource support forms for that purpose are discussed.

Keywords: renewable energy sources, solar energy.

6.1. Introduction: green energy

Development of renewable energy sources has been supported by many governments for years, both in large scale projects (such as wind farms) as well as by motivating citizens to invest in green energy for their houses (solar thermal panels, heat pumps and photovoltaic systems). Poland was not a leader of the process, which was probably caused by many factors, however, the tradition of coal mining seems to be an important one. Renewable energy enthusiasts waited years for state regulations supporting such solutions, and when they finally came, they did not seem to be as motivating as what was previously introduced in some western countries (e.g. Germany, France).

Apart from the pressure of such stakeholders as the mining industry, renewable energy development was also affected by those who would use every occasion to prove that it did not pay off. Of course, in many cases, direct comparison of investment costs and future financial savings would confirm such theses. Nevertheless, governments should always take environmental and health aspects of such projects into consideration. Environmental pollution and, as a consequence, deterioration of society's health, generates remarkable financial costs, which has also been confirmed by Harry Wirth from Fraunhofer ISE (Fraunhofer ISE, 2021). Every year in Poland, from 45,000 to 48,000 people die because of air pollution (smog). The problem of premature death because of air quality touches 400,000 Europeans (PolsatNews, 2018). On the other hand, from a Corporate Social Responsibility point of view, it must be stressed that the positive effect of renewable energy sources will be high if equipment dedicated to such systems is environmental-friendly at all stages of the products' "life": from manufacturing, throughout transportation, installation and operation, to the moment when they need to be recycled.

6.2. Thermal solar installation at educational institutions

A thermal solar installation expert was asked to consult a project regarding a rather large system for domestic hot water purposes at an educational institution. When he met the engineer responsible for managing the project (and was also a representative of the investor), he started to have doubts whether total surface of the solar panels was appropriate for the needs of the building that was supposed to be equipped with the system. The only activity at the facility were classes with students, which actually meant that domestic hot water would be used only to wash hands (no baths or showers). A response to the question as to why such a size of the instal-

lation had been planned surprised the consultant, as it became clear that the only determinant was the minimal surface that could obtain subsidy. He asked if the subsidy was supposed to cover 100% of investment cost. When that the answer was it would only be partial, he advised the engineer to make a new plan with reduced budget—equal to financing part that the investor would have to cover anyway. In this way, the solar panels would achieve the same cost, but in addition, they would also get a chance to function properly whilst the oversized installation with subsidy would immediately go into breakdown mode due to a heat supply much higher than the demand. The consultant never received feedback as to whether his advice was followed. Nevertheless, it was rather surprising that neither the environmental effects nor future cost savings were initially determinants for those planning the investment. Even the cost for the investor was not an issue. The only factor taken into consideration was how much money could be provided by a 3rd-party—no matter if it was needed or not. To respond to any doubts that might occur–heat transmission from one building to another is usually technically-challenging and cost-consuming. Therefore, covering the energy supply by demand from another facility, would not be an efficient solution.

6.3. Development of photovoltaic installation

A private, Polish investor decided to have his house equipped with a photovoltaic installation (Figure 1) to cover his electrical energy consumption that was high as—apart from lighting and standard electrical home appliances—the facility was heated by a heat pump system—much more efficient than direct electrical heating (e.g. radiators or storage heaters), but still consuming a remarkable amount of electricity. The company that prepared the offer for the investor provided him with potential savings calculations, that compared to investment cost (decreased by a small subsidy and some tax reduction), meant pay off in ca. 10 years. As the guarantee period for PV panels was 20 years (which suggested their working "life" length), it could be questioned if it was worth getting the system. One of the reasons why the payback period was rather long was the fact that power company supplying the building with electricity would charge 20% of energy that would go to its network (in the periods when photovoltaic supply was higher than the household's demand)—the investor would only get 80% of his electricity production back free-of-charge. It is obvious that if the electricity provider charged 20%, it was allowed by certain regulations. However, this is an interesting subject for discussion on the responsibility for future generations and the environment they will inherit from today's generations—if it should be allowed to set such high charges for those who had decided to invest in green energy with a little support

of subsidies and tax reduction (in this case, the estimated financial support was, in total, less than 40% of the investment cost). A positive example of different regulations could be the German Renewable Energy Act introduced in 2000 that guaranteed fixed feed-in tariffs for renewable energy generation (a policy mechanism providing remuneration above the retail or wholesale rates of electricity), which encouraged households' owners to install solar panels for their own consumption or feeding the electricity produced into the grid. The solution engaged citizens and communities in the process, and in 2012, close to half of the renewable energy capacity in Germany was owned by individuals or by local as well as regional energy cooperatives, having contributed almost 1/3 of total investments to the renewable energy generation (European Commission, 2018). The investor mentioned before, finally decided to get photovoltaics installed, as he estimated that the majority of his energy consumption would be covered by renewable sources (PV installation and heat pump), which generated some satisfaction.

Figure 1. Photovoltaic installation

Source: Author's archives.

Questions / tasks

1. Taking into consideration the fact that small photovoltaic installations in private households mean not only better quality of air in the neighbourhood or money saving for their owners, but that they also make electricity production more diversified on a larger scale—do you think that charging 20% for the energy supplied to the network is appropriate?
2. How can universities promote sustainable energy?
3. Many countries subsidise green energy. Do you think that the "green" subsidies in your country are sufficient? Compare solutions implemented in at least 2 countries (visit websites). What kind of determinants are behind solutions implemented in those countries? Classify them and explain. Are those solutions really effective or just a kind of compromise? Discuss the issue.
4. How should efforts to leave a clean environment for future generations and care for today's workers in the coal industry be balanced in countries with a long tradition of mining?
5. How does energy from renewable sources influence the health of society and overall quality of life? Justify your opinion.
6. Socially responsible enterprises try to consider whether renewable energy equipment is environmental-friendly at all stages of product "life": from manufacturing, throughout transportation, installation and operation, to the moment when they need to be recycled. They often do not have the tools needed to influence suppliers, especially if rare raw materials or components are required. However, they promote their products as sustainable. What do you think about such an interpretation?

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