ANNALS OF THE POLISH ASSOCIATION
OF AGRICULTURAL AND AGRIBUSINESS ECONOMISTS

Received: 15.08.2022
Acceptance: 17.09.2022
Published: 24.09.2022
JEL codes: Q20, Q40

Annals PAAAE • 2022 • Vol. XXIV • No. (3)

DOI: 10.5604/01.3001.0015.9766

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ENERGY CLUSTERS IN LIGHT OF THE AMENDMENT TO THE ACT ON RENEWABLE ENERGY SOURCES (RES)

Key words: energy clusters, renewable energy sources, legislative changes, prosumer, RES Act

ABSTRACT. The aim of the article is to present the idea of energy clusters and legislative changes concerning the creation of energy clusters. An attempt was made to theoretically analyze the concept of energy clusters in light of the amendment to the Act on renewable energy sources (RES). The method of literature review was applied and the most important items concerning the functioning of energy clusters were referred to. Provisions of subsequent RES laws regarding energy clusters were presented, starting from the Act of February 20, 2015, in which the definition of an energy cluster appeared for the first time, and ending with the latest amendment to the Act of February 24, 2022. It was found that the progressing globalization encourages austerity measures, especially in the energy sector, which contributes to the development of the economy. The way to meet the requirements of the European Union regarding increasing the share of renewable energy sources in the energy mix and limiting the consumption of conventional resources may be achived by distributed energy based on the activities of prosumers, which is undoubtedly manifested by energy clusters.

INTRODUCTION

Contrary to popular perception, the concept of clusters is nothing new, but few authors undertake research in this area [Gronkowska 2021, Staszków et al. 2017]. On the other hand, generally available studies are published which, due to the changing legal conditions regarding RES, prepare and motivate potential prosumers to function in clusters [Baker et al. 2021]. The concept of clusters consisting in focusing a group of specialized entities in one area was introduced as early as the 19th century [Marshall 1890]. Nevertheless, the concept of currently functioning clusters dates back to the beginning of the 1990s and Michael Porter is considered its founder, who defines the cluster as "... a group of enterprises and related institutions in a specific field, linked by similarities, located in

a geographical neighborhood and complementing each other ...” [Porter 2000]. In the energy sector, the concept of clusters is perceived somewhat differently as: “a tool for the development of modern power systems based on renewable energy”, the basis of which should be distributed energy based on prosumers [Popczyk 2011]. In order for the above idea to become real, the focus was on creating multi-entity structures (clusters) within which energy is produced and consumed mainly at the local level [Jabłońska 2015, Siudek, Klepacka 2020]. The potential of energy clusters has also been noticed in Poland. A manifestation of this is the amendment to the Act of February 20, 2015 on renewable energy sources (RES) [Journal of Laws, 2016, item 925], carried out in June 2016, under which the institution of energy clusters was introduced into the Polish legal system [Journal of Laws, 2015, item 4].

The aim of the article is to present the idea of energy clusters and to present the provisions of the amended RES Act on the creation of energy clusters. The method of reviewing the literature on the subject was used and reference was made to the most important, according to the authors of the article, items concerning the functioning of energy clusters in the Polish legal system.

INTRODUCING ENERGY CLUSTERS INTO POLISH LEGISLATION

As mentioned, the concept of an energy cluster in Polish legislation appeared for the first time in the amendment to the RES Act of June 22, 2016, and the number of provisions in the Act on the energy cluster is rather modest. Apart from the definition (Art. 2, point 15a), the act contains only a few details concerning the functioning of the energy cluster, included in Art. 38a, and information on a separate auction basket for the sale of electricity generated in renewable energy source installations by members of an energy cluster (Art. 73).

When reviewing the existing regulations and analyzing the model of functioning energy clusters, it was found that the regulations contained in the act do not ensure the effective development of these cooperative structures in Poland, and the formula of the cluster operation requires greater emphasis on cooperation with local governments and bringing benefits primarily to local communities [Pylak et al. 2017].

