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Environmental Activity of Polish Energy Enterprises Participating in the EMAS Scheme

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Jadwiga Nycz-Wróbel[1]

Abstract:

Purpose: *The purpose of the paper is to present the aspects and environmental objectives identified by the Polish enterprises in the energy sector participating in the EMAS scheme, and to highlight their significance in planning and improvement of the outcomes of their environmental activity.*
Design/Methodology/Approach: *The theoretical part of the paper presents the outcomes of desk research of previous studies on the EMAS scheme, indicating a gap in the knowledge concerning specific aspects and environmental objectives identified in organisations with a particular profile of activity. The empirical part contains the results of individual research conducted among the Polish energy enterprises participating in the EMAS scheme. The assumed research method was based on the analysis of secondary sources in form of environmental statements. The selection of sample was targeted, the research involved a complete analysis encompassing 6 organisations (including 50 facilities) in the energy branch, participating in the Polish EMAS scheme. It should be noted that analysis of environmental statements has already been used as the basis for the current research method, in the course of the previous studies on the EMAS scheme, covering, among others, the effects of its implementation on the improvement of environmental performance.*
Findings: *The conducted analysis allowed to distinguish environmental aspects as well as long- and short-term environmental objectives identified by the majority of enterprises in the energy industry participating in the study. Significant environmental aspects concerned, among others, emission of contaminants to the air, production of waste and wastewater, as well as consumption of natural resources and energy. The objectives included in environmental policies related, among others, to raising environmental awareness in the society, taking actions to reduce negative environmental effect and development of innovative environmental technologies. Based on these aspects and objectives, enterprises formulated different short-term environmental objectives. The majority of enterprises participating in the study continue implementation of given short-term objectives in a perspective exceeding one year.*
Practical implications: *The major benefit of the described study is presenting examples of environmental aspects and objectives identified and deemed significant by the Polish enterprises in the energy sector, which can serve as a guideline and reference for other enterprises in the that branch of industry, as well as organisations with a different profile of activity (regardless of their participation in the EMAS scheme), that intend to improve*

[1]*PhD., Rzeszow University of Technology, Poland, ORCID: 0000-0002-2100-6765, e-mail: jnw@prz.edu.pl;*

understanding and implement the system requirements, or just take inspiration while planning their own environmental activity.
Originality/value: *This paper supplements the previous study concerning the EMAS scheme, listing the exemplary environmental aspects and objectives identified by the enterprises with a specific profile of activity (energy sector in this case).*

Keywords: *EMAS Eco-Management and Audit Scheme, environmental aspects, environmental policy, environmental objectives.*

JEL Codes: *P18, Q53.*

Paper Type: *Research article.*

1. Introduction

One of the key areas of activity of the European Union is protection of natural environment. According to Art. 191 of the Treaty on the Functioning of the European Union, the EU policy in this field shall, in the first place, contribute to preserving, protecting and improving the quality of the environment, rational utilisation of natural resources, protecting human health, and promoting measures at international level to deal with emerging environmental problems. Above all, this policy shall aim at rectifying environmental damage at source (Consolidated Version of…, 2016), in which taking preventive action both in macro and micro scale is very important.

Among the instruments provided by the European Union as an important element of its environmental policy, is the EMAS Eco-Management and Audit Scheme. The major goal of EMAS is to support organisations in continuous improvement of their environmental performance. Currently, EMAS is the most transparent and credible environmental management system, but it sets much higher requirements for organisations than other similar schemes. Its primary objective is to support organisations in planning and implementing different preventive actions that aim at limiting negative environmental effect.

The EMAS scheme can be implemented in any type of organisation. It is particularly important in organisations conducting activity with significant environmental impact. Enterprises in the energy sector belong to this group. The European Union highlighted the significance of this group with reference to proper actions aimed at

environmental protection, including, among others, improvement of energy efficiency and development of new and renewable forms of energy (Consolidated Version of…, 2016). The EMAS scheme can be helpful in taking these actions, as mentioned in the Act of 20 May 2016 concerning energy efficiency (Ustawa z dnia…, 2016).

