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# Public Support for Renewable Energy in Poland

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**Abstract:** The article discusses major public funding sources available to promote investments in renewable energy projects in Poland. The main sources include environmental funds that are financed from environmental charges levied on companies that cause environmental damage and operational programmes funded by European Union funds. The aim of the paper is to reveal the amount of public support for renewable energy in Poland, after comparison of funding programmes implemented by environmental funds and EU funds managing authorities. The comparison includes the level of support and impact on objectives in relation to renewable energy production and greenhouse gas emissions. Based on available information it can be concluded that the level of financial support for investments in renewable energy provided by the environmental funds and operational programmes was quite comparable in recent years. Both types of funding sources are also important instruments to foster the use of renewable energies. An important result of the support is the reduction of greenhouse gas emissions.

**Keywords:** renewable energy, climate change, environmental funds, operational programmes

**JEL codes:** H23, Q42, Q54

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## 1. Introduction

One of the Polish climate policy targets is to reach 15% share of renewable energy in the gross final energy consumption by 2020. The main policy instrument to reach the target used to be a green certificate system. Under this scheme renewable energy producers receive revenues from sales of electricity and green energy certificates which are purchased by energy suppliers obliged to submit a certain number of certificates to the regulator (Energy Regulatory Office) (Gürkan, Langestraat, 2014: 85). The system is uniform which means that all renewable technologies receive

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the same amount of certificates per generated MWh of electricity (Kitzing et al., 2012: 195). In 2016 the green certificate scheme was partly replaced by the auction system and feed-in tariffs.

Another important instrument used to promote “green” energy in Poland is the financial support from public funds to renewable electricity or heat installations. The major public funding sources available to promote investments in renewable energy (by decreasing equipment costs) are (Abdmouleh et al., 2015: 251)<sup>1</sup>:

- Environmental funds which operate as legal entities with mostly extra-budgetary revenues received from charges levied on companies that cause environmental damage, including “substitution fees” paid by energy companies (Paska, Surma, 2014: 289). Nation-wide assistance programmes are offered by a National Fund for Environmental Protection and Water Management. On the voivodship level there are 16 regional funds for environmental protection and water management.
- Operational programmes co-financed from the EU funds within cohesion policy, both in 2007-2013 and in 2014-2020 programming period. The main operational programmes providing assistance to investors in renewable energy projects are the Infrastructure and Environment Programme (managed at the national level) and 16 regional operational programmes prepared by the voivodships<sup>2</sup>.

The aim of the paper is to reveal the amount of public support for renewable energy in Poland, after comparison of funding programmes implemented by environmental funds and EU funds managing authorities. The comparison includes the level of support and impact on objectives in relation to renewable energy production and greenhouse gas emissions. The analysis focuses on the support provided for investors in renewable energy facilities and equipment. It does not include financial support for research and innovation investments.

The paper is largely based on data presented by environmental funds and by managing authorities for operational programmes in Poland. The author refers to assistance programmes for investments in renewable energy or reports on implementation of the support schemes.

The paper also reviews literature and reports on renewable energy and support from earmarked environmental funds and the EU funds.

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<sup>1</sup> Some authors argue that supporting renewable energy through grants is more effective than through subsidies to energy prices (e.g. green certificates). (Bunn, Muñoz, 2015: 8).

<sup>2</sup> There are also other less important public sources such as Rural Development Programme or the European Economic Area Financial Mechanism. See: Minister Gospodarki (2009).

The analysis focuses on measures implemented in two programming periods, 2007-2013 and 2014-2020.

## 2. Forms and the level of support for renewable energies

Major areas which have to be supported by environmental funds in Poland are defined by law. According to the Article 400a of the Environmental Protection Law one of the funds' spending objectives is the promotion of the use of local renewable energy sources and the introduction of more environmentally friendly energy sources. Some of the funds give priority to this area. For example, this is the case for Regional Fund in Pomorskie voivodship. The Pomorskie region has considerable potential for renewable energy generation, especially wind and solar power<sup>3</sup>.