An energy cluster is, within the meaning of the Act “... a civil law agreement, which may include natural persons, legal entities, scientific units, research institutes or local government units, regarding the production and balancing of demand, distribution or trade in energy from renewable energy sources or from other sources. or fuels, within the distribution network with a rated voltage lower than 110 kV, in the area of operation of this cluster not exceeding the boundaries of one poviat within the meaning of the Act of June 5, 1998 on poviat self-government [Journal of Laws, 2016, item 814] or 5 communes within the meaning of the Act of March 8, 1990 on the local government [Journal of Laws, 2016, item 446]”.

There is no doubt that the definition of a cluster is quite unclear, and the scope of activities carried out within a cluster may be exceptionally wide – from electricity generation through distribution to trading [Sołtysik et al. 2018, Mataczyńska, Kucharska 2020]. The provisions of the RES Act describe the outline of the institution of the energy cluster in a very general manner.

Pursuant to Art. 2 point 15a of the RES Act, the energy cluster takes the form of a civil law agreement. The ambiguity results primarily from the term "civil law agreement" used in the definition, which in the first place brings to mind a certain civil contract between individual entities regulating the principles of their cooperation. Therefore, it should be assumed that the energy cluster is an institution of a voluntary nature, and entities interested in participation have great freedom in shaping the principles of cluster functioning, including mutual rights and obligations. Another problem related to the very definition provided in the Act is that the term "civil law agreement" does not function in the Polish legal system. It is pointed out that it is not advisable to mention scientific units, research institutes and local government units in the definition, as they are legal persons, and legal persons have been indicated in the definition [Adamska et al. 2017]. A cluster formed on the basis of an unnamed civil contract is therefore not endowed with legal capacity. In practice, therefore, it will be necessary to establish additional separate business entities in the form of commercial companies, associations or cooperatives, as they are a separate part of the civil law system. Both micro- and macro-clusters are also required to obtain the necessary licenses for energy production, distribution and trading [Rabiega 2021]. It is worth noting that the legislator in the definition indicated a very wide group of entities that may be cluster members. They can be both natural persons (prosumers), as well as local government units and municipal companies [Maśliński 2016]. Undoubtedly, on the one hand, a broad approach to entities that can create a cluster makes it possible for all interested entities to participate in this undertaking. On the other hand, a question arises regarding the practical aspects of the functioning of the cluster, and more specifically about the issues related to defining the rules of participation and the degree of involvement of individual members.

Another element distinguished in the definition of energy clusters concerns the subject of its activity. Pursuant to Art. 2 point 15a of the RES Act, the concluded agreement should concern: generation and demand balancing, distribution or trade in energy from renewable energy sources or from other sources or fuels within the distribution network with a rated voltage lower than 110 kV. It follows from the literal wording of the definition of an energy cluster that it is not limited only to projects aimed at generating energy from RES. The legislator clearly emphasized that the activity of the cluster with the use of other sources or fuels, including conventional fuels, is also allowed. It seems, however, that ultimately energy clusters should focus on green energy, and other sources of energy generation should be complementary sources, i.e. balancing and supporting the system. The word

"applicable" in the description of the subject of the cluster's activity is also controversial. The phrase that an energy cluster is an agreement "concerning the generation and balancing of demand, distribution or trade in energy" opens up a wide field of interpretation as to the actual object of the cluster activity.

In the part of the definition concerning the area of energy cluster activity, there seems to be no clarification that it does not exceed the boundaries of one poviat or five neighboring communes. Currently, there is no condition in the definition of neighboring municipalities, but it seems to be purposeful as the whole concept of energy clusters concerns mainly rural areas and local energy use.

