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EUROPEAN UNION REGIONAL POLICY SUPPORT FOR INVESTMENTS IN RENEWABLE ENERGY IN RURAL AREAS OF THE MAZOVIAN VOIVODSHIP

Key words: renewable energy, EU cohesion policy, rural areas, Mazovian Voivodship

ABSTRACT. EU regional policy funding was said to be a significant source of co-financing renewable energy investments in Poland, however, what has not yet been investigated thus far is the impact of such financing in rural areas of the Mazovian Voivodship, the biggest in the country. Thus, the aim of the paper is to explore the main outcomes of using this funding for RE investments in rural areas of the Mazovian Voivodship and look into the relations between these outcomes and important factors determining them. The study is based on qualitative and quantitative data from the SIMIK 2007-2013 data base of the Ministry of Development, Local Data Bank of Statistics Poland, data from 3 classifications of communes and a questionnaire survey. Findings prove that RE investments in the rural Mazovian Voivodship differ from investments in other rural areas of Poland as they only used wind and solar RE, were carried out only by local self-governments and enterprises, and obtained EU co-funding only from regional operational programmes. The similarities between RE investments in the rural Mazovian Voivodship and other rural areas of the country indicate an insufficient adjustment of eligible costs to total costs and a lower than available share of EU funding in eligible costs, both significantly increasing the share of non-EU funding necessary to carry out projects. The shortage of funding was indicated by local authorities and the respondents of the survey as the main obstacle in supporting local development and was the reason for taking other than RE investment development priorities. The paper concludes with recommendations on an increase of RE investments in the rural Mazovian Voivodship.

INTRODUCTION

Due to the more and more urgent need to decarbonize the energy system, and thus to increase the use of renewable energy (RE), the European Union set overall targets determining the gross final consumption of RE [EC 2016, p. 7] and agreed overall national targets for each member state till 2050, with interim goals for 2020 [Directive 2009/28/EC] and 2030. It has also been encouraging member states to set their own, more ambitious, national targets [Directive 2018/2001, p. 2]. The EU renewable energy targets fully comply with the requirements of sustainable development [Lund 2007, Pultowicz 2009, Kurzak 2010, Czupich 2017]. In order to support achieving these targets, the EU designated structural and cohesion funds allocated in eligible member states in consequent budget

perspectives under operational programmes of regional policy. EU funds have been supporting investments in RE both in urban and rural areas. The deployment of renewable energy in rural areas was additionally indicated as an important driver of local economic development [EC 2011, p. 11, MAP 2019].

According to EU set targets, Poland committed to achieve a 15% share of renewable energy in the gross final consumption of energy till 2020 [MG 2010] and not less than 32% by 2030. Difficulties in reaching this goal may result from increasing needs for energy [Wójcicki 2010], numerous barriers in assessing the potential of RE production [Sobolewski 2010, Putek-Szeląg, Gierałtowska 2013, Nowodziński, Kościańska 2016] and insufficient use of RE sources [Gorczyca 2011] both in urban and rural areas of the country. The use of RE sources requires legal and financial support [Graczyk 2015]. Both have been included in EU regional policy supporting Poland since EU accession. In the budget perspective 2007-2013, EU regional policy funding co-financing RE investments was available in Poland from two sources: the Operational Programme Infrastructure and Environment 2007-2013 (OPIE), which received the highest EU funding for any OP in the history of EU regional and cohesion policy [MRR 2007] and from 16 regional operational programmes. The latter ones were implemented in 2007-2013 for the first time, as a financial tool designed to better respond to varied development needs of different regions [Rakowska 2016, 2019]. These reasons and the fact that the budget perspective 2007-2013 was the first and, so far, the only one in which Poland participated fully, i.e. from its beginning in 2013 till its end in 2015 according to the $n+2$ rule, makes it optimal for studies on the topic of this paper.

Investments in RES in rural areas of the Mazovian Voivodship can significantly contribute to achieving RE targets set for Poland, as the Mazovian Voivodship is not only the biggest NUTS 2 region in the country, but is also the region whereby its rural areas and rural population constitute the biggest share of rural areas and population in the country. It also has quite favourable conditions for producing RE from solar, wind, biomass and other sources [IE 2006, MBPPRRW 2006] and it approved an increase in the production and consumption of RE as one of its development targets [UM 2006].