In recent years a number of funds' environmental investment programmes targeted towards investments in renewables has increased. The principal objectives of the programmes is to reduce CO<sub>2</sub> emissions, promote energy efficiency or cogeneration of power and heat. In some cases the main objective is to reach the 15% target for renewable energy (eg. the programme of financial support for small renewable energy systems prepared by the Regional Fund in Warsaw).

Some of assistance programmes for renewable energy (eg. the Jackdaw and Prosument programmes) are implemented jointly by the National Fund and the regional funds. There are also regional funds which have their own subsidy schemes to promote renewable energy. For example, the Regional Fund in Lublin provides grants for the partial repayment of commercial bank loans for small-scale renewable energy systems (Regional Fund for Environmental Protection and Water Management in Lublin, 2017a). The support for renewable energies is also provided under the green investment scheme<sup>4</sup>.

Table 1 provides an overview of funding programmes implemented by environmental funds and EU funds managing authorities in order to promote investments in renewable energy projects. It includes environmental funds' assistance schemes that have been in place in 2014-2017. The EU funding assistance programmes cover the 2014-2020 programming period. It should be noted that

<sup>3</sup> Ogłoszenie nr 1/2015 Zarządu Wojewódzkiego Funduszu Ochrony Środowiska i Gospodarki Wodnej w Gdańsku; Regionalny Program Operacyjny Województwa Pomorskiego na lata 2014-2020.

<sup>4</sup> Under green investment schemes (GIS) the revenues from the sale of assigned amount units (the greenhouse gas emission allowances under the Kyoto Protocol) are used to finance projects beneficial to the environment. The green investment scheme established in Poland is managed by the National Fund for Environmental Protection and Water Management. (Conway, 2015: 429).

renewable energy is supported by the EU funds under thematic objective 4 – supporting the shift towards a low-carbon economy in all sectors. Thematic objective 4 is translated in Poland into following investment priorities (IP):

- 4a (4.i) – promoting the production and distribution of energy derived from renewable sources,
- 4b (4.ii) – promoting energy efficiency and renewable energy use in enterprises,
- 4c (4.iii) – supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including in public buildings, and in the housing sector,
- 4d (4.iv) – developing and implementing smart distribution systems that operate at low and medium voltage levels,
- 4e (4.v) – promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures,
- 4g (4.vi) – promoting the use of high-efficiency co-generation of heat and power based on useful heat demand.

**Table 1. Selected assistance schemes of the environmental funds and operational programmes for 2014-2020 encouraging renewable energy development**

Source and the disbursement period	The type and amount of support (as a percentage of the eligible costs or bank loan) and main recipients
Small renewable energy installations	
National Fund, 2010-2014	Grants for the repayment of bank loans (45%) for housing communities and individuals who buy solar thermal collectors
National and regional funds (the Prosumpt program), 2014-2019	Grants (15%-40%) and loans (60%-85%) for local governments, individuals and housing communities
Regional Fund in Lublin	Grants for the repayment of bank loans (up to 30%)
Larger renewable energy installations and facilities	
National Fund (the Stork programme), 2015-2023	Loans (up to 85%) for entrepreneurs
National Fund (the GIS programme), 2010-2015	Grants (up to 30%) and loans (up to 45%) for entities who construct agricultural biogas plants and power plants to produce renewable energy from biogas
National Fund (The use of geothermal energy), 2016-2025	Loans and capital investments for entrepreneurs
Regional Fund in Warsaw, 2015-2017	Loans (up to 100%) for local governments, legal persons, individuals
Infrastructure and Environment Programme (IP 4.i)	Grants and loans for enterprises
Regional operational programmes (IP 4.a)	Grants and loans for enterprises, authorities, NGOs and others
Energy saving measures in enterprises combined with renewable energy	
National Fund, 2014-2015	Grants for the repayment of loans (up to 40%) for small and medium-sized enterprises
Infrastructure and Environment Programme (IP 4.ii)	Loans for large enterprises
Regional operational programmes (IP 4.b)	Grants and loans for micro, small and medium-sized enterprises
Improvement of the energy performance of buildings using renewable energy sources	
National Fund and voivodship funds (the Jackdaw programme), 2015-2018	Grants (up to 90%) for various entities who reduce air pollutants
Infrastructure and Environment Programme (IP 4.iii)	Grants and loans for authorities, housing associations, housing communities, state-owned energy service providers
Regional operational programmes (IP 4.c)	Grants and loans for authorities, housing associations, housing communities, NGOs
Power grids for renewable sources	
National Fund (the GIS programme), 2010-2014	Grants (up to 40%) for entities who expand power grids for wind power generation
Infrastructure and Environment Programme (IP 4.iv)	Grants for enterprises who develop and implement smart distribution systems that operate at low and medium voltage levels
Biofuels in transport	
Regional operational programmes (IP 4.e)	Grants for enterprises, authorities, NGOs and others
High-efficiency cogeneration using renewable energy	
Infrastructure and Environment Programme (IP 4.vi)	Grants for authorities, energy suppliers
Regional operational programmes (IP 4.g)	Grants and loans for authorities, energy suppliers, housing communities and others

