GOSPODARKA SUROWCAMI MINERALNYMI – MINERAL RESOURCES MANAGEMENT

2025 Volume 41 Issue 3 Pages 211–239

DOI: 10.24425/gsm.2025.155334

KORNELIA PRZEDWORSKA[1], ANGELIKA KANTOR[2]

Eco-pea coal – tradition or greenwashing? A study of perceptions among fuel depots employees

Introduction

In an era of increasing environmental awareness, both among consumers and other market actors, environmental issues have become an important part of many companies' strategies (Barić 2022). It may be observed that products and services promoted as "environmentally friendly" or "green" are appearing on the market to attract the attention of consumers seeking more sustainable solutions. However, there are times when companies' messages are not fully in line with reality or are completely false, implying the presence of a phenomenon known as "greenwashing": a false environmental narrative to benefit the company. One

✉ Corresponding Author: Kornelia Przedworska; e-mail: kornelia.przedworska@uekat.pl
[1] University of Economics in Katowice, Katowice, Poland; ORCID iD: 0000-0003-2714-4066; Scopus ID: 58567609400; e-mail: kornelia.przedworska@uekat.pl
[2] University of Economics in Katowice, Katowice, Poland; ORCID iD: 0000-0002-3775-731X; e-mail: angelika.kantor@edu.uekat.pl

© 2025. The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-ShareAlike International License (CC BY-SA 4.0, http://creativecommons.org/licenses/by-sa/4.0/), which permits use, distribution, and reproduction in any medium, provided that the Article is properly cited.

area where greenwashing has become noticeable is the coal market, particularly in the sale of so-called eco-pea coal. Despite its name, which suggests it is a more environmentally friendly fuel, eco-pea coal remains a coal-based product whose combustion contributes to the emission of harmful substances.

Despite efforts, Poland emits 20% of the particulate matter and 10% of the greenhouse gases (GHG) released into the air across the entire EU. The largest share (75%) of total GHG emissions in this sector in Poland comes from fuel combustion processes (GUS 2022). This is primarily due to the high consumption of coal and wood. The situation is further exacerbated by specific weather conditions (Kaczmarczyk and Sowiżdżał 2024; Vovk et al. 2024). Scientific research confirms the negative impact of air pollution on human health (Heyes and Zhu 2019; Liao et al. 2021; Zhang and Mu 2018). This raises the question: is the commonly used term for coal, eco-pea coal, an example of greenwashing?

In the draft regulation of the Minister of Climate and Environment on quality requirements for solid fuels dated April 25, 2024 (hereinafter referred to as "the draft"), the authors emphasise the need to change the nomenclature of certain fuel assortments to avoid misleading terminology. The draft regulation has responded to numerous demands submitted to the Ministry of Climate and Environment by citizens, non-governmental organizations, local government units, and research institutions, advocating against the use of the prefix "eco-" in fuel names to counter the phenomenon of so-called greenwashing. It proposed simplifying fuel assortment names to eliminate ambiguity and facilitate informed consumer choices regarding fuels. This initiative was also a part of the achievement of milestone B4G and aims to secure funds under the National Recovery Plan (KPO) for measures to improve air quality, including the implementation of measures from the Priority Programme "Clean Air". The draft was part of the second payment request (WoP2), which was expected to be submitted between June and July, 2024 (Ministry of Climate and Environment 2024b; 2024a).

Research on the impact of familiarity with the concept of "greenwashing" on the perception of coal products may provide valuable insights into the effectiveness of marketing strategies and the educational needs within the energy sector. Understanding these relationships is crucial for promoting responsible business practices and increasing environmental awareness in society. Therefore, the primary objective of this study is to examine the influence of knowledge about "greenwashing" on the perception of coal products among coal depot employees. The specific objectives of the study are:

1. Identifying the extent to which the educational background of coal depot employees influences their familiarity with the term "greenwashing".
2. Determining whether employees who are familiar with the term "greenwashing" are more likely than others to recognize its occurrence in the energy and fuel sectors.
3. Examining how knowledge of greenwashing affects employees' perception of the environmental friendliness of burning high-quality coal.

Investigating whether familiarity with the term "greenwashing" influences coal depot employees' opinions on the environmental friendliness of eco-pea coal.

4. Identifying respondents' attitudes towards changing the name "eco-pea coal" and the common use of this term.

Additionally, for the purposes of this study and to facilitate comparisons with other research on the perception of coal products, the following were undertaken:

- **Analysis of coal product terminology**, which allowed for an understanding of whether differences in nomenclature may create challenges in product perception and marketing.
- **Identification of the characteristics of eco-pea coal**, which helped determine the attributes perceived as most important by sellers.
- **Comparison of coal products** in the context of their environmental friendliness as assessed by coal depot employees.
- **Identification of the main sources of air pollution** as indicated by coal depot employees.

The study adopted the following research hypotheses:

H1: The educational background of coal depot employees is correlated with their familiarity with the term "greenwashing".

H2: Familiarity with the term "greenwashing" is correlated with the belief that this phenomenon occurs in the energy and fuel sectors.

H3: Familiarity with the term "greenwashing" is correlated with the belief that burning high-quality coal may be environmentally friendly or neutral.

H4: Familiarity with the term "greenwashing" is correlated with the assessment of *eco-pea coal* as an environmentally friendly product.

H5: Familiarity with the term "greenwashing" is correlated with the belief that changing the name "eco-pea coal" to another will not affect the common use of this term.

1. Greenwashing – a theoretical outline

Nowadays, many organizations declare their commitment to local communities and the natural environment in line with the concepts of sustainable development, corporate social responsibility (CSR), and ESG principles (Responsible Business Forum Reports 2024). However, corporate declarations are not always truthful, leading to a gap between communication and actual practices (Martín-de Castro et al. 2017). This discrepancy between claims and actions results in dissatisfaction not only among consumers but also among stakeholders, especially when such practices are identified and exposed. These deceptive practices, particularly in relation to environmental issues, are referred to as greenwashing.

The term "greenwashing" gained widespread popularity in the 21st century, although the phenomenon itself was recognized in the 20th century. It was first highlighted by Jay Westerveld, who accused the hospitality industry of engaging in superficial environmental actions. The growing use of this term reflects its relevance as a pressing issue requiring action.

Researchers studying greenwashing have not adopted a single and unified definition, which may be attributed to the multifaceted nature of the phenomenon and the diverse contexts in which it develops. Greenwashing may be analyzed from multiple perspectives. In academic literature, this issue is most commonly addressed within the field of marketing, as evidenced by the approach of Nyilasy et al. (2014). From the perspective of marketing and management, the issue is discussed by Delmas and Burbano (2011). From a corporate perspective, greenwashing is discussed by Kim and Maxwell (2011), whereas Font et al. (2012) examine it from the standpoint of socially responsible business. There are also publications that consider greenwashing from a financial perspective. The multidimensional nature of this phenomenon has led researchers worldwide to adopt various definitions of greenwashing. For the purposes of this study, the definition from "The Concise Oxford English Dictionary" (2023) has been adopted. It describes greenwashing as disinformation that misleads the public by presenting a false image of an organization as environmentally responsible. Greenwashing exemplifies dishonest and deceptive corporate communication, misleading consumers through inaccurate claims. As A. Kantor (2022) notes, organizations often claim their actions align with CSR or ESG principles even when no such practices are actually implemented. Greenwashing occurs across many economic sectors, with scientific publications highlighting examples of such malpractice in industries including fashion, services, and energy (Kantor 2023). It should be noted that greenwashing has now become a subject of discussion on the international stage. The obligation of non-financial reporting is intended to help reduce the scale of greenwashing and its negative consequences for both consumers (like reducing a product's lifespan) and businesses (EC 2024; EP 2024).

2. Eco-pea coal as an example of greenwashing

In the face of global challenges related to climate change, increasing emphasis is being placed in the energy sector on reducing pollution emissions and promoting sustainable energy sources (IEA 2021). One such product, whose name suggests environmentally friendly characteristics, is eco-pea coal. Although the product is marketed as an environmentally friendly solution, its actual environmental impact is being questioned by consumers, industry experts, and scientists (Przybojewska 2022).