This paper attempts to supplement the knowledge on the environmental aspects and objectives important for Polish enterprises in the energy sector in the context of their environmental activity. Supplementing this knowledge can be significant for other companies (not participating in the study), dealing with production and supply of energy (from Poland and abroad), as well as organisations representing other industries, where protection of environment is a key field of activity.

By explaining the significance of environmental aspects and objectives in setting the direction and improvement of environmental performance, and by providing their specific examples, this paper can support managers of various organisations (participating in the EMAS scheme, implementing another environmental management system, or lacking a formally implemented system) in the process of planning and improvement of their own environmental activity.

1.2 The Role and Significance of Environmental Aspects and Objectives in Planning and Improvement of Environmental Activity of an Organisation

The major objective of the EMAS scheme is to promote behaviours aiming at constant limitation of negative and strengthening of positive environmental effects within the organisations. In order to achieve that, organisations participating in the EMAS scheme must meet a number of important requirements. These include the obligation to identify significant environmental aspects and to formulate environmental policy as well as short- and long-term environmental objectives.

Environmental aspects are defined in the EMAS Regulation as an element of activity, products or services of an organisation, that has or may have impact on natural environment. The environmental impact of aspects is defined as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services (The European Parliament and the Council of the European Union, 2009).

Organisations participating in the EMAS scheme are obliged to perform preliminary identification of all direct and indirect aspects, and then specify so-called significant aspects. Direct aspects belong to the group of environmental aspects directly controlled by the organisation (according to the EMAS Regulation requirements, all organisations participating in the scheme are obliged to analyse them). They can be related with emission to the air, release of pollutants to water, soil usage and contamination, production of waste, usage of natural resources and energy or local

issues, e.g., noise or odour (The European Parliament and the Council of the European Union, 2017).

Indirect aspects result from the organisation's relations with third parties. This group of aspects can be controlled by the organisation to a limited extent. These include, among others: issues related to product or services lifecycle (e.g., raw material acquisition, design, production or transportation), administrative and planning decisions, product offer structure or effects of environmental activity and practices of suppliers, contractors and subcontractors (The European Parliament and the Council of the European Union, 2017).

In terms of the direction of environmental activity, the most important group of aspects are significant aspects. Their environmental impact is or can be significant (The European Parliament and the Council of the European Union, 2009). According to EMAS requirements, each organisation is obliged to identify this group of aspects. In assessing their significance, the organisation shall consider normal operating conditions, start-up and shutdown conditions and reasonably foreseeable emergency conditions.

The organisation shall determine the significance of those aspects based on individually established assessment criteria and additional considerations that may include but are not limited to the activities regulated by environmental legislation or activities with the most significant environmental costs, and environmental benefits (The European Parliament and the Council of the European Union, 2017).

These significant environmental aspects defined by the organisation provide the basis to formulate environmental objectives included in the environmental policy. This policy is a major document of the environmental management system. It is defined as a set of general goals and the direction of an organisation with reference to the effects of its environmental activity.

It should be formally approved by high level management and include, among others, commitment to continuous improvement of environmental activity effects (The European Parliament and the Council of the European Union, 2009).

Environmental policy is the basis for the identification of short-term environmental objectives, while these allow to define specific environmental targets facilitating achievement of those objectives.

In-depth identification of significant environmental aspects and thoughtful formulation of environmental objectives and targets is important for each organisation, as they serve as the grounds for planning, and in a longer perspective also improvement of their environmental activity effects.

2. Review of Previous Research Concerning the EMAS Scheme

Previous research on the EMAS scheme focused mainly on the motives (Abeliotis, 2006; Biondi and Frey, 1995; Bohne, 2000; Freimann and Schwaderlapp, 1996; Freimann and Schwedes, 2000; Hyršlová and Hájek, 2005,2006; Iraldo *et al*., 2010; Iraldo *et al*., 2005; Jaźwińska, 2013; Kossler *et al*., 2002; Meinke, 2002; Morrow and Rondinelli, 2002; Nycz-Wróbel, 2016; Schucht, 2000; Steyrer and Simon, 2013; Strachan *et al*., 1997; Strachan, 1999; Umweltbundesamt, 2000; Vernon *et al.,* 2009; Wenk, 2004).