Investments in RE in the Mazovian Voivodship have so far been supported by domestic and EU funding. In 2007-2013 investors in RE could obtain EU financial support from the above mentioned OPIE and from the Regional Operational Programme for the Mazovian Voivodship (ROPMV), which received the highest (1831,5 mln euro) EU funding for any regional operational programme in Poland in that budget perspective. Although EU funding under operational programmes 2007-2013 was said to contribute significantly to RE development in the Mazovian Voivodship [Cieszkowski et al. 2015], literature lacks studies on the outcome of this support in rural areas of this region. Thus, the aim of the paper is to explore the main outcomes of using EU cohesion policy funding 2007-2013 for RE investments in rural areas of the Mazovian Voivodship and look into the relations between these outcomes and some factors determining them.

MATERIAL AND METHODS

The study is based on several sources of secondary data and a questionnaire survey carried out in rural communes of the Mazovian Voivodship in 2017. The data on RE projects co-financed from EU funding under operational programmes 2007-2013 in Poland was obtained from the SIMIK 2007-2013 data basis of the Ministry of Development, in which 836 entries described 716 RE projects in the whole country, of which 45 entries described 25 projects in the Mazovian Voivodship. Data on the main characteristics of local units where RE projects were located was obtained from the Local Data Bank, Statistics Poland, data on the level of development was obtained from the Monitoring of Rural Development [Rosner, Stanny 2016] and data on the functional classification of communes from the “Functional classification of Polish communes for the purposes of monitoring spatial planning” [Śleszyński, Komornicki 2016]. Communes of the Mazovian Voivodship were classified as rural according to DEGURBA classification. The questionnaire survey carried out in 2017 was sent by mail to all 251 rural (by DEGURBA classification) communes of the Mazovian Voivodship, of which 157 responded, generating a 62% response rate. The questionnaire included questions on the main barriers for local self-governments to support the development of their communes, priority investments, as well as the most important environmental issues and ways to solve them.

Quantitative data was analysed using descriptive statistics and Pearson’s correlation index, while qualitative data using standard methods of qualitative analysis.

RESULTS

In 2007-2013, investors carried out 25 renewable energy (RE) projects co-financed from EU regional policy all over the voivodship, of which 16 projects only in rural areas. The 16 rural RE projects made up 64% of all RE investments under OPs in the region and absorbed 64.5% of EU funding obtained from this source, however they obtained EU funding only from the Regional Operational Programme for this region (Table 1). This is the first difference between RE investments in the rural Mazovian Voivodship and the rest of the rural country where investors obtained EU funding not only from regional operational programmes, but from the Operational Programme Infrastructure and Environment 2007-2013 (OPIE), as well.

Mazovian rural RE investments only used wind and solar energy (37.5% and 62.5%, correspondingly). They were only carried out by enterprises (37.5%) and local self-governments (62.5%). There is a full correlation between energy sources and types of investors ($r_{xy} = 1$, $p < 0.00$, $\alpha < 0.05$) as projects in solar RE were only carried out by local self-governments and projects in wind RE only by enterprises. That is another difference between RE investments in the rural Mazovian Voivodship and in rest of the rural country, where varied entities invested in varied (not only wind and solar) RE obtaining EU funding from different OPs. These findings are important due to the fact that the Regional Operational Programme for the Mazovian Voivodship, precisely Axis 4, action 3 ‘Air protection, energy’, addressed EU funds to a wide range of beneficiaries, not only to communes and enterprises, to support projects in varied RE sources, not only wind and sun.

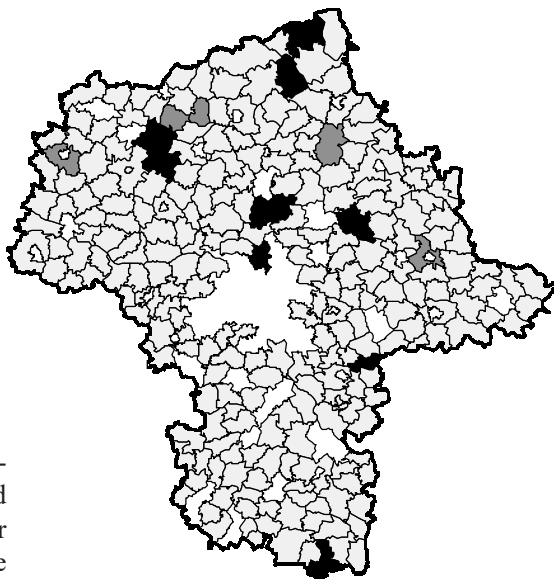
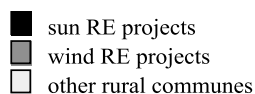


Figure 1. Location of RE investments co-financed from EU regional policy funding 2007-2013 in the rural Mazovian Voivodship

Source: own elaboration based on SIMIK 2007-2013 data

As there is a full correlation between RE types of investments and the type of investor, the findings for investments in solar RE also describe investments by local self-governments

and those in wind RE describe investments by enterprises. Thus, the further part of the study includes an analysis by types of RE only as fully representative for analysis by types of investors.

