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## Achieving United Nations sustainable development goals by the mining sector – a Polish example

### Introduction

According to many stakeholder groups, sustainable mining is indeed an oxymoron (Kirsch 2010). Especially in the face of climate changes, shifting atmospheric air conditions or mining damages, this position has been gaining popularity. The media informing about the decline of the mining sector (Dziennik Zachodni 2016; Dziadul 2017; WWF Polska 2020; Piszczatowska 2020; TokFm 2020) – often identifying mining only with the extraction (and burning) of coal. In spite of the fact that the press releases lack a thorough analysis referring to the country's energy independence (Poland has the energy dependency rate lower than the average for the European Union (EU) (Eurostat Database 2020; Manowska et al. 2017) which is due to the resources of energy minerals, including hard coal and lignite), they also indicate the problem that is related to environmental issues, and also to a number of social aspects the importance of which is emphasized by scientists from Poland and the world (Hilson and Murck 2000; Hilson 2000; Fugiel et al. 2017; Gavriletea 2017; Tuokku et al. 2019). The mining sector requires a comprehensive and multi-faceted approach.

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Attention should be paid to its diversity and the possibility of availing the raw materials it provides, bearing in mind not only the resources of fossil fuels, but also copper ores or rock raw materials. This does not mean that the degradation of the natural environment resulting from interference with the ecosystem should be ignored. On the contrary, it is necessary to monitor the impact of the industry on fauna, flora, atmospheric air and the degree of water pollution with due diligence (Namysłowska-Wilczyńska and Pyra 2005; Rashed 2010; Mwaanga et al. 2019; Etteieb et al. 2020). Currently, access to some of the above-mentioned data is enabled by sustainable development reports. Despite the disadvantages of such studies (Fonseca et al. 2014), reports are a publicly available resource, and the guidelines according to which they are prepared are improved in subsequent versions.

Mining companies should be required to pay for exceeding environmental standards as well as to invest in modern technologies. An example is the transfer by mining entities to municipal budgets of amounts that allow for the greater expenditure of local governments in environmental protection or education (Pactwa et al. 2018). Therefore, one cannot ignore the benefits of mining activities for the economy and society. Especially when mining is key to maintaining current living standards (Virgone et al. 2018).

A visible impact of the mining sector in this area requires analyses in the context of sustainable development (SD) and a reinterpretation of the objectives from the perspective of the industry in question. It is reasonable to diagnose the current situation and attempt to determine the direction of changes transparent at the level of the natural environment and society (stakeholders).

The assessment of industry activities over time, taking territorial or industry constraints and their interpretation in the context of sustainable development into account, requires objective analysis. It should be remembered that not every change in an unsustainable state in the context of the activities of the industry in question can be considered as achieving sustainable development goals (Holden et al. 2014). Therefore, it is necessary to define sustainable directions for the discussed industry branch. The activities carried out in this area (among others (Hilson and Basu 2003; ICMM 2020)) are summarized in this work (Table A1).

The purpose of this publication is to define, analyze and evaluate the implementation of sