SUPPORT SYSTEMS FOR THE PRODUCTION OF AGRICULTURAL BIOGAS AND ELECTRICITY IN RENEWABLE AND CO-GENERATION SOURCES IN POLAND

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Summary. Operation of winning fuel and energy sources, which reduce people's negative environmental impact, presents a fundamental challenge for contemporary societies. Undoubtedly, renewable energy plays an increasingly crucial role in ensuring energy security of the country, by means of sources' diversification, in order to obtain electricity (heat), as well as by limiting the dependence on fossil fuels' production. At the same time, in view of high acquisition costs of such energy, the interest in developing of renewable and co-generation sources is based in large measure on various support systems. Accordingly, the existence of such properly constructed systems determines the scope of developing and using such energy sources. Subject to the present analysis are the most vital assumptions of the Polish support system for electricity, produced from renewable and co-generation sources. At the same time, the article covers issues of the stipulated support for sources of agricultural biogas.

1. INTRODUCTION

Renewable sources of energy, improvement of electricity effectiveness and the utilization and potential of existing primary fuels are subject of interest to contemporary society. The importance of environmental protection and the improvement of energy security is visible in many political, legal and economic documents [8]. These aims are to be fulfilled by increasing the domestic use of the potential inherent in renewable fuels and by supporting greater efficiency in their use. The key tools available for these vitally important tasks promote development of energy sources, including renewable resources, as well as high efficiency production and use of electricity. It should be taken into consideration that protecting the environment and ensuring the security of energy supply, together with market competitiveness, constitute the basic pillars of energy policy of both the European Union and Poland [22]. However, all legal instruments which are designed to protect the environment and which influence the electricity sector can be accepted as the legal basis of environmental protection in this domain.

The conditions presented above shall result in the increasing role of the renewable energy and co-generation over the next few years, as well as in influencing an improvement in the energy security of the country. This will probably be achieved mainly by increasing diversification in the sources of electricity, heat and gas (biogas) and the simultaneous decreasing the network losses at the electricity distributional level and following a major study of the production and consumption of electricity. Adopting such a course of action within the political and legal framework of Poland will signal the execution of policy based on the strategy of the European Union, described in short as 3 x 20%. This strategy, which forms the basis of European energy policy to the year 2020, assumes: 20% reduction of greenhouse gas emissions compared to 1990, 20% lower consumption of electricity (understood as the improvement in electricity efficiency) as well as a 20% share of electricity coming from renewable sources within the production structure [19].

At the same time, the European legislation envisages the possibility of introducing appropriate systems of financing in order to pursue such aims. The question of the existence of adequate support systems is clearly laid down in European law. Directive 2001/77 [4], directive 2004/8 [5] [7] and directive 2009/28 [2] envisage the possibility of introducing support systems, indicating at the same time that such actions do not violate regulations concerning acceptable state aid from the state resources, mentioned in Article 107 and 108 TFUE [23]. There is no doubt whatsoever that the implementation of the above strategy demands an increase in the exploitation of all technological and economic potential. Adoption of the strategy related to 3x20% principle and increase of renewable sources, due to its technological complexity, demands financing. Funds are necessary to introduce innovative solutions, to build new power sources, but also to guarantee new transmission and distribution network and reserve generation sources (to support unstable power sources as wind turbines). All these activities will incur costs for many different entities, all of which have to be appropriately covered.

Considering current technology developments, electricity obtained from renewable sources is

generally more expensive than electricity produced by conventional means [12] [16] [20]. Stimulating an increase in the use of these sources will require granting of suitable legal 'privileges' and specific economic authorizations. In other words, the interest at present in developing renewable sources (including biogas) and co-generation, is a political and social choice, which includes the need for protection of the environment for future generations. This cannot necessarily be based purely on economic calculation. The doctrine raised the fact that environmental protection constitutes one of the types of qualified public interest, which justifies limiting unconditioned business activity [27].

In a broad sense, allowances – which can be applied to the development of renewable sources, including biogas and co-generation – consist of the following :

- taxes – a system as yet undeveloped, addressed solely to electricity produced in renewable sources, which mainly comes down to provisions contained in the Excise Act [3]; this relies upon exempting from excise duty on electricity produced from renewable sources of energy, on the basis of a document confirming the cancellation of certificates of origin for electricity. This is in accordance with the provisions, wherein the exemption is applied no earlier than the moment of receiving a document confirming the cancellation of the certificate of origin for electricity. This is based on the reduction of the excise duty on electricity for the nearest settling period. In the opinion of the author, the authorization included in the Excise Act was addressed to the wrong entities, because the documents confirming the cancellation of certificates of origin are in most cases owned by entities which do not use renewable sources,
- subventions, for example from the National Fund for Environmental Protection and Water Management, as well as assistance programs of various EU founds and others,
- systems of direct support described in the Energy Law Act (later Energy Law or PE) [21].

