



EU funds and adaptation of enterprises to the requirements of environmental protection

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ABSTRACT

Poland's accession to European Union was associated with the introduction of EU law. It also referred to the field of the environmental law. In accordance with the principles of sustainable development, the economic growth should take into consideration the impact on the environment. The protection of the environment necessitates creation and implementation of new techniques and technologies that contribute to the elimination of all kinds of pollution. These investments are generally expansive and the funds are limited. The financial resources play an important role in the process of adapting the requirements of environmental protection, which have to assist economic entity in achieving the ecological activities. The aim of the study was to analyze the availability of funds from the European Union in the period 2007–2013, offered to economic entities to adapt requirements of environmental protection, and increase their competitiveness in the Voivodeship of Silesia in Poland. The paper tries to answer the question whether and to what extent these activities have influenced the environmental situation in the region in recent years and what measures should be taken afterward? In conclusions, the procedure of investment conduct raising funds for activities related to the adaptation to the requirements of environmental protection is done.

Keywords: Enterprise; Environmental management; EU funds

1. Introduction

The concept of sustainable development clearly highlights three objectives: economical, environmental, and social. However, over time the ecological aspect has become more and more perceived as a factor in the competitiveness of enterprises and regions. Environmental quality significantly affects the standard of living and satisfactory economic growth. From an ecological point of view, the negative effect of the activity

of enterprise could pose a serious threat to the development of the region. Application of innovative technologies will reduce the pressure on the environment and the cost of that activity. Implementation of ecological activities is reflected in the relevant legislations identifying the need to adapt to the requirements of environmental protection which is the consequence of Polish integration with the EU. Thanks to the funds allocated by European Union, within the framework

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of various programs in recent years. Poland has had a possibility of improving the environment, especially in heavily degraded areas, which include the Voivodeship of Silesia.

2. Silesian region and its environmental problems

Silesian Voivodeship is located in the southern Poland. Its total area is 12,331 km², representing 3.9% of the country. According to the Silesian Regional Development Strategy for 2000–2020, the Silesian region is divided into four subregions: central, northern, southern, and western. Silesia Voivodeship is divided into 167 gminas, including 49 urban, 22 urban–rural, and 96 rural grouped in 36 powiats [1]. The population in the voivodeship is systematically decreasing. In 2005, the region had a population of 4.7 million people, in 2013, it was already less than 4.6 million. Nevertheless, in terms of population, Silesian region is still in the second place among the regions in Poland [2]. Silesian region is characterized by the highest density of population in the country, which is 372 persons per km², with the national average—123 persons per km² and the EU average, EU-28 117 persons per km² [3].

Silesian region is located in the economically strongest group of Polish regions. Taking into account the gross domestic product calculated per inhabitant, this voivodeship occupies the third place in the country, just after the Mazowieckie and Lower Silesian provinces [1]. The region concentrates 11.28% of all economic entities of the country, there are 460,481 of national economy entities (according to data from the III of 2014), thus, the Silesian Voivodeship is in the second place after the Mazowieckie Voivodeship. Among the total number of enterprises of the region: 73.26% are individual businessmen engaged in business activity, and 26.74% are legal entities and organizational units without legal personality, of which 5.28% are commercial companies with foreign capital (6,504 entities), and 0.12% sole shareholder companies of the State Treasury (49 entities) [2].

Silesian region plays a central role in the national fuel and energy balance. Due to the raw material resources: mining, metallurgy industry, and energy were developed in the region. The production of electricity in the province of Silesia is the highest in the country [4]. Among the economic entities, 502 (0.11%) conduct business activity in the field of mining, 43,348 (9.41%) in the manufacturing, and 530 (0.12%) in the generation and supply of electricity [2]. An important role in the economy of the region play micro and small enterprises which carry out diverse business activities. Although its number has been changing

over years, generally the balance between newly established and closed down is positive. The biggest share 95% have micro-enterprises (employing on average 9 persons), companies employing 10–49 people (4%), and only 1% are enterprises employing 50 people or more [5].

The state of environment reflects the nature of the region. The high concentration of industry and urbanization caused a permanent transformation of this area. The emission of dust and gas pollutions and the amount of waste produced in the region are not comparable with any other region in Poland. Despite the improvement in this area in recent years, which is mainly associated with the process of restructuring of heavy industry, some ecological investments and growing environmental awareness of the population, the long-term negligence dating years back contributed to unsatisfactory state of the environment. Compared with 2007, the emission of dust decreased by 51.55% in 2012. The emission of gaseous pollutants dropped by 11.73% [6,7]. According to the data from 2012, the emissions of dust in Silesian Voivodeship accounted for 20.17%, while the emission of gaseous pollutants—18.87% of the total emissions of these pollutants in Poland [7].