As Figure 1 shows, most RE projects in the rural Mazovian Voivodship were located in the north and central parts of the region, while RE investments in the south were scarce. The location pattern does not match the opinion of the Mazovian Agency for Energy [MAE, no date] that the region has potential for developing wind RE in eastern and south-eastern parts and in solar RE all over the voivodship. It proved that location favourable to developing RE did not determine the beneficiaries' decisions on RE investments.

Among the 15 rural communes where the 16 Mazovian RE projects were located, 13 were included in the research on rural development [Rosner, Stanny 2016]. According to the findings, most of them (6) were assigned to type 2 – communes of a low level of development, 3 to type 1 – communes of a very low level of development, and also 3 to type 3 – communes of a very low level of development, while only 1 was assigned to type 5 – a commune of a very high level of development. The composition of rural communes where RE investments were located reflects the composition of all rural communes in the Mazovian Voivodship, where those of a very low and low level of development prevail.

The 15 rural communes where the analysed projects are located also have varied functions [Śleszyński, Komornicki 2016]. These are: external zones of urban functional areas of voivodships (type B) and large-scale functions including mining (type G), each represented by 1 commune, 2 communes assigned to extensively developed units (type J), 4 communes with a moderately developed agricultural function (type I) and 7 communes with an intensively developed agricultural function (type H). The structure of the analysed communes by functional type is quite similar to the structure of all rural communes by this classification, as in both cases types H and I prevail, while types B, H and J constitute the smallest share.

Neither the total value of projects nor their EU co-funding were related to the level of development (MROW) or to the main functions of the communes where they were located.

Mazovian rural RE investments were co-financed by PLN 47.5 mln of EU funding, which constitutes 64.5% of EU funding for all RE investments under OPs in this region and 1.7% for all RE investments under OPs in the whole country (Table 1). As mentioned before, this whole sum came from the Regional Operational Programme for the Mazovian Voivodship, which is another difference between Mazovian rural RE investments and the same type of investments in the country total or in rural areas of the country.

Table 1. Main outcome of RE investments under operational programmes 2007-2013 in the rural Mazovian Voivodship compared to the Mazovian Voivodship and country total

Data category		Types of RE investments	Poland total	Mazovian total	Mazovian rural	Share of Mazovian rural RE investments in [%]	
						Poland total	Mazovian total
Number of	RE investments under OPs 2007-2013	all	716	25	16	2.2	64.0
		sun	427	7	10	1.4	85.7
		wind	88	17	6	11.4	58.8
		other	201	1	0	0	0
EU funding for [mln PLN]	RE investments under OPs 2007-2013	all	2,850.6	73.7	47.5	1.7	64.5
		wind	1,368.5	31.3	21.3	1.6	68.1
		solar	863.9	41.8	26.2	3.0	62.7
		other	618.2	0.6	0	0	0

Source: own elaboration based on SIMIK 2007-2013 data

Due to the above findings, a further, comparative analysis will be based on data for RE investments in rural areas of Poland, co-financed from regional operational programmes and only including wind and solar RE projects, as in the Mazovian Voivodship.

The findings show that both in the rural Mazovian Voivodship and in rural Poland, wind RE projects were much more expensive than solar ones, as their mean total value was approximately three times higher than the same value of solar RE projects (Table 2). However, the mean EU funding for wind RE projects was only 25% higher than the same value of solar RE projects and the share of EU funding in the total value of wind RE projects was much lower than that of solar projects (Table 3).

