WORking papers in Management Science

WORMS/16/01

Eco-innovative Sustainable Investments and a Potential of Environmental Insurance

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WORMS is a joint initiative of the Management Science departments
of the Wrocław University of Science and Technology,
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ECO-INNOVATIVE SUSTAINABLE INVESTMENTS AND A POTENTIAL OF ENVIRONMENTAL INSURANCE

Abstract

In recent decades, the importance of sustainable development has been growing considerably as a premise for economic growth, evolution of societies within the rational use and protection of the environment. In the background of sustainable development, the eco-innovation market emerges to riposte a negative impact of human activity on the environment, making, for this purpose, use of innovative methods and technologies. The eco-innovation market in Poland is still in its development phase, but it is expected to expand due to the system of political and regulatory initiatives, as well as the current financial initiatives. Environmental investments, including those innovative ones, comprise, among others, renewable energy sources (RES). In the world of emerging technologies, one cannot forget they carry risks above mere advantages. This paper addresses a new product on the insurance market, the environmental insurance, presenting its potentialities for eco-innovation projects.

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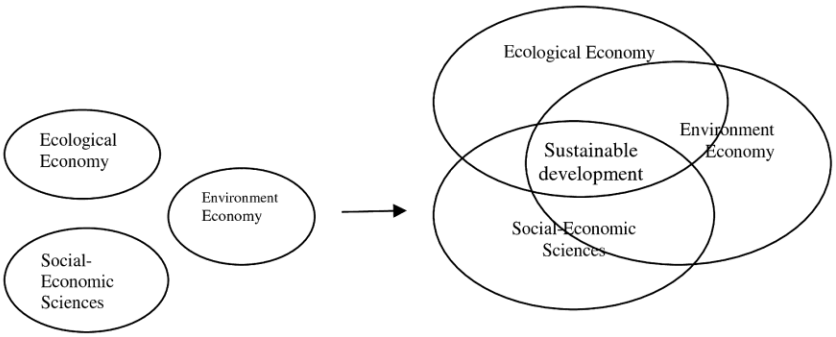
1. Introduction

Sustainable development has a long tradition and history and dates back to early Greek philosophers, Aristotle and Hippocrates. Over the centuries, most of great economists, to name only a few of them such as Ricardo, Malthus, and Jevonson, while developing their economic theories, posed a foundation for the advances of the concept of sustainable development[1,2]. Nowadays, the term 'sustainable development' should be understood as viable socio-economic development in the process of integrating political, economic and social aspects, with a delicate balance of nature and durability of basic natural processes, in order to guarantee the ability to meet basic needs of communities or citizens of both, the present and future generations.

[1] H. Landreth, D. C. Colander, *History of Economic Thought*, PWN, Warsaw 2005.
[2] J. Siekierski, M. Rutkowska, *Zrównoważony rozwój jako koncepcja w naukach ekonomicznych [Sustainable development as a concept in economic sciences]*. /In/ *Rozwój Zasobów Kapitału Ludzkiego Obszarów Wiejskich [Development of Human Capital in Rural Areas]*, G. Spychalski, M. Malicki (Eds), University of Szczecin Scientific Publishers, Szczecin 2008, pp. 359-361.

Sustainable development occupies a distinct place in economic sciences, especially in environmental economy, ecological economy, and, more recently, in socio-economic sciences (Figure 1).

Figure 1: Current understanding of sustainable development in scientific disciplines



Source: J. Siekierski, M. Rutkowska, op. cit, p. 365

Nowadays, sustainable development includes elements not only of ecological economy, which puts a significant role to physical processes, with an emphasis on environmental sustainability and fairness between generations, but also of the economic environment, which has been on the boundary between economics and ecology, and explores the relationship between the process of socio-economic and environmental conditions[3]. Furthermore, sustainable development also appears in the new social-economic disciplines that take into account social as well as political aspects. This science emphasizes the relevance of integration in the field of economics and ecology, and goes further than integrating sociology and political science, which in turn causes the dissemination of ecological knowledge and social acceptance of environmental policy and sustainable development strategies.

2. Environmental investments typology

A driving force for sustainable development are investments, including environmental investments. Literature lists different typologies of environmental investments. They are divided into two types, that is[4,5]:

[3] M. Blaug, *Teoria Ekonomii [Theory of Economics]*, PWN, Warszawa 1994, p. 34.
[4] J. Fila, D. Burzyńska, *Inwestycje ekologiczne w przedsiębiorstwie [Ecological investiments in an enterprise]*, „Ekologia Przemysłowa", 2008, no. *2*(7-9), p. 34.
[5] A. Smolińska, *Efektywność inwestowania w oczyszczalnie ścieków w Polsce a wykorzystanie zewnętrznych środków pomocowych [Effectiveness of investment in sewage treatment plants in Poland and the use of external aid]*. PhD Thesis, Poznań University of Economics, Poznań 2011. Retrieved from http://www.wbc.poznan.pl/Content/187923/SmolinskaAnnaS4248.pdf [access: 10 September 2014], p. 25.