Source: Ministerstwo Infrastruktury i Rozwoju (2014a); Regional Fund for Environmental Protection and Water Management in Warsaw (2015); Regulation (EU) No 1303/2013; National Fund for Environmental Protection and Water Management (2015a); National Fund for Environmental Protection and Water Management (2017b), Ustawa z dnia 17 lipca 2009 r. o systemie zarządzania emisjami gazów cieplarnianych i innych substancji (2009); Regional Fund for Environmental Protection and Water Management in Lublin, 2017a.

As Table 1 shows, support is provided for a variety of projects in the area of renewable energies including small and large renewable energy systems, energy-efficiency measures, power grids and biofuels. The assistance is available for whole range of different recipients such as public authorities, private firms, housing communities and households. The main disbursement mechanisms are grants. Loans are offered under some of the environmental funds' programmes. However, it should be noted that several regional operational programmes provide for the possibility to use loans to support renewable energy related projects.

The document which constituted a reference instrument for preparing the programming of the Structural Funds and the Cohesion Fund in Poland for 2007-2013 stated that a gradual increase of the total share of renewable energy was important for Poland's energy security (Ministerstwo Rozwoju Regionalnego, 2006). It seems that the Partnership Agreement for the 2014-2020 programming period places more emphasis on climate policy objectives<sup>5</sup>. The development of renewable energy sources has to be a vital element of the intervention strategy. However, financial support for the production and distribution of energy derived from renewable sources is much lower than the support for improving the energy efficiency (respectively 12% and over 80% of the allocation for the thematic objective 4). The development of renewable energy sources has to be to larger extent supported by other public policies and private sector (Ministerstwo Infrastruktury i Rozwoju, 2014b).

In the programming period 2007-2013 support for renewable energy sources provided under operational programmes was aimed at installing renewable energy systems, improving energy efficiency, developing efficient integration of power grids with renewable energy resources, biofuels production or cogeneration using renewable energy. Small projects (with a value of less than PLN 10 million or 20 million depending on the type of the project) were supported by regional programmes. Larger projects were supported by the Infrastructure and Environment Programme (Tessen-Węsierski, 2009: 79). As it was shown in Table 1, in the period 2014-2020 the thematic structure of funding under operational programmes is similar to the thematic orientation in the previous programming period. The support for renewables is mainly provided within investment

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<sup>5</sup> According to the Article 2 of the Regulation (EU) No 1303/2013 Partnership Agreement means a document prepared by a Member State with the involvement of partners in line with the multi-level governance approach, which sets out that Member State's strategy, priorities and arrangements for using the European Structural and Investment Funds in an effective and efficient way so as to pursue the Union strategy for smart, sustainable and inclusive growth, and which is approved by the European Commission following assessment and dialogue with the Member State concerned.

priority aimed at promoting the production and distribution of energy derived from renewable sources (IP 4a or 4.i).

In the programming period 2014-2020 “demarcation line” between support for renewable energy provided by operational programmes managed at central and local levels is based on the installed capacity of the installation (Table 2). As one can also see, regional operational programmes and the National Fund support similar projects. This can lead to some competition between the discussed sources of financing.