A rather vague picture of energy clusters emerges from the legislation in force. Undoubtedly, the intention of the legislator was to create a legal institution that would contribute to grouping energy producers and consumers from a given area in such a way as to maximize energy flows between them. Such a conclusion results directly from the definition of an energy cluster, which refers to "balancing the demand" of electricity from RES and other sources within a given network. However, is this sufficient motivation to create a complex organizational structure? This problem has been noticed during numerous public consultations on energy clusters, according to which it will be of key importance for clusters to determine the direction of development of such agreements. Namely, whether they will constitute an institution aimed at supporting the development of energy based on renewable energy sources, or a form of building an interactive electricity market (IREE). So far, many questions remain unanswered. As a result, in the context of energy clusters, we can speak of the principle "what is not forbidden is allowed".

THE AMENDMENT OF THE RES ACT OF 2022 AS A CHANCE FOR ENERGY CLUSTERS

After several years of efforts, the idea of local power systems seems to take real shape, being reflected in the provisions of the next amendment to the RES Act. The draft of February 24, 2022 of the act amending the act on renewable energy sources and some other acts provides for significant changes, including in terms of the functioning of energy clusters. The existing legal regulations have been extended with many requirements, however, according to the authors, they will provide energy clusters with many additional benefits. While continuing to promote the development of energy clusters, the bill in this area includes:

– establishing clear rules for concluding an agreement on establishing an energy cluster and changing the definition of an energy cluster;
– clarification of the provisions defining the subjective and objective scope as well as the area of operation of an energy cluster;

- adding an energy cluster purpose;
- creating a register of energy clusters and defining the rules of its operation;
- ensuring conditions for the development of energy clusters by introducing a mechanism for awarding energy generated by members of the energy cluster;
- facilitating the cooperation of individual members of an energy cluster with distribution system operators by defining detailed principles of this cooperation;
- determination of the requirements, the fulfillment of which by the energy cluster will enable the use of the exemption from fees specified in the Act and the preferential method of settlements (requirements regarding the degree of coverage during the year of the total own needs of energy cluster members in terms of electricity, total installed electricity capacity, for energy storage at the level specified in the Act, as well as the requirement that at least 30% (and from January 1, 2027, at least 50%) of the energy generated in the energy cluster comes from RES).

In line with the above, the following will change, inter alia, statutory definition of an energy cluster. Pursuant to the wording of the act, an energy cluster is an "agreement the subject of which is cooperation in the field of production, storage and demand balancing, distribution or trade in electricity, heat or solid, liquid and gaseous fuels that are carriers of chemical energy, to which at least one entity is a part of local government and the aim of which is to provide economic, social or environmental benefits to the parties to the agreement or to increase the flexibility of the power system".

The amended definition first of all introduces the requirement of the participation of a local government unit (LGU) in the energy cluster.

From the perspective of the cluster members, the above-mentioned point concerning the introduction of a bonus mechanism for the use of energy produced by cluster members for own needs is important. The basic mechanism of preferences for energy clusters will include exemptions from the RES fee, cogeneration fee, excise duty and obligations related to certificates of origin for electricity generated from RES by members of the energy cluster and consumed by its members. Additionally, an additional support instrument is provided for cluster members who show the level of self-consumption above 60%. It is to include a discount on the variable components of the distribution tariff – with self-consumption above 60%, the discount will amount to 5%, and in the case of 100% self-consumption, as much as 25%. These solutions, in accordance with the assumptions of the draft act, are temporary and will be valid until December 31, 2029. The project initiator estimates that as a result of the introduced solutions, about 300 new energy clusters may be created in Poland by 2029.