Eco-pea coal is a type of solid fuel produced from high-calorific coal with a grain size of 5 to 25 mm, a fraction informally named by coal depot workers. It is designed to be burned in automatic boilers, which are equipped with feeders that allow for controlled fuel combustion. This is intended to improve energy efficiency and reduce pollution emissions compared to traditional stoves (Anchim and Piotrowska-Wroniak 2010). The key technical parameters of eco-pea coal include its high calorific value (typically between 24 and 28 MJ/kg), low sulphur content (typically below 1%), and limited ash content (between 5% and 12%). While the specifications of eco-pea coal highlight its advantages in terms of better

parameters, it remains a fuel whose combustion results in emissions of gases such as carbon dioxide (CO_2) and other harmful substances, including particulate matter, which may exceed permissible levels by up to forty times (Badyda et al. 2021). The environmental impact of eco-pea coal is significantly greater than that of alternative energy sources.

Eco-pea coal may be used in modern automatic boilers with advanced flue gas cleaning systems, yet this does not change the fact that it is a coal-based product, and, according to global trends, coal should gradually be phased out in favor of more sustainable energy sources (IPCC 2021). It is important to note that in this case, there is an attempt to present coal – one of the main sources of global greenhouse gas emissions – as an environmentally friendly fuel. Although producers emphasize that the environmental benefits of the product stem from lower emissions compared to other coal fuels, it still cannot be considered an environmentally friendly product.

Marketing concepts emphasize the importance of transparent product communication (Kotler and Keller 2012), particularly for products related to environmental protection. The controversies surrounding the product arise from its "eco-" prefix, which suggests that the product has environmentally friendly characteristics or has a neutral impact on the environment. This is supported by Kantar study, which found that on average, 4 out of 10 consumers using eco-pea coal perceive it as an environmentally friendly product. Given that the product does not possess these characteristics, it is an example of greenwashing. The product's name is misleading to the average consumer who may not have specialized knowledge of energy or environmental protection. Consumer psychology suggests that such labels have a strong influence on how consumers perceive a product, especially given the increasing environmental awareness (Siano et al. 2017). The combustion of eco-pea coal contributes to CO_2 emissions and other pollutants. Therefore, using the "eco-" prefix misleads consumers, which may be considered sufficient evidence that consumers are dealing with a deceptive practice known as greenwashing. This practice illustrates how selective disclosure strategies used in marketing may mislead consumers (Lyon and Maxwell 2011).

Another reason why eco-pea coal may be considered an example of greenwashing is its exploitation of the pro-environmental trend and consumers' desire to purchase eco-friendly products in order to increase sales. It may be observed that modern consumers are more likely to choose products labeled "bio" or "eco". They are also willing to pay more for products with environmentally friendly features (Al Mamun et al. 2018; Sörqvist et al. 2013). Therefore, the use of the "eco-" prefix in a product that does not actually possess such features takes advantage of consumers' lack of knowledge and encourages the purchase of a non-eco-friendly product, one that does not align with the values presented by these consumers. As a result, consumers will unknowingly select a product that lacks eco-friendly attributes, which may delay the transition to clean technologies.

3. Changes in legislation regarding the naming of eco-pea coal

On November 8, 2024, the term "eco-pea coal" was removed from the Polish nomenclature. According to the new regulations, products with a granulation of 5–25 mm, commonly known as eco-pea coal, is replaced by "pea coal". However, the legislator went a step further

Table 1. Changes in the quality parameters of coal with a granulometry of 5–25 mm

Tabela 1. Zmiany parametrów jakościowych węgla o granulacji 5–25 mm

Effective Date	Parameters	Eco-pea coal	Pea coal Plus, Eco-pea coal – trade name	Pea coal Premium	Pea coal Standard
From 4.11.2018	Sulphur S_t^r (%) max.	1,2	*		
	Total Moisture W_t^r (%) max.	15			
	Ash A^r (%)	12			
	Calorific value Q_i^r (MJ/kg)	24			
From 31.12.2022	Sulphur S_t^r (%) max.	**	1,2	0,8	
	Total Moisture W_t^r (%) max.		15	11	
	Ash A^r (%)		12	7	
	Calorific value Q_i^r (MJ/kg)		24	25	
From 07.11.2024	Sulphur S_t^r (%) max.	**		0,8	
	Total Moisture W_t^r (%) max.			11	
	Ash A^r (%)			7	
	Calorific value Q_i^r (MJ/kg)			25	
From 01.12.2024	Sulphur S_t^r (%) max.	**			0,8
	Total Moisture W_t^r (%) max.				11
	Ash A^r (%)				7
	Calorific value Q_i^r (MJ/kg)				25

* Does not occur, common group of coal named eco-pea coal.

** Does not occur, coal divided into one/two groups on the right.

Source: Regulation ME 2018; Regulation MCE 2022; Regulation MI 2024

eliminating the term "premium pea coal" as well and replacing it with the name "standard pea coal", designated for use in boilers of above 3rd generation (Regulation MI 2024).

The first regulation standardizing coal nomenclature came into force following the regulation of the Minister of Energy from September 27, 2018 on the quality requirements for solid fuels (Regulation ME 2018). The quality requirements for "eco-pea coal" were included in Table 4. The subsequent regulation, dated December 23, 2022, further addressed these specifications (Regulation MCE 2022). The regulation introduced the term "eco-pea coal" as a commercial name covering the product range called "pea coal plus". It also added Table 5, specifying the parameters for coal named "pea premium". The quality requirements tables adopted a granulometry of 5–31.5 mm, however, market practice shows that these coals typically have a granulometry of 5 to 25 mm (see: PGG 2024; PKW 2024; Węglokoks Kraj SA 2024).

From December 31, 2022, the change in nomenclature from "eco-pea coal" to "pea coal plus" with the additional option of using "eco-pea coal" as a commercial name did not result in any change in quality parameters. This change was, therefore, temporary. The change is only made with the introduction of the "pea coal premium" grade, which has a lower content of sulphur, ash, and total moisture. Ultimately, the successor to "eco-pea coal" will be "pea coal standard" (see Table 1).

The changes also apply to other coal grades, and the proposed solutions, including the adjustment of quality parameters for fuels used in modern low-emission boilers, as well as the gradual phase-out of certain fuel grades from circulation, are key tasks. This will make it possible to achieve new air quality standards concerning PM10, PM2.5, nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) levels, which must be met by 2030. All of this aligns with the framework of the draft directive on air quality and cleaner air for Europe (AAQD – Ambient Air Quality Directive) (Ministry of Climate and Environment 2024a).

3.1. Methods

The study analyzed the activities of 300 companies in Poland specializing in the retail trade of coal products with a particular focus on coal with a grain size of 5–25 mm. A purposive sampling method was used to focus on companies that best met the study criteria. To gather data, information on authorized dealers of mining companies extracting hard coal in Poland was analyzed along with the website www.cieplo.gov.pl where fuel depots are required to list the availability and prices of the products they offer. A total of 3,238 email addresses for coal depots were obtained (potential respondents). The study was conducted from June to July, 2024, using the CAWI method. An online questionnaire was sent to respondents in this group who filled it out independently. Additionally, respondents were instructed that only one person from each organization should complete the survey. All survey responses submitted within the designated research period were included in the analysis. Data on respondents, including gender, age, and employment status, as well as

information on the coal depot, such as place of residence, region, and number of employees, are presented in Table 2.

Table 2. Demographic characteristics of respondents and attributes of coal depots

Tabela 2. Charakterystyka demograficzna respondentów i atrybuty składów węgla

Category	Value	Frequency
Gender	Female	122
	Male	175
	Other	3
Age	25–34	29
	35–44	102
	45–54	83
	55–64	65
	65 and above	21
Place of residence	Village	158
	Town up to 20,000 inhabitants	78
	City 20,000–99,000 inhabitants	41
	City 100,000–500,000 inhabitants	19
	Over 500,000 inhabitants	4
Region	Southern	71
	South-Western	42
	Northern	25
	North-Western	26
	Central	89
	Eastern	47
Employment status	Owner/board member	175
	Managerial position employee	51
	Office employee	66
	Manual worker	8
Number of employees	1–9	234
	10–20	31
	21–50	20
	51–100	12
	101–249	2
	250+	1

Source: own research

Statistical analysis was conducted using IBM SPSS Statistics software.