On barriers as well as problems (Abeliotis, 2006; Biondi and Frey, 1995; Freimann and Schwaderlapp, 1996; Hillary, 1998, 2004; Hyršlová and Hájek, 2006; Iraldo *et al*., 2005; Ministerio De Medio Ambiente, 2006; Nycz-Wróbel, 2018; Strachan *et al*., 1997; Strachan, 1999; Wenk, 2005; Vernon *et al.,* 2009; Zobel and Burman, 2004). and

On benefits of its implementation in an organisation (Abeliotis, 2006; Bohne, 2000; Daddi *et al.,* 2011; Dąbrowa, 2014; Freimann and Schwaderlapp, 1996; Freimann and Schwedes, 2000; Hillary, 1998, 2004; Hyršlová and Hájek, 2005,2006; Iraldo *et al*., 2005; Iraldo *et al*., 2009; Jaźwińska, 2013; Kossler *et al*., 2002; Meinke, 2002; Merli *et al*., 2014; Ministerio De Medio Ambiente, 2006; Morrow and Rondinelli, 2002; Nycz-Wróbel, 2016a; Schucht, 2000; Steger, 2000; Steyrer and Simon, 2013; Strachan *et al*., 1997; Strachan, 1999; Rennings *et al*., 2006; Umweltbundesamt, 2000; Vernon *et al.,* 2009; Wenk, 2004).

One of the most frequently mentioned benefits of EMAS scheme implementation was systematisation and improvement of the organisation's environmental activity. This effect has been achieved, among others, in organisations based in Austria (Kossler *et al*., 2002), European Union (Iraldo *et al*., 2005), Poland (Dąbrowa, 2014; Nycz-Wróbel, 2016a) Great Britain (Strachan *et al*., 1997) and in companies from Germany (Bohne, 2000; Freimann and Schwaderlapp, 1996; Morrow and Rondinelli, 2002; Umweltbundesamt, 2000).

Some studies mention that meeting specific requirements of the EMAS Regulation facilitated achievement of these benefits. In organisations from Czechia, they were related, among others, with the identification of significant environmental aspects, formulation of environmental policy and defining environmental objectives (Hyršlová and Hájek, 2005). In organisations from the European Union, they were related with the development of environmental programmes (Hillary, 1998).

Companies from Germany highlighted the significance of defining environmental objectives that in their opinion had indirect impact (along with the training and audit system) on increasing environmental awareness of employees (Morrow and Rondinelli, 2002).

Studies conducted among British enterprises showed the importance of development and implementation of environmental objectives for the improvement of relations with stakeholders (through the possibility to demonstrate organisation's involvement in environmental activity to both interested parties). The same organisations claimed that EMAS scheme implementation was motivated by the possibility of formalisation and systematisation of the organisation's approach to environmental management.

Activities that could, according to the questioned companies, support achieving this benefit, would be related, among others, with the formulation of environmental policy, defining environmental objectives and targets, and drafting an environmental programme (Strachan, 1999).

There are also other studies that show difficulties in understanding and practical implementation of particular EMAS scheme requirements, including identification of environmental aspects, development of environmental policy or formulation of short-term environmental objectives, etc. Companies from Spain reported difficulties in identifying indirect and direct environmental aspects and defining measurable environmental objectives (Ministerio De Medio Ambiente, 2006). Enterprises from the European Union and organisations from Great Britain mentioned difficulties in drafting environmental policy (Hillary, 1998; Strachan *et al*., 1997).