In fact, one can further speculate that the details of such support framework, even the method of its preparation and presentation, will determine the investment in, and the scope and nature of innovation, in view of the development of economically viable renewable energy sources. The same principle will apply to further efficiencies in the area of primary fuel use. Given the subject of this article, in the later parts the author has concentrated on presenting solutions connected with the system of direct support stipulated in Energy Law.

2. THE RULES OF ENTERING THE SYSTEM OF SUPPORT

Formally, the fundamental requirement to allow the use of support systems stipulated by Energy Law, which has to be obtained by the renewable, biogas and co-generation source, is to receive a license or registration of an activity, which in turn is regulated in accordance with the rules of the Act on Freedom of Business Activity [1] (later UoSDG).

According to Article 32(1)(1) of Energy Law, a license is necessary in order to undertake business activity in the area of producing fuel or electricity, excluding the production of solid or gaseous fuels, as it is for producing electricity from sources with the combined power of installed electricity not exceeding 50 MW and not classified as a renewable source. The same applies to producing electricity in co-generation, excepting the production of electricity from agricultural biogas as well as heat from a source with the combined power not exceeding 5 MW. License is necessary, according to Energy Law, to conduct every business activity engaged in the production of electricity from renewable sources of energy and from co-generation (not necessarily high efficiency), regardless of the size of the installed power capacity of the source, or the amount of energy produced from such source. The only exception from this rule concerns the production of electricity from agricultural biogas, in which case, regardless of the technology used (including co-generation), entrepreneurs are restricted only to registration. According to Article 9p PE, which came into force on 1 January 2011, business activity in the area of producing agricultural biogas or producing electricity from agricultural biogas is an activity regulated in accordance with UoSDG, and requires entry into the register of electricity undertakings dealing with the production of agricultural biogas. The register is managed by the President of the Agricultural Market Agency.

According to the well settled case law, legal requirements regarding license must be duly fulfilled by any undertaking willing to participate in the support system. This problem, especially in the context of using the support system, was also considered by the judiciary. In one of rulings, the Court of Appeal in Warsaw emphasized '*We should share the opinion* (of the President of the Energy Regulatory Office (later ERO President – Z.M) *expressed on the basis of an analysis of the regulations Article 9e and Article 3 (12) as well as Article 32 ()(1) of the Energy Law that the certificate of origin can be obtained only by a business entity which possesses a license for conducting business*

activity in the area of the production of electricity from renewable sources of energy [25].

In the Polish legislation there is one exception from such a rigorously defined rule. It was defined in the Regulation of the Minister for the Economy dated 14 August 2008 and concerned the method of obtaining and presenting for authentication certificates of origin, the payment of a substitute fee, the purchase of electricity and heat produced from renewable sources of energy as well as the obligation to confirm the data concerning the amount of electricity produced from renewable sources (later the OZE Regulation [11]). According to § 5 point 2 of the OZE Regulation, electricity produced from renewable sources, in a technological trial run and with the exception of electricity produced in co-firing unit (that is, a unit in which at the same time renewable and non-renewable fuels are burnt) or produced in a hybrid configuration, qualifies as electricity produced from a renewable source of energy.

Electricity can be qualified as electricity produced from renewable sources of energy as long as it comes to electricity produced in the period of up to 60 days from the date of starting the technological trial run of the production unit. This Regulation does not introduce any exception for the necessity to hold a license or to complete registration, but only allows electricity produced in a strictly specified period (60 days) to be 'classified' as electricity produced from renewable source for the purpose of issuing a certificate of origin. Therefore, in the case described above, there is an exception with objective character (referring to electricity) and not subjective one (referring to producer). *A contrario*, energy cannot be 'qualified', if the source is not renewable, and, in the Polish legal system, if it does not receive a proper license. The same, the certificates of origin for the period of a technological trial run can be obtained by an operator only if it is formally confirmed that the source produces renewable electricity and a proper license was obtained (with the aim of making it easier and standardize requirements connected with granting licenses, the ERO office developed so called 'Information Packages', which include requirements that have to be fulfilled by the entrepreneur to be granted a license www.ure.gov.pl.). On the other hand, problems connected with the registration of entities performing regulated activity were described in Article 9p-9s PE. At the same time, Article 9p PE rules issues concerning business activity in the area of producing agricultural biogas or producing electricity from agricultural biogas, whereas Articles 9r and 9s PE deal with the obligations of energy enterprises as well as imposing controls on this type of activity. Reference to the 'regulated activities' in the meaning of UoSDG by Article 9p PE should be judged positively as an attempt to limit restrictions in business activity and liberalise the necessary operating procedures. It must be stressed, though, that *it often appears in practice that those applying for entry into a regulated activity are faced with conditions which are not less difficult to realize than the obtaining of a license* [14] [24].