**Table 2. Renewable energy projects supported under selected assistance schemes implemented by funds for environmental protection and operational programmes for 2014-2020 (in MW of installed capacity of the installation or a plant)**

Energy source	National and regional funds (the Prosument programme)	National Fund (the Stork programme)	Regional operational programmes for 2014-2020	Infrastructure and Environment Programme for 2014-2020
Biogas	–	0.04–2	$\leq 1$	$> 1$
Biomass	$\leq 0.3$	0.3–20	$\leq 5$	$> 5$
Geothermal	$\leq 0.3$	5–20	$\leq 2$	$> 2$
Hydro	–	0.3–5	$\leq 5$	$> 5$
Solar (collectors)	$\leq 0.3$	0.3–2	$\leq 2$	$> 2$
Solar (PV systems)	$\leq 0.04$	0.04–1	$\leq 2$	$> 2$
Wind	$\leq 0.04$	0.04–3	$\leq 5$	$> 5$

Source: WYG PSDB Sp. z o. o. (2015: 130), Fund for Environmental Protection and Water Management (2017b), National Fund for Environmental Protection and Water Management (2017c).

Table 3 shows the data available on the amount of support for renewable energy investments. It is somewhat difficult to assess levels of funds’ spending on renewable energy because the financial support was offered for investments that could include renewable power (eg. cogeneration).



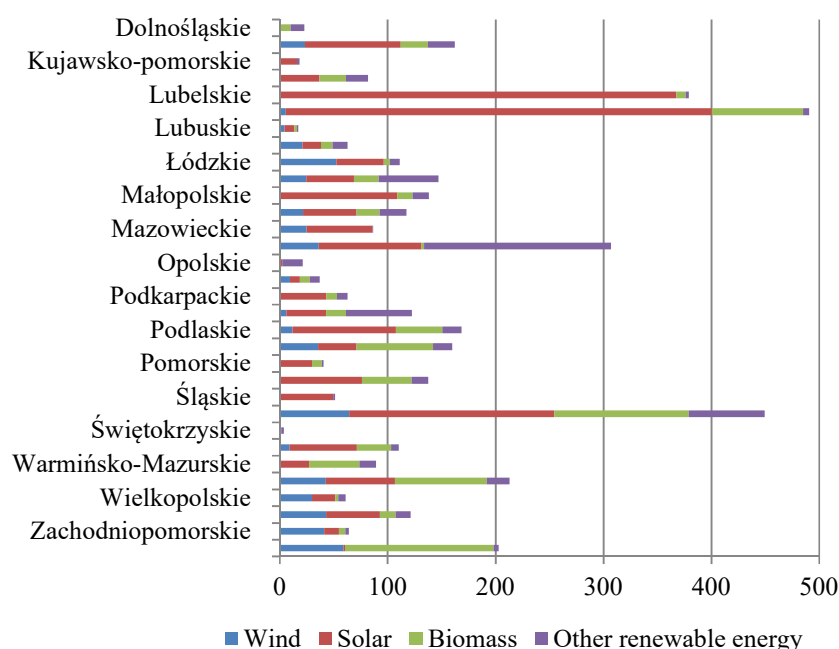
**Table 3. The amount of support for renewable energy investments from environmental funds and operational programmes**

