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SELECTED RENEWABLE ENERGY LEGAL ISSUES IN THE CONTEXT OF LOGISTICS MANAGEMENT

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Abstract. The purpose of the paper is, firstly, to present renewable energy sources in Poland compared with other EU countries and, secondly, to evaluate legal regulations relating to the implementation of renewable energy projects and to operation in the context of logistics management. The article also presents the definition and statistical data on renewable energy. Then, it focuses on legal aspects of the building process of wind farms and biogas plants. It also points out the process of organising the project, including ensuring a legal title to lands and obtaining, apart from the building permit, some other decisions. Next, the paper raises selected issues of financing the projects and of a contract engineer. Finally, it refers to the stage of operating the biogas plants and to the obligations relating to the agricultural biogas.

Key words: renewable energy, wind energy, biogas plants, logistics management

INTRODUCTION

The development of renewable energy in Poland not only helps to perform its international obligations but is also a prerequisite for fulfilling a constitutional principle of sustainable development[1] (Ministry of Economy, 2010a). Additionally, our domestic electric power engineering is in 90% based on coal and that is why it is of particular importance to diversify and develop renewable energy sources (explanatory statement of a bill, 2013). One of priorities of that strategy is that by 2020 Poland will have had at least 15% share of renewable energy sources in final energy consumption gross, including at least 10% share of renewable energy used in transport (Ministry of Economy, 2010a). The obligation to achieve the above-mentioned goal results directly from the Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/177/EC and 2003/30/EC[2]. It goes without saying that in order to achieve these indicators it is necessary to adopt acts favourable for the development of that sector as well as to ensure fast and effective implementation of renewable energy projects.

Currently, the main act regulating the issue of renewable energy is the Act of 20 February 2015 on renewable energy sources[3] and Act of 10 April 1997 on Energy Law[4]. The renewable energy generation, however, is impacted by a large number of other regulations, for example the Act on Waste[5], regulations concern-

[1] See: Article 5 of the Constitution. The definition of sustainable development contained in Article 8 of the Act of 27 April 2001 on Environmental Protection Law, consolidated text, Journal of Laws from 2013, Item 1232, as amended.

[2] Official Journal of the European Union L 140/16.

[3] Journal of Laws, Item 478, hereinafter referred to as Act of renewable energy sources

[4] Consolidated text Journal of Laws from 2012, Item 1059, as amended.

[5] Consolidated text Journal of Laws from 2013, Item 21 as amended.

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ing implementing building projects[6] and protecting the environment[7].

As for renewable energy a significant role is played by logistics management, which means a process of integrated planning, organising and controlling the flow of such energy to consumers. Logistics management, however, is also of particular importance during implementing projects and commissioning (Świerczek, 2006). As an example, it is worth mentioning, say, the wind energy and biogas plants, namely the common sources of renewable energy in Poland. An effective and fast implementation of a project is crucial both for investors and, commonly, for the owners of lands where wind power stations were located. Undoubtedly, organising a project, in terms of its location, using of modern technologies, links to other devices, highly impacts further renewable energy supply chain and, that is why, it is worth raising that issue. A wrongly planned or incorrectly implemented project entails extensive damages. Therefore, it is essential to manage knowledge, know-how, IT systems and organizational structures in the course of a building process (Wach-Grzybowska, 2011). The references books often emphasise that „…logistics is an inherent element of a business activity run in the market economy. It deals with the flow of goods and information in economic processes. A building process treated as a logistics process allows to better understand the essence of constructing production management. From that perspective, it is possible to analyse basic elements of a building process from input data to output data which, in the end, take the form of building goods and services" (Obolewicz, 2001).

Carrying out the research into the issue is justified by social and economic aspects, as well as the aspects connected with passing and applying the law. Definitely, more and more importance is given to a well-prepared and effective logistics management process while implementing a renewable energy project. It results from complicated legal regulations, financial and social conditions, namely high financial outlays and not always positive attitude of residents towards the implementation of the project, as well as the decrease in the surface areas used for agricultural purposes. Moreover, for many years there was no act on renewable energy which would comprehensively regulate the renewable energy issues. Currently, the provisions on renewable energy were spread in many laws and give rise to many problems in interpretation, which does not help to implement and operate the renewable energy projects. Although the Act on renewable energy was adopted this February, its entry into force was staggered. Only part of the act has been in force since May 2015. Some regulations will be in force in 2016.

