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DETERMINANTS OF RES IMPLEMENTATION IN POLAND AND THE EUROPEAN UNION

The article explores some potential conditions for the introduction of renewable energy sources taking into account the legal, social and institutional aspects. Current research results confirm that in the world there are huge resources of renewable energy sources, especially hydropower, wind power, biomass. Technical progress in the field of renewable energy sources will further increase their use.

Key words: *renewable energy sources, energy management, energy clusters.*

*“Europe is on the brink of a clean energy revolution... The Commission has cleared the way to a more competitive, modern and cleaner energy system”
Commissioner for Climate Action and Energy, Miguel Arias Cañete (2016)*

Introduction. The European Union (EU) imports 53% of the energy it consumes, 6 Member States import gas only from one external supplier, 75% of residential buildings in the EU are energy inefficient, 94% of transport uses petroleum products that are in 90% imported; comparing to the USA, wholesale electricity prices are 30% higher in the EU and gas - more than 100%¹, hence the issue of sustainable management of energy sources and rational use of renewable sources (RES)² is on many levels an important issue in every EU member state. The management of energy sources should be considered in the context of the implementation of energy policy bringing measurable economic, environmental and social effects. The implementation of this process is one of the ways to reduce costs and energy consumption, while maintaining conditions for the desired socio-economic development of each economy³. In 2016, the EU pledged to reduce the CO₂ emissions by at least 40% by 2030, focusing on the so-called decarbonization in the light of which dependence on coal will be lower by 57% in 2030 compared to 2015, and the share of non-fossil fuels in energy production by 72% in 2030 as well as modernization of the EU economy, including the need to create new work places. The following fun-

¹ <http://www.consilium.europa.eu/pl/policies/energy-union/>

² Renewable energy means energy from natural recurring natural processes, obtained from renewable non-fossil energy sources (water, wind, solar, geothermal, waves, currents and tides energy and energy produced from solid biofuels, biogas and liquid biofuels, and also the energy of the environment (natural environment) used by heat pumps. https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5485/3/11/1/energia_ze_zrodel_odnawialnych_2016.pdf

³ Tokarčík A., Rovňák M., Lechwar M., Wisz G., Zarządzanie energią w jednostkach samorządu terytorialnego wybrane modele – możliwości, ograniczenia, rekomendacje, CeDeWu, Warszawa 2017.

damental objectives guide the presented proposal: energy efficiency, achieving a leading position in the field of renewable energy and care for fair treatment of consumers⁴.

The aim of this study is to indicate selected potential conditions for RES implementation, taking into account the legal-regulatory, social and institutional aspect. The issue is important due to the fact that current research results confirm that the world has enormous resources of renewable energy sources, especially hydro-power, wind energy, biomass and is currently an important source of energy supply, and technical progress in the field of renewable energy will contribute to further increase in their use⁵. In addition, according to Eurostat, the share of renewable energy sources in energy consumption in the European Union reached 17% in 2016, and eleven Member States have already achieved their RES share targets for 2020. The highest share of renewable sources in consumption is in Sweden, the lowest in Luxembourg, in Malta and the Netherlands. The goal for Poland is 15%. In 2016, Poland had an 11.3% share of RES in energy consumption⁶.

The spatial scope of the conducted analysis covers Poland and the European Union. Research carried out for the needs of implementation of the adopted objective was performed using the actual methods. "Desk research", i.e. secondary, indirect one, was conducted in the process of learning the problem and at each subsequent stage of the research objective realization. Necessary data and information on the subject and object of the research was collected on the basis of a documentary method, which is related only to the consolidation, processing and analysis of data dispersed among various sources. The documentation research covered the actual information collected for information and economic policy purposes. Part of the information had a form recorded in relevant existing documents and studies as well as publications having the character of secondary sources. Based on research covering the subject literature, information contained on websites, reports, the implementation of RES was identified.

Legal and regulatory conditions of RES implementation. Regulations concerning the operation and development of the renewable energy industry are defined by general development conditions and directions of potential actions in economic entities based on and/or interested in RES.