Source	Amount of support
National Fund for Environmental Protection and Water Management	<p>In the years 2007-2013 the total amount of aid granted in the area of “Air and climate protection” was PLN 2800 million and accounted for 19% of total fund’s environmental expenditure. The value of contracts for renewable energy sources awarded by the National Fund in 2007-2008 for renewable energy sources was PLN 220 million (two thirds of the value of contracts in the area of air protection). In 2011-2013 the fund awarded grants under the “Programme for renewable energy sources and high-efficiency cogeneration” of approximately PLN 535 million and under the GIS programme of approximately PLN 965 million (respectively 34% and 61% of expenditures in the area of “Air and climate protection”). The GIS programme was focused on renewable energy sources and energy efficiency.</p> <p>In 2014 and following years the budgets of subsidy schemes aimed directly at renewable sources are of PLN 910 million (No data for the geothermal energy programme) (see Table 5). Financial resources are partly transferred to regional funds.</p>
Regional funds for environmental protection and water management	<p>In the years 2007-2013 the total amount of aid granted in the area of “Air and climate protection” was PLN 3500 million and accounted for 25% of total funds’ environmental expenditure.</p> <p>Detailed data regarding the support for renewable energies can be found in reports published by the Regional Fund in Lublin. According to the reports in 2009-2013 the fund provided support of PLN 3 million for investments in renewable energy sources. The support represented 0.85% of the fund’s total environmental expenditures.</p> <p>Detailed data on support in 2014-2020 is not available. In 2014-2016 the Regional Fund in Lublin provided support of PLN 7.3 million for investments in renewable energy sources. The support represented 3.01% of the fund’s total environmental expenditures.</p>
The Infrastructure and Environment Programme	<p>In the years 2007-2013 the value of assistance contracts for investments in renewable energy was PLN 1575 million and accounted for 1.17% of the signed contracts (as of July 3, 2017). 82% of the support for renewable energy was allocated to wind energy investments.</p> <p>In 2014-2020 allocation for renewable energy sources is of PLN 533 million. Substantial resources are to be devoted to biomass (50%) and wind energy (40%).</p>
Regional operational programmes	<p>In the years 2007-2013 the value of assistance contracts for investments in renewable energy was PLN 1334 million and accounted for 1.87% of the signed contracts (as of July 1, 2015). Two thirds of the support for renewable energy was allocated to solar energy, 12% to wind, 12% to biomass and 9% to other renewable energy investments.</p> <p>In 2014-2020 allocation for renewable energy sources is of PLN 2922 million. 43% of the allocation is allocated to promotion of solar energy, 25% to biomass energy, 14% to wind energy and 18% to other renewable energy investments.</p>

Source: Główny Urząd Statystyczny (2008: 504); Główny Urząd Statystyczny (2009: 470); Główny Urząd Statystyczny (2010: 497-498); Główny Urząd Statystyczny (2011: 464-465); Główny Urząd Statystyczny (2012: 489-490); Główny Urząd Statystyczny (2013: 477-478); Główny Urząd Statystyczny (2014: 487-488); Krajowy System Informatyczny – raporty (2017); M. Ptak (2014: 434); Ministerstwo Infrastruktury i Rozwoju (2014a); Regional operational programmes for 2014-2020; Regional Fund for Environmental Protection and Water Management in Lublin (2017b); National Fund for Environmental Protection and Water Management (2017b).

Figure 1 shows the structure of the support for renewable energy sources from regional operational programmes. In almost all of the regions the planned level of support for renewables in the 2014-2020 perspective exceeds the value of contracts signed within programmes for 2007-2013. In some of the regions the structure of the support will change to a great extent. For example in kujawsko-pomorskie, małopolskie, mazowieckie, podkarpackie and śląskie voivodships the support provided in 2007-2013 was focused on solar energy. In the programming period 2014-2020 the financial assistance is more available for investors interested in other renewable technologies.

**Figure 1. The support for investments in renewable energy provided under regional operational programmes in the programming period 2007-2013 and 2014-2020 (PLN million)**



Source: own calculations based on regional operational programmes for 2014-2020; Ptak (2015).

In the programming period 2007–2013 regional operational programmes provided subsidised financing for investments in renewable energy almost exclusively through grants (financial assistance that does not have to be repaid) (Abdmouleh, Alammari, Gastli, 2015: 251). Soft loans were only offered under the JESSICA initiative implemented within 5 regional operational programmes. The support was provided for comprehensive projects in the area of energy management. The interest rate of the loans was low enough to be attractive for investors (WYG PSDB, 2015).

Most of the operational programmes for 2014-2020 involve the use of non-repayable grants to promote renewable energy related projects. The loan disbursement mechanism is used, for example, in the Regional Operational Programme for Pomorskie Voivodship (Zarząd Województwa Pomorskiego 2017). It can be expected that repayable financial instruments may discourage some investors to invest in the renewable energy sector. Loans were recommended in some of the evaluation studies of the regional programmes. The reason for such recommendations was that renewable energy projects are largely profitable (Agrotec Polska Sp. z o.o., 2015). One can also assume that the use of financial instruments will enhance financial efficiency of investments (Ministerstwo Gospodarki Ecorys Polska Sp. z o.o., 2012).