It should be also noticed that licenses for the production of electricity specify exactly the place, amount, power and the type of units in which electricity is produced. However, if an operator wishes to extend the range of their activities with new sources, and at the same time to have the possibility to use the support system in relation to new units, a change in the granted license has to be introduced. In practice, this omission to amend the licence constitutes one of the common causes in losing the possibility of benefiting from the support system.

3. SYSTEM OF SUPPORT OF RENEWABLES, CO-GENERATION AND BIOGAS – COMMON ISSUES

3.1. The development of the Polish support system

Since the introduction of Energy Law in 1997, Polish legislators have been aware of the necessity of appropriate support for the development of renewable sources, with the aim of promoting the production of electricity from such sources. Since the year 2000, solutions have been introduced in order to support the functioning of co-generation sources, and from 2011 on a support system, reserved for agricultural biogas, is in force. Present systems supporting renewable energy sources in (later OZE), including biogas as well as co-generation, are based on the 'amount system', that is, the obligatory possession by the relevant entities, in their purchase portfolio, of adequate and appropriate certificates of origin – as is the case with all support systems in Poland. The lack of such certification would be a subject to financial penalties. So it is a system based upon the amount of electricity derived from renewable sources, including biogas and co-generation (each type of certificate constitutes the confirmation of producing specified type of electricity, see Article 9e (1), 9l (1) and (1a) as well as Article 9o (1) PE), as opposed to the price (a system of *feed-in-tariff*).

The support system operating in Poland, is based on certificates of origin (Article 9e PE), certificates of origin from co-generation (Article 9l PE) as well as certificates of origin from biogas (Article 9o PE), and the property rights resulting from them, depends upon the possibility of obtaining *sui generis* securities in the form of certain types of certificates. These

securities become transferable and constitute an exchange good after having been entered into the register for certificates of origin on the commodity exchange or other regulated market, in the form of so called property rights. This was mentioned in Article 2(2)(d) of the bill dated 26 October 2000 concerning commodity exchanges [9].

3.2. The application stage

The procedure concerning the realization of rights, which derives from the system of support functioning in the country, has three stages, where the undertakings indicated in PE realize their fundamental rights and obligations. The procedure has been described below in detail.

A. The stages of issuing of certificates of origin, certificates of origin from co-generation or certificates of origin from biogas

This is the stage at which licensed or registered renewable, biogas or co-generation sources producer can apply to the ERO President, through the appropriate electricity system operator or gas distribution system operator, about issuing certificates of origin, certificates of origin from biogas or certificates of origin from co-generation. At the same time, the Energy Law describes both the formal requirements concerning the certificate itself, the application for a certain certificate (detailed requirements concerning applications to issue certificates were enclosed on the official ERO websites www.ure.gov.pl.) as well as the period after which it is not possible to apply for the certificate. The application process can last for45 days for renewable and biogas sources and 14 days for co-generation sources respectively, from the final day of producing the particular amount of electricity covered by the application, during which such an application must, in reality, be provided to the proper system operator. Exceeding this deadline results in the unconditional loss of the right to obtain certificates, and, importantly, the application for the certificate can cover one or more consecutive months of a certain calendar year, and cannot cover different calendar years), as well as the period in which the certificate should be issued by the ERO President (that is, 14 days from the date of receiving the application by the regulatory body - see Article 9e (2-5a) and 9l (2-11) as well as 9o (2-8) PE). A significant distinction concerning the certificates of origin from co-generation is the obligation to carry out a so called ‘post implementation audit’, within whose framework the operating entity has to settle the number of received certificates of origin in a certain year on the basis of the actual performance value (i.e. the real yearly average efficiency of transforming the chemical energy of fuel into electricity or mechanical electricity and usable heat in co-generation). If the audit shows that the entity received an insufficient number of certificates, additional certificates can be applied for, and in case when too many certificates were obtained, it is obligatory to write off this surplus (no matter if an entity had its own certificates or if it had to purchase them), and such written-off certificates do not count as fulfilment of the obligation described in Article 9a (8) PE.

B. Property rights resulting from certificates of origin – issuing and trading on commodity exchange

This is the stage following the issuing by the ERO President of the certificates of origin, the certificates of origin from co-generation or certificates of origin from biogas. In addition to the paper version of the appropriate certificate, which is handed over to the proper producer, an electronic form is also created with appropriate information for the commodity exchange or other regulated market (Presently these tasks are realized only by Towarowa Giełda Energii S.A. in Warsaw, www.tge.pl.). On the basis of information transferred by the ERO President, the appropriate authority registers on the account of a particular producer the number of property rights resulting from the issued certificate (the property rights are the equivalent to the amount of electricity for which the certificate of origin or the certificate of origin from co-generation was issued, with the accuracy up to 1kWh). After registering the appropriate certificate for the particular producer and generating the property rights from it, the producer can trade with these rights in session or non-session transactions (*over the counter*), but as the rights are always registered on the account of a certain producer, such transactions have to be declared on the commodity exchange or the regulated market, so that the rights can be transferred to the account of the buyer (see Article 9e (6-12) and Article 9m (1) as well as 9o (8) PE).