The Silesian region causes many problems in terms of water relations. The consumption of water for the needs of the national economy and the population decreased from 433.8 hm³ in 2007 to 392.7 hm³ in 2012 [6,7]. In 2012, 128.5 hm³ was used for the industrial purposes but 186.5 hm³ on municipal purposes [7]. The Silesian region is also in the first place in Poland in terms of the amount of industrial and municipal wastewater requiring treatment. Sewage generated in the region accounted for 16% of the total amount of sewage in Poland, in 2012 [7]. In 2007, the total quantity of industrial and municipal sewage amounted to 367.2 and 372.4 hm in 2012 which shows a slight increase. On the other hand, the amount of industrial sewage treated in wastewater plants decreased from 178.4 hm³ in 2007 to 159.3 hm³ in 2012 [6,7]. In 2012, the industrial wastewater was treated in 178 sewage treatment plants, including 87 mechanical and 25 chemical [6].

In 2007, in Silesian region 31.88% of the total amount of waste in Poland was generated. According to estimates for 2012, the amount of waste decreased by 28.95% altogether. In 2007, industrial waste was around 96.95% of the total waste generated in the region. In 2012, it was 96.48% [6,7]. Industrial waste include non-hazardous and hazardous waste. Non-hazardous waste was the largest stream of waste from economic sector in the voivodeship. In 2008, hazardous waste was only 0.9% of the total waste, generated

in the economic sector [8]. The predominant method of municipal waste treatment is still landfilling. In contrast, the industrial waste is mainly subjected to recovery processes. Among the industrial waste 91.3% was recovered, 7.9% was neutralized, and 0.8% was stored temporarily, in 2012. In addition, the amount of waste accumulated in landfills is still declining. According to the information available at Regional Inspectorate of Environmental Protection in Katowice, the decrease is due to systematic liquidation of landfills since 2008, and rehabilitation of degraded areas [9]. These processes require some significant financial resources.

3. EU funding available for adapting enterprises to the requirements of environmental protection in 2007–2013

The requirements contained in EU directives in the branch of environment protection indicate the need of huge investments. Limited capital capacity of enterprises represents a barrier in financing environmental investments. EU funds are designed to help overcome this barrier and allow enterprises to adapt to the environmental requirements given by EU Directives, in particular, in important areas for the Silesian Voivodeship such as: air protection, water protection, and waste management. Of particular importance are the following directives:

- 2008/1/EC of 15 January 2008 concerning integrated pollution prevention and control, OJ L 24, 29.1.2008;
- 2001/80/EC of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants, OJ L 309, 27.11.2001;
- 2006/11/EC of 15 February 2006 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community, OJ L 64, 4.3.2006;
- 2008/98/EC of November 2008 on waste and repealing certain Directives, OJ L 312, 22.11.2008;
- 2000/76/EC of 4 December 2000 on the incineration of waste, OJ L 332, 28.12.2000.

The 2007–2013 budgeting period EU was full of various operational programs to assist enterprises in adapting to the environmental requirements, both at national and local level. Generally, the decisive factors for the project implementation under the specific operational program were: the value and the scale of the project, and the size of the enterprise. Granted aid and funds were coordinated in a way to prevent double funding.

One of such programs was the Operational Programme Infrastructure and Environment (OP I&E). The main objective of the program was to increase the investment attractiveness of Poland's regions through the development of technical infrastructure taking into account the environment, health, and preservation of cultural identity. The first five program's priorities were related to environmental protection but only IV Priority was addressed to small, medium, and large enterprises. Under this priority the following projects were supported:

- projects in the field of environmental management systems,
- projects relating to the rationalization of waste management in enterprises,
- projects supporting enterprises in the implementation of best available techniques,
- investments aimed at reducing the amount of hazardous substances discharged with sewage,
- projects in the field of air protection [10]. A detailed information of EU funds from the European Regional Development Fund related to the actions under Priority IV OP I&E is given in Table 1.

Most of the funds were allocated for activities to support enterprises in the field of air protection (57.87%). Activities concerned the rationalization of resource and waste management in enterprises (16.71%) were on the second position.

The next program supported enterprises in activities concerning the protection of the environment 2007–2013 was Operational Programme Innovative Economy (OP IE). All priority axes of the OP IE were aimed at promoting innovation and supporting. As part of the OP IE were supported innovative projects focused on the changes in patterns of production and consumption. These projects contributed to reducing the pressure on environment. This was to be achieved by reducing emissions, elimination of harmful substances from the economic cycle to the environment and human health, reducing the amount of hazardous waste, reducing the need for non-renewable resources, and rationalizing energy use. It also concerned innovative environmental techniques which provide higher efficiency in reducing the impacts on the environment, with reduced costs and lower material and energy inputs [12].