For Greek enterprises, the major challenge was the implementation of an environmental programme (Abeliotis, 2006), while Swedish organisations faced problems with the identification and assessment of environmental aspects (Zobel and Burman, 2004). For German enterprises, difficulties were related with environmental policy and defining environmental objectives (Freimann and Schwaderlapp, 1996), while Polish organisations reported challenges related with drafting environmental statement and identification of environmental aspects (Nycz-Wróbel, 2018).

The review of the previous studies leads to a conclusion that one of the most frequently reported benefits of the EMAS scheme implementation was systematisation of environmental activity. Some studies highlighted that identification of environmental aspects as well as implementation of environmental policy and environmental objectives were significant for the achievement of these benefits.

However, previous studies do not provide any examples of specific environmental aspects and objectives identified by organisations with particular profiles of activity. So far, similar research has been conducted among the Polish organisations participating in the EMAS scheme, but without distinguishing the type of their activity (Nycz-Wróbel, 2012). In most cases, significant environmental aspects identified by the analysed organisations included emissions to the air, utilisation of natural resources and production of waste and wastewater.

A smaller number of organisations also identified aspects related to noise emission, failures and contamination of water and soil environment. Long-term environmental objectives included in environmental policies were mainly connected with rational use of resources and waste management, preventing contamination of environment, raising environmental awareness among employees and compliance with legal requirements relating to the environment.

Objectives formulated by a smaller group of organisations also related to shaping environmental activity among organisation's stakeholders, implementation of technologies aimed at reduction of harmful environmental impact, failure prevention and noise reduction. The studies also identified short-term environmental objectives planned by Polish organisations.

These mostly concerned reducing the use of natural resources, reducing emission of air contaminants and volume of produced waste, and also promoting environmental activity among stakeholders. Beside that, a smaller number of organisations identified objectives related with failure prevention, raising environmental awareness of employees, reduction of noise, wastewater, and water and soil contamination, production of renewable energy and maintaining legal compliance (Nycz-Wróbel, 2012).

The review of previous research concerning the EMAS scheme allowed to distinguish studies which highlighted the significance of environmental aspects and objectives for the improvement of environmental activity, but also indicated them as those EMAS scheme requirements that are difficult to comprehend and implement (considering the fact that it was not particular aim of those studies, but only additional information obtained when identifying the motivation, problems or benefits related with the EMAS scheme).

Therefore, it is really important to understand the concept of environmental aspects and objectives, and provide specific examples. This study is an attempt to fill this gap. Presenting the outcomes of this research is significant in the context of EU environmental policy implementation, promotion of EMAS scheme and support for different organisations in planning and improvement of their environmental performance. Presenting environmental aspects and objectives identified by organisations dealing with a specific type of activity can also be helpful for other organisations with a similar business profile.

Additionally, this paper can be helpful for managers of all organisations facing difficulties with understanding and practical implementation of the EMAS scheme requirements, including identification of significant environmental aspects, drafting environmental policy and defining short-term environmental objectives, or organisations without formal environmental management systems that seek good environmental practices applied by other organisations implementing these systems.

3. Purpose and Methodology

The purpose of the paper is to present the aspects and environmental objectives identified by the Polish enterprises in the energy branch participating in the EMAS scheme, and to highlight their significance in planning and improvement of the outcomes of their environmental activity.

The theoretical part of the paper presents the concept of environmental aspects and environmental policy, and also highlights their significance in the context of planning and improvement of the organisation's environmental activity performance.

It also describes the outcomes of desk research conducted as part of the previous studies on the EMAS scheme, indicating a gap in the knowledge concerning specific aspects and environmental objectives identified in organisations with a particular profile of activity. The empirical part contains the results of individual research conducted among the Polish energy enterprises participating in the EMAS scheme.

The grounds for the assumed research method was the analysis of secondary sources in form of environmental statements, serving as a form of an environmental report validated by a third party environmental verifier. Organisations registered under EMAS are obliged, among others, to draft a statement, and provide it to interested parties.

The statement shall include information concerning the effects of conducted environmental activity, with identified significant environmental aspects and short-term environmental objectives (fulfilled or planned for fulfilment). Beside that, the environmental statement should also include environmental policy of the organisation (The European Parliament and the Council of the European Union, 2009).