- ‘End of pipe’ technology investments - not interfering with the production process (production can be carried out without the investment), but reducing or disposing of pollutants produced within the production process. The investments of this sort are municipal and industrial wastewater treatment plants, sewage systems, investments to reduce particulate and gaseous pollutants, selective collection and disposal of waste and the construction of the landfill;
- Integrated anti-pollution investments - leading to a reduction of pollution generated by modifying processes such as replacing or upgrading the production line, purchase of additional equipment, which means that production shall become cleaner and more environment friendly (e.g. investments in renewable energy sources).

Another typology distinguishes direct and indirect environmental investments. The first include construction of new facilities and equipment within the broader environmental infrastructure. The latter encompass activities aimed at technological modernization and technical upgrading of production processes or operating machinery and equipment. The result of such actions is to reduce the emission of pollutants “at source”[6].

3. Development of eco-investments

Sustainable development can be considered and implemented at global, international, national and company levels. It can be achieved by making a number of investments in environmental protection and making business activities in an eco-friendly way[7]. The last decades have brought a considerable number of new strategic documents and regulations at the EU level[8] that require environment protection, promotion of renewable energy sources, increase of energy efficiency and reducing greenhouse gas emissions. Thus, the climate for investors attracted by innovative projects in the field of ecology and energy is encouraging and favourable. Such projects may include investments in:

- wastewater management and water protection, within the climate and atmospheric air, soil protection, waste management, soil conservation, landscape protection and biodiversity, protection against noise, radiation and vibration;

[6] A. Smolińska, *op. cit.*, p. 26.
[7] B. Fura, *Nakłady inwestycyjne w ochronie środowiska a realizacja założeń rozwoju zrownoważonego [Capital investments in environmental protection in view of the accomplishment of the sustainable development assumptions]*, „Nierówności Społeczne a Wzrost Gospodarczy”, 2010, no. 17, p. 303.
[8] Eco-Innovation Observatory. *EIO The eco-innovation challenge: pathways to a resource-efficient Europe*. Brussels 2011.

- renewable energy (including wind power, solar power, small hydro, biogas, biomass power plants, etc..); and
- energy efficiency (including thermo-modernization of public and private structures, and energy conservation).

4. Eco-innovation

It is commonly accepted that the character of today's environmental investments should be eco-innovative. The concept of eco-innovation founded in the 90's, is an innovation that improves the efficiency in the use of natural resources in the economy by reducing the negative impact of human activity on the environment and strengthening the economy's resilience to environmental pressures[9]. Due to their balanced nature, eco-innovation investments have not only environmental but also economic advantages (for example, by reducing costs).

Both, the national authorities and the European Union are important players in promoting the technological development. The implementation of environmental technology is an especially group of means tailored to means and consisted of legislation and currently available economic instruments. In 2004, the European Commission introduced the Eco-Innovation Action Plan, which became the foundation for eco-innovation policy in a number of countries[10]. In Poland, the following major programmes and projects, among several regulations, can be distinguished: the National Action Plans, the GreenEvo Green Technology Accelerator Project initiated by the Ministry of Environment and the Operational Programmes: the Infrastructure and Environment, and the Innovative Economy or strategic programs of the National Centre for Research and Development[11,12].

According to the latest market research[13], the eco-innovation market in Poland, especially the one for environmental technologies, is in its early stages of evolution. The market is facing a number of difficulties related to financial and educational barriers. However, its further growth is forecasted. Institutional measures to support the eco-innovation can be exceptionally helpful in the development of the market. Among the eco-innovation market in Poland the sector of renewable energy is growing particularly rapidly.

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[9] A. Szpor, A. Śniegocki, *Eco-innovation in Poland. Current status, barriers to development, support capabilities*, The Institute for Structural Research 2012.
[10] A. Szpor, A. Śniegocki, *op. cit.*, p. 15.
[11] A. Szpor, A. Śniegocki, *op. cit.*, pp. 10-17.
[12] The Ministry of Environment. Program Executive for the National Action Plan for Environmental Technologies for the period 2007-2009 with a perspective for 2010-2012. Warsaw 2007.
[13] A. Szpor, A. Śniegocki, *op. cit.*, pp. 11-12.