Functioning of solutions in the field of energy production from renewable sources is related to the adoption by the European Parliament the Directive 2009/28/EC with provisions on energy from renewable sources, which Member States were required to implement into national legislation by 2010. The regulations included in the document were a consequence of the adoption of the Climate Package, which assumed the achievement of three goals, i.e. 20% in the scope of carbon dioxide emission reduction, energy savings and the share of energy produced from renewable sources. The adopted Directive 2009/28/EC concerned the implementation of only the third objective by defining mandatory levels of energy production from RES, with reference, among others, to the total share of energy from renewable sources in

⁴ http://europa.eu/rapid/press-release_IP-16-4009_pl.htm

⁵ Soliński J., *Sektor energii świata i Polski. Początki, rozwój, stan obecny*, Warszawa 2012, s. 49, http://wec-pksre.pl/pliki/Artykul/23_sektor-energii-swiate-i-polski-poczatki-rozwoj-stan-obecny.pdf

⁶ http://energetyka.wnp.pl/eurostat-udzial-oze-w-konsumpcji-energii-w-europie,316118_1_0_0.html

final gross energy consumption. In the case of Poland, it amounts to 15% (the rules for achieving this goal are set out in Annex 1 to the Directive). Poland adopted a goal, on the basis of Art. 4 of the Directive, which is 15.85% and is approved by the European Commission, divided into three sectoral objectives: 13% share of RES in the power sector, 5% share of renewable energy in heating and cooling, and 14% share of renewable energy in transport⁷.

These regulations are the basis for changes in the Polish economy conditioned by the guidelines of the European Union⁸, and moreover the content of, among others, the following documents:

– The Europe 2020 strategy indicates that in order to build a resource-efficient Europe, technological improvements, significant changes in the area of energy, industry, agriculture and transport need to be made, as well as the behavior of producers and consumers should be changed⁹;

– The Energy Strategy for Europe 2011-2020 emphasizes that the use of renewable energy contributes to reducing negative climate change, increasing the security of energy supply and allowing the creation of new work places in Europe¹⁰;

– Directive of the European Parliament and the Council on the promotion of energy use from renewable sources (establishing a framework for the promotion and production of energy from renewable sources)¹¹;

– The Green Paper “Towards a European energy security strategy” indicates the satisfaction of Europe’s energy self-sufficiency at the level of 50%¹²;

– The White Book “Energy for the future: Renewable energy sources” indicates a small contribution of RES to the energy balance of EU countries¹³.

In 2016, the European Commission presented a package of solutions aimed at maintaining the competitiveness of the European Union in the conditions of transition to clean energy changing global and national energy markets. It assumes a large degree of freedom for consumers who will be active participants in energy markets in the future, and their role will be crucial, because they will have the right to choose from more energy suppliers, they will have an access to tools to compare prices, and the ability to generate electricity in own scope and will acquire the right to sell it. Greater transparency and

⁷ Zaleski P., Państwa unii walczą o cele OZE. Jak radzi sobie polska?, *Energetyka* 24 2018, <http://www.energetyka24.com/pdf/?article=panstwa-unii-walcza-o-cele-oze-jak-radzi-sobie-polska>

⁸ Energy policy of the European Union, http://oide.sejm.gov.pl/oide/index.php?option=com_content&view=article&id=14876; <http://gepsa.pl/3-regulacje-prawne-dotyczace-oze-w-ue-i-w-polsce/>

⁹ http://ec.europa.eu/europe2020/index_pl.htm

¹⁰ <http://www.psz.pl/119-energia/nowa-strategia-energetyczna-ue>

¹¹ The Renewable Energy Directive is and will remain a key component of the energy union policy and an indispensable driving force that provides all Europeans with clean energy, aiming at achieving the EU's leading position in the field of renewable energy while contributing to the five dimensions of the energy union. <http://ec.europa.eu/transparency/regdoc/rep/1/2017/PL/COM-2017-57-F1-PL-MAIN-PART-1.PDF>

¹² http://www.cire.pl/UE/dokumenty/Green_paper.pdf

¹³ <http://www.biomasa.org/index.php?d=artykul&kat=22&art=14>

better lawmaking is the basis for civil society for greater opportunities to be involved in the sustainable development of the energy system¹⁴.