These characteristics of analysed investments might result from the principles of the European Union regional and cohesion policy 2007-2013, which read that the share of EU funding in eligible costs could be as high as 85%, while the share of eligible costs in the total value of projects was not determined, and so could range from 1% to 100%. Consequently, the share of EU funding in the total value of projects could range from 1% to 85% maximum. However, the best possible situation for investors obtaining EU funds

Table 2. Descriptive statistics for RE investments in the rural Mazovian Voivodship and the rest of rural Poland under regional operational programmes 2007-2013

Data category	Rural Mazovian [mln PLN]				Rural Poland [mln PLN]			
	total value		EU funding		total value		EU funding	
	wind	solar	wind	solar	wind	solar	wind	solar
N	6	10	6	10	23	234	23	234
Min	6.7	1.2	2.1	0.8	1.6	0.03	0.7	0.02
Max	13.6	8.5	5.5	5.4	90.7	18.1	11.3	11.8
Range	7.0	7.3	3.4	4.6	89.1	18.1	10.6	11.8
Sum	72.4	38.8	25.1	26.2	318.5	879.2	106.9	556
Mean	12.1	3.9	4.2	2.6	13.8	3.8	4.6	2.4
SE	1.1	0.8	0.5	0.5	3.7	0.2	0.6	0.1
Median	12.9	3.3	4.6	2.2	11.4	3.2	3.8	2.1
SD	2.7	2.4	1.3	1.6	17.7	3.3	2.7	2.2

Source: own elaboration based on SIMIK 2007-2013 data

would be one whereby the eligible costs equalled the total value of the project and the project received the maximum 85% EU co-funding of eligible costs, and so EU co-funding would reach the upper limit of 85% of the total value of investments.

The findings show that in the rural Mazovian Voivodship eligible costs of wind RE projects constituted, on average, 77% of their total value, while the eligible costs of solar RE projects constituted on average 97% of their total value. The average share of EU funding in the eligible costs of wind RE projects equalled 45%, while that of solar RE 70%. It proves that the lower share of EU funding in the total value of wind RE projects resulted from a lower share of EU funding in eligible costs and a lower share of eligible costs in the total value, when compared to solar RE projects. As a result, Pearson's correlation between the total value and EU co-funding for all RE projects in the rural Mazovian Voivodship is strong and negative ($r_{xy} = -0,841$, $p < 0,00$ and $\alpha < 0.05$), while for solar and wind RE projects the above discussed Pearson's correlations were insignificant as $p\text{-value} > \alpha$. Although the results for wind and solar RE projects in rural Poland (Table 3) are slightly different than those for the rural Mazovian Voivodship, they show the same tendency – neither wind nor solar projects reached the upper limit of EU co-funding from the analysed sources.

The analysed 6 RE wind investments resulted in the construction of 7 wind farms of 2 MW power each, giving a total potential of 14 MW of wind RE energy. All 10 RE solar investments carried out by the communes resulted in the installation of solar sets, 4 of them in additional modernising existing heating systems and 1 in the installation of hybrid lamps. The solar sets were installed on 3,183 buildings in all, of which at least¹ 36

¹ Available information on projects specifies the type buildings where solar sets were installed only in four cases, thus the data on the number of public buildings should be interpreted as “not less than”.

Table 3. Descriptive statistics for RE investments in the rural Mazovian voivodship and the rest of rural Poland under regional operational programmes 2007-2013

Data category			N	Min	Max	Mean	Median	Range
Rural Mazovian – the share of:	eligible costs in the total value	wind RE	6	72	81	77	78	9
		solar RE	10	91	100	97	98	9
	EU funding in the total value	wind RE	6	24	41	34	36	17
		solar RE	10	64	70	68	69	6
	EU funding in eligible costs	wind RE	6	30	50	45	50	20
		solar RE	10	70	70	70	70	0
Rural Poland – the share of:	eligible costs in the total value	wind RE	23	54	90	75	80	37
		solar RE	234	34	100	88	91	66
	EU funding in the total value	wind RE	23	12	63	41	41	51
		solar RE	234	20	85	61	70	65
	share of EU fund in eligible costs	wind RE	23	20	71	57	60	50
		solar RE	234	33	85	72	77	52

Source: own elaboration based on SIMIK 2007-2013 data

on public buildings administered by the communes and the rest on family houses. The communes applied for EU funding, and thus were registered as beneficiaries in cases of investments that included the installation of solar sets on both public buildings and family houses, as well as in cases of the installation of solar sets on family houses only.

The survey responded by 157 rural communes of the Mazovian Voivodship showed that insufficient own and external funds for investments were the main barrier for local self-governments to support the local development of their communes. Considering the limited availability of finances, respondents indicated the construction and/ or modernisation of local roads, sewage and water systems as the most necessary and urgent. Investments in RE were pointed out as the most important by only 1% of respondents. None of the communes where analysed projects were located and which responded to the survey listed investments in renewable energy as the most important and urgent. However, when answering the question on the most important environmental issues and ways to solve them, 35% of respondents mentioned the necessity of developing RE in their communes, especially referring to the poor quality of air. This group included 2 rural communes where the analysed projects were located. Thus, financial barriers and development priorities, other than environmental ones, indicated by the majority of respondents, can be the reasons why conditions more favourable to RE development did not cause more RE investments in them in other parts of the rural Mazovian Voivodship.