The selection of questions in the questionnaire was inspired by the 2021 study "Perception of Coal Products: Quantitative Research Report", conducted by Kantar Polska SA on behalf of the ClientEarth Lawyers for the Earth Foundation (Kantar Polska SA 2021). The questionnaire was adapted to suit coal depots as respondents and enriched with questions that allowed a broader exploration of the issue from the entrepreneur's perspective. The questionnaire defined the concept of greenwashing for respondents as "(eco-deception, "green lie") – unjustified creation of an ecological image of a product, service, or company, potentially misleading consumers".

A review was conducted of the quality parameters for hard coal with a grain size of 5–25 mm offered to the communal and household sector, including future changes to these parameters.

3.2. Results

In order to achieve Objective 1 and verify Hypothesis 1, which states that the educational background of coal depot employees is correlated with their familiarity with the term "greenwashing", a chi-square test was performed. The cross-tabulation table is presented below.

Table 3. Education level of coal depots employees vs knowledge of the term "greenwashing"

Tabela 3. Poziom wykształcenia pracowników składów węglowych a znajomość pojęcia „greenwashing"

Familiarity with the concept of "greenwashing" by fuel depot employees	Education			Total
	vocational and lower	secondary education	higher	
No	3%	17%	16%	36%
Yes – but I don't quite understand what it means	3%	9%	7%	18%
Yes – I know the term, and I know what it means	4%	16%	26%	46%
Total	9%	42%	49%	100%

N = 300, test χ^2 = 9,171[a], df = 4, p = 0.057.
Source: own research

The results of the Pearson's Chi-square test indicate that there is no statistically significant relationship between the level of education and the knowledge of the term "greenwashing". Therefore, hypothesis H1 is rejected.

To verify the detailed hypothesis H2, which states that Familiarity with the term "greenwashing" is correlated with the belief that this phenomenon occurs in the energy and fuel sectors, a cross-tabulation table was created. The Chi-square test was performed, and Cramér's V correlation coefficient was calculated. The results are presented in the table below.

Table 4. Occurrence of greenwashing in the energy/fuel sector vs. knowledge of the term by employees of coal depots

Tabela 4. Występowanie greenwashingu w sektorze energetyczno-paliwowym a znajomość tego terminu wśród pracowników składów węgla

Familiarity with the concept of "greenwashing" by fuel depot employees	Conformity with the statement: "greenwashing" also occurs in the energy/fuel industry		Total
	no	yes	
No	13%	23%	36%
Yes – but I don't quite understand what it means	4%	15%	18%
Yes – I know the term, and I know what it means	4%	42%	46%
Total	21%	79%	100%

N = 300, test χ^2 = 28,331[a], df = 2, współczynnik Phi = 0.307, V Kramera = 0.307, $p < 0.001$.
[a] 0.0% of the cells (0) have an expected frequency of less than 5. The minimum expected frequency is 11.37.
Source: own research

The results of the analysis indicate a moderate relationship between these variables, which suggests that the better the understanding of greenwashing, the more likely individuals are to recognize this phenomenon in the energy and fuel industries. The data show that among the group of people who have a good understanding of greenwashing, as many as 126 out of 138 respondents believe that this phenomenon is present in the energy/fuel industry. This may indicate that employees of coal depots are aware of potential greenwashing practices in their sector, which could influence their perception of the environmental aspects of coal products. Thus, specific objective two has been achieved, and the specific hypothesis H2 has been accepted.

In the next step, respondents were asked to evaluate the environmental nature of various types of hard coal, which is presented in the table below.

The results indicate that among the analysed types of coal, eco pea-coal and pea-coal premium are perceived as the most ecological, which is reflected in the high number of "ecological" and "very ecological" ratings. This suggests that these products have an advantage in the eyes of the respondents when it comes to their environmental impact. Their higher ratings may result from reduced emissions of pollutants or other properties that favor

Table 5 Perception of the environmental nature of different types of coal

Tabela 5. Percepcja charakteru środowiskowego różnych rodzajów węgla

Rate	Cube-coal	Walnut-coal	Eco pea-coal	Pea-coal	Pea-coal	Pea-coal+	Pea-coal Premium
Very non-ecological	6%	5%	3%	4%	3%	3%	3%
Non-ecological	26%	24%	14%	21%	18%	14%	14%
Neither non-ecological nor ecological	56%	56%	46%	58%	60%	49%	48%
Ecological	10%	12%	27%	15%	15%	26%	25%
Very ecological	3%	3%	10%	3%	3%	7%	10%

N = 300.
Source: own research

the environment, such as lower sulphur content or higher calorific value. In comparison, traditional types, such as cube-coal and walnut-coal, receive more ratings in the "non-ecological" or "very non-ecological" categories.

To verify hypothesis 3, which states that familiarity with the term "greenwashing" is correlated with the belief that burning high-quality coal may be environmentally friendly or neutral, a Chi-square test and Kramer's correlation were performed. The results are presented in the table below.

Table 6. Attitude of fuel yard employees towards the statement that burning high-quality coal may be environmentally friendly or neutral and knowledge of the term "greenwashing"

Tabela 6. Postawa pracowników składów paliw wobec stwierdzenia, że spalanie węgla wysokiej jakości może być przyjazne dla środowiska lub neutralne dla środowiska oraz znajomość terminu „greenwashing"

Familiarity with the concept of "greenwashing" by fuel depot employees	Agreement with the statement: burning coal may be environmentally friendly/neutral when using high-quality coal					Total
	strongly disagree	disagree	neither agree nor disagree	agree	strongly agree	
No	1%	2%	9%	9%	14%	36%
Yes – but I don't quite understand what it means	1%	1%	4%	3%	8%	18%
Yes – I know the term, and I know what it means	3%	6%	4%	10%	24%	46%
Total	5%	9%	18%	22%	45%	100%

N = 300, test χ^2 = 19,844[a], df = 8, współczynnik Phi = 0.257, V Kramera = 0.182, p = 0.011.
[a] 6.7% of the cells (1) have an expected frequency of less than 5. The minimum expected frequency is 2.93.
Source: own research

Based on the obtained results, detailed hypothesis 3 was accepted. A relationship between knowledge of "greenwashing" and respondents' attitudes towards coal combustion was observed. Individuals who have a good understanding of the term "greenwashing" are more likely to agree (10%) or strongly agree (24%) with the statement that burning high-quality coal may be environmentally friendly compared to those who are not familiar with the term (9% and 14%, respectively). On the other hand, individuals who have never heard of the term "greenwashing" or do not fully understand its meaning are more neutral or uncertain in their responses (18%). Overall, it may be assumed that better knowledge of "greenwashing" is associated with somewhat more decisive opinions, both positive and negative, regarding the environmental impact of coal combustion.

To verify detailed hypothesis 4, which states that familiarity with the term "greenwashing" influences coal depot employees' opinions on the environmental friendliness of "eco-pea coal", a cross-tabulation was created, and the correlation between the variables was examined.

Table 7. Awareness of the term "greenwashing" among coal depots employees and their environmental ratings of "eco-pea coal"

Tabela 7. Świadomość pojęcia „greenwashing" wśród pracowników składów węgla i ich ocena wpływu na środowisko „ekogroszkowego"

Assessment of the ecological quality of eco-pea coal	Familiarity with the concept of "greenwashing" by fuel depot employees			Total
	no	yes – but I don't quite understand what it means	yes – I know the term, and I know what it means	
Very unecological	1%	0%	2%	3%
Unecological	4%	3%	7%	14%
Neither unecological nor ecological	18%	8%	20%	46%
Ecological	10%	5%	12%	27%
Very ecological	3%	2%	5%	10%
Total	36%	18%	46%	100%

N = 300, test $\chi^2 = 5{,}045^a$, df = 8, p = 0.753.
Source: own research

The p-value of 0.753 in the Chi-square test suggests that the level of awareness of greenwashing does not significantly influence the perceived eco-friendliness of eco-pea coal; therefore, the specific hypothesis H4 is rejected.

In order to verify specific hypothesis 5, which states that the awareness of the concept of "greenwashing" is correlated with the belief that changing the name "eco-pea coal" to

another will not affect the common use of this term, a Chi-square test was conducted. The results are presented in the table below.