The research and innovation in the field of clean energy are extremely important issues for the implementation of renewable energy. The European Parliament points out that they depend on market stability and a regulatory framework that requires a long-term political vision, including goals and commitments in energy and climate, permanent targeted incentives and stable core capital in order to create a level playing field for all technologies, which in the case of innovations in the field of clean energy makes it is easier to achieve the critical mass necessary at placing on the market¹⁵. Research and innovation are at the heart of the European Commission's policy to boost employment, growth and investment. Research and innovation also provide knowledge and solutions for long-term societal challenges, including climate change and energy. The European Union is one of the main actors in the world of science and technology; it is also a leader in many areas, such as renewable energy and environmental protection¹⁶. In the matter raised, the Resolution of the European Parliament of 6 February 2018 on accelerating innovation in the field of clean energy, stressing that research, development and innovation are a separate dimension of the EU's energy Union, and research, development and innovation in the field of clean energy, are key factors in the Union's leadership in industry, its global competitiveness, sustainable economic growth, workplaces creation and the overall energy security of Member States and the Union, due to reducing the dependence on energy imports and encouraging the efficient and sustainable use of all energy sources. Furthermore, it stresses that innovations can enable citizens to play a more active role in energy production, including by supplying the network with energy generated on its own, as well as contributing to a more efficient use of energy due to lower consumption at the household level, which results in lower emissions and charges for energy consumption¹⁷.

In Poland in 2015, the Act on Renewable Energy Sources introducing new rules for supporting energy generated from renewable sources was adopted. The clear prosumer definition contained therein gave citizens interested in activities in the field of renewable energy the protection resulting from the provisions on competition and consumer protection. The prosumer has been equipped with mechanisms to assert his rights. The system has been simplified and standardized. The possibility of producing and using energy by citizens, schools, hospitals, public utility institutions for development of civic energy was created. In addition, the Ministry of Energy creates the concept of energy clusters ensuring stable energy supply, as well as

¹⁴ http://europa.eu/rapid/press-release_IP-16-4009_pl.htm; <https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition>

¹⁵ <http://www.europarl.europa.eu/sides/getDoc.do?type=REPORT&reference=A8-2018-0005&format=XML&language=PL>

¹⁶ Badania naukowe i innowacje, Zrozumieć politykę Unii Europejskiej – Badania naukowe i innowacje, Komisja Europejska, Bruksela Belgia 2016, s. 3, http://publications.europa.eu/resource/cellar/ba202c94-aa5d-11e6-aab7-01aa75ed71a1.0013.03/DOC_1

¹⁷ <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2018-0026+0+DOC+XML+V0//PL>

energy self-sufficiency at the level of county, commune or town¹⁸. At present, the Ministry of Energy is preparing amendments to the act on renewable energy sources, which will fit into the need to continue works aiming at further administrative and system facilitations for all RES energy producers, including further systemic changes, assuming, among others, changes in support mechanisms¹⁹.

The development of RES in Poland is also conditioned by the following documents²⁰:

- The Energy Policy of Poland by 2030 (improvement of energy efficiency and development of renewable energy sources²¹,
- National Action Plan on energy from renewable sources²²,
- National plan for the development of micro-installation of renewable energy sources by 2020²³,
- Strategy Energy Safety and Environment²⁴.

Objectives of the Energy Policy of Poland by 2030 in the priority IV: Development of the use of renewable energy sources, including biofuels, indicate, among others,²⁵:

- increase in RES share in final energy consumption to at least 15% in 2020 and further increase of this ratio in the following years;
- achieving a 10% share of biofuels in the transport fuels market by 2020;
- sustainable use of agricultural areas for RES purposes;
- creating optimal conditions for development of distributed energy based on locally available raw materials.

From the content of the document *Evaluation of the implementation of the Energy Policy of Poland until 2030*²⁶ it follows that the system of supporting entrepreneurs producing electricity from renewable sources was one of the elements of energy sources supply diversification.