CONCLUSIONS

The 16 renewable energy investments in rural areas of the Mazovian Voivodship, co-financed from the EU regional policy funding 2007-2013 constituted 2% of all projects of this kind in Poland and 64% in the Mazovian Voivodship. There are several differences between RE investments in the rural Mazovian Voivodship and the rest of rural areas in the country, as the rural Mazovian Voivodship: 1. obtained EU co-financing only from the Regional Operational Programme for the Mazovian Voivodship 2007-2013, 2. only used wind and solar energy, 3. were only carried out by local self-governments and enterprises. There were, however, some similarities between RE investments in the rural Mazovian Voivodship and rural Poland as well: 1. RE solar and wind investments did not reach the upper limit of the share of EU funding in eligible costs, 2. the eligible costs did not constitute as high a share of total costs as it was allowed, 3. consequently, the shares of EU funding under operational programmes in total costs of RE investments were lower than available. Summing up, Mazovian rural areas benefitted from available EU funding to a limited degree. The last above listed finding is of special importance, as the shortage of funds being the main obstacle in supporting local development resulted in taking other development priorities than RE investments, although respondents were aware of how important and urgent environmental issues were.

The findings and conclusions of this study lead to the following recommendations on the increase of RE investments in the rural Mazovian Voivodship: 1) the share of eligible costs in total costs should be made as high as possible; 2) investors should try and achieve the upper limit of the share of EU funding in eligible costs; 3) institutions governing EU regional policy should increase the amount of EU funding co-financing RE projects under regional operational programmes in on-going and future budget perspectives; 4) other investors should also be encouraged to carry out RE projects in the rural Mazovian Voivodship, particularly in those parts, where conditions are most favourable to RE production.

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INWESTYCJE W ENERGIĘ ODNAWIALNĄ NA OBSZARACH WIEJSKICH WOJEWÓDZTWA MAZOWIECKIEGO WSPÓLFINANSOWANE ZE ŚRODKÓW POLITYKI REGIONALNEJ UNII EUROPEJSKIEJ

Słowa kluczowe: energia odnawialna, polityka regionalna UE, obszary wiejskie,
województwo mazowieckie

ABSTRAKT

Fundusze polityki regionalnej UE są określane jako ważne źródło współfinansowania inwestycji w energię odnawialną w Polsce. Jednak do tej pory nie zbadano, czym ich wykorzystanie poskutkowało na obszarach wiejskich województwa mazowieckiego, największego województwa w kraju. Dlatego celem artykułu jest zbadanie głównych rezultatów wykorzystania tego finansowania dla inwestycji w energię odnawialną na obszarach wiejskich tego regionu oraz określenie związków między tymi wynikami a ważnymi czynnikami je determinującymi. Wykorzystano dane jakościowe i ilościowe z bazy danych SIMIK 2007-2013 Ministerstwa Rozwoju, Banku Danych Lokalnych GUS oraz dane z 3 klasyfikacji gmin i badania ankietowego. Wyniki wskazują, że inwestycje w energię odnawialną na obszarach wiejskich województwa mazowieckiego różniły się od inwestycji na pozostałych obszarach wiejskich w Polsce, ponieważ wykorzystywały wyłącznie energię wiatrową i słoneczną, były realizowane wyłącznie przez samorządy lokalne i przedsiębiorstwa, a dofinansowanie ze środków UE pochodziło tylko z regionalnego programu operacyjnego. Podobieństwa między inwestycjami w odnawialne źródła energii na obszarach wiejskich województwa i na obszarach wiejskich kraju wskazują na niewystarczające dostosowanie kosztów kwalifikowalnych do kosztów całkowitych oraz niższy niż dostępny udział finansowania UE w kosztach kwalifikowalnych, co znacznie zwiększa udział finansowania krajowego niezbędnego do realizacji projektów. W badaniu ankietowym wskazano niedobór środków krajowych i zbyt mało środków unijnych, jako główną przeszkodę we wspieraniu rozwoju lokalnego i przyczynę realizacji innych priorytetów niż inwestycje w OZE. Artykuł kończą rekomendacje dotyczące zwiększenia inwestycji w energię odnawialną na obszarach wiejskich województwa mazowieckiego.

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