As part of Priority IV "Investments in innovative enterprises" in OP IE the instrument for SMEs was planned. The idea was to help SMEs by purchasing or using results of R&D. Under Action 4.3, entrepreneur, who has allocated technological credit for: the

Table 1

Distribution of EU funds for the various actions of the IV Priority OP I&E [11]

Priority IV	Projects adapting enterprises to the requirements of environmental protection	The financial allocation for action in million euro	The EU contribution from the ERDF in million euro	The maximum share of funding at project level (%)
Action 4.1	Support for environmental management systems	0.84	0.42	50
Action 4.2	Rationalization of resources and waste management in enterprises	139.41	41.81	30
Action 4.3	Support for enterprises in the implementation of best available techniques (BAT)	126.97	38.09	30
Action 4.4	Support for enterprises in the field of water and wastewater treatment	38.21	11.46	30
Action 4.5	Support for enterprises in the field of air protection	482.94	144.77	30
Action 4.6	Support for enterprises engaged in the recovery and disposal of industrial waste	46.15	13.84	30

implementation of new technology, production of new products, modernization of products on services based on new technology, after the project implementation and products introduction was able to get the support in the form of bonuses, allocated for repayment of the technological credit. Under Action 4.4, the financing could be obtained by enterprises from the sector of manufacturing and services in the field of implementation of innovative technological solutions. The main objective of all projects was to reduce a harmful impact on the environment by achieving lower energy, material and water consumption, and the use of life cycle assessment at stages of technological process [13]. Detailed information of EU funds from the ERDF for 4.3 and 4.4 actions is given Table 2.

Innovative solutions were also promoted and supported under the Regional Operational Programme of Silesia (ROPS) 2007–2013. This program was the most important instrument of regional policy in Silesian province. The main objective of the program was to

stimulate dynamic development, taking into account social, economic, and spatial aspects. Within the ROPS, support for enterprises was mainly focused on SMEs [4]. Under the Priority I of ROPS, “Research and technological development (R&D), innovation and entrepreneurship” some projects were preferred. The projects were on the list of directions of technological development to 2020, adopted by the Steering Committee of the Regional Innovation Strategy of Silesia. In the area of environmental protection the projects included: the technology of collection and water treatment, the technology of protection, and rehabilitation of the environment or industrial and hazardous waste management technologies [14]. Action 1.2 “Micro-enterprises and SMEs” supported projects of innovational products and processes taking into account the use of environmental standards, as well as projects introducing innovative solutions and technologies. In particular, these activities included:

Table 2

Distribution of EU funds as part of the 4.3 and 4.4 IV Priority OP IE [12]

Priority IV	Investments in innovative undertakings	The EU contribution from the ERDF in million euro	% of the allocation for direct support SMEs (%)	The maximum share of EU funds (%)
Action 4.3	Technological credit	348.37	100	85
Action 4.4	New investments of high innovative potential	1,370.51	70	85

Table 3
Distribution of EU funds for the various actions of the ROPS [15]

Priority I	Research and technological development (R&D), innovations and entrepreneurship	The financial allocation for action in million euro	The EU contribution from the ERDF in million euro
Action 1.2	Micro-enterprises and SMEs	354.20	155.20
Sub-action 1.2.1	Micro-enterprises	22.30	9.80
Sub-action 1.2.2	Small and medium enterprises	72.40	31.70
Sub-action 1.2.3	Innovations in micro-enterprises and SMEs	130.50	57.20
Sub-action 1.2.4	Micro, small land medium enterprises	129.00	56.50
Priority V	Environment	The financial allocation for action in million euro	The EU contribution from the ERDF in million euro
Action 5.3	Clean air and renewable energy sources	80.00	61.60

- expansion of the enterprises leading to the introduction of new or improved products or services,
- modernization activities leading to the introduction of new or improved products or services,
- making fundamental changes in manufacturing process or a way to provide services,
- adaptation of technology and products to the requirements of EU directives in the field of environmental protection, health, and safety work,
- implementation and commercialization of innovative technologies and products, and
- support in development of R&D activities in the micro-, small-, and medium-sized enterprises [15].

Under Priority V Action 5.3 “Clean air and renewable energy sources” it was possible to apply for funds for activities related to an protection, as well as for projects concerning the use of alternative energy sources in the aspect of air protection. Action 5.3 was primarily directed to public entities. However, a large part of the heating infrastructure which belong to local governments or entities in which the local government has a majority of shares, have been sold or is in the process of selling to businesses. Heat supply is the responsibility of the municipalities, the implementation of which may transmit to others entities. Therefore, the catalog of beneficiaries was extended to allow energy enterprises obtaining funds for investments in district heating infrastructure [16]. The amount of funds allocated to these actions of the ROPS is given in Table 3.

Skillful use of EU funds in the Silesia province would result in reduction of the emission of air pollutants, better management of industrial waste, and improvement of surface water and groundwater quality. The innovation in the business was to contribute

the reduction in pressure on the natural environment, both at the local and global scale by improving the efficiency of resource use, increasing the transfer of modern technologies and products to meet the requirements of environmental protection.