Undoubtedly, an important element of the new regulations on energy clusters are the support instruments for such initiatives. Namely, the RES Act guarantees cluster coordinators the possibility of establishing cooperation with the appropriate operator of

the distribution network. According to Art. 38a paragraph. 3 of the RES Act, the operator of the distribution system with which the energy cluster intends to cooperate is obliged to conclude an agreement with the coordinator of the energy cluster for the provision of distribution services, referred to in Art. 5 of the Energy Law. Moreover, the act provides for a separate auction basket for entities participating in the energy cluster draft of the amended act also provides for many statutory requirements regarding the content of the cluster agreement. First of all, it should be made in writing, otherwise null and void, and contain the following elements:

– rights and obligations of the parties included in the energy cluster;
– the scope of the cooperation within the energy cluster;
– giving the energy cluster coordinator strictly defined rights and obligations;
– indication of the area of activity within the energy cluster, indicating the energy consumption points of the cluster members;
– agreement termination rules.

Moreover, the energy cluster is to be entered into the register of clusters kept by the President of the Energy Regulatory Office.

CURRENTLY FUNCTIONING ENERGY CLUSTERS IN POLAND

In 2015, the Polish Agency for Enterprise Development (PARP) carried out an inventory of clusters in Poland. 134 clusters operating in Poland were identified. The analyzed population of 134 clusters was established in the years 2003-2015. The two oldest clusters were established in 2003, and the most clusters were established in 2011 (26 clusters). Over 60% of inventoried clusters were established in 2011-2015 (81 clusters). The oldest clusters exist for 12 years, and the average age of an energy cluster operating in Poland is over 4 years [Buczyńska et al. 2016]. Moreover, in 2018, the Ministry of Energy announced on May 9 the results of the 1st Competition for energy clusters by awarding the first Pilot Energy Cluster Certificates. On November 6, 2018, the results of the 2nd Competition for energy clusters were adjudicated and announced, with the award of further Pilot Energy Cluster Certificates.

Among the 66 winners, the largest number of energy clusters that received the title of pilot energy clusters are located in the Mazowieckie Voivodeship (10), while the lowest in the Świętokrzyskie Voivodeship (1). A complete list of energy clusters with the dominant source of renewable energy used in them is provided in the article by Aleksandra Siudek and Anna Klepacka [2020].

In Poland, energy clusters are young in comparison to clusters in Europe. According to the benchmarking carried out in Europe as part of the NGP Excellence project, energy clusters in Europe were created in 1997-2010 (in Finland in 1997-2007, in Germany in

1998-2006, in Austria – 1999-2003, in Denmark – 2003-2010, in Norway – 2003-2007, Sweden – after 2004, France – after 2005 and Spain – after 2006, and at the latest in Iceland – after 2007).

Energy cooperatives are a parallel organizational form similar to cluster initiatives. According to a 2020 study by the European Union›s Joint Research Center, the countries with the largest number of energy communities are primarily their western neighbors – Germany (1,750 energy communities), followed by Denmark (700) and the Netherlands (500).

Table 1. Advantages and disadvantages of the functioning of energy clusters

Advantages	Disadvantages
– reduction of energy transmission losses; – stopping the outflow of money from a given local government unit (funds intended to pay for the supply of electricity and fuel are no longer „moved" outside the region, because residents cease to partially pay fees to global energy companies for energy produced from small, local RES sources); – the ability to precisely match the capacity of generating units to the demand (high flexibility of work, adapted to the needs of consumers and price conditions on energy markets); – use of local raw materials; – sale of surplus energy to the NPS (increase in the capacity of sources generating electricity from RES has a chance to reduce the volume of fuel imports – membership in the energy cluster is a chance to purchase energy cheaper); – support for scientific and industrial centers in order to implement a common idea (exchange of experiences).	– the existing electricity infrastructure (the existing local infrastructure has limited technical capabilities to connect additional generating sources, the need to carry out the necessary expansion and modernization of the network in order to adapt it to the changing needs of the local market generates high costs, which will be covered by the entity applying for the connection to the network); – a limited area of the cluster delimited by the point of connection of sources and receivers (possible appearance of strong competition between entities); – insufficient knowledge of the proposed changes, which translates into fear of new solutions; – large and long-term investment costs (the cost of building renewable energy installations is a challenge, but there are many ways to finance their construction, including: own funds, bank loans, crowdfunding, foreign funds, European funds, basing the system on feed-in tariffs); – a continuous increase in the number of renewable energy sources may in the future make it difficult to balance the system.