Table 8. Knowledge of the term "greenwashing" and the opinions of coal depots employees regarding the change of the name "eco-pea coal"

Tabela 8. Znajomość terminu „greenwashing" oraz opinie pracowników składów węglowych na temat zmiany nazwy „ekogroszek"

Familiarity with the concept of "greenwashing" by fuel depot employees	The agreement with the statement: changing the name "eco-pea coal" to another will cause the name to no longer be used colloquially			Total
	no	yes	don't know	
No	28%	3%	5%	36%
Yes – but I don't quite understand what it means	13%	1%	4%	18%
Yes – I know the term, and I know what it means	36%	2%	8%	46%
Total	77%	6%	17%	100%

N = 300, test $\chi^2 = 2{,}852^a$, df = 4, p = 0.583.
Source: own research

The p-value of 0.583 in the Chi-square test suggests that knowledge of the term "greenwashing" is not correlated with the belief that changing the name "eco-pea coal" will stop its colloquial use. Thus, the detailed hypothesis H5 is rejected.

The changes in the quality requirements for solid fuels, which came into force on November 8, 2024, eliminated the name "eco-pea coal". When respondents were asked whether the name would cease to be colloquially used, the majority (three-quarters of those surveyed) answered that it would not. Only one in twenty agreed that it would be phased out, while two in ten respondents had no opinion. Based on the performed test, no statistically significant relationships between the variables were observed, leading to the rejection of the detailed hypothesis H5.

In order to assess the terminology used for coal products and identify the characteristics of eco-pea coal, as well as compare coal products in terms of their ecological properties, the employees of coal yards were asked for their opinions on the issues being studied. Respondents were asked to spontaneously suggest a name for the 5–25 mm coal grade, and then their responses were matched to the names imposed by the Regulation of the Minister of Climate and Environment of December 31, 2022, on the quality requirements for solid fuels (Table 4). The figure below presents the names used by employees for coal with a grain size of 5–25 mm.

Based on the results presented in the table, it may be observed that the name "eco-pea coal" was used by an average of 4 out of 10 employees. The name "pea-coal" was used by

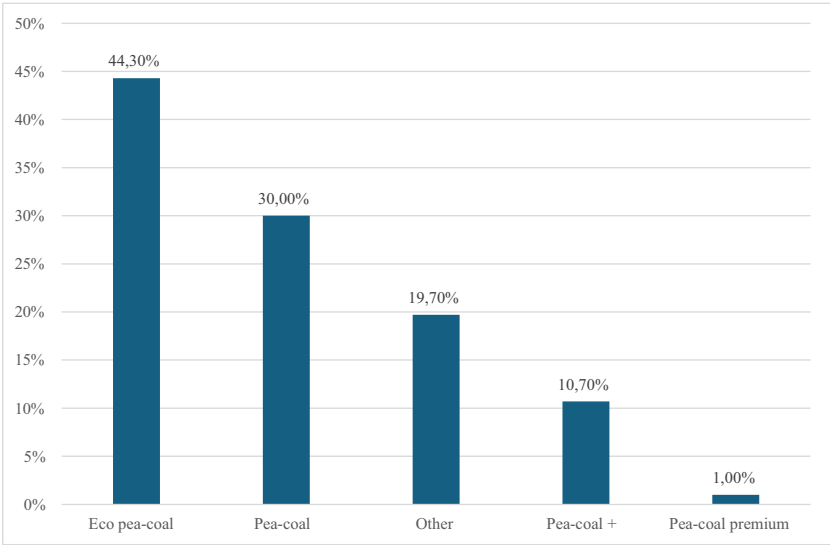

Fig. 1. Names used by coal yard employees for 5–25 mm coal
N = 300
Source: own research

Rys. 1. Nazwy używane przez pracowników składów węgla dla węgla o kalibrze 5–25 mm

1/3 of the employees, while "pea-coal+" was used by only about 1 in 10 employees. The popularity of names, such as "eco pea-coal" may suggest that coal yard employees continue to use terminology that was historically associated with coal of this granulation (see Table 1). The presence of a large "other" category indicates that there is no unified terminology, which may be due to regional differences or the individual preferences of the coal yards.

Respondents were asked about the basic differences between various coal grades such as eco-pea coal, pea coal plus, pea coal II, and premium pea coal (Figure 2).

On average, 3 out of 10 respondents claim that the difference between the grades is based on their calorific value. 2 out of 10 respondents state that the difference are due to the product's quality. One respondent in five believes that the differences is due to the size of the coal. Notably, on average, 2 out of 10 respondents do not see any differences between the various grades, while 1 in 10 respondents mentioned that they differ only in their name. Therefore, it may be observed that the terminology of coal products poses a challenge even for the employees of the fuel depots.

Next, respondents were asked to answer what they believe it means for eco-pea coal to be environmentally friendly. The results are presented in the following figure.

On average, one in four respondents indicated that eco-pea coal causes less dust and smog. On average, 14 out of 100 respondents stated that it is associated with fewer pollutants, and 1 in 10 respondents indicated that it is of better quality. However, it should be noted that, on average, one in 10 respondents does not see any difference between eco-pea coal and

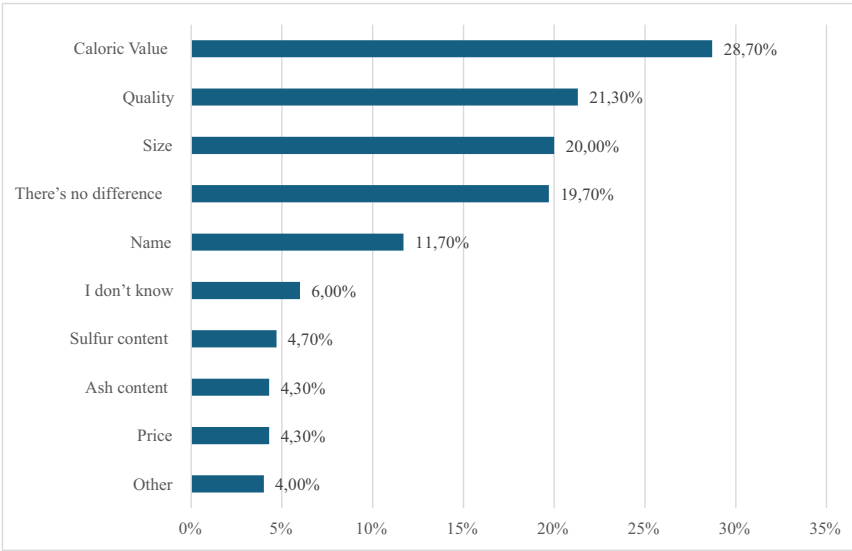

Fig. 2. The main differences between fuel grades such as eco-pea coal, pea coal plus, pea coal II, and pea coal premium according to fuel depot employees
N = 300
Source: own research

Rys. 2. Główne różnice między rodzajami paliwa, takimi jak ekogroszek, groszek plus, groszek II i groszek premium według pracowników składu opału

other types of hard coal, and, on average, one in 10 respondents stated that calling eco-pea coal an environmentally friendly product is a lie.

The following figure shows the results concerning the perceived characteristics of eco-pea coal according to fuel depot employees.

Nearly half of the coal depot employees declare that the characteristics of eco-pea coal include ease and convenience of use. On average, 2 out of 10 respondents state that eco-pea coal is characterized by its good quality-to-price ratio and high calorific value. These are the three characteristics most frequently mentioned by coal depot employees.

In the next step, the main sources of air pollution were identified according to fuel depot employees, as shown in the figure below.

On average, 3 out of 10 respondents identify the industrial sector as the main source of pollution. Similarly, 3 out of 10 respondents cite garbage combustion as a source of pollution. On average, 24 out of 100 respondents consider cars to be a major source of pollution. Solid fuels are identified as the main source of pollution by an average of 5 out of 100 respondents. At the same time, two-thirds of the respondents, to varying extents, agreed with the statement that burning coal may be environmentally friendly or neutral if high-quality coal is used (Figure 2).

In the next step, fuel depot employees were asked whether burning coal may be environmentally friendly/neutral if high-quality coal is used.