It should be noted that the analysis of environmental statements had been used as the grounds for the research in previous studies concerning the EMAS scheme, among others, describing the effects of its implementation on the improvement of environmental performance (Daddi et al., 2011; Matuszak-Flejszman, 2019; Heras-Saizarbitoria, 2020; Nycz-Wróbel, 2020).
Environmental statements were downloaded from the Polish EMAS website. The selection of sample was targeted, the research was complete and encompassed 6 energy companies participating in EMAS in Poland, according to the register dated 1 September 2026. Table 1 presents the characteristics of the analysed enterprises.

Table 1. *Characteristics of enterprises participating in the study*

No.	Number of facilities	Type of activity (NACE)
1	4	35.11 - Production of electricity from non-renewable sources 35.30 - Steam and air conditioning supply

2	4	35.1 - Electric power generation, transmission and distribution 35.3 - Steam and air conditioning supply
3	24	35.11 - Production of electricity from non-renewable sources 35.12 - Production of electricity from renewable sources 35.13 - Transmission of electricity 35.14 - Distribution of electricity 35.15 - Trade of electricity 35.16 - Storage of electricity 35.23 - Trade of gas through mains 35.30 - Steam and air conditioning supply Other
4	4	35.11 - Production of electricity from non-renewable sources 35.30 - Steam and air conditioning supply
5	7	35.1 - Electric power generation, transmission and distribution 35.30 - Steam and air conditioning supply
6	7	35.11 - Production of electricity from non-renewable sources 35.30 - Steam and air conditioning supply

Source: *Individual research based on the analysis of environmental statements.*

The dominant type of activity (according to the EU statistical classification of economic activities NACE) was production of electricity from non-renewable sources as well as steam and air conditioning supply. This type of activity was reported by all analysed enterprises.

The analysis was carried out in 6 organisations with 50 sites in total (including, among others, individual Departments of Power Plants and Combined Heat and Power Plants, Bottom Ash Dump Sites, Brown Coal Mine Branches, small hydroelectric plants and photovoltaic farms).

According to the EMAS regulation, "organisation" means e.g. a company, corporation, enterprise or institution, located inside or outside the Community, whether incorporated or not, public or private, which has its own functions and administration. Site means a distinct geographic location under the management control of an organisation (The European Parliament and the Council of the European Union, 2009).

The study was conducted from 1 to 25 September 2026. The analysis of environmental statements and environmental policies included in those statements allowed to distinguish significant environmental aspects as well as long- and short-term environmental objectives defined by the organisations encompassed by the study. The outcome has been presented in form of a chart.

4. Outcomes of Empirical Research

Table 2 presents significant environmental aspects defined by the analysed enterprises in the energy sector.

Table 2. *Significant environmental aspects*

Significant environmental aspects	**Number of organisations**
NEGATIVE	
Emission of gases and dust to the air	6
Production of waste	5
Production and drainage of wastewater	5
Consumption of natural resources and electric energy	5
Emission of noise	4
Landscape modification	2
Failures	2
Other	2
POSITIVE	
Biodiversity	1
Production of "green" energy from biomass	1
Cleaning of water ecosystems by removing waste with the use of power plant traps	
Producing gypsum and fly ash (as side products)	1

Source: *Individual research based on the analysis of environmental statements.*

Significant environmental aspects identified by the analysed companies included mainly those causing negative impact on the environment. These were mainly related with the emission of air contaminants (6), producing of waste and wastewater (5), usage of natural resource and energy consumption (5), and noise emission (4). Three companies also distinguished aspects that served as a basis for further actions with positive effect on the environment.

Significant environmental aspects are the basis to formulate environmental objectives included in the environmental policy. Research outcomes in this context are presented in Table 3.