The purpose of the paper is, firstly, to present renewable energy sources in Poland compared with other EU countries and, secondly, to evaluate legal regulations relating to the implementation of renewable energy projects and its operation in the context of logistics management. The subject of the paper is wide and covered by many legal acts while its scope is limited. That is why, the analyses concentrate on selected issues.

The main research method used in the paper is a dogmatic analysis of normative texts. The study is based mainly on Polish and EU legal acts, reference books and on statistical data.

THE CONCEPT OF RENEWABLE ENERGY. STATISTICAL DATA

Under the Act on renewable energy source, a renewable energy source is a source which uses wind power, solar power, aerothermal, geothermal energy, hydrothermal, sea wave, sea current and tidal energy, energy obtained from the falls of rivers and biomass energy, energy from landfill biogas and biogas produced in the process of sewage disposal and treatment or decomposition of plant and animal remains[8]. That definition is similar to the one laid down by Directive 2009/28/EC on the promotion of the use of energy from renewable sources.

The development of using the renewable energy is part of the European principle of climate and environment protection. In this respect, it is worth referring, for example, to the Treaty of Maastricht, or the Treaty

[6] For example Act of 7 July 1994 on Construction Law, consolidated text Journal of Laws from 2013, Item 1409.

[7] Act of 27 April 2001on Environmental Protection Law, Consolidated text Journal of Laws from 2013, Item 1232 as amended; Act of 3 October 2008 on the Provision of Information on the Environment and its Protection, Public Participation in Environmental Protection and Environmental Impact Assessment, Consolidated text Journal of Laws from 2013, Item 1235, as amended.

[8] It is worth mentioning that these traditional energy sources include fossil fuels, namely hard bituminous coal, brown coal, peat, crude oil and natural gas.

of Amsterdam of 1997, where the sustainable development principle and high environmental standards were defined as one of the objectives of the European Union. The documents from following years, such as Commission communication of 1998 on including the environmental protection issue into the Community policy, also emphasised the significance which the Union attached to that issue. In 2008, the European Union adopted the so-called climate and energy package, which prescribed, among other things, the decrease in the emission of greenhouse gases emitted by power stations and other energy-consuming branches of the economy by 21% by 2010 compared with 2005 (Wnukowski, 2010). On 22 January 2014, the European Commission proposed another energy and climate package including two goals which are to be met by 2030. The former assumes the cut of greenhouse gas emissions by 40% and the latter – the increase in the share of renewable energy to 27%, without specifying the share at the country level (Gawlikowska-Fyk, 2014). Each year the share of renewable energy in Poland and in general in the European Union in total amount of generated energy increases, which is illustrated by Table 1.

The share of renewable energy in 2009 in Germany amounted to 25.2%, in Austria – 72.7%, Lithuania – 90.1%, Latvia – 99.8%, Czech Republic – 9.5% (GUS 2013). A high share of solid biofuels in the EU countries should be noted (Table 2). In Germany, there is a high share of wind energy (13.4%) and biogas (16.1%), and in Sweden – water energy (36.3%). In the years 2003–2012, the share of electric energy acquired from solid biofuels in renewable energy in Poland increased from 17.73% to 56.45% whereas from wind – from 5.51% to 28.12%. On the other hand, the share of electric energy acquired from water decreased from 74.27% to 12.07% (GUS, 2013).

The GUS report shows that, the basic solid biofuel in Poland is firewood in the form of logs, chips and briquette, pellet fuels and forestry waste in the form of unusual dimensions: branches, perches, bushes, brushwood, stumps, as well as waste from wood industry (shaving, sawdust) and paper industry (black liquor). A separate group consists of fuels acquired from the plantations designed for energy purposes (fast growing trees, dicotyledon perennial plants, herbaceous perennial plants, grains grown for energy purposes), as well as the organic waste from agriculture and gardening (e.g. gardening waste, animal faces, straw) (GUS, 2013).