¹⁸ <https://www.gov.pl/energia/energetyka-odnawialna>

¹⁹ <http://biznesalert.pl/piotrowski-cel-oze-2020-energetyka/>

²⁰ Ślusarczyk B., Bariery i szanse wykorzystania źródeł energii odnawialnej w Polsce, [w:] Usiak J., Kollar D., Bezpečnostné fórum 2015. Zborník vedeckých prác, Vydavateľstvo Univerzity Mateja Bela - Belianum 2015, Banská Bystrica 2015, s. 572-580. Wykaz obecnie obowiązujących aktów prawnych w obszarze OZE jest dostępny w zasobach Urzędu Regulacji Energetyki, <https://www.ure.gov.pl/pl/rynki-enerгии/energia-elektryczna/aukcje-oze/dokumenty/6538,Akty-Prawne.html>

²¹ Until the adoption of the new Polish energy policy, the current Polish energy policy remains the Energy Policy of Poland until 2030 adopted by the Council of Ministers in November 2009, as well as the Strategy for Energy Security and the Environment - the prospect of 2020 adopted by the Council of Ministers on 15 April 2014, <https://www.me.gov.pl/Energetyka/Polityka+energetyczna>

²² <http://www.mg.gov.pl/Bezpieczenstwo+gospodarcze/Energetyka/Odnawialne+zrodla+enerгии/Krajowy+plan+dzialan>

²³ <http://www.ieo.pl/pl/aktualnosci/679-polacy-chc-produkowa-energi-z-oze-wyniki-najnowszych-bada-zawartych-w-raporcie-krajowy-plan-rozwoju-mikroinstalacji-odnawialnych-rode-enerгии.html>

²⁴ <http://bip.mg.gov.pl/node/21165>

²⁵ http://www.pic.pl/materialy/_upload/doc/ustawa_odnawialne.pdf

²⁶ Ocena realizacji Polityki energetycznej Polski do 2030 roku, Ocena PEP2030 – projekt wersja 0.5. Projekt, Warszawa, sierpień 2014 r., s. 39, http://bip.mg.gov.pl/files/OcenaPEP2030_0.5.pdf

In turn, in the document of the Ministry of Economy entitled: *The Polish energy policy project until 2050*²⁷ setting the main objective, operational goals and areas of intervention in energy policy, the use of renewable energy sources is envisaged within the third area of intervention, and renewable energy and prosumer energy as one of the priority directions of intervention. According to the provisions presented, renewable energy sources are to be an important element of the power system in the future. Potential increase in the share of RES above the level resulting from the provisions of Directive 2009/28/EC should depend in particular on the progress in achieving economic maturity by individual RES technologies. Generally, the goal for Poland will be to meet the RES obligations arising from the Energy and Climate Package, including costs that charge the energy consumers and costs of the power system operation²⁸.

Social determinants of RES implementation. Social acceptance for RES investments is a positive for RES implementation. It applies not only to residents, but also to investors and authorities. Public opposition may concern various infrastructure investments, including energy investments. Acceptance of the community for energy investments in their immediate vicinity is crucial for success in the field of implementation. In practice, it turns out that negative social attitude to investment is the result of the lack or too late provision of answers to residents' concerns and questions, or not listening or taking into account the voices of the social party or lack of elementary knowledge about the specifics of new solutions, including renewable energy technology²⁹. The latter is the reason for the occurrence of myths about renewable energy, including the following: renewable energy is too expensive, energy from renewable energy sources is just as harmful to the environment as energy from conventional sources, renewable energy sources require too much land for energy production, renewable energy sources do not provide reliable energy on demand, renewable energy sources cannot replace fossil fuels in the transport and construction sectors, renewable energy is infinite etc.³⁰

Particularly noteworthy is the NIMBY (*Not In My Back Yard*) phenomenon, i.e. not in my garden. The following levels of NIMBY syndrome can be distinguished³¹:

– economic - a situation, in which a small number of people incur costs, and benefits are derived from a much wider group,