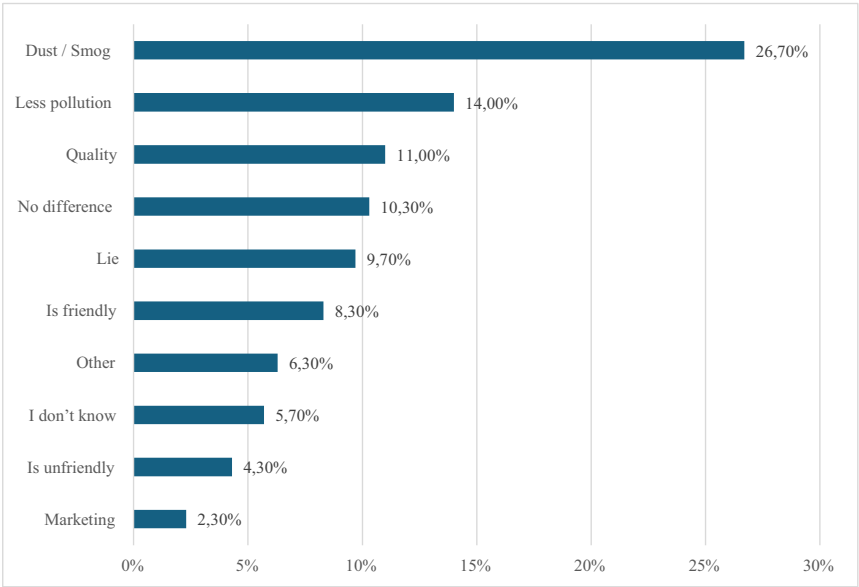

Fig. 3. Opinion of fuel depot employees on the environmental friendliness of eco-pea coal
N = 300
Source: own research

Rys. 3. Opinia pracowników składu opału na temat ekologiczności ekogroszku

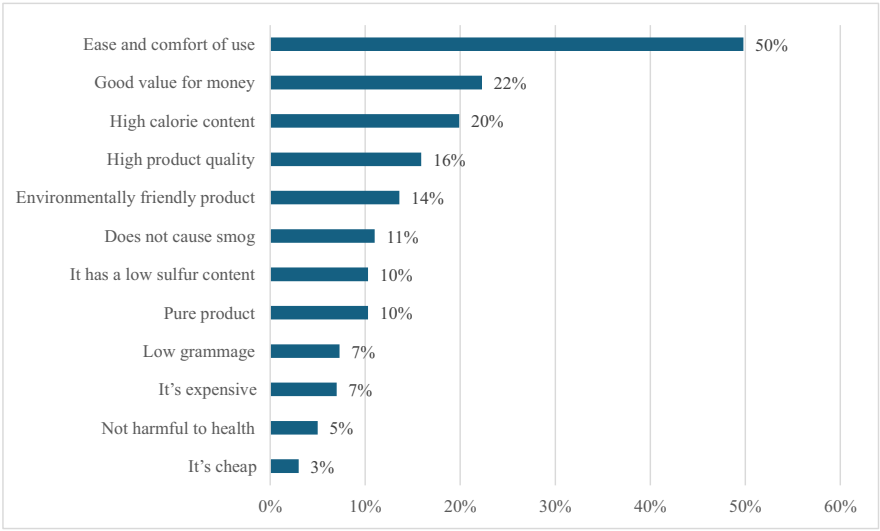

Fig. 4. Characteristics of eco-pea coal according to coal depot employees
N = 1037
Source: own research

Rys. 4. Charakterystyka węgla „ekogroszkowego" według pracowników składów węglowych

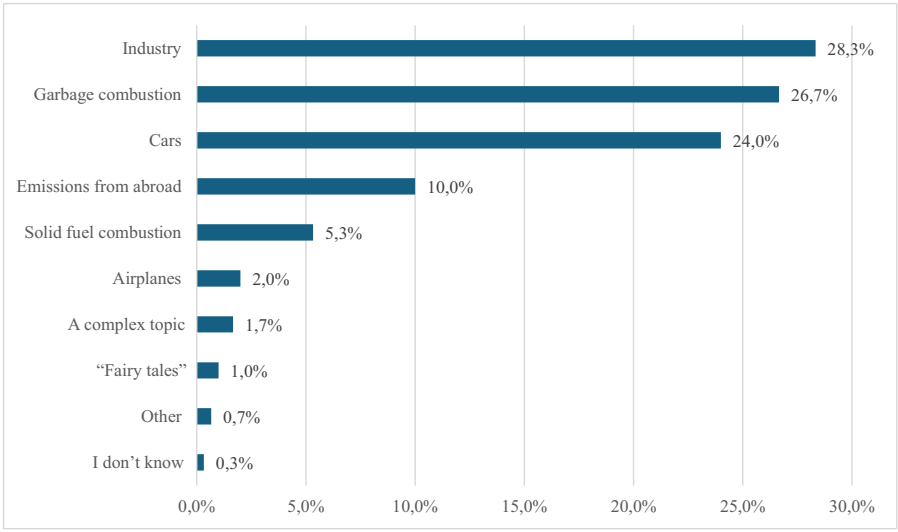

Fig. 5. Main sources of air pollution in Poland according to coal depot employees
N = 300
Source: own research

Rys. 5. Główne źródła zanieczyszczenia powietrza w Polsce według pracowników składów węglowych

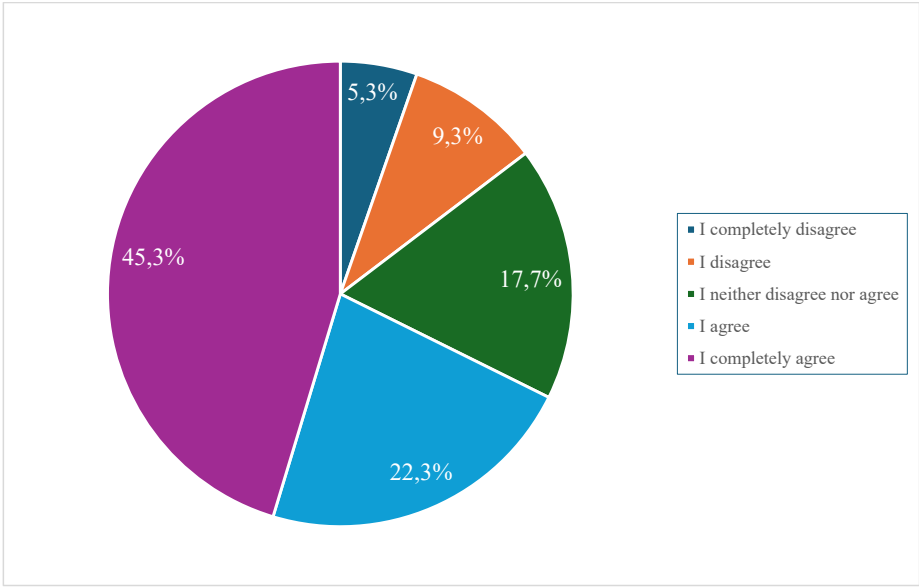

Fig. 6. Perception of coal burning in terms of its environmental impact
Source: own research

Rys. 6. Percepcja spalania węgla w kontekście jego wpływu na środowisko

Nearly three-quarters of respondents agree with the statement that burning high-quality coal may be environmentally friendly or neutral. On average, nearly 2 out of 10 respondents are unable to clearly determine the impact of coal burning on the natural environment, while 15 out of 100 respondents believe that using even high-quality coal will not be neutral or environmentally friendly.

4. Discussion

Based on the conducted research, the influence of knowledge about greenwashing on the perception of coal products by coal depot employees was examined, thus achieving the main objective of the study. It was observed that, depending on the level of knowledge about "greenwashing", employees perceive coal products and their characteristics differently.

Specific Objective 1, which aimed to identify the extent to which the educational background of coal depot employees influences their familiarity with the term "greenwashing", was achieved. Based on the analysis, Specific Hypothesis 1 was rejected, suggesting that the level of education may not be correlated with the knowledge of the term.

Specific Objective 2, which aimed to determine whether employees who are familiar with the term "greenwashing" are more likely than others to recognize its occurrence in the energy and fuel sectors, was achieved. Specific Hypothesis 2, stating that familiarity with the term "greenwashing" is correlated with the belief that this phenomenon occurs in the energy and fuel industries, was accepted.

Specific Objective 3, which aimed to examine how knowledge of greenwashing affects employees' perception of the environmental friendliness of burning high-quality coal, was achieved. Hypothesis 3, stating that familiarity with the term "greenwashing" is correlated with the belief that burning high-quality coal may be environmentally friendly or neutral, was accepted.

Specific Objective 4, which aimed to investigate whether familiarity with the term "greenwashing" influences coal depot employees' opinions on the environmental friendliness of eco-pea coal, was achieved. Specific Hypothesis, stating that familiarity with the term "greenwashing" is correlated with the assessment of eco-pea coal as an environmentally friendly product, four was rejected.