IMPLEMENTING A PROJECT (CONSTRUCTION OF WIND POWER STATION, AND BIOGAS PLANTS)

As statistical data confirm, in the recent years wind energy has accounted for more and more total renewable energy in our country. It is worth indicating that Poland came third in the renewable energy market in the European Union in terms of the increase in new projects with 892.8 MW installed in 2013. It constitutes the growth by 28.1% compared to the previous year. Poland has appropriate geographical conditions with favourable wind zones. As an example, the Baltic Sea coastline regions,

Table 1. Share of energy from renewable sources
Tabela 1. Udział energii ze źródeł odnawialnych

Area Obszar	2003	2005	2007	2008	2010	2011
Share of energy from renewable sources in primary energy altogether in EU (%) Udział energii ze źródeł odnawialnych w energii pierwotnej ogółem w UE (%)	11.1	12.9	15.6	16.7	20.1	20.3
Share of energy from renewable sources in primary energy altogether in Poland (%) Udział energii ze źródeł odnawialnych w energii pierwotnej ogółem w Polsce (%)	5.2	5.8	6.7	7.6	10.2	10.9

Source: own elaboration based on GUS, 2013.
Źródło: opracowanie własne na podstawie GUS, 2013.

Table 2. Structure of energy acquiring according to selected sources in selected EU countries in 2011
Tabela 2. Struktura pozyskania energii według wybranych źródeł w wybranych krajach UE w 2011 roku

Selected sources of renewable energy in 2011 Wybrane źródła energii odnawialnej w 2011	EU UE	Czech Republic Czechy	Germany Niemcy	Poland Polska	Latvia Łotwa	Sweden Szwecja
Solid biofuels Biopaliwa stałe	48.1%	68.6%	37.4%	85.3%	84.1%	51.8%
Solar energy Energia słoneczna	3.7%	6.5%	7.1%	0.1%	–	0.1%
Water energy Energia wody	16.3%	5.6%	4.7%	2.7%	12.0%	36.3%
Wind energy Energia wiatru	9.5%	1.1%	13.4%	3.7%	0.3%	3.3%
Biogas Biogaz	6.3%	8.2%	16.1%	1.8%	1.1%	2.8%
Liquid biofuels Biopaliwa ciekłe	7.1%	7.3%	11.7%	5.8%	2.6%	3.2%

Source: own elaboration based on GUS, 2013.
Źródło: opracowanie własne na podstawie GUS, 2013.

east and northern-east of Poland and the mountainous southern regions of Dolny Śląsk and lower ranges of the Karpaty mountains are worth mentioning (Biuletyn OZE – energetyka wiatrowa).

The construction of a wind farm is a complicated and complex investment process which requires proper preparation, financial resources and logistics management. The first stage involves preparing the project, which is connected with determining the investor's right to have at their disposal the land assigned to building purposes; providing proper financial sources and documents. There are some opinions, however, that high volume of infrasounds are detrimental to health. That is why it is of importance to properly plan and find proper lands located at a long distance from residential buildings. Most often the lands assigned to a construction of wind farms are agricultural and not building areas (Energia wiatru. Ważne pytania – ważne odpowiedzi).

Legal titles to land assigned for projects are usually ensured by lease contracts or the so-called agreements for using the land for the purposes of building and operating wind farm plants made between an investor and land owners. As for the access roads, however, easement contracts are made. A built wind power station has to be properly connected to transformer stations by means of cables. It is also worth adding that built wind power plants must be connected by means of an adequate network with transformer stations. The issue of using the land to carry out the appropriate wiring is regulated under civil law contracts.

Windmill projects contracts are often made for 25 years with the possibility of extending them by further periods. The process of signing the contracts is, however, spread over time. Investors apply contract templates which are not always beneficial for the land owners. Therefore, not everyone makes such contracts right away, sometimes lengthy negotiations take place. The construction of wind plants is needed and unavoidable. At the same time, agricultural producers should ensure themselves beneficial conditions of contracts as the balance between the parties needs to be maintained. Moreover, allocating the lands for renewable energy projects results in different tax obligations (Suchoń, 2014). It is worth explaining that the Supreme Court in its decision of 5 October 2012 ruled that "the contract providing a party with the right to generate income from the sales

of electric energy obtained from processing wind energy by means of wind turbines in turn for periodical monetary benefit defined as the percentage from the value of sold electric energy is an innominate contract to which, to the matters not regulated in such a contract, provisions of the civil code on lease can apply"[9]. The limited scope of the article does not allow to refer to that decision. Many specialists in the subject, however, do not agree with the decision of the Supreme Court, which is exemplified by, among other things, the gloss to the above-mentioned decision by Ł. M. Wyszomirski. The problem is whether the contract under which the land is allocated for renewable energy project can be deemed to be a lease contract or whether it falls into the category of an innominate contract regulated by the Civil Code provisions on lease.