Table 3. *Environmental objectives formulated in environmental policies*

Environmental objectives mentioned in environmental policies	**Number of organisations**
Environmental initiatives within the community	6
Reducing negative environmental effect	6
Development of modern environmentally-friendly technologies	6
Compliance with legal requirements concerning environment	5
Raising environmental awareness among employees	5
Saving fuel and electric energy	5
Preventing failures	4

Identification, inspection and supervision of significant aspects	4
Development of renewable energy	2
Development of energy production from cogenerative sources	2
Development of circular economy/minimising the volume of produced waste	2
Assessment of biodiversity and ecosystems	2
Respecting sustainable development principles	2
Other	4

Source: *Individual research based on the analysis of environmental statements.*

All enterprises representing the energy sector included in their environmental statements objectives relating to different activities for the community, aimed e.g. at raising environmental awareness (6), taking actions focused on limiting negative environmental impact (6), and development of modern environmental technologies (6).

Certain analysed organisations also specified objectives related with ensuring continuous compliance with environmental legislation (5) raising environmental awareness of employees (5), and saving fuel and electric energy (5). Other frequently mentioned objectives also included preventive actions taken to avoid failures (4), and environmental aspects management (4).

Environmental objectives formulated in the environmental policy provide the basis for setting short-term environmental objectives. Typically, these objectives are defined in a yearly perspective, and after the scheduled fulfilment period, their outcomes are verified (if an objective has not been reached or fulfilled partially, organisations analyse the causes and decide whether to suspend or continue fulfilment of particular objective).

Table 4. *Short-term environmental objectives formulated by the analysed companies*

Short-term objectives	**F ***	**P ***	**Organisation number**
Reducing negative environmental impact	+	+	1
Reducing consumption of natural resources	+	+	
Maintaining biodiversity in the branch area	+	+	2
Continued investments aimed at significant reduction of hard coal proportion in the fuel mix (over 25% in the following years), and consequently reducing emissions to the air	+	+	
Reducing the amount of electric energy bought for the internal needs of renewable energy installations and office buildings	+		3**
Reducing indirect air emissions of SO_2, NOx, CO_2 from electric energy production processes by limiting electric energy losses in the transformation and transfer processes	+		
Facilitating passage of water organisms at small hydroelectric plants	+	+	

Increasing participation of renewable energy sources in electric energy production	+	+	
Improving reliability of renewable electricity production installation	+	+	
Reducing the risk for protected plant and animal species and protected areas, resulting from the existence and operation of power network	+	+	
Reducing the risk of environmental damage		+	
Decontamination of power plant water intake		+	
Preparing a waste transfer site at the landfill	+		4
Rebuilding rainwater systems at the combined heat and power plant	+		
Zero heat transfer losses as a result of the heat distribution network failure	+	+	
Reducing the volume of landfilled waste by facilitating removal of waste		+	
Cooperation with the Forest Authority aimed at planting new trees in the nearest forests as part of the corporate volunteering programme		+	
Improvement of activities related to waste management and maintaining order and tidiness	+		5
Raising awareness of Branch employees and third party employees (Contractors) in terms of proper waste management	+		
Reducing leakages of substances depleting ozone layer and F-gases	+		
Reducing output of cooling water pumps at units 5 and 6		+	
Technical and biological restoration		+	
Limiting heat consumption in buildings and facilities connected to the Power Plant heating network		+	
Reducing environmental emissions with reference to the period of 2024-2025. Construction of start-up station	+		6
Reducing electric energy usage for internal needs with reference to the period of 2024-2025. Construction of start-up station	+		
Usage of 100% of side product obtained in the power plant (synthetic gypsum)	+	+	
Usage of 100% of side product obtained in the power plant (fly ash)	+	+	
Reduction of environmental emissions between 2025-2026, estimated reduction 40% reduction of SO_2 and NO_x, and 10% reduction of dust, with the assumed 8 000 hours of operation per year in 2025 and 2026		+	
Reducing electric energy consumption for internal needs between 2025-2026 as compared with 2024, estimated 50%, with the assumed 8 000 hours of operation per year in 2025 and 2026		+	

Note: **F – fulfilled objectives, P – objectives planned for fulfilment ("+" in the "F" field means that objective has been fulfilled; "+" in the "P" field means that objective is planned; "+" both in "F" and "P" fields means continued objective fulfilment); ** for this company, analysed objectives related only to two business lines - production and distribution (operation of other business lines is not directly connected with production and distribution of energy)*

Source: *Individual research based on the analysis of environmental statements.*

Since the EMAS scheme requires continuous implementation and documenting environmental activities, environmental statements contain information concerning both implemented objectives and those scheduled for implementation in the following year(s). Table 4 presents short-term environmental objectives, both implemented and planned for implementation.