C. The stage of writing off the property rights by obligated entities and settling the obligation

This is the stage where entities settle their obligation for purchase and present for writing off a certain number of appropriate certificates. The process commences with the entity obtaining a certain number of the appropriate type of certificates on the commodity exchange or the regulated market, receiving the confirmation of this fact in the form of a document stating the possession of property rights, and finishes with a decision concerning writing off of a certain number of certificates of origin by the ERO President. Significantly, only certificates written off

by 31 March each calendar year are taken into account, when settling the performance obligation for the previous calendar year [17]. After writing off the certificate, the property rights resulting from this certificate also expire, and on the basis of information provided by the ERO President, are entered accordingly in the registration of property rights.

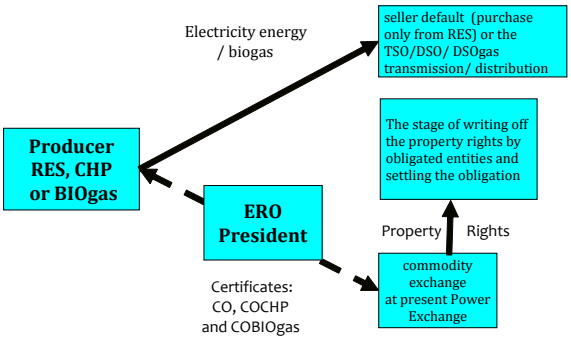

Fig.1. Schema of the support system of renewable energy, co-generation and agricultural biogas

4. TYPES OF SUPPORT FOR RENEWABLE

The mechanism of support for entities producing electricity in OZE, which functions in the Energy Law, has two-components. Firstly, it is based on the obligatory purchase of produced electricity by the so-called 'default supplier', and secondly, on the issue of the certificates of origin by the ERO President.

As a result of the functioning of the system of support, the producer of electricity from renewable source of energy gains two types of guaranteed revenue:

– from selling the property rights resulting from the certificates of origin;
– from selling electricity.

The first type of revenue is connected with the possibility of selling the acquired certificates of origin (so called 'green certificates'), or more precisely, the property rights which resulted from the registration of such rights on the commodity exchange or other regulated market. It is, therefore, obtained within the framework of transactions concluded on the exchange market and thus the final price depends on supply and demand. What is worth underlining here is that at present, due to the small number of relevant OZE sources, there is not enough CoO on the market. In relation to the level of obligation described in the ordinance of OZE (according to § 3 of the ordinance OZE the obligation was defined on the level: 10,4 % - in 2010; 10,4 % - in 2011; 10,4 % - in 2012; 10,9 % - in 2013; 11,4 % - in 2014; 11,9 % - in 2015; 12,4 % - in 2016; and 12,9 % - in 2017), the prices of the property rights resulting from the certificates of origin to a large degree are correlated to the level of the substitute fee stipulated by the ERO President according to a formula described in Article 9(a) (2-4) PE (for example, in 2011, the substitute fee is 274,92 PLN/MWh in comparison to 267,95 PLN/MWh in 2010). All types of renewable sources can take advantage from the extent of this support, including those producing electricity on the basis of agricultural biogas.

The second type of revenue is obtained through the sale of electricity on the open market at a price agreed with a buyer. Significantly, in case of a lack of a buyer, the producer has guaranteed, by the Energy Law, the volume of the energy sales, as well as its price. Thus, the entity obligated to purchase the offered electricity from a renewable source is the seller default (see Article 9a (6) PE) However, the price for which this entity is obligated to purchase electricity, is equal to the average sales price of electricity on the competitive market (the price for the year 2011 it - 195,32 PLN/MWh). The price is announced every year on 31 March and is in force for the full calendar year in which it was announced. It should be emphasized that the above mentioned obligation to purchase constitutes a right of the electricity producer and cannot be seen as an order of the seller in favour of the seller default. At the same time, it is the seller default, who is obliged to purchase any offered amount of electricity produced from renewable sources. This regulation currently does not cover sources producing electricity on the basis of agricultural biogas, which are subject to registration and not licensing. On the other hand, the regulation in Article 9a act 6 PE enacts the above mentioned obligation solely in relation to licensed sources. The postulate of *De lege ferenda* should cover the change of this regulation by 'extending' its provisions (also to sources, which now are subject only to registration, as there is no rational explanation for such inequitable treatment of these types of production sources. The mere fact of creating such a disproportionate situation should be seen rather as a legal loophole than as an intentional legislative action, considering that the solutions adapted in 2010 aimed to strengthen support for this type of source.