4. Analysis of the use of EU funds by the enterprises in 2007–2013 in Voivodeship of Silesian taken to adapt to the requirements of environmental protection

The 2007–2013 EU budgeting period ended. In 2015, the time remained for completion and financial settlement of projects also ends. However, on the basis of closed competitions this period can be summarized to answer the question provided that enterprises used the funds properly in order to adapt fully to the requirements of environmental protection according to EU directives. All points encompassing what have been done and what still has to be done in the upcoming years to improve the environment quality in Silesia Voivodeship in order to increase region competitiveness and to raise the standards of living have to be listed. The data analysis in the framework of the IV Priority Axis of OP I&E showed that enterprises fully used the EU funds. At the end of 2013, there were announced 17 calls for activities aimed at adjusting enterprises to the requirements of environmental protection. Six calls for proposals were held under the Action 4.1 “Support for environmental management systems,” in others activities, there were two or three. Most of the calls took place in 2008 and 2009 (65% of the total) [17]. On 31st of December 2013, 366 applications were formally approved on the total amount 2,124.9 million PLN, 250 agreements were signed from ERDF at the level 1,032.6 million PLN, what was 99% of EU commitments. The level of allocation done by cleared payment applications was 63%,

Table 4

Distribution of funds for each actions of Priority IV OP I&E as part of all country and the number of signed contracts [19]

Action	The value of total in million PLN	EU co-funding in million PLN	% EU co-funding (%)	Number of signed agreements
4.1	5.36	1,834.83	34.24	104
4.2	682.09	137.67	20.18	33
4.3	1,358.16	163.57	12.04	19
4.4	217.14	47.76	22.00	11
4.5	4,330.27	625.13	14.44	55
4.6	268.70	56.67	21.09	28

while at the end of 2012 it was 46% [18]. Most agreements were signed in the framework of Action 4.1 “Support for environmental management systems,” and the least of Action 4.4 “Support for enterprises in the field of water and wastewater.” The details of signed agreements and of co-funding within Actions are represented in Table 4.

Analyzing the spatial distribution of implemented projects in Poland, one could notice that most of the agreements were signed in Silesia, Lower Silesia, and Mazovia, and the least were in the Warmia and Mazury, Lodz, Opole, Podlasie and Świętokrzyskie. However, the higher amount of EU funds was directed to Voivodeship of Silesia, and the lowest to Subcarpathian and Warmia–Mazury (see Fig. 1).

In Voivodeship of Silesia there were signed 46 agreements, representing 20% of all contracts signed under Priority IV in Poland. It represents 13.76% of the allocated EU funds (first place in Poland). Most agreements in Voivodeship of Silesia were signed by enterprises in the framework of environmental management systems, the least in the field of water and wastewater management. On the other hand, most ERDF co-funding supported enterprises in the field of air protection. Data are presented in Table 5.

These projects were implemented mainly by large enterprises (44 large and 2 medium-sized economic entities). Most agreements were signed in the central subregion, and the least in the southern subregion (see Fig. 2).

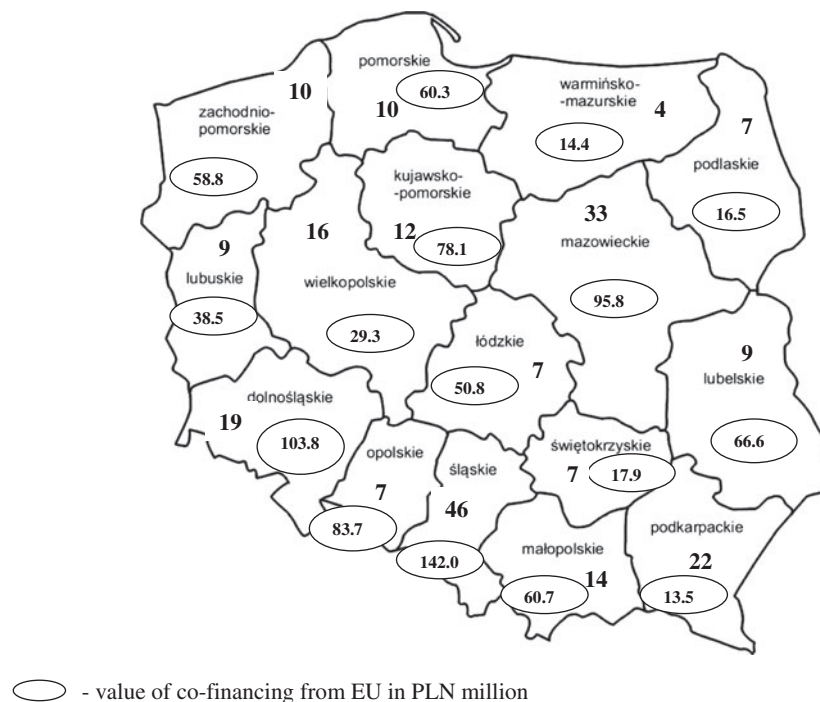


Fig. 1. Number of contracts signed under Priority IV OP I&E and value of ERDF co-funding, broken down by voivodeships (31 December 2013) [19].