Specific Objective 5, which aimed to identify respondents' attitudes towards changing the name "eco-pea coal" and common use of this term, was achieved. The detailed hypothesis which stated that familiarity with the term "greenwashing" is correlated with the belief that changing the name "eco-pea coal" to another will not affect the common use of this term, was rejected.

This study also observed that coal products with a granulometry of 5 to 25 cm are referred to differently by coal depot employees. The research showed that these products were most frequently assigned the name "eco-coal", which, according to the authors, may be the result of historical practices when every product of this granulometry was called eco-

coal. Additionally, other names for this type of product were used, including those that do not fit within the terminology established by the legislator. Therefore, it may be assumed that this causes difficulties in the perception and marketing of these products.

Coal depot employees describe eco-coal, its properties, and characteristics in a variety of ways. The most commonly mentioned responses include statements such as "eco-coal causes less dust and smog", "it causes fewer pollutants", and "it has better quality". Employees also consider it a convenient product to use with a good price-to-quality ratio and high calorific value. At the same time, it should be noted that some fuel depot employees do not see any differences in the properties of the various coal grades, their characteristics, and properties. This may, therefore, lead to unintentionally misleading consumers who are seeking products with specific characteristics.

Coal depot employees declare that the main sources of pollution are the industrial sector, the burning of rubbish, and cars. A small percentage of respondents notice the impact of solid fuels. At the same time, two-thirds of respondents, to a greater or lesser extent, agreed with the statement that burning coal may be environmentally friendly or neutral if high-quality coal is used. This statement may be very concerning, as it indicates a low level of environmental awareness and insufficient understanding of the impact of burning coal, even high-quality coal, on the natural environment. In reality, burning coal, regardless of its quality, results in the emission of carbon dioxide (CO_2) and a range of other harmful substances such as sulphur oxides, nitrogen oxides, and particulate matter. These compounds contribute to air pollution, the greenhouse effect, and climate change, as extensively documented in scientific literature and industry reports.

Conclusions

The research was conducted before the regulation removing the term "eco-pea coal" from use in relation to hard coal came into effect, but at a time when the discussion about the use of the name "eco-pea coal" and the draft regulation to remove this term were already available for public opinion. This allowed for an assessment of how deeply the name "eco-pea coal" is rooted among coal sellers. This could, in turn, serve as a basis for further research examining whether the name has been eliminated from the economic circulation or if its usage tradition remains strong among Polish entrepreneurs and their customers.

The authors are aware of the limitations present in the study. The main limitation is the intentional selection of the research sample. Therefore, the results presented only relate to the group of surveyed enterprises.

The results highlight the need for training for employees in the context of the products offered by fuel depots. This is due to the fact that employees used different terms to refer to the coal assortments and also attributed different characteristics and properties to them. Thus, it may be assumed that this may stem from their lack of knowledge and the absence of up-to-date training. At the same time, employee training should address environmental pollution

issues and reliable marketing communication, which would help prevent the phenomenon of greenwashing. Raising awareness on this topic could lead to a more critical approach to the marketing of fuel products and their actual environmental impact. It is also important for politicians and decision-makers to take the findings of such studies into account when formulating regulations regarding the labeling of fuel products as "eco-friendly" or "environment friendly". Introducing more stringent standards could limit greenwashing practices, provided there is a shift in the mindset of coal depot employees, and they stop using the term "eco-pea coal". In the face of growing environmental awareness in society, it is crucial to promote accurate information about the environmental impact of burning coal and the challenges associated with its use. Examples of effective information campaigns, such as "Clean Air" in Poland (NFOŚiGW 2024), "Coal kills" (2024) in Australia, and "Beyond Coal" organised by Sierra Club (2017), may help change the perception of coal as a "clean" source of energy.

Supplementary files

The article includes a survey questionnaire that was originally developed in Polish and subsequently translated into English by the authors.

Perception of Coal Products

Part I

In this section of the questionnaire, you will be asked to answer several questions. Please provide responses regarding the products you offer to your CUSTOMERS.

* Indicates a required question

1. What name do your customers use for coal with a grain size of 5–10 mm to 25 mm?* (open-text question)

2. What types of coal do you offer to your customers?* Assortment refers to coal with different granulation and parameters.

(open-text question)

3. Which type of coal do you sell in your depot?* Select all applicable answers.

- Cube/Lump
- Nut coal
- Eco-pea coal
- Pea coal
- Pea coal II
- Pea coal Plus
- Pea coal Premium
- Other

4. Which type of coal do you sell the most at your depot?* Select all applicable answers.

- Cube/Lump
- Nut coal
- Eco-pea coal
- Pea coal
- Pea coal II
- Pea coal Plus
- Pea coal Premium
- Other

5. What factors influence your customers when purchasing coal? Please indicate the key features and values.* Select all applicable answers.

- Environmentally friendly / ecological product
- High calorific value
- Does not cause smog
- Ease and convenience of use
- Clean product
- High product quality
- Low granulation
- Cheap
- Expensive
- Does not have a harmful effect on health
- Good price-to-quality ratio
- Low sulfur content
- I have not encountered this product
- Other

Part II

In this section of the questionnaire, you will be asked to answer several questions regarding the products you use personally. Please respond according to your own knowledge and beliefs.

6. What name do you use for coal with a grain size of 5–10 mm to 25 mm?*
(open-text question)

7. What type of coal do you use for heating your home?* Select only one answer.

- Cube/Lump
- Nut coal
- Eco-pea coal
- Pea coal
- Pea coal II
- Pea coal Plus

- Pea coal Premium
- I do not heat my home with coal
- Other

8. What factors influence your decision when purchasing coal? Please indicate the key features and values.*

(open-text question)

9. What factors influence your decision when purchasing coal? Please indicate the key features and values.* Select all applicable answers.

- Environmentally friendly / ecological product
- High calorific value
- Does not cause smog
- Ease and convenience of use
- Clean product
- High product quality
- Low granulation
- Cheap
- Expensive
- Does not have a harmful effect on health
- Good price-to-quality ratio
- Low sulfur content
- I have not encountered this product
- I do not buy coal
- Other

10. On the household fuel market, eco-pea coal is a popular product. What do you think characterizes this product?* Select all applicable answers.

- Environmentally friendly / ecological product
- High calorific value
- Does not cause smog
- Ease and convenience of use
- Clean product
- High product quality
- Low granulation
- Cheap
- Expensive
- Does not have a harmful effect on health
- Good price-to-quality ratio
- Low sulfur content
- I have not encountered this product
- I do not buy coal
- Other

11. What is the basic difference between assortments such as eco-pea coal, pea coal plus, pea coal II and premium pea coal?

(open-text question)

12. Will changing the name eco-pea coal to something else cause this name to cease to be commonly used? Select only one answer.

- Yes
- No
- I don't know

13. Based on your knowledge, please determine the degree of environmental friendliness of the product. Mark only one answer per row.

	Very non-ecological	Non-ecological	Neither non-ecological nor ecological	Ecological	Very ecological
Cube/Lump					
Nut coal					
Eco-pea coal					
Pea coal					
Pea coal II					
Pea coal Plus					
Pea coal Premium					

14. Eco-pea coal is said to be a more environmentally friendly product. What does that mean to you?

(open-text question)

15. What do you think is the main source of air pollution in Poland?* Select only one answer.

- Cars
- Burning solid fuels
- Industry
- Burning waste
- Emissions from abroad
- Other

16. Do you agree with the statement that burning high-quality coal can be environmentally friendly/neutral?* Select only one answer.

- Strongly disagree 1 2 3 4 5 Strongly agree

17. How significant is air pollution in your place of residence?* Select only one answer.

- Very insignificant problem 1 2 3 4 5 Very significant problem

18. What impact does smoke from household coal burning have on human health?* Select only one answer.

- Strongly negative 1 2 3 4 5 Strongly positive

19. What impact does indoor coal smoke have on household members' health?* Select only one answer.

- Strongly negative 1 2 3 4 5 Strongly positive

20. Have you encountered the term "greenwashing"?* Select only one answer.

- No
- Yes – but I don't quite understand what it means
- Yes – I know the term and I know what it means

21. Do you believe that greenwashing occurs in the energy/fuel industry?* Select only one answer.

- Yes
- No

22. Do you think the government helps people who want to switch to a non-coal heating source?* Select only one answer.

- Does not help at all 1 2 3 4 5 Helps a lot

23. Do you think the local government helps people who want to switch to a non-coal heating source?* Select only one answer.