²⁷ According to Art. 15 of the Act of April 10, 1997 - Energy Law (Dz. U. of 2017, pos. 220, as amended), the energy policy of the state is updated every 4 years. The purpose of preparing new documents is first of all to adapt the strategy to the changing situation both in the field of technological development and socio-economic changes in the country, in the European Union, but also in the world, <https://www.gov.pl/energia/projekt-polityki-energetycznej-polski-do-2050-roku>

²⁸ Projekt Polityki energetycznej Polski do 2050 roku, wersja 0.2, Warszawa, sierpień 2014r., s. 6, 11, 19, <https://www.gov.pl/energia/projekt-polityki-energetycznej-polski-do-2050-roku>

²⁹ http://www.malopolskie.pl/Pliki/2014/2.%20Seminarium_Krak%C3%B3w.pdf

³⁰ Demaskowanie mitów: Obalenie mitów o energii odnawialnej, WWF Raport 2014, s. 18-19, 21, http://awsassets.wwfpl.panda.org/downloads/wwfpolska_demaskowanie_mitow_klimatycznych.pdf; <http://www.cpe.info.pl/wp-content/uploads/Tabela-OZE-Mity-i-Fakty.pdf>

³¹ Matczak P. Społeczne uwarunkowania eliminacji syndromu NIMBY, [w] Cichoński R. Podmiotowość społeczności lokalnych. Praktyczne programy wspomagania rozwoju, Media-G.T., Poznań 1996.

- political - results from a lack of trust in the authorities and business representatives,
- ethical - it is an effect connected with presenting an individual good over a common good,
- social - related to the display of the role of individual entities and groups involved in a given conflict.

The NIMBY phenomenon is the attitude of people, who express their opposition to investments in their immediate neighborhood, although they do not deny that they are needed at all. In activities that hamper the location of potentially burdensome energy infrastructure³², including RES, different social stakeholders may be involved: residents, authorities, including local, investors and formal and informal organizations. The NIMBY syndrome is considered a type of conflict that runs in a micro or macro scale. In general, it is an open conflict of an economic, ecological and spatial nature. However, it can, to a certain extent, integrate the local community, increase its social capital and be a source of new opportunities³³.

The abovementioned *European Parliament resolution on speeding up innovation in the field of clean energy in the area of Citizens' energy innovation* indicates that accelerating the innovation in the field of clean energy requires Europeans to change their minds that would go beyond mere energy awareness and aim at understanding the change in behavior in terms of energy saving and new production and consumption technologies without which it will not be possible to successfully transform energy.

According to the research conducted by the Center for Public Opinion Research (CBOS), the assessment of the surveyed Poles creates a positive image of renewable energy sources. Renewable energy is perceived as safe (87%, including 64% of very positive ratings) and forward-looking (82%, including 52% of very positive ratings). Over two-thirds of respondents are convinced of the efficiency of renewable energy sources (68%). The cost of generating the energy from renewable sources is relatively the lowest, but even in this case, positive assessments prevail over the negative ones (55% vs. 28%). Poles are definitely on renewable energy sources: as many as 89% of respondents share the view (over a half in a decisive way) that in this period, a significant increase in electricity production from renewable energy sources is necessary, which will increase the standards of clean natural environment in Poland and increase the influence of citizens and local communities on energy decisions³⁴.

Institutional determinants of RES implementation. In the Polish energy industry, a cluster of energy is a special type of institutional solutions desired today. Cluster differs from traditional production system in that it is essential for partnership and cooperation not only between companies, but also between companies and scientific research units³⁵. Energy clusters are solutions that aim at developing distributed

³² Dmochowska-Dudek K., Obiekty NIMBY jako przykład konfliktowych inwestycji na terenach mieszkaniowych – teoretyczny zarys problemu, s. 47, <http://www.sse.geo.uni.lodz.pl/uploads/space10/dmochowska.pdf>

³³ Staniszevska M., Syndrom NIMBY jako przykład konfliktu społecznego o charakterze lokalnym, *Acta Innovations*, nr 12, 2014, s. 19, http://www.bioenergiadlaregionu.eu/gfx/baza_wiedzy/259/syndrom_nimby.pdf

³⁴ Gwiazda M., Polacy o przyszłości energetycznej kraju, Komunikat z badań Nr 28/2016, s. 5, 8, https://www.cbos.pl/SPISKOM.POL/2016/K_028_16.PDF. The study was conducted using the computer-aided face-to-face method (CAPI) on 21-28 January 2016 on a representative sample of 992 adults in Poland.