The conducted study allows to distinguish the variety of objectives implemented in Polish companies operating in the energy sector. Their analysis leads to a conclusion that they were formulated in a more or less detailed way (not all of them are measurable) and concerned, among others, limitation of usage of natural resources, renewable sources of energy, activities aimed at reducing negative environmental impacts in different areas, or protection of ecosystems and biodiversity.

Most of the analysed enterprises (5) continued a number of environmental objectives, and three out of them, beside fulfilment of continuing objectives, had new objectives planned for future implementation. Only one company had completely different objectives planned for future implementation, and reported achievement of all previously defined environmental objectives.

5. Discussion

This paper highlights the significance of environmental aspects and objectives for setting the direction and improvement of enterprises' environmental performance. Significant environmental aspects allow to formulate environmental policy and its objectives. The objectives defined in the environmental policy allow to formulate short-term environmental objectives and targets that facilitate their fulfilment.

These elements of the EMAS scheme are essential for improvement of environmental performance, that is for the fulfilment of one of the key system requirements. Planning environmental activity on the basis of identified environmental aspects lets organisations increase their chance to perform actions that are precisely aligned with their environmental impact.

In terms of planning and implementation of environmental activities that can really help achieve measurable and noticeable effects, in-depth analysis of the type of their operations is also very important. What needs to be considered in this field, is that environmental aspects identified by organisations differ.

Aspects that are most important for one organisation, for another one (with a different type of activity) would be less important or not taken into consideration at all. Consequently, environmental objectives and targets planned within an organisation will depend on environmental aspects identified as the most significant. The study presented herein concerned Polish enterprises operating in the energy sector, whose core activity was related with production of energy from non-renewable sources.

The analysis conducted as part of the study indicates that environmental aspects that are most significant for companies in this sector are related with the emission of contaminants to the air, production of waste and wastewater, usage of natural resources and noise emission.

It means that these companies should focus on improving their performance in those particular fields in the first place. In order to help managers of these organisations analyse their environmental aspects, we can also highlight their impact on the natural environment (Table 5).

***Table 5**. Significant environmental aspects and their impact on the environment, companies in the energy sector*

Significant environmental aspect	**Environmental effect**
Emission of contaminants to the air	Air contamination, acid rain, greenhouse effect
Production of waste	Landfilling, contamination of soil and water
Wastewater production	Water contamination, fauna and flora degradation
Consumption of natural resources	Shortage of non-renewable resources
Emission of noise	Harmful effects for human and fauna

***Source:** Individual study.*

We should remember that environmental aspects listed in Table 5 can serve only as a reference and guidelines in the process of identification of significant environmental aspects. Each organisation must conduct their own in-depth analysis considering all requirements of the EMAS Regulation and its specific type of activity. Managers of organisations should also consider the fact that environmental aspects identified as significant will set the direction of their further environmental activity.

When it comes to the objectives most frequently formulated in environmental policies of the analysed companies, they mainly related to taking different environmental initiatives within the community, reducing negative environmental impact, implementing modern environmental technologies, compliance with environmental legislation, raising ecological awareness among employees, rational usage of resources, preventing failures and management of environmental aspects.

The review of these objectives allows to conclude, among others, that for companies dealing with the production of energy from non-renewable sources, it is very important to improve technological processes connected with significant negative environmental impact.

Organisations with this profile of activity should also pay attention to activities aimed at reducing the usage of natural resources, which is related with their depletion and for many years has been considered one of the key prerequisites of the state energy security.