The logistics process connected with building biogas plants is complicated. An investor usually purchases the lands but the problems start when the owners of adjacent lands start protesting and objecting to the project. The owners of adjacent lands, being interested parties, can use administrative procedure, for example appeal or lodge a complaint to administrative court. The basic document in relation to the project in a building permit, which is an administrative decision allowing to start the carrying out of the construction or carrying out of construction works different than a non-building structure. Important is that in the light of the Act of 7 July 1994 Construction Law, an investor can build also on the lands assigned under obligation agreement (e.g. lease agreement) provided the agreement prescribes the construction licence. Except for the building permit, the construction of a biogas plant or wind power station usually requires a lot of additional documents, often depending on the scale of the project, for example a feasibility study, report on the environmental impact, decision on environmental conditions and on land development (Mazowiecka Agencja Energetyczna, 2009). It also needs to be determined whether a selected location of the project will have a negative impact on the network of protected areas NATURA 2000. The negative impact may make the whole procedure much longer (Oniszk-Popławska, 2009).

One of the basic problems relating to projects are undoubtedly, financial resources. It refers especially to the construction of biogas plants. In 2008, agricultural biogas accounted only for 0.05% of end energy consumption from renewable sources in Poland and the share of all types of biogas, together with sewage and dump biogas, amounted to about 2.3% (GUS, 2009). Currently, the situation is a bit better. Under law it is the president of the Agricultural Market Agency who is responsible for maintaining of the Register of power companies dealing with the production of agricultural biogas. As of 16 August 2014, there are 45 entities in the Register maintained by the president of the Agricultural Market Agency[10], mainly large capital companies (joint-stock companies and capital companies).

Undoubtedly, that is not enough, especially that the document "The directions of the development of agricultural biogas plants in Poland in 2010-2020", says that its objective is to create the conditions to implement about two thousand projects on agricultural biogas plants in Poland by 2020. Most agricultural communes have the proper amount of waste biomass so they can set up on average 1 biogas plant of 0.5-1 MWel (Ministry of Economy, 2010b). The obstacle is the lack of financial means. Within the framework of the Operational Programme Infrastructure and Environment, action 9.4 (support for biogas plant focused on producing mainly electric energy) and 9.1 (support for biogas energy as part of promoting highly-efficient cogeneration) it was possible to obtain a subsidy but it required meeting a number of requirements (Ministry of Economy, 2010b).

It is worth mentioning that in the EU countries where biogas plants are popular, they are often owned by cooperatives, also agricultural. Their members are for example agricultural producers who supply biomass.

As for Poland, cooperative Nasza Energia should be mentioned. It was established in 2014 in the Lublin voivodeship, on the initiative of four neighbouring municipalities Sitno, Skierbieszów, Łabunie, and Komarów-Osada , as well as Bio Power Ltd. Zamosc. The investment involved the construction of biogas plants complex of interconnected autonomous network, each with a capacity ranging from 0.5–1 MW[11]. Not only residents of the above-mentioned municipalities may become members of a cooperative but also

[9] Retrieved July 16th 2014 from: http://legalis.pl.

[10] Retrieved August 16th 2014 from: http:// arr.gov.pl/index.php?option=com_content&view=article&id=792&Itemid=552.

[11] Retrieved January 15th 2015 from: http://nasza-energia.com.

every natural or legal person interested in participating in building the first energy cooperative in Poland[12].

In some countries of the European Union the biogas plants are built as part of public-private partnership (Curkowski et al., 2011). In Poland there is the act regulating that issue but it is not often used in practice. The total number of projects in all fields in 2009, 2010 and 2011 amounted to 35, 52 and 14 respectively – in total 103 (Herbst, Jadach-Sepioło, Marczewska 2012). The Act of 19 December 2008 on public-private partnership says that the object of public-private partnership is joint implementation of a project based on the division of tasks and risks between a public entity and private partner (Skoczyński, 2012).

Under the contract of public-private partnership the private partner commits himself to implement the project at a remuneration and to cover in whole or in part the expenditure for project implementation or cover them by a third party while the public entity commits itself to collaborate for the purpose of achievement of the project goal, in particular by making own contribution (Skoczyński, 2012).