³⁵ Porter M.E., Porter o konkurencji, *Polskie Wydawnictwo Ekonomiczne*, Warszawa 2001, s. 193, 248.

energy to improve local energy security while maximizing economic efficiency. Energy cluster is a civil law agreement that may include natural persons, legal persons, scientific units, research institutes or local government units, concerning generation and balancing demand, distribution or trade of energy from renewable energy sources or from other sources or fuels, as part of distribution network with a rated voltage lower than 110 kV, over the area of this cluster operation not exceeding the limits of one county within the meaning of the Act of 5 June 1998 on county self-government or 5 communes within the meaning of the Act of 8 March 1990 on local government³⁶.

The possibility of undertaking joint activities is inextricably linked to the category of trust. Limiting the mental barrier in the form of distrust of partners is one of the most important determinants of clusters development³⁷. Among other mentality barriers, the following dominate: dominance of the competition paradigm, public trust deficit in the public sphere, weakness of public initiatives (bottom-up), weak foundations of civil society, misunderstanding of clustering idea, egoism and particularism, impatience and short-sightedness, occasional cooperation with regional or local authorities³⁸. At this moment, organizational behaviors in energy clusters have not yet been recognized, which is related to the initial phase of their operations. In May this year, 33 ideas for energy clusters (115 applications submitted in total) were certified by the Ministry of Energy.³⁹

A good example of a cluster initiative, from which knowledge and practical solutions can be drawn, is a Slovakian case study⁴⁰ of energy cluster. Energy Cluster of Prešov Region⁴¹ (KEWP) is an association of legal persons operating in the Prešov region. It acts as a partner institution in the field of energy diversification in the region with technological support of specialist companies. The aim is to ensure the region's competitiveness with the best use of natural resources. The cluster consists of five members - the founders and about thirty partners from the private and public sectors. The priority for KEWP is to focus on renewable energy sources in relation to the region's environmental requirements and energy efficiency. The cluster also conducts research activity in the field of using aerogels to increase the energy efficiency of buildings. The cluster, through its activity, plays an important role in the process of managing the impact of energy on the natural environment. The main activities of the cluster are measurements, analyses and scientific and research activities, including educational ones. The Management Board of KEWP in 2015 created,

³⁶ The concept of energy cluster was introduced into the Polish legal order as of 1 July 2016 under the Act of 22 June 2016 amending the act on renewable energy sources and certain other acts, <https://www.gov.pl/energia/klastry-energii>

³⁷ Wierzyński W., Klaster to zaufanie, http://www.pi.gov.pl/parp/chapter_86196.asp?soid=02091BA6083F43EA929DC1546E4B1599.

³⁸ Wierzyński W., Bariery w rozwoju klastrów, http://ppp.parp.gov.pl/PARP/chapter_86197.asp?soid=07983AF8204B4040A487DCF7A1C67774

³⁹ <http://www.me.gov.pl/node/28416>

⁴⁰ Slovakia faces important energy challenges: nuclear energy, nuclear waste storage, dependence on fossil fuels, dependence on oil, hence any examples of institutional activities for the implementation of renewable energy in this economy with problems appear to be extremely important. In 2015, the share of renewable sources in energy consumption in Slovakia was 12.9% against the 2020 target of 14%. Slovaks have not yet achieved the national RES target for 2020, and therefore each initiative is extremely valuable, <http://gramwzielone.pl/energia-sloneczna/25990/stagnacja-ryнку-pv-w-czechach-i-na-slowacji>

⁴¹ <http://www.ekpk.sk>

documented and introduced a Quality Management System (QMS) that is an instrument allowing to provide services that meet the requirements of partners.