The outcomes of the study also indicate commitment of the analysed organisations to raising environmental awareness of employees and undertaking different initiatives in the community. Involvement of employees in environmental activities is one of the key requirements of the EMAS scheme (which differentiates it from the environmental management system according to ISO 14001 standard). It says that organisations should consider the significance of active involvement of employees in the current environmental activity as one of the major conditions of its improvement.

This should be achieved, among others, by providing information, and also active participation of employees at different levels of organisational structure, envisaged in employee participation programmes. Open dialogue with the community is an additional requirement of the EMAS scheme.

Open dialogue with the community is an additional requirement of the EMAS scheme. This dialogue, in the field of the conducted environmental activity, should be continuous, and can be maintained through the publication of environmental statements and other initiatives within the community, aimed (beside providing information) at raising environmental awareness of the society (The European Parliament and the Council of the European Union, 2017).

Defining these objectives within the frames of the environmental policy provides the basis to formulate specific short-term environmental objectives and targets in this field, and can help organisations meet the requirements of the EMAS Regulation in a continuous way. This implies that similar objectives could be defined also in other organisations, not only in the energy sector, as two of the listed requirements apply to every type of organisation, irrespective of the type of their activity.

The objective related to failure prevention is also worth further attention. All organisations whose activity entails the risk of failures posing very harmful environmental impact, should consider defining this objective (among others, it applies to enterprises in the energy sector).

The analysis of objectives specified in environmental policies confirms a certain degree of maturity and experience in their identification among the described organisations. This particular group includes objectives that on one hand can help improve performance in areas connected with the identified significant environmental aspects, while on the other, can help ensure continuous compliance with selected EMAS system requirements.

The comparison of outcomes of the current and previous research conducted among all Polish organisations participating in the EMAS scheme (Nycz-Wróbel, 2012), is quite interesting. The objectives set in environmental policies by the minority of organisations participating in the previous study (related to environmental activity of stakeholders, implementing modern environmental technologies and reducing

negative impact on the environment), were formulated by all companies from the energy sector participating in the recent study.
This can result from the structure of the analysed population (in which companies representing energy sector were the minority in the previous study, and the only group of analysed organisations in the recent study).

However, it justifies highlighting the significance of distinguishing environmental aspects or objectives with reference to the type of activity, which can help other organisations with the same profile of activity identify the areas that should be particularly considered when planning their environmental activities.

The analysis of short-term environmental objectives identified by the described enterprises, and their comparison with the objectives identified in the previous research (Nycz-Wróbel, 2012), indicates that currently these objectives are more specific. This can result from the obligation to meet the EMAS scheme requirement for continuous (year to year) improvement of environmental performance (which somehow forces organisations to seek new solutions), but is also a sign of significant maturity and experience of organisations in this field.

We can also notice that the majority of organisations from the energy sector encompassed by the recent study continues implementation of selected short-term environmental objectives, due to the fact that a higher number of environmental targets is set for each objective.

These targets are usually scheduled in a several years' perspective, which means that a given objective can be achieved only when all environmental targets are completed.

It should also be noted that distinguishing same or very similar short-term objectives set by different organisations encompassed by the study, was very difficult. It is a sign of the commitment and individual approach of each enterprise to planning their own environmental activity.

6. Conclusions

The purpose of the paper is to present the aspects and environmental objectives identified by the Polish enterprises in the energy sector participating in the EMAS scheme, and to highlight their significance in planning and improvement of the outcomes of their environmental activity.

The major benefit of the described study is presenting examples of environmental aspects and objectives identified and deemed significant by the Polish enterprises in the energy sector, which can serve as a guideline and reference for other enterprises in the that branch of industry, as well as organisations with a different profile of activity (regardless of their participation in the EMAS scheme), that intend to

improve understanding and implement the system requirements, or just take inspiration while planning their own environmental activity.
The findings of this study will be also significant for supplementing the previous research concerning the EMAS system and for the implementation of EU environmental policies.

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