The second stage of the project implementation involves the construction and supervision over the project. As for larger building projects, especially those relating to wind power stations, investors use the Contract Engineer. It is a function included in FIDIC principles created by Federation Internationale Des Ingenieurs-Conseils (FIDIC) – on the basis of the experiences acquired in the course of carrying out such projects within many years. Attention should be given to Conditions of Contracts for Construction (the Red Book); Conditions of Contracts for Plant and Design-built (Yellow Book); Conditions of Contract for EPC/Turnkey Projects (Silver Book). The priority is given to contractual provisions and Polish mandatory provisions (e.g. the Act on Construction Law and its secondary legislation, civil code). The general come second Contract Conditions (FIDIC template). It is worth mentioning that the European Commission recommended FIDIC as a contract template for the contractor in infrastructure undertakings (projects), financed with the EU funding and loans from the European Investment Bank (Piliszka, 2006).

The contract engineer supervises the investment process and that is why he/she needs to be supported by qualified and experienced team members. Their knowledge and skills have a key impact on the quality of the supervision and made decisions (Szewczyk, 2010). Basic duties of the contract engineer include investor's supervision over the construction works being part of a contract. Moreover, contracts often lay down that the contract engineer performs duties of the advisor of the Orderer and building supervision as defined in Polish building law. In such case the tasks of a contract engineer include performing duties of a site manager pursuant to the Articles 25, 26 of Building Law; coordinator of investor's supervision (Article 27 of Building Law). The contract engineer often fills in for the Orderer as an investor, as laid down in Article 18 of Building Law.

GENERATING ELECTRICAL ENERGY FROM AGRICULTURAL BIOGAS

The construction of a biogas plant is followed by the operation phase, which requires meeting a number of statutory obligations. First of all, an economic activity in the field of generating: 1) agricultural biogas in the installations of renewable energy source, 2) electricity from agricultural biogas in the installations other than a micro-installation – it is, in principle, a regulated activity within the meaning of the Act on freedom of economic activity (with some exceptions) and requires entry in the register of manufacturers engaged in business activities in the field of agricultural biogas, called the "Register of Manufacturers of Agricultural Biogas". This register is run by AMA President, who makes an entry in the register of agricultural biogas generators based on an application of the producer who conducts a business activity in the field of agricultural biogas. Additionally, the power company running an activity relating to the production of agricultural biogas or producing electric energy from agricultural biogas is obliged to take some specific actions:

Firstly, to use the resources, namely agricultural biogas. The act on renewable energy sources defines agricultural biogas as a gas fuel acquired in the process of methane fermentation of agricultural resources, agricultural by-products, solid or liquid animal faeces, by-products or co-products coming from processing agricultural products or forest biomass, except for gas acquired from the resources coming from sewage treatment plant or waste stockpile.

[12] Retrieved January 15th 2015 from: http://nasza-energia.com/misja.

Secondly, to keep record about: a) the amount and types of resources used to generate agricultural biogas or electric energy from agricultural biogas, b) the amount of generated agricultural biogas, specifying the amount of agricultural biogas put into the gas distribution chain, used to generate electric energy in separate systems or combined heat and power system or used in a different way c) the amount of heat and electric power generated from agricultural biogas or in a separate system or combined heat and power system; d) the amount of electricity sold, including the amount of electricity sold to the obliged seller, referred to in Article 40 paragraph. 1, which is produced from agricultural biogas and introduced into the distribution network, e) the amount of by-product resulting from gas generation farm.

Thirdly, to provide the president of the Agricultural Market Agency, within 45 days after the end of a quarter, with quarterly reports including information mentioned in (2) according to a template drafted and made available by the Agricultural Market Agency.

At the same time is should be emphasised that the Act on renewable energy sources has introduced some simplifications concerning the agricultural producers.

A producer of electricity from agricultural biogas in micro-installations[13] and a manufacturer of agricultural biogas who are natural persons entered into the register of producers referred to in the provisions of the national registration system of producers, farm records and records of claims for payment, who produce electricity from agricultural biogas or agricultural biogas to use it for their own needs, may sell: 1) unused electricity generated from agricultural biogas in micro-installations; 2) unused agricultural biogas produced in the installation of renewable energy sources with an annual capacity of no more than 160 thousand m3 and introduced to the grid. The production and sale of electricity from agricultural biogas and agricultural biogas does not constitute an economic activity within the meaning of the Act on freedom of economic activity.