Implementation of the 2020 RES target in the EU. The European Union strives to achieve a 20% share of energy from RES in EU final gross energy consumption⁴² by 2020. This objective has been set in the EU Member States by means of national action plans showing directions for development of energy from renewable sources in the Member States. In 2014, the share of renewable energy sources reached 16% of gross final energy consumption. The average share of RES in the EU - 28 in 2013/2014 was 15.5%, significantly exceeding the indicative exchange rate (2013/2014), which predicted for the EU - 28 the value of 12.1%. In 2015, RES shares were estimated at 16.4% of gross final energy consumption, while the indicative exchange rate for 2015/2016 was 13.8%. All Member States, with the exception of the Netherlands, showed in 2013/2014 the average share of renewable energy not less than the corresponding indicative rate in accordance with the Renewable Energy Directive. According to estimates for 2015, 25 Member States have already reached a higher level than anticipated in the indicative rates for 2015/2016 in line with the Renewable Energy Directive. For three Member States, i.e. the Netherlands, France and Luxembourg, estimated RES share for 2015 was lower than the indicative exchange rate for 2015/2016 in line with the Renewable Energy Directive⁴³. The implementation of RES share in final energy consumption in EU countries is presented in Fig. 1.

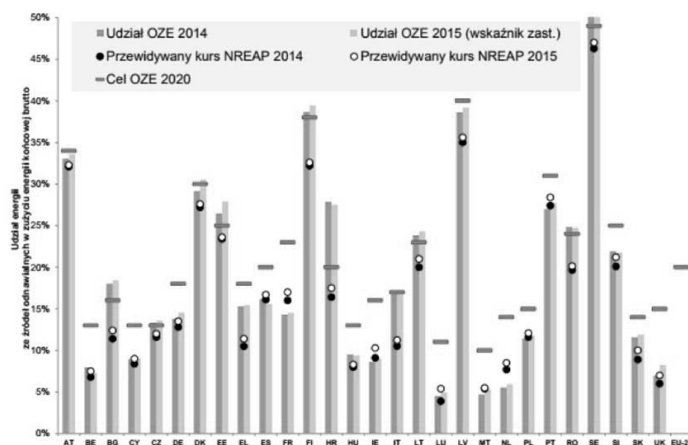


Fig. 1. Realization of indicative targets in accordance with the directive on renewable energy sources for 2013/2014 and 2015/2016

Source: Report from committees to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions, Report on progress in the field of renewable energy, Brussels, February 1st, 2017 COM(2017) 57 final, <https://eur-lex.europa.eu/legal-content/PL/TXT/PDF/?uri=CELEX:52017DC0057&from=PL>

⁴² Gross final energy consumption - energy carriers supplied for energy purposes to industry, the transport sector, households, the services sector, public, agriculture, forestry and fisheries, including the energy and heat consumption of the energy industry for energy production.

⁴³ Report from committees to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions, Report on progress in the field of renewable energy, Brussels, February 1st, 2017 COM(2017) 57 final, <https://eur-lex.europa.eu/legal-content/PL/TXT/PDF/?uri=CELEX:52017DC0057&from=PL>

The share of energy from renewable sources in the final gross energy consumption in Poland compared to the EU in 2006-2015 is shown in Fig. 2. For Poland, the share of energy from renewable sources in final gross energy consumption in 2016 was 11.3% and it was lower than in 2013, when it amounted to 11.37%, in 2014 - 11.49%, and in 2015 - 11.93%.

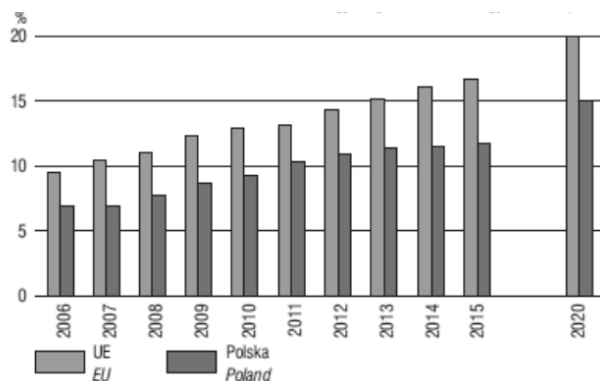


Fig. 2. Share of energy from renewable sources in final gross energy consumption

Source: *Energia 2017*, GUS Warszawa 2017, <https://stat.gov.pl/obszary-tematyczne/srodowisko-energia/energia/energia-2017-folder,1,5.html>

The EU is on the right track for the promotion of renewable energy. In 2017, in the EU for the first time, the total production of energy from wind, sun and biomass was higher (produced 679 TWh of energy, i.e. 12% more than in 2016) from that in power units fired with hard coal and lignite. Five years earlier, hard and brown coal power plants produced twice as much energy as wind farms, solar farms and biomass sources - Fig. 3⁴⁴.