### **3. Effects of the public support on renewable energy projects**

Renewable energy projects bring climate and environmental benefits by replacing energy produced by fossil fuels. The benefits of increased renewable energy production include avoided emissions of carbon dioxide and air pollutants, wastes and wastewater discharges.

Table 4 presents the available data on the effects of National Fund's support. As one can see a contracted amount of annual electricity production in 2014-2015 increased to approximately 190 GWh. Total energy production expected in contracts concluded in 2015 was 0.8% of total renewable energy production in Poland in 2015 (Główny Urząd Statystyczny, Departament Produkcji Ministerstwo Gospodarki Departament Energetyki, 2016). The annual carbon dioxide emission reduction expected in contracts concluded in 2007-2016 is 271 thousand tonnes. It corresponds to 0.07% of total greenhouse gas emissions in Poland in 2015 (Eurostat 2017).

**Table 4. Results of the National Fund's support for climate and air protection and energy efficiency**

Year	Electricity production (in GWh per year)		Heat production (in TJ per year)		Reduced or avoided CO <sub>2</sub> emissions (in thousands of tonnes per year)	
	Contracts signed	Projects completed	Contracts signed	Projects completed	Contracts signed	Projects completed
2007	–	74.8	.	.	557.9	390.5
2008	11.5	12.9	204.9	15.5	121.7	149.5
2009	47.2	.	654.1	.	626.0	.
2010	56.0	93.8	53.2	3531.5	26.4	1176.6
2011	19.0	0.4	194.7	18.4	107.0	20.2
2012	99.8	12.0	422.6	1.4	509.3	35.8
2013	108.2	34.9	800.5	4.2	263.8	24.2
2014	191.0 <sup>a)</sup>	37.8 <sup>a)</sup>	.	.	291.7	18.6
2015	189.2 <sup>a)</sup>	308.0 <sup>a)</sup>	.	.	151.2	593.6
2016	11.3 <sup>a)</sup>	58.5 <sup>a)</sup>	.	.	56.3	727.0

a) Total energy production.

Source: National Fund for Environmental Protection and Water Management (2017a).

A National Fund's environmental programme which had a big influence on the development of renewable energy sources in Poland was a system of partial repayment of bank loans for purchase and installation of solar collectors by households and residential communities. Area of solar collectors installed thanks to support from the fund was 483.800 m<sup>2</sup> and accounted for 33%-69% of the total area of solar collectors installed in Poland at the end of 2013 (depending on the data source on the area of collectors in Poland) (National Fund for Environmental Protection and Water Management 2015b; Główny Urząd Statystyczny. Departament Produkcji Ministerstwo Gospodarki Departament Energetyki 2016)). Benefits from the collectors are now being more widely appreciated by the homeowners, designers and installers (National Fund for Environmental Protection and Water Management 2017a). The fund has been awarded the best practice certificate at the European Public Sector Award for the solar collector programme (Graczyk, 2014: 307).

Table 5 provides a comparison of the results of the programme of partial repayment of bank loans for solar thermal collectors (implemented in 2010-2014) and expected results of the Prosument and the Stork programmes. The Table 5 shows that the largest reduction of CO<sub>2</sub> emissions will likely be achieved through investments supported under the Stork programme. Furthermore, the support provided under the Stork programme is most efficient as it has the lowest assistance to results ratio. However, it should be noted that under this scheme aid is offered for

larger installations and the support takes the form of repayable assistance. The loans are repaid and the resources of the fund can be replenished.

**Table 5. The results of selected National Fund's programmes**

Specification	The collectors programme	The Prosument programme	The Stork programme
Budget (million PLN)	449.57	340.40	570
Production of energy from renewable sources (GWh per year)	.	47.2	705 <sup>a)</sup>
CO <sub>2</sub> reduction (thousands of tonnes per year)	75.1	36.8	400

a) 430 GWh of electricity and 990 000 GJ of heat.