Source: own study

In Poland, in 2019, there were only 12 energy cooperatives [Błażejowska, Gostomczyk 2018]. The experience of Western countries shows that energy cooperatives evolve and may take higher forms over time, becoming part of the civic energy sector. Energy cooperatives can be viewed as a transitional form from a prosumer to an energy cluster.

Table 1 presents the most important advantages and disadvantages of energy clusters and the consequences of their formation.

SUMMARY

Energy clusters raised high hopes on the market related to the possibility of actively shaping the local energy market in accordance with local conditions and with the participation of local entities. As follows from the amendment to the act, the initiators of energy clusters should be primarily local government units. The development of energy cooperatives and energy clusters is part of the sustainable development policy of individual European countries. In many countries, they have become an element of green economy, local and regional development and one of the paths of environmental policy. The undertaking is intended to establish and develop cooperation: for the development of local energy efficiency and the development of local renewable energy resources based on knowledge transfer, implementation of innovative solutions in the energy sector and improvement of the competitiveness of entities forming the "Energy Cluster", as well as creating a region open to the development of clean technologies that significantly reduce the burden and environmental effects generated by the traditional energy sector.

In the long term, placing RES in the national power system may affect the possibility of their further and rapid development. While, in the light of the draft amendment to the RES Act, the possibilities for the development of local energy are becoming greater than before, but they still seem insufficient for the mass development of such initiatives. The National Chamber of Energy Clusters estimates that there are currently 60 active energy clusters on the Polish market. At the same time, the announcement of the amendment to the RES Act stimulated the market, which means that this sector is more active than before. According to the assumptions, in the following years, on average, approx. 25 clusters will be created annually. As a result, in accordance with the assumptions of the draft act, by 2029, approximately 300 energy clusters will be created in Poland, which will have a generation capacity of 840 GWh per year.

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KLASTRY ENERGII W ŚWIETLE NOWELIZACJI USTAWY O ODNAWIALNYCH ŹRÓDŁACH ENERGII (OZE)

Słowa kluczowe: klastry energii, odnawialne źródła energii, zmiany legislacyjne, prosument, ustawa OZE

ABSTRAKT

Celem artykułu jest przedstawienie idei klastrów energii i przybliżenie zmian legislacyjnych, dotyczących tworzenia klastrów energii. Podjęto próbę teoretycznej analizy pojęcia klastrów energii w świetle nowelizacji ustawy o odnawialnych źródłach energii (OZE). Zastosowano metodę przeglądu literatury przedmiotu i odniesiono się do najważniejszych pozycji dotyczących funkcjonowania klastrów energii**.** Przedstawiono przepisy kolejnych ustaw o OZE dotyczące klastrów energii, począwszy od ustawy z 20 lutego 2015 roku, w której po raz pierwszy pojawiła się definicja klastra energii, a skończywszy na najnowszej nowelizacji ustawy z 24 lutego 2022 roku. Stwierdzono, że postępująca globalizacja skłania do działań oszczędnościowych, zwłaszcza w sektorze energetyki, która przyczynia się do rozwoju gospodarki. Sposobem na sprostanie wymogom Unii Europejskiej, dotyczącej zwiększenia udziału OZE w koszyku energetycznym i ograniczenia zużycia zasobów konwencjonalnych, może stać się energetyka rozproszona oparta na działaniach prosumentów, czego niewątpliwie przejawem są klastry energii.

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Proposed citation of the article:
Siudek Aleksandra, Anna M. Klepacka. 2022. Energy clusters in the light of the amendment to the act on Renewable Energy Sources (RES). *Annals PAAAE* XXIV (3): 149-159.