5. TYPES OF SUPPORT FOR CO-GENERATION

At first, it should be emphasized that although all co-generation sources are obliged to possessing a license, only sources producing in high-efficiency co-generation are allowed to use the support system. High efficiency co-generation is identified by the level of savings in primary fuel (see Article 3 point 38 PE) [6] [18] [28] [29].

Similarly, as in the case of electricity originating from renewable sources, the producer of electricity in high efficiency co-generation also obtains two types of revenue:

- from selling the property rights resulting from certificates of origin from co-generation;
- from selling electricity.

The first type of revenue, similarly to OZE, is connected with the possibility of selling certificates of origin. Here, according to accepted legal definitions, we can distinguish three types of certificates of origin: 1) certificates issued for sources heated by gaseous fuels (regardless of the installed power of the source) or with a total installed electricity power source lower than 1 MW (so called 'yellow certificates'); 2) certificates issued for sources heated by methane, which is released and captured in deep mining work, in the process of liquidation or already liquidated coal mines, or by gas obtained from processing biomass in accordance with Article 2 (1) (2) of the regulation concerning bio-components and liquefied bio-fuels [10] (so called 'violet certificates') and 3) for remaining co-generation sources (so called 'red certificates'). According to the regulations introduced by a 2010 amendment to PE, sources producing electricity in high-efficiency co-generation on the basis of different primary fuels can obtain certificates of origin for co-generation proportional to the amount of chemical energy of fuels used in the process of producing electricity, calculated on the basis of the actual combustible value of the types of fuels used in the process. However, at present, one co-generation source can actually obtain all three types of certificates of origin proportional to 100% of the production, as long as it uses the right types of primary fuel, and the range of usage of certain primary fuels will be specified on the basis of direct measurements. At the same time, in a situation when the co-generation source simultaneously meets the criteria necessary to obtain yellow and violet certificates for the same amount of electricity, there is a possibility of obtaining only one type of certificate of origin (Article 9l (1b) PE).

The trade of certificates of origin from co-generation, or, more precisely, the trade of property rights resulting from these certificates, can take place within session and non-session transactions on the commodity exchange. On the other hand, the present shortage of certificates of origin from co-generation in relation to levels of obligation, as stipulated by the legal regulations (according to § 9 of the co-generation ordinance, the obligation was stipulated on the level: 1) for 'yellow certificates' 3,1 % in 2010, 3,3 % in 2011, 3,5 % in 2012; 2) for 'red certificates': 21,3 % in 2010, 22,2 % in 2011, 23,2 % in 2012; 3) according to the project of amendment of this ordinance, the obligation for violet certificates is projected on the level of : 0,3 % in 2010, 0,4 % in 2011, 0,6% in 2012, 0,9 % in 2013, 1,1 % in 2014, 1,3 % in 2015, 1,5 % in 2016, 1,8 % in 2017, 2,3 % in 2018), influences the prices for these certificates of origin, which oscillate about the level of substitute fees (in 2011 the substitute fees were as follows: 127,15 PLN/MWh (for 'yellow certificates'), 59,16 PLN/MWh (for 'violet certificates') and 29,58 PLN/MWh (for 'red certificates')), as they were established by the ERO President. The second type of revenue for co-generation sources is obtained from selling electricity on the open market, where the producer does not have a guaranteed minimal price, and neither the participant in the transaction (the electricity enterprise or the consumer) has an obligation to purchase electricity coming from such a source. This means that during the selling process the producer must accept the current market price. However, it should also be noted that in case of a lack of a buyer, the electricity system operator, to whose grid the source producing in highly-efficient co-generation is connected, has according to Article 9c (6) and (7) PE, the obligation to ensure the priority in providing transmission or distribution services for electricity produced by such co-generation as well as the obligation of receiving electricity produced from such sources. Thus, eventually, the obligation of receipt guarantees that the electricity will be introduced into the system and calculated on the basis of prices existing in the framework of the central mechanism for trade balance. This obligation, in contrast to the obligation concerning renewable sources, was drawn up for a specified time, that is, until 31 March 2013 in relation to the obligation concerning yellow and red certificates as well as until 31 March 2019 in relation to violet certificates.

The support system in form of 'violet certificates' was introduced into Polish Law in 2010. Therefore, it was assumed that by means of furthering the intended aim in form of the increased energy production from methane from mining work (one of the most dangerous greenhouse gases) and biogas will be possible only then, when this system will encourage building new production sources, instead of only arousing the interest in its usage in the already existing sources. Yet, support systems in form of yellow and red certificates were planned in 2007 as systems meant to facilitate the operation of the co-generation sources in functioning market economy. Nowadays, however, the Ministry for Economy is working on the question whether these systems should be maintained after 2013. It is beyond doubt

that having different priorities in view influences the originally planned functioning period.