Table 5

Distribution of funds for each actions of Priority IV OP I&E as part of the Silesian Voivodeship and the number of signed contracts [19]

Action	The value of total in million PLN	EU co-funding in million PLN	% EU co-funding (%)	Number of signed agreements
4.1	0.77	0.86	11.20	15
4.2	96.17	15.04	15.64	5
4.3	150.78	32.95	21.85	6
4.4	32.94	8.09	24.59	1
4.5	396.41	75.03	18.93	6
4.6	48.61	10.64	21.90	13

At the end of 2013, 31 projects were finished in the Voivodeship of Silesia. The co-funding was 96.12 million PLN. Under Action 4.6 “Support for enterprises engaged in the recovery and disposal of waste other than municipal” there are still 11 unfinished projects with a total amount of co-funding on 6.39 million PLN. It’s planned to be finished before August 2015.

Taking into account selected indicators for project assessment within Priority IV OP I&E should be noted that the indicator “number of new or upgraded environmental installations” considerably exceeded the value which was assumed in the OP I&E. The indicator reached 182%. The higher value of this indicator was the result of additional funds for Priority IV. Thus, a greater number of projects were supported. Taking into account the agreements already finished,

the value of the indicator “number of projects aimed at improving air quality” was 64 and 122%, taking into account the values estimated on the basis of all agreements. For the Voivodeship of Silesia it means the implementation of 6 projects to improve air quality and 25 new or upgraded installations (see Table 6).

Analyzing indicators defined in the OP I&E, it can be noted that most of them have not been reached, and especially in the Voivodeship of Silesia they are still high. The values of indicators give in Table 7, are based on Central Statistical Office statistics for 2012. The data presented in Table 7 show in indirect way, ecological effects achieved through the implementation of projects co-financed under Priority IV OP I&E.

Data analysis in the framework of Priority IV OP IE Actions 4.3 and 4.4 showed that also in this pro-

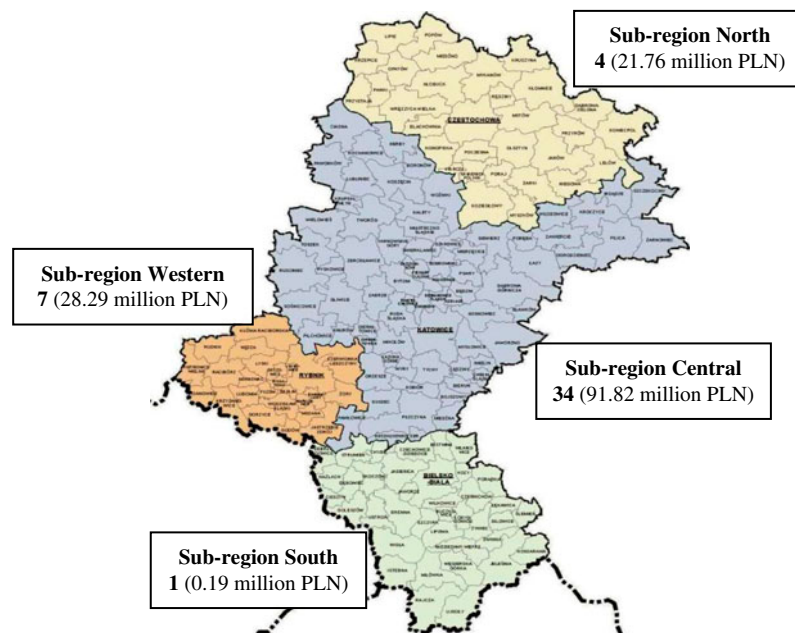


Fig. 2. Number of contracts signed under Priority IV OP I&E and value of ERDF co-funding, broken down by sub-region Voivodeships of Silesia (31 December 2013) [4,19].

Table 6

The state of implementation of selected indicators IV Priority OP I&E (31.12.2013) [19]

Name of indicator	The target value of the indicator in OP IE [10]	The estimated value of the indicator for the whole country on the basis of signed agreements	Finished Project	The estimated value of the indicator for Voivodeship of Silesia on the basis of signed agreements	Finished projects
The number of new or upgraded installations	50	91	71	25	11
Number of projects aimed at improving air quality	45	55	29	6	5