A producer of electricity from agricultural biogas in micro-installations and a manufacturer of agricultural biogas to install renewable energy source which are: 1) natural persons entered into the register of producers referred to in the provisions of the national registration system of producers, farm records and records of claims for payment, generating electricity from agricultural biogas or agricultural biogas to use it for their own needs, 2) entrepreneurs within the meaning of the Act on Freedom of Economic Activity – In writing, inform the operator of the electricity distribution system or a gas distribution system operator to whose network the micro-installation is to be attached or the installation of renewable energy sources in which agricultural biogas will be generated on the planned date of connection of these installations, micro-installations of the planned location and the type micro-installations and its installed electrical capacity and, in case of a manufacturer of agricultural biogas – an annual capacity of this plant (art. 20 act on renewable energy sources).

CONCLUSION

The analyses made in the paper allow to draw the following conclusions. Statistical data show that renewable wind energy share in Poland is higher and higher. During the last years quite a few new wind farms projects have been constructed and commissioned. At the end of September 2013, there were 795 Polish wind power plants with a total capacity of 3 082 MW (TPA Horwath, 2013). There is no doubt, however, that logistics management, both during implementing a project and after, when the power is consumed, is not easy. It entails not only the necessity to meet a large number of legal requirements but also to consider a lot of social and environmental aspects. The project itself and a lot of factors connected with it, such as the force of the wind in a given region, the distance from buildings and, then, making contracts for using the lands for building purposes constitute a complex process. On the one hand, such projects are undoubtedly necessary and they fit into the principle of protecting the climate, protecting the environment and sustainable development. Logistics management, on the other hand, at the stage of planning the implementation of a project should also take into consideration the rights of an owner to enjoy peaceful and undisturbed possession of lands and the protection of an agricultural activity. Close proximity of wind power stations to residential buildings has a negative influence on health. Moreover, excluding lands from agricultural activity in order to build wind farms and, then,

[13] Micro installations – installations of renewable energy with a total installed capacity no greater than 40 kW connected to the power grid with a rated voltage less than 110 kV or an achievable associated heat capacity no greater than 120 kW (art. 2 act on renewable energy sources).

the distance, impact agriculture in a negative way. That is why, while planning a project it is important to select low class agricultural lands located far from buildings. The implementation of a project requires obtaining a large number of decisions and then, supervising the effective completion of the project. That is why, it is a common practice to use a substitute investor or Engineer under standard FIDIC in farm wind projects. In this case, an entrepreneur having professional experience and a team of qualified employees deals with the preparation and implementation of a project, namely logistics management of its stages, using modern technologies, passing on information and taking care of an operation phase, namely the chain of renewable energy supply to a consumer.

It is usual that large enterprises, namely capital companies, invest in the construction of biogas plants in Poland. There are not enough biogas plants owned by agricultural producers or cooperatives of farmers (owned by agricultural producers, which is common in the Western European countries). Biogas supply chain depends on legal regulations, among other things, on the entry in the Regulated Activity Register, possessing biogas meeting requirements laid down by regulations, keeping records, etc. At the same time adopting the act on renewable energy sources creates new possibilities for renewable energy development, including carrying out of investments by agricultural producers.

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WYBRANE ZAGADNIENIA PRAWNE ENERGII ODNAWIALNEJ W ASPEKCIE ZARZĄDZANIA LOGISTYCZNEGO

Streszczenie. Celem artykułu było przedstawienie źródeł energii odnawialnej w Polsce na tle innych państw UE, a także ocena regulacji prawnych związanych z realizacją inwestycji w zakresie energii odnawialnej i jej eksploatacją w kontekście zarządzania logistycznego. Zaprezentowano definicję oraz dane statystyczne dotyczące energii odnawialnej. W dalszej kolejności rozważania koncentrowały się na prawnych aspektach procesu budowlanego elektrowni wiatrowych oraz biogazowi. Zwrócono uwagę na fazę organizacji inwestycji, w tym na zagwarantowanie tytułu prawnego do gruntów i konieczność uzyskania, oprócz pozwolenia na budowę, także innych decyzji. Następnie w artykule zaprezentowano wybrane zagadnienia poświęcone finansowaniu przedsięwzięć oraz instytucji inżyniera kontraktów. Nawiązano także do etapu eksploatacji biogazowni oraz obowiązków związanych z biogazem rolniczym.

Słowa kluczowe: energia odnawialna, elektrownie wiatrowe, biogazownie, zarządzanie logistyczne

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