6. TYPES OF SUPPORT FOR AGRICULTURAL BIOGAS

The support system for the production of agricultural biogas, which has been effective since 1 January 2011, is, similarly to the above mentioned systems referring to the support for the production of electricity, based on the possibility of obtaining two types of revenue:

- from selling the property rights resulting from the certificates of origin of biogas;
- from selling agricultural biogas.

The first type of revenue is connected with the obtaining of certificates of origin for biogas issued for the production and simultaneous introduction of agricultural biogas into the gas distribution network, within parameters, which is described in a Regulation made by the minister responsible for economic affairs. The certificate of origin for biogas is issued not in connection with the production of biogas itself, but one further element has to be fulfilled, namely this biogas has to be delivered into the gas distribution grid. Therefore, the entities producing biogas and utilizing it in the form of gaseous fuel for their own needs will not be permitted to use any form of preferences and support, as opposed to, e.g., production and utilization of electricity in renewable source for one's own use. On the other hand, when electricity is produced from agricultural biogas, the producer receives a proper certification of origin or a certificate of origin from co-generation or even both types of these certificates (according to Article 9e (1a) PE the President of Energy Regulatory Office issues certificates of origin, which are mentioned in Act 1, as well as certificates of origin from co-generation, which are mentioned in Article 9l (1), for electricity produced in renewable source of energy, which simultaneously meet the conditions of high efficiency co-generation) and not a certificate of origin for biogas. The trade of certificates will take place in the framework of session and non-session transactions on the commodity exchange. At the same time, the legislator has made no decision to specify a separate range for the obligatory purchase of this type of certificates of origin. These certificates were recognized as equal to certificates of origin, so they should serve the realization of the obligation stipulated in Article 9a (1) PE. According to the mechanism described in this act, the produced amount of biogas will be converted (the formula for conversion will be described in the regulation) into an equivalent amount of electricity, which will allow calculation of the obligation in relation to electricity through this type of certificates.

The second type of revenue will be connected to the sale of gas which will have to be refined before being introduced into the gas distribution network, and the minimum parameters required to introduce such gas into the grid are stipulated in the regulation. At the same time, similarly to the case of electricity produced by high-efficiency co-generation, the operator of the gas distribution network, within the scope of his activity, is obliged to receive agricultural biogas, with quality parameters stipulated in the regulations, which was produced in installations directly connected to the network of a particular operator (Article 9c (6a) PE). This means that there is no obligation to purchase this type of gas, and its price should be settled between the producer and the buyer or ultimately calculated in the framework of the balancing mechanism.

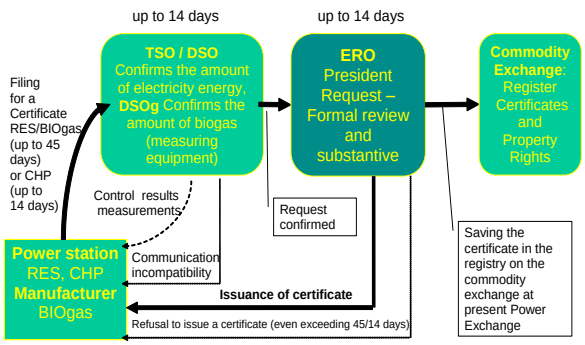

Fig. 2. Scheme of the system of issuing CO (Certificates of Origin), COCHP and COBIOgas

7. SYSTEM OF SANCTIONS

A crucial element, closing the support system of renewable sources in Poland, is a financial penalties' scheme, penalizing not fulfilling the statutory duty. According to Article 56 (1) (1a) anyone is subject to a financial penalty who does not comply with the obligation to obtain and present for termination to the ERO President the certificates of origin, certificates of origin from biogas or the certificates of origin from co-generation, as well as not paying the substitute fees, which are mentioned in Article 9a act 1 and 8 PE. Financial penalty is also envisaged for a lack of compliance with the obligations concerning the purchase of electricity from renewable sources. Also, presenting to the ERO President applications concerning the issue of certificate of origin, certificates of origin from biogas or certificate of origin from co-generation that contain data or information which are contrary to the actual facts, is liable to penalty of a fine. This regulation provides the

possibility of imposing a penalty not only on both: (i) the entity, which is obligated to terminate a certain number of certificates of origin, certificates of origin from biogas or certificates of origin from co-generation, as well as (ii) on the entity obligated to purchase offered electricity from a renewable source of energy, but also on producers of electricity who present incorrect applications concerning the issue of certificates of origin, certificates of origin from biogas or certificates of origin from co-generation. In fact, both the subjective as well as the objective scope of this regulation is very extensive.