Table 7

The degree of implementation of the outcome indicators

Name of indicator	The target value of the indicator in OP I&E [10]	Values obtained of CSO data in 2012 for the whole country [7]	Values obtained of CSO data in 2012 for Voivodeship of Silesia [7]
Reducing the emissions of major air pollutants from the combustion of fuel (in 1,000 tonnes):			
Sulfur dioxide	358.0	441.3	72.3
Nitrogen oxides	239.0	276.1	54.0
Particulates	50.0	36.9	6.7
Reducing the amount of industrial wastewater requiring treatment (in cubic hectometers):	675.0	950.5	No data
including wastewater treated	660.0	834.4	
Reducing the amount of waste (other than municipal) (in 1,000 tonnes):			
Generated in total	110,000.0	123,123.5	37,067.7
Including waste recovered	99,000.0	89,008.5	33,830.9
Including waste treated	49,500.0	31,495.0	2,933.4

gram, enterprises fully used the EU funds. Until the end of 2013, the Bank of National Economy as an Implementing Institution announced six calls under Action 4.3 “Technological credit” [20]. Under the Action 4.4 “New investments of high innovative potential” Polish Agency for Enterprise Development as an Implementing Institution announced four calls [21]. On 31st of December 2013, under Action 4.3, 778 applications of co-funding were approved, which were correct in terms of formal and substantive, of which 732 agreements were signed and co-financed from ERDF at the level of million PLN 1,537.16, which was 99.74% of EU commitments. Payments made for beneficiaries amounted to 50.67%. Under the Action 4.4, 554 applications of co-funding were approved.

The agreements were signed for 530 projects. Co-financing from ERDF was at the level of 5,688.94 million PLN, which was for 98.23% of EU commitments. Payments made for beneficiaries amounted of 59.46% [22]. The highest amount of agreements under Action 4.3 was signed in the Wielkopolska region (122), Silesia (72), Lodz (69), and the Subcarpathian (69). Under Action 4.4 in Malopolska (78), Subcarpathian (64) and Mazowieckie (57). The lowest number of agreements were signed in Action 4.3 in Świętokrzyskie (11) where co-financing from the EU was the lowest and it was 24.16 million PLN. Under Action 4.4 the lowest number of agreement was in the Voivodeship of West Pomerania (9) and Warmia–Mazury (10). The projects under Action 4.3 with highest co-financing were in

Table 8

Distribution of funds for actions 4.3 and 4.4 of IV Priority OP IE and the number of signed contracts in Voivodeship of Silesia [22]

Action	The value of total in million PLN	EU funding in million PLN	% EU funding (%)	Number of signed contracts
4.3	393.42	154.04	39.15	72
4.4	1,954.93	568.84	29.10	48

Wielkopolska Voivodeship (million PLN 234.69), Lodz (million PLN 167.22), and Subcarpathian (million PLN 163.68). In the case of Action 4.4 the highest EU co-financing was in Voivodeship of Malopolska (million PLN 709.45), Subcarpathian (million PLN 697.00), and the Silesian (million PLN 568.84). Taking into account the number of signed agreements, the Silesia Voivodeship was on the second place in Action 4.3 and on fourth place in Action 4.4, and in terms of co-financing from the EU on fourth place in Action 4.3 and on third place in Action 4.4. (see Table 8).

Analyzing projects implemented by enterprises under Action 4.3 and 4.4 one can notice a clear dominance of industrial sector out of about 80% of all projects. Mainly medium-sized companies were beneficiaries. In the Silesian Voivodeship, the number of medium-sized enterprises is not so big, only less than 1% on the economic base. In the case of Action 4.3 SMEs accounted for 61.11% of signed agreements, in Action 4.4 they accounted for 53.19%.

The indicator “number of supported projects” exceeded the values expected in Priority IV OP IE. Indicator reached the level of 114% on the basis of all agreements signed by the end of 2013 [12,22]. The indicator “number of enterprises” (including SMEs), which received support for the introduction of environmental technologies also exceeded expected number of supported projects. It was six times more than the target value 157 projects (including 150 SMEs) [23].

Under Action 1.2 “Micro-enterprises and SMEs” of ROPS in Silesia region, the largest group of signed

agreements were projects related to the actions aiming at new or improved products or services or making changes in the manufacturing process or in a way to provide services (sub-actions 1.2.1, 1.2.2, and 1.2.4). The projects supported R&D activities and the implementation of innovative solutions in enterprises were on further position (sub-action 1.2.3). Until the end of 2013 under this Action it was announced 11 calls, including the 3 calls for sub-action 1.2.1, 1.2.2, and 1.2.3, and 5 calls for sub-action 1.2.4. During this period, under the Action 1.2, 7,417 applications of co-financing EU on the total amount of 2,026.51 million PLN. There were 5,767 correct applications on the total amount of co-financing of 1,611.30 million PLN. During this period, 2,958 agreements were signed co-financed from ERDF at the amount of 830.96 million PLN, representing approximately 120% of EU commitments. This was the result of shifts unused in the allocation of financial resources from the others activities in ROPS. Allocation of funds within each sub-actions and the number of signed agreements is given in Table 9.