Source: National Fund for Environmental Protection and Water Management (2017b), National Fund for Environmental Protection and Water Management (2017c).

According to the reports on implementation of operational programmes for 2007-2013 in Poland the expected increase in capacity of renewable energy production as a result of intervention is 1.267 MW (Table 6). For comparison, the installed capacity in renewable energy sources by the end of June 2017 in Poland amounted to 8.478 MW (Urząd Regulacji Energetyki 2015). It should be noted that up to the end of 2013 there was 2.800 MW additional capacity of renewable energy production achieved in EU Member States in the framework of cohesion policy programmes 2007-2013. The highest achievements (523 MW) were reported in Poland (European Commission 2015).

**Table 6. The expected effects of support for energy investments provided under the operational programmes**

Operational programme	Additional capacity of renewable energy production (MW)	Estimated annual decrease of GHG (thousands of tonnes CO eq.)	
		IP 4a	Other IPs
The Infrastructure and Environment Programme for 2007-2013	838	–	–
Regional operational programmes for 2007-2013	429	–	–
The Infrastructure and Environment Programme for 2014-2020	297	115	760
Regional operational programmes for 2014-2020	665	990	1586
Regional operational programmes for 2014-2020 (as of December 31, 2016) <sup>a)</sup>	286	153.3	182.5

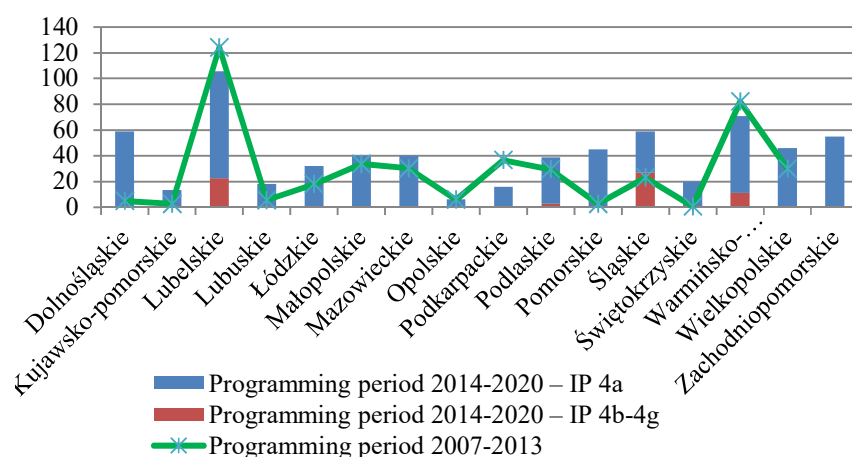
a) Forecast presented by current beneficiaries. For opolskie and zachodniopomorskie voivodships – as of December 31, 2016. No data for Świętokrzyskie voivodship. Actual level (as of December 31, 2016) of both indicators is zero.

Source: Regional operational programmes for 2014-2020; Ministerstwo Infrastruktury i Rozwoju (2014a); Reports on regional operational programmes for 2014-2020.

Additional capacity of renewable energy production as a result of support under operational programmes for 2014-2020 is estimated at 962 MW in 2023. Much of the increase in the renewable energy production capacity is going to come from investments financed under regional programmes<sup>6</sup>. As one can see, currently supported projects are to increase renewable energy capacity by 286 MW.

As shown in Figure 2 in many regions additional capacity of renewable energy production expected by 2023 is higher than 2007-2013 achievement figures. The highest value is expected in lubelskie voivodship which is the region with one of the lowest share of renewable energy in energy production (5.3% in 2015) (Local Data Bank 2017; Regionalny Program Operacyjny Województwa Lubelskiego na lata 2014–2020). It should be noted that the amendment of the law on renewable energy (implementation of the auction system and feed-in tariffs) negatively affected the implementation of investment priorities related to renewables (Komitet Monitorujący Program Infrastruktura i Środowisko 2014-2020, 2017).