It should be underlined here that a very significant element distinguishing the possibility to impose a penalty on a certain entity, on the basis of Article 56 PE, is also the fact that, as a principle, the responsibility described in this regulation is not based on the principle of guilt but on the illegality or abandonment of activity. The administrative responsibility in respect of not fulfilling the obligations imposed by the authority of PE has the character of objective responsibility, and that is why it is totally independent. Consequently, if the URE-Presidents states the offence described in disposition Article 56 of the Energy Law, a financial penalty has to be imposed on the entrepreneur. As emphasized by the Supreme Court in its verdicts *'according to the regulation Article 56 of the Energy Law – the financial penalty is liable to this, who…, so the ERO President is obligated, not entitled, to impose a penalty in the case of a circumstance in which the penalty is amendable'* [26].

Another major distinguishing point concerning the possibilities of imposing financial penalties for other offences described in Article 56, lies in the fact that the legislator described not only the maximum but also the minimum level for the imposed penalty connected with breaching an obligation to purchase electricity coming from renewable sources, as well as the obligation to terminate certificates of origin or certificates of origin from biogas and certificates of origin from co-generation (see Article 56 (2a, 2c, 2d and 3) PE, which stipulated the formula to calculate financial penalties). This creates a situation whereby even penalties at the minimum level are really noticeable, guaranteeing the effective realization of all obligatory duties.

8. CONCLUSIONS

Support for the development of both renewable sources, biogas as well as co-generation, is a fact in a political, legal and economic aspect. The above described systems of support were based on common estimations concerning the way the support is provided. The issue of effective functioning of every support system in the presented manner can be looked at through the perspective of two elementary parameters: 1) the amount of increase in power installed in sources using such systems as well as 2) the accumulation of capital gained from it.

Therefore, when evaluating the system of support in Poland, itshould be noted that the dynamic increase of installed power capacity in domestic renewable sources is significant, though very strongly irregular in the area of particular production technologies. In the five years during which the system of support has been functioning, the installed power capacity of renewable sources increased from about 1150 MW to almost 2400 MW. This dynamic is even more visible in the wind power sector (84 MW in 2005 compared to 1188 MW in 2010). Judging by the latter comparison, it is easy to notice that almost all of the increase in installed power can be credited to wind sources. The use of biomass has also increased significantly, as a result of large scale technological development, and the so called co-firing of renewable and conventional sources in almost all system units in the country. Even more asymmetry in the level of support for particular technologies of production is visible, when we look at the dynamics of interest in investment in renewable sources through the perspective of the granted promise of licenses by the ERO President (according to the position in 2010, promises of license were granted for over 3640 MW of power in wind sources, and only about 60 MW in other sources) [13] [15]. It could be claimed here that the functioning system proposes adequate (or even excessive) support only for wind and co-firing sources, thus its variety is too small to guarantee a stable development of a wide spectrum of renewable sources.

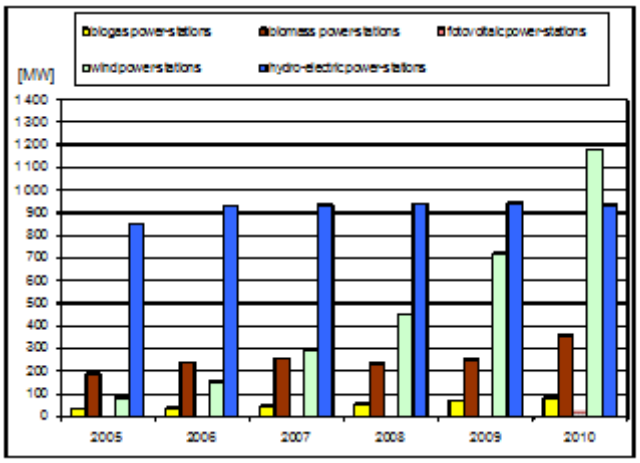

Fig. 3. Increase of installed capacity in renewable sources in Poland between 2005 and 2010

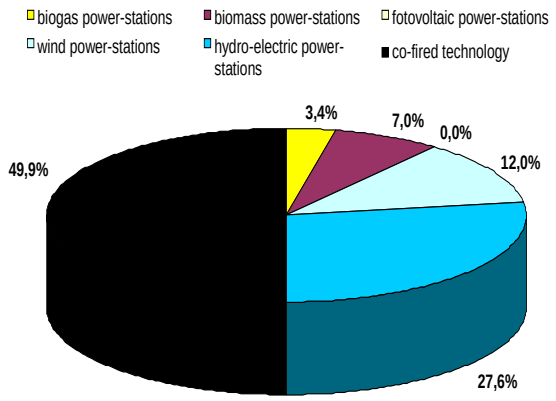

Fig. 4. Production of electric energy (divided into production in renewable energy sources) in the year 2009