5. Environmental impact of investments in renewable energy sources

A distinctive feature of renewable energy, in comparison to the typical conventional energy, is lack (or a significantly smaller range) of its impact on the environment. This is due both, to the renewal of primary energy (sun, water) and a limited amount of waste emissions, dust and gases[14,15]. Among renewable energy sources, those whose impact on nature can be described as non-confrontational and those with associated environmental and spatial constraints can be distinguished. Conflict-RES may include, for example, biomass waste thus waste from agriculture, industry (including wood) and municipal biogas from landfills, sewage treatment plants, and solar power recognized in distributed systems. However, the conflict for the environment can include renewable energy, for instance, wind energy, hydropower, and geothermal resources[16].

Despite the generally environmentally friendly and eco-innovative character of investments of renewable energy, a plan of investment in renewable energy sources is limited by a number of permissions related with an assessment of the impact of the proposed activity on environment[17]. According the referred Law, the project is analysed and evaluated from the perspective of its direct and indirect impact on environmental, health and living conditions, the possibility and ways of preventing and reducing negative environmental impacts, and the required range of monitoring[18]. Basic categories of exclusions and limitations of location-RES for the protection of the natural environment are: spatial conditions, areas of conservation (e.g. areas covered by the Natura 2000 sites, parks, reserves, etc.), or the protection of species and landscape areas of conflict, farm buildings, housing, etc.[19] The main threats identified with the wind power are the risk to birds (bird mortality, decreasing the number of bird populations, loss of habitat), the risk to humans (noise and vibration from the turbines, propellers, turbines), or changes in the landscape. Importantly, the remaining investment in renewable energy may in some way affect the environment, such as hydroelectricity has been linked to construction of barriers on rivers, flooding part of the valley above the barrier, changes in the hydrological regime of the river, or a change of scenery. In addition,

[14] M. Ligus, *Efektywność Inwestycji w Odnawialne Źródła Energii. Analiza Kosztów i Korzyści* [*Efficiency of Investment in Renewable Energy. Cost-benefit Analysis]*, CeDeWu, Warsaw 2010.
[15] F. Wolańczyk, *Elektrownie Wiatrowe [Wind Power Plants]*, KaBe, Krosno 2009.
[16] J. E. Kawałczewska, Poradnik Ochrony Środowiska dla Małych i Średnich Przedsiębiorstw *[Environmental Guide for Small and Medium Enterprises]*, Eko-Konsult, Gdańsk 2006.
[17] *The Environmental Protection Law* (Decree Law from 27/04/2001, Dz.U. 2001, no. 62, position 627 and its amendments).
[18] F. Wolańczyk, *op. cit.*, p. 115.
[19] J. E. Kawałczewska, *op. cit*.

hydropower operation may lead to sudden changes in flow rate and water level below the dams, or decrease the population of aquatic organisms. In case of biomass, too large interest in biomass carries a risk of reduced biodiversity of monocultures of energy crops, such as eucalyptus, willow and poplar, and raises the problem of air pollution ash, dioxins and furans, which are carcinogenic and are emitted during the combustion of biomass soaked with pesticides and mixed with waste plastics[20].

Frequently, in the preparation phase for the implementation of renewable energy investments, investors forget about possible negative effects that the investment may, eventually, have on the environment. Currently, among many financial tools available to investors the attention leads into ecological insurance, which can be an effective financial instrument for investors in the 'green market' eco-innovation.

6. Environmental insurance

In the literature, there is little information on environmental insurance. Ecological security is an important instrument of economic and financial environment. The objective of the insurance company is, on the one hand, to improve the environment, but also to impact the economic growth of the country. Environmental responsibility encompasses the prevention of 'a risk to public' (called public hazard), including an associated disaster (including natural disasters). The legislation makes a distinction between two types of environmental responsibilities, with the responsibility for[21]:

- 'Proven guilty' - a classic example of civil liability (included in the civil code of every country) responsibility for potential environmental hazard;
- Responsibility for a potential ecologic threat.

In the environmental insurance policy, there are two conventional rules, pointing either a 'polluter' or a 'victim' as an accountable payer. A characteristic feature of the 'polluter pays' principle is the liability for environmental damage due to the size of the perpetrator who inflicts the damage. Damage is defined as wound in the environmental caused by the environmental impact of two types, namely[22]:

[20] J. E. Kawałczewska, *op. cit.*

[21] M. Rutkowska, *Ecological insurance in Poland as instrument of environmental policy*. /In/ H. E. Dny (Ed.), *Podnikáni a Rozwoj Regionu*, Univerzita Hradec Králové – Gaudeamus, Hradec Králové 2006, p. 400.