Detailed analysis of the data showed that nearly 46% of the projects concern on the process innovations. About 20% of projects concern product innovations. This implies that enterprises in the Voivodeship of Silesia often try to raise the process efficiency in order to reduce costs, rather than introducing innovative products. Similarly, as in the case of Priority IV OP IE, also in the ROPS the beneficiaries are mostly enterprises from industrial processing sector.

Table 9

Distribution of EU funds for each sub-action of action 1.2 ROPS and the number of signed agreements [24]

Sub-action	Type of project: investment—I/ participation in trade fairs—II	EU co-funding in million PLN	Number of signed contracts
1.2.1	I	46.25	342
	II	2.17	53
1.2.2	I	15.20	313
	II	6.28	182
1.2.3	I	243.77	494
1.2.4	I	366.21	1,066
	II	16.07	508

Table 10

Value of EU funding and number of contracts, from submission of applications to the signing of contracts by energy enterprises under action 5.3 ROP of Silesia [24]

Action 5.3	Clean air and renewable energy sources—beneficiary: energy enterprise
Number of applications submitted	20
EU funding—applications submitted	40.40 million PLN
Number of applications after the formal evaluation	12
EU funding—applications after the formal evaluation	24.09 million PLN
Number of contracts signed	7
EU funding—contracts signed	9.83 million PLN

An important fact in the process of adaptation enterprises to the requirements of environmental protection was a change in Action 5.3 “Clean air and renewable energy sources” ROPS. It made it possible to co-finance investments in a heat distribution infrastructure. In two calls, which were held in 2010 and 2011 the energy enterprises submitted 20 applications. At 31st December 2013, seven agreements were signed on 9.83 million PLN co-financed from ERDF, which was 4.54% of EU funds allocated under this action (see Table 10).

The rest of the EU funds under Action 5.3 of ROPS has been intended for public entities.

5. The procedure of investment conduct in the enterprise in order to obtain funds

The need to adapt to the requirements of environmental protection requires from enterprises conducting a large-scale specific investment activities. Very often, the only barrier for implementing specific targets for environmental protection, in the shortest period of time, is the lack of sufficient funds. It is important to abolish this restriction, which becomes one of the main objectives of the activity of the entity. The procedure of investment procedure was proposed (see Fig. 3), which has a universal character. It represents the path, which has to overcome the economic entity, seeking funds for investment, which aims is to adapt the enterprise to the requirements of environmental protection. The first stage of the procedure shows the conditions which have to exist the enterprise began preparing an investment project. This applies to the change in legislation, which is the result of adaptation to the EU Directives. The need is to be competitive on the European market, which is associated with an increase in the enterprise's efficiency through the implementation

of environmental management systems and the use of innovative environmental technologies. In addition, increasing environmental awareness and social pressures to perform certain actions to protect the environment and the availability of financial resources allowing the implementation of a specific task. It cannot start a venture without preliminary projects and analyzes.

Very important are the technical and economic researches, well-prepared financial schedule, and correctly identified the possibility of funds. The second stage of the procedure shows the possibility of obtaining funds. Starting with the funds from the capital market, such as emission of additional shares or bonds, money market funds, such as credits or loans from financial institutions, or the possibility to obtain funds from FEP&WM, which gather funds mainly from fees and penalties for the use of the environment. If the enterprise did not accumulate the necessary funds, it should go to the third stage of procedure, that is, the possibility of obtaining the funds from the European Union, including in particular the ERDF.

The proposed method to obtain funds is a way of effective management in direction to accelerate the implementation of a specific project, which is used for adapting the enterprise to the requirements of environmental protection. The presented method systematizes the procedure in order to gather the necessary funds for investment. Nevertheless, the phenomenon can be observed that economic entities willingly reach for the EU funds as a cheaper source of funding. The current EU perspective focuses on the innovative projects, including the projects for environmental protection. Nevertheless, own contribution is essential. It is therefore necessary, to skillfully use the opportunities offered by the European Union, having also in mind looking for other solutions.