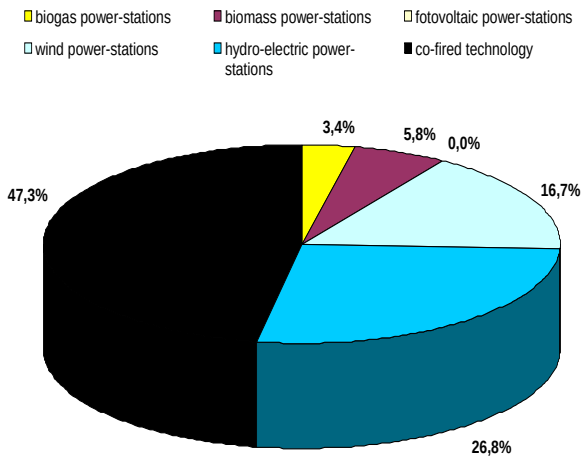

Fig. 5. Production of electric energy (divided into production in renewable energy sources) in the year 2010

In order to change the above mentioned proportions, the legislator introduced in 2010 new solutions in the area of systems of support. Both in the form of new types of certificates as well as the possibility to accumulate support in strictly described types of sources. It is worth underlining that presently there is a possibility of obtaining certificates of origin as well as certificates of origin from co-generation for the same amount of energy, on condition that it was produced on the basis of renewable fuels or in high-efficiency co-generation technology (for example, the source producing electricity by high efficiency co-generation from agricultural biogas can obtain both a certificate of origin as well as a certificate of origin from co-generation for all the production – so called 'yellow certificates', taking into consideration that agricultural biogas is always recognized as a gaseous fuel).

Yet, it should also be emphasized that at present there is a lack of any tools of support directed at the development of the necessary network infrastructure, without which there is no possibility of connecting new sources to the network. This results, amongst other things, in the slowing of development in renewable sources from the point of view of production, transmission or distribution possibilities. There is also a lack in the Polish legislation of rules concerning exteriorization of connecting costs of such type of sources for all users of the electricity system, which can lead to unjustified, uneven charging with the costs of developing the network carried by only some customers (in regions 'rich' in primary carriers of electricity). It is also worth stressing that the increase of new production power in sources with an unstable profile of production must be connected with an assurance to cover reserves of power with sources which could 'quickly' replace them, which is also connected with the necessity to bear substantial expenses. These reserve sources determine in such case the extent of security and stability of the electricity system, and as of today this issue has not been regulated.

Moreover, the disadvantage of the system of support for renewable sources functioning in Poland is also that it is a system for every production unit without any time limit, and is thus deprived of elements for the stimulation of innovation. Therefore, for the purpose of ensuring an increase in power as well as gaining new technologies, we should also introduce, following the pattern of many other European countries, an expiring system of support for particular investments, in the form of time limits for such support, in the case of a lack of construction of new power sources by a specific entity or the lack of modernization of already owned production sources.

When planning further possible changes in support systems, it should be taken into account that the efficiency of such systems is guaranteed mainly by their time stability and respect for acquired rights. This facilitates both an efficient investment preparing and security and stability of financing, as well as crediting of such projects by the investors themselves or by financial institutions.

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SYSTEMY WSPARCIA WYTWARZANIA BIOGAZU ROLNICZEGO I ENERGII ELEKTRYCZNEJ W ŹRÓDŁACH ODNAWIALNYCH I KOGENERACJI W POLSCE

Słowa kluczowe: odnawialne źródła energii, kogeneracja, biogaz, systemy wsparcia, koncesje

Streszczenie. Funkcjonowanie źródeł pozyskania paliw i energii ograniczających oddziaływanie człowieka na środowisko naturalne stanowi jedno z podstawowych wyzwań współczesnych społeczeństw. Obecnie nie ulega bowiem wątpliwości, że energetyka odnawialna i kogeneracja ma w perspektywie najbliższych lat stanowić w coraz większym stopniu element wpływający na poprawę bezpieczeństwa energetycznego kraju, w tym głównie poprzez zwiększony zakres dywersyfikacji źródeł pozyskania energii elektrycznej, ciepła oraz gazu (biogazu), a także ograniczenie uzależnienia produkcji od paliw kopalnych. Nie ulega także wątpliwości, że wykorzystanie tego rodzaju źródeł obniża niekorzystne oddziaływanie energetyki na środowisko, m.in. poprzez redukcje szkodliwych emisji. Jednocześnie ze względu na wysokie koszty pozyskania takiej energii zainteresowanie rozwojem źródeł odwianych i kogeneracyjnych, oparte jest w dużej mierze na różnorodnych systemach wsparcia. Istnienie zatem odpowiednio skonstruowanych tego rodzaju systemów decyduje o zakresie rozwoju i wykorzystania takich źródeł energii. W niniejszy artykule skoncentrowano się na przedstawieniu najistotniejszych założeń polskiego sytemu wsparcia energii elektrycznej wytwarzanej w źródłach odnawialnych i kogenereacyjnych oraz wsparcia przewidzianego dla źródeł wytwarzających biogaz rolniczy.

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