[22] D. Maśniak, Ubezpieczenia Ekologiczne [*Environmental Insurance]*, Kantor Publishing Zakamycze, Kraków 2003, p. 119.

- Damage to the environment - is a violation of the public interest. Distinguished here: the environmental costs, loss of benefits associated with environmental pollution, and loss or damage to the environment as a common or a public good.
- Damage to a person or property - that is, the infringement of an individual. In this case, it refers to the cost of environmental degradation, loss of benefits associated with environmental pollution, personal injury, death, or loss of, and damage to natural resources.

From the point of view of environmental insurance relationships with investments, it is essential to consider the ecological damage to individuals or property. Therefore, damage in this case should be based, in accordance with art. 363 of the Polish Civil Code, to restore the previous state of damage of goods or the provision of funds for the loss suffered[23].

The second of the rules that apply in the insurance scheme is the 'victim pays' principle. This principle is important from the point of view of environmental damage, which should be understood as "any harm which marks the general interest and the individual as a result of environmental deterioration"[24]. Relevant in this case are especially harmful effects on a man and the surrounding environment degradation. Therefore, the Environmental Protection Law[25], art. 326, states that: "The entity that repaired the damage to the environment shall have the perpetrator of the damage claim for reimbursement of expenses made for this purpose; the amount of the claim is limited in this case to the reasonable costs incurred to restore the previous state." It is then essential to comprehend the cost of environmental damage, because the protection of the environment and restoration to the desired state are associated with incurring costs[26]. The current Polish Law of Business Insurance[27] offers a potential to compensate for the environmental damage as a result of the insurance agreements:

- Risk of harm suffered 'by themselves' (property - property insurance and personal - personal insurance);
- Risk of liability (civil), in connection with business or owning property incurred 'by other' harm: (property - liability insurance and personal - liability insurance).

[23] *The Civil Code (*Decree Law from 23/04/1964, Dz.U. 1964, no. 16, position 93 and its amendments).
[24] D. Maśniak, *op. cit.*, p. 217.
[25] *The Environmental Protection Law*, *op. cit.*
[26] B. Kryk, *Rachunek Sozoekonomiczny Działalności Gospodarczej na Przykładzie Energetyki Zawodowej Regionu Szczecińskiego [Sosoeconomic Business Account on an Example of Power Plants in Szczecin Region]*, University of Szczecin, Szczecin 2003, p. 9.
[27] *The Insurance Activity Law* (Decree Law from 22/05/2003, Dz.U. 2003, no. 14, position 1151 and its amendments).

Despite the fact that according to the law, environmental insurance may function in Poland, its actual expansion is modest, which is due to a variety of reasons, such as[28]:

- Particular difficulty to assess the risk;
- Existence of so-called hidden risks that cannot be detected even with the state of modern science and technology;
- Threat of an existence of undertaking insurance as a result of poorly estimated risk;
- The necessity to employ experts with special knowledge and making thus costly risk assessments;
- Existence of long-term, continuous and, at the same time, difficult to determine at early stages impacts on environment, emerging eventually impossible to compensate huge loss.

Environmental insurance may cover the loss and damage to the environment impossible to predict that may happen in spite of normal maintenance and operation of equipment used in the environment. In recent years, the scale of commitment for the perpetrators of environmental degradation and ecological damage had increased, so the insurance should be an incentive for economic expansion, rather than hamper development.

7. Conclusions

According to the forecasts, in the next few years the market of eco-investments (largely eco-innovation) in Poland shall intensively expand. According to the principle of sustainable development, although with a generally positive impact on the environment, these investments could, inadvertently, burden the environment. It is one of the often overlooked investment risks in this type of projects.

In the insurance market, there is a new product called 'environmental insurance'. According to the authors, there is currently no coherent legal system, which would comprehensively regulate the responsibility for the damage caused in nature. However, it seems that environmental insurance can be an effective financial instrument for investors in the 'green market' eco-innovation.

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[28] T.P. Lenart, A. Pietrewicz, *Ubezpieczenia ekologiczne jako instrument przyspieszania proekologicznych przemian w gospodarce* [*Environmental insurance as a tool for accelerating environmental changes in the economy]*, Kancelaria Brokerska "Lenart", 1999, pp. 10-14.

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19. Wolańczyk, F., *Elektrownie Wiatrowe [Wind Power Plants]*. KaBe, Krosno 2009.