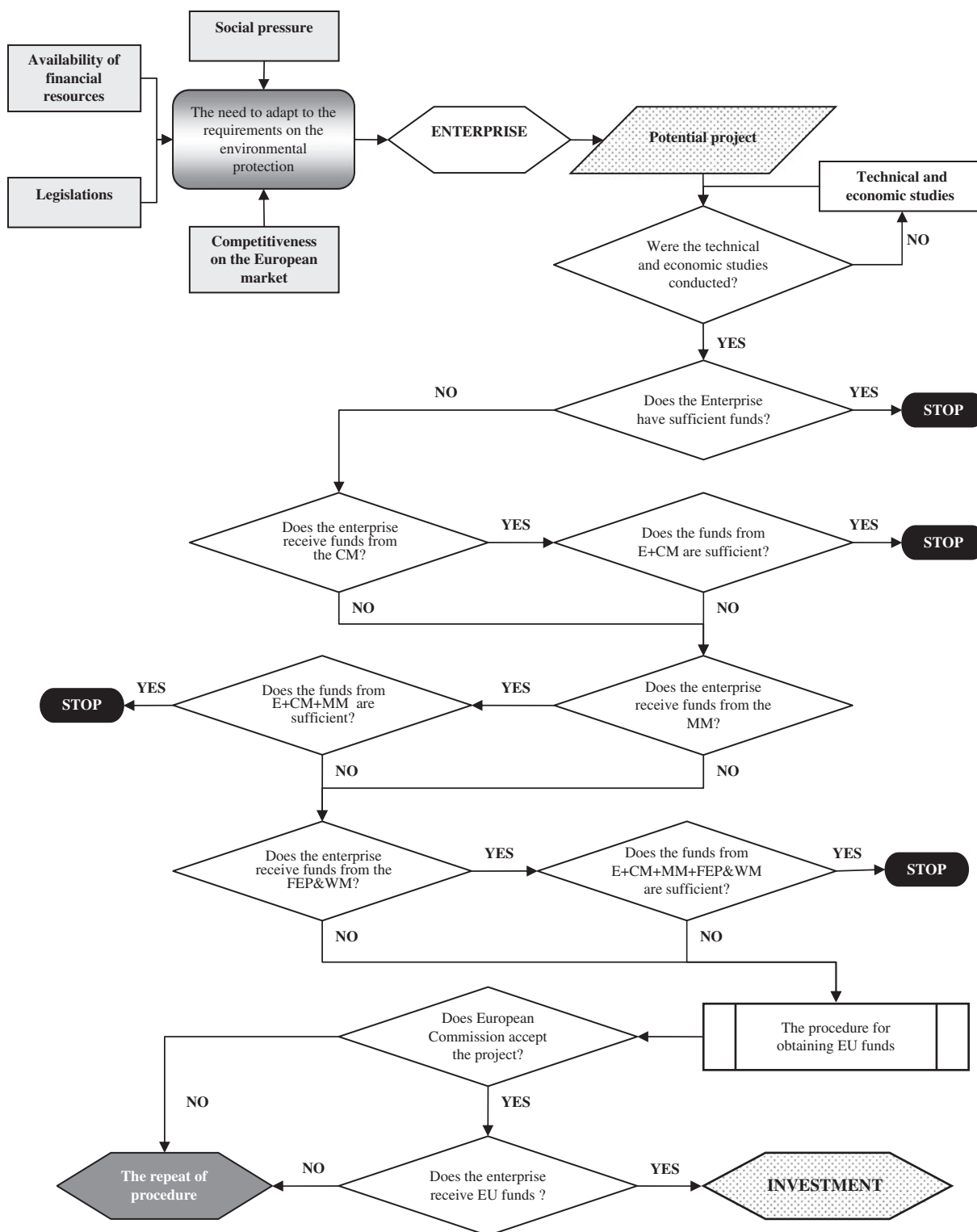


Fig. 3. The procedure of investment conduct. Abbreviations used in the diagram: E—Enterprise, CM—Capital Market, MM—Money Market, FEP&WM—Funds for Environmental Protection and Water Management.

6. Conclusion

As a result of actions taken in the Voivodeship of Silesia over the period 2007–2013, the most significant ecological effects are achieved in the protection of air as the result of equipping power plants or thermal power plant in desulfurization (a decrease in 47.27% from 2007 to 2012) and denitrification of combustion gases (a decrease within 2007–2012 at 17.5%). Others types of investments generate environmental benefits in terms of reduced emissions of particulate matter (a decrease in 51.55% from 2007 to 2012) and carbon dioxide (a decrease in 11.73% from 2007 to 2012). Other important factors are the effects of reducing water consumption in production processes (a decrease in 11.83% from 2007 to 2012), reducing the amount of waste landfilling (down by 16.08% from 2007 to 2012), and reducing energy consumption in enterprises (a decrease in the country in 2009–2011 of 6.4%/year), which is the result of implementing innovative technologies. The analysis of the data showed that the use of resources from European Union funds led to many positive changes. The enterprises in the Voivodeship of Silesia implemented a number of projects to improve the environment. Unfortunately, as shown by the result indicators much still has to be done and available EU funds in the next budgeting period 2014–2020 should be effectively used.

Abbreviations

OP I&E	—	Operational Programme Infrastructure and Environment
OP IE	—	Operational Programme Innovative Economy
ERDF	—	European Regional Development Fund
COS	—	Central Statistical Office
EU	—	European Union
ROPS	—	Regional Operational Programme of Silesia
FEP&WM	—	Funds of Environmental Protection and Water Management
SMEs	—	Small Medium Enterprises
R&D	—	Research and Development

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