- Does not help at all 1 2 3 4 5 Helps a lot

24. Do you plan to use a municipal or national financial support program for those who want to replace their old heating source?* Select only one answer.

- I have already used one
- I plan to use one
- I would like to use one, but I do not know how
- I would like to use one, but I do not have the opportunity
- I do not plan to use one
- I have not heard about such programs
- Other

Demographics

25. Gender:

- Female
- Male
- Other

26. Age:

- Under 18
- 18–24
- 25–34

- 35–44
- 45–54
- 55–64
- 65 and over

27. Education:
- Primary
- Vocational
- Secondary
- Higher education

28. Place of residence:
- Village
- Town under 20,000 inhabitants
- City 20,000–99,000 inhabitants
- City 100,000–500,000 inhabitants
- Over 500,000 inhabitants

29. Region. Select only one answer
- South
- Southwest
- North
- Northwest
- Central
- East

30. Employment status:
- Owner/Board member
- Managerial position
- Office worker
- Physical worker

31. Number of employees in the company:
- 1–5
- 5–9
- 10–20
- 21–50
- 51–100
- 101–249
- 250 and more

Thank you for participating in the study!

The Authors have no conflict of interest to declare.

REFERENCES

Al Mamun et al. 2018 – Al Mamun, A., Fazal, S.A., Ahmad, G.B., Yaacob, M.R.B. and Mohamad, M.R. 2018. Willingness to Pay for Environmentally Friendly Products among Low-Income Households along Coastal Peninsular Malaysia. *Sustainability* 10(5), pp. 1–19, DOI: 10.3390/su10051316.

Anchim, P. and Piotrowska-Wroniak, J. 2010. Eco-pea coal – A cheaper and ecological way to heat a single-family home. Part 1. Choosing the fuel and boiler (*Ekogroszek – Sposób na tańsze i ekologiczne ogrzewanie domu jednorodzinnego. Cz. 1 Wybór paliwa i kotła*). *Budownictwo i Inżynieria Środowiska* 1(3), pp. 179–184 (*in Polish*).

Badyda et al. 2021 – Badyda, A., Krawczyk, P., Bihałowicz, J. and Kępa, P. 2021. Report on the implementation of site and analytical tests related to the combustion process of eco-pea coal, along with an expert opinion (*Raport z realizacji badań stanowiskowych i analitycznych związanych z procesem spalania ekogroszku wraz z opinią ekspercką*). [Online:] https://www.clientearth.pl/media/ujopbxwm/2021-02-19-raport-z-realizacji-badan-stanowiskowych-i-analitycznych-zwiazanych-z-procesem-spalania-ekogroszku-wraz-z-opinia-ekspercka-ext-pl.pdf [Accessed: 2024-12-12] (*in Polish*).

Barić, A. 2022. The Role of Social Responsibility in Company Strategy. *ENTRENOVA – ENTerprise REsearch InNOVAtion* 8(1), pp. 390–405, DOI: 10.54820/entrenova-2022-0033.

Coal Kills 2024. *Stop Adani*. [Online:] https://www.stopadani.com/coal_kills [Accessed: 2024-12-12].

Delmas, M.A. and Burbano, V.C. 2011. The Drivers of Greenwashing. *California Management Review* 54(1), pp. 64–87, DOI: 10.1525/cmr.2011.54.1.64.

EC 2022. *Circular Economy: Commission proposes new consumer rights and a ban on greenwashing.* European Commission (EC). [Online:] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2098 [Accessed: 2025-02-04].

EP 2024. *Stopping greenwashing: how the EU regulates green claims*. European Parliament (EP). [Online:] https://www.europarl.europa.eu/topics/en/article/20240111STO16722/stopping-greenwashing-how-the-eu-regulates-green-claims [Accessed: 2025-02-04].

Font et al. 2012 – Font, X., Walmsley, A., Cogotti, S., McCombes, L. and Häusler, N. 2012. Corporate Social Responsibility: The Disclosure–Performance Gap. *Tourism Management* 33(6), pp. 1544–1553, DOI: 10.1016/j.tourman.2012.02.012.

Forum Odpowiedzialnego Biznesu 2024. Report „Responsible Business in Poland 2023. Good Practices" (*Raport „Odpowiedzialny biznes w Polsce 2023. Dobre praktyki"*). [Online:] https://odpowiedzialnybiznes.pl/publikacje/raport-2023/ [Accessed: 2024-12-12] (*in Polish*).

Greenwashing 2023. W 13. *The Concise Oxford English Dictionary*. Oxford University Press.

GUS 2022. Poland on the path of sustainable development. Environmentally sustainable development (*Polska na drodze zrównoważonego rozwoju. Rozwój zrównoważony środowiskowo*). Główny Urząd Statystyczny (GUS). [Online:] https://raportsdg.stat.gov.pl/2022/Raport_pdf/Raport_SDG_2022.pdf [Accessed: 2024-12-12] (*in Polish*).

Heyes, A. and Zhu, M. 2019. Air pollution as a cause of sleeplessness: Social media evidence from a panel of Chinese cities. *Journal of Environmental Economics and Management* 98, pp. 1–86, DOI: 10.1016/j.jeem.2019.07.002.

IEA 2021. *Net Zero by 2050—A Roadmap for the Global Energy Sector*. International Energy Agency (IEA)

IPCC 2021. *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.

Kaczmarczyk, M. and Sowiżdżał, A. 2024. Environmental friendly energy resources improving air quality in urban area. *Energy Reports* 11, pp. 3383–3394, DOI: 10.1016/j.egyr.2024.03.017.

Kantar Polska SA 2021. Perception of coal products: Report of a quantitative study (*Percepcja produktów węglowych: Raport z badania ilościowego*). [Online:] https://www.clientearth.pl/media/aomjh1n0/2021-02-08-percepcja-produktow-weglowych-raport-z-badania-ilosciowego-coll-pl.pdf [Accessed: 2024-12-12] (*in Polish*).

Kantor, A. 2022. Greenwashing as a Threat to Corporate Social Responsibility (*Greenwashing jako zagrożenie dla społecznej odpowiedzialności biznesu*). Prace Naukowe / Uniwersytet Ekonomiczny w Katowicach, *Zrównoważony rozwój w kontekście współczesnych zmian społeczno-gospodarczych*, pp. 49–58 (*in Polish*).

Kantor, A. 2023. Greenwashing and Marketing Communication of Companies—A Threat to the Credibility of Information. Examples Based on the Service Sector. *Scientific Publications / University of Economics in Katowice*, *International Service Management in the Context of Sustainable Development*, pp. 127–144.

Kotler, P. and Keller, K.L. 2012. *Marketing Management* (14th ed.). Upper Saddle River, New Jersey: Pearson.

Liao et al. 2021 – Liao, L., Du, M. and Chen, Z. 2021. Air pollution, health care use and medical costs: Evidence from China. *Energy Economics* 95, DOI: 10.1016/j.eneco.2021.105132.

Lyon, T.P. and Maxwell, J.W. 2011. Greenwash: Corporate Environmental Disclosure under Threat of Audit. *Journal of Economics and Management Strategy* 20(1), pp. 3–41, DOI: 10.1111/j.1530-9134.2010.00282.x.

Martín-de Castro et al. 2017 – Martín-de Castro, G., Amores-Salvadó, J., Navas-López, J.E. and Balarezo-Nuñez, R.M. 2017. Exploring the nature, antecedents and consequences of symbolic corporate environmental certification. *Journal of Cleaner Production* 164, pp. 664–675, DOI: 10.1016/j.jclepro.2017.06.238.

Ministry of Climate and Environment 2024a. Project name: Regulation of the Minister of Climate and Environment on quality requirements for solid fuels (*Nazwa projektu rozporządzenie Ministra Klimatu i Środowiska w sprawie wymagań jakościowych dla paliw stałych*). [Online:] https://www.bankier.pl/static/att/497000/8735920_48312735-dokument665295-1.doc [Accessed: 2024-12-12] (*in Polish*).

Ministry of Climate and Environment 2024b. Draft of April 25, 2024 (*Projekt z dnia 25 kwietnia 2024 r.*). [Online:] https://www.zpp.pl/storage/library/2024-04/5ac60df2231de0446ea9dbc4ea86f678.pdf [Accessed: 2024-12-10] (*in Polish*).