**Figure 2. Additional installed capacity of renewable energy sources expected over the 2007-2013 and 2014-2020 periods (MW)<sup>a)</sup>**



a) For 2007-2013 period: at the end of 2014, except for the mazowieckie voivodship – at the end of 2012 and kujawsko-pomorskie, opolskie, pomorskie, śląskie – at the end of the first half of 2014. In zachodniopomorskie voivodship the indicator „Additional installed capacity of renewable energy sources” has not been reported.

Source: Ministerstwo Infrastruktury i Rozwoju (2014a); regional operational programmes for 2014-2020; reports on implementation of regional operational programmes for 2007-2013.

<sup>6</sup> It is interesting that the planned outcome is very much dependent on the assumed level of support for renewable energy sources: the correlation coefficient between those two variables for 16 regional operational programmes is +0.82.

Table 6 shows that operational programmes also contribute to greenhouse gas reductions. It is assumed that energy investments supported by the programmes for 2014-2020 will reduce greenhouse gas emissions by 3.45 million tonnes CO<sub>2</sub> equivalent by 2023. It corresponds to 0.86% of total greenhouse gas emissions in Poland in 2015 (Eurostat 2017). In the case of regional operational programmes emission reductions will be mainly achieved through implementation of investment priority 4a.

#### **4. Conclusion**

Environmental funds and operational programmes are both extra-budgetary sources which support investments delivering major benefits for economy and society such as new jobs in the renewable energy sector and lower impact on the environment. It is important that assistance programmes continue to change in order to meet new challenges in the energy and environmental sector, better use local potential and resources of renewable energy and to boost regional entrepreneurship initiatives. Financial and environmental benefits associated with renewable energy technologies are now being more widely known and appreciated by the entrepreneurs, homeowners, officials, designers and installers. To some extent environmental funds and operational programmes managed at the national and regional levels are complementary to each other. However, there can also be some competition between financial sources.

The analysis showed that the level of financial support for investments in renewable energy provided by the environmental funds and operational programmes was quite comparable in recent years. In 2014 and subsequent years regional operational programmes become a very important source of financing for renewable energy projects. The support provided at regional level will help not only to reach the 15% renewable energy target but also to achieve regional development objectives. Funds used at regional level better address the needs of local communities and can be more flexible.

The financial support is disbursed to many categories of beneficiaries and is delivered through grants or soft loans. Loans are likely to become increasingly important in the coming years. It will be interesting to compare results of the two forms of support (non-repayable and repayable assistance) provided in the 2014-2020 period. Such comparison will be of particular importance to Marshall Offices managing regional operational programmes.

Both types of funding sources are effective instruments to foster the use of small renewable energy systems and to promote increased renewable power capacity. An important result of the support is the reduction of greenhouse gas emissions. In a period of seven years the assistance contributes to reduce emissions by several million tonnes of CO<sub>2</sub> equivalent.

## Literature

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## ***Wsparcie energii odnawialnej ze środków publicznych w Polsce***

### ***Streszczenie***

W artykule omówiono główne źródła finansowania inwestycji w energetykę odnawialną w Polsce. Najważniejsze z tych źródeł to fundusze ekologiczne zasilane opłatami za korzystanie ze środowiska oraz programy operacyjne finansowane z funduszy Unii Europejskiej. Celem artykułu jest określenie wysokości wsparcia na odnawialne źródła energii w Polsce na podstawie porównania programów pomocowych funduszy ochrony środowiska i gospodarki wodnej oraz programów operacyjnych. W porównaniu uwzględniono zarówno poziom pomocy, jak i jej wpływ na realizację celów związanych z produkcją energii odnawialnej i redukcją emisji dwutlenku węgla. Opierając się na dostępnych danych można przyjąć, że w ostatnich latach poziom dofinansowania z obydwu źródeł był zbliżony. Oba źródła finansowania są ważnym instrumentem mającym wpływ na rozwój energetyki odnawialnej. Istotnym rezultatem pomocy finansowej jest też redukcja emisji gazów cieplarnianych.

**Słowa kluczowe:** energetyka odnawialna, zmiany klimatu, fundusze ekologiczne, programy operacyjne

**Kody JEL:** H23, Q42, Q54

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