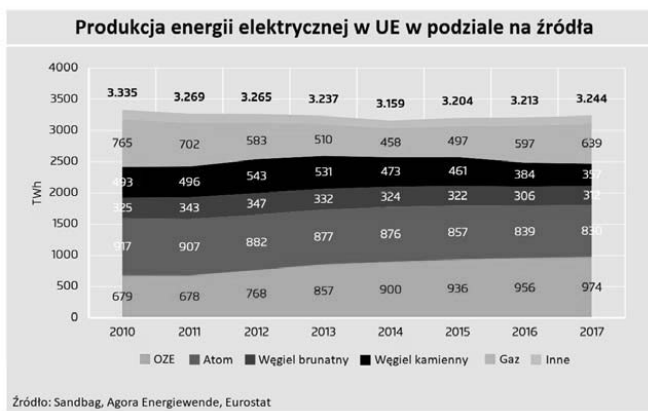


Fig. 3. Electricity production in the EU by source

Source: <https://wysokienapiecie.pl/8225-unijna-produkcja-energii-z-oze-po-raz-pierwszy-przescignela-wegiel/>

⁴⁴ <https://wysokienapiecie.pl/8225-unijna-produkcja-energii-z-oze-po-raz-pierwszy-przescignela-wegiel/>

Prospects of RES implementation - final conclusions. The following general conclusions can be drawn on the basis of analysis of the selected documentation data:

- energy management is aimed at guaranteeing the state in which users, i.e. economy, regions, enterprises, and households, will receive the necessary amount of energy on time and to the place of consumption, at the lowest costs and in the expected quality,
- changes in the legal bases and principles of energy management in the EU are important for its economic growth, creating new work places, launching potential for economic growth, reducing greenhouse gas emissions, securing energy supply sources and strengthening the leading position in the field of renewable energy,
- social potential in the implementation of renewable energy sources is the ability to cooperate as one of the most important factors for the development and implementation of RES, and broad political and economic support for inter-institutional cooperation would significantly contribute to increasing the use of renewable energy existing in the EU,
- energy clusters, in particular with high business and technological potential, are an important way to build social capital, stimulate entrepreneurship development and improve the situation on labor markets, and above all, are a way to implement the adopted energy policy, including in the field of dynamic implementation of RES.

Summing up, one should point out the social, economic and environmental benefits of renewable energy sources expected and already achieved at the local, regional and national levels, which determines the possibility of implementing the adopted economic assumptions for the entire EU.

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В статье исследованы отдельные потенциальные условия для внедрения возобновляемых источников энергии с учетом правового, социального и институционального аспектов. Текущие результаты исследований подтверждают, что в мире имеются огромные ресурсы возобновляемых источников энергии, особенно гидроэнергетика, энергия ветра, биомасса. Технический прогресс в области возобновляемых источников энергии будет способствовать дальнейшему увеличению их использования.

Ключевые слова: *возобновляемые источники энергии, управление энергопотреблением, энергетические кластеры.*

У статті досліджено окремі потенційні умови для впровадження відновлюваних джерел енергії з урахуванням правового, соціального та інституційного аспектів. Поточні результати досліджень підтверджують, що у світі є величезні ресурси відновлюваних джерел енергії, особливо гідроенергетика, енергія вітру, біомаса. Технічний прогрес у галузі відновлюваних джерел енергії буде сприяти подальшому збільшенню їх використання.

Ключові слова: *відновлювані джерела енергії, управління енергоспоживанням, енергетичні кластери.*

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