NFOŚiGW 2024. Clean Air Program – Up to PLN 136,200 for thermal modernization and replacement of heat sources. Clean Air Program (*Program „Czyste Powietrze" – Do 136 200 zł na termomodernizację i wymianę źródeł ciepła. Program „Czyste Powietrze"*). [Online:] https://czystepowietrze.gov.pl/ [Accessed: 2024-12-10] (*in Polish*).

Nyilasyet al. 2014 – Nyilasy, G., Gangadharbatla, H. and Paladino, A. 2014. Perceived Greenwashing: The Interactive Effects of Green Advertising and Corporate Environmental Performance on Consumer Reactions. *Journal of Business Ethics* 125(4), pp. 693–707, DOI: 10.1007/s10551-013-1944-3.

PGG 2024. PGG SA STORE | coal | eco-pea coal in bags and in bulk (*SKLEP PGG S.A. | węgiel | ekogroszek workowany i luzem*.) Polska Grupa Górnicza SA (PGG). [Online:] https://sklep.pgg.pl/ [Accessed: 2024-12-10] (*in Polish*).

PKW 2024. Bagged fuel – cheap coal straight from the mine | Południowy Koncern Węglowy SA (*Paliwo workowane – tani węgiel prosto z kopalni | Południowy Koncern Węglowy SA*). Południowy Koncern Węglowy SA (PKW). [Online:] https://sklep.tauron.pl/ [Accessed: 2024-12-10] (*in Polish*).

Przybojewska, I. 2022. Greenwashing in the context of legal regulations (*Greenwashing w kontekście unormowań prawnych*). *Prawne Problemy Górnictwa i Ochrony Środowiska* 1, pp. 1–26 (*in Polish*).

Regulation MCE 2022. Regulation of the Minister of Climate and Environment of 23 December 2022 on quality requirements for solid fuels (*Rozporządzenie Ministra Klimatu i Środowiska z dnia 23 grudnia 2022 r. w sprawie wymagań jakościowych dla paliw stałych*). (Dz.U. 2022, poz. 2856) (*in Polish*).

Regulation ME 2018. Regulation of the Minister of Energy of 27 September 2018 on quality requirements for solid fuels (*Rozporządzenie Ministra Energii z dnia 27 września 2018 r. w sprawie wymagań jakościowych dla paliw stałych*). (Dz.U. 2018, poz. 1890) (*in Polish*).

Regulation MI 2024. Regulation of the Minister of Industry and the Minister of Climate and Environment of November 4, 2024 on quality requirements for solid fuels (*Rozporządzenie Ministra Przemysłu oraz Ministra Klimatu i Środowiska z dnia 4 listopada 2024 r. w sprawie wymagań jakościowych dla paliw stałych*). (Dz.U. 2024, poz. 1618) (*in Polish*).

Siano et al. 2017 – Siano, A., Vollero, A., Conte, F. and Amabile, S. 2017. "More than words": Expanding the taxonomy of greenwashing after the Volkswagen scandal. *Journal of Business Research* 71, pp. 27–37, DOI: 10.1016/j.jbusres.2016.11.002.

Sierra Club 2017. New Coalition Aims To Take Europe Beyond Coal | Sierra Club. [Online:] https://www.sierraclub.org/press-releases/2017/11/new-coalition-aims-take-europe-beyond-coal [Accessed: 2024-12-12].

Sörqvist et al. 2013 – Sörqvist, P., Hedblom, D., Holmgren, M., Haga, A., Langeborg, L., Nöstl, A. and Kågström, J. 2013. Who Needs Cream and Sugar When There Is Eco-Labeling? Taste and Willingness to Pay for "Eco-Friendly" Coffee. *PLOS ONE* 8(12), pp. 1–9, DOI: 10.1371/journal.pone.0080719.

Vovk et al. 2024 – Vovk, T., Kryza, M. and Werner, M. 2024. Using random forest to improve EMEP4PL model estimates of daily PM2.5 in Poland. *Atmospheric Environment* 332, pp. 1–15, DOI: 10.1016/j.atmosenv.2024.120615.

Węglokoks Kraj SA 2024. WĘGLOKOKS Kraj Online Sales Service Platform (Internetowa Platforma Obsługi Sprzedaży WĘGLOKOKS Kraj). [Online:] https://platforma.weglokokskraj.pl/ [Accessed: 2024-12-12] (*in Polish*).

Zhang, J. and Mu, Q. 2018. Air pollution and defensive expenditures: Evidence from particulate-filtering facemasks. *Journal of Environmental Economics and Management* 92, pp. 517–536, DOI: 10.1016/j.jeem.2017.07.006.

ECO-PEA COAL – TRADITION OR GREENWASHING? A STUDY OF PERCEPTIONS AMONG FUEL DEPOTS EMPLOYEES

Keywords

greenwashing, hard coal, eco-pea coal, environmental awareness, sustainable development

Abstract

Environmental awareness plays a vital role in shaping the behaviour of today's consumers, influencing their purchasing decisions and their interactions with the marketplace. Marketing communications that emphasise environmentally friendly product features, packaging, and even product names have a significant impact on purchase decisions. Consumers who prioritise environmental concerns are often willing to pay more and are more likely to select environmentally friendly products. An example of greenwashing in the energy market is eco-pea coal. The purpose of this study is to explore the impact of knowledge about greenwashing on the perception of coal products by employees of coal depots. To achieve this, a survey (CAWI) was conducted with a sample of 300 coal depot employees. The study aimed to determine whether employees in the energy sector are familiar with the issue of greenwashing, how this knowledge influences their perception of the environmental impact of burning high-quality coal, and whether awareness of the term greenwashing affects their opinions on the environmental friendliness of eco-pea coal. The research also examined respondents' attitudes towards renaming eco-pea coal and its colloquial use. An analysis of coal product terminology and relevant legal regulations was conducted. The study identified the characteristics of eco-pea coal and compared these features with those of other coal products. The findings revealed that employees' perceptions of coal products and their characteristics varied according to their level of awareness regarding greenwashing. The results emphasize the importance of training coal depot employees to ensure consistent terminology and accurate descriptions of coal assortments, preventing potential consumer misguidance.

**EKOGROSZEK – TRADYCJA CZY GREENWASHING?
BADANIE PERCEPCJI WŚRÓD PRACOWNIKÓW SKŁADÓW OPAŁU**

Słowa kluczowe

greenwashing, węgiel, ekogroszek, świadomość ekologiczna konsumentów, zrównoważony rozwój

Streszczenie

Świadomość ekologiczna odgrywa istotną rolę w zachowaniach współczesnych konsumentów, wpływając na ich decyzje zakupowe i zachowania rynkowe. Komunikaty marketingowe uwzględniające proekologiczne cechy produktów, sposób pakowania, a także samo nazewnictwo produktu mogą determinować decyzje o zakupie. Konsument, dla którego ważne są kwestie ekologii, jest w stanie zapłacić więcej i chętniej wybrać produkt przyjazny środowisku. Przykładem greenwashingu na rynku energetycznym jest ekogroszek. Celem pracy jest zbadanie wpływu wiedzy na temat greenwashingu na postrzeganie produktów węglowych przez pracowników składów węgla. W tym celu przeprowadzono badanie ankietowe (CAWI) na próbie 300 pracowników składów opału. Na podstawie opracowania rozpoznano, czy pracownicy branży energetycznej są zaznajomieni z problematyką greenwashingu, jak znajomość greenwashingu wpływa na postrzeganie ekologiczności spalania węgla wysokiej jakości, a także czy znajomość pojęcia „greenwashing" wpływa na opinie pracowników składu opału dotyczące oceny ekologiczności ekogroszku. Rozpoznano stosunek respondentów do zmiany nazwy ekogroszku oraz jej potocznego używania. Dokonano analizy terminologii produktów węglowych oraz regulacji prawnych w tym zakresie. Zidentyfikowano cechy ekogroszku, a także porównano cechy wybranych produktów węglowych. Na podstawie badania zauważono, że w zależności od stanu wiedzy o greenwashingu pracownicy odmiennie postrzegają produkty węglowe oraz ich cechy. Wyniki podkreślają znaczenie szkolenia pracowników składów opału w celu zapewnienia spójnej terminologii i dokładnych opisów asortymentu węgla, co pozwoli uniknąć potencjalnego wprowadzania w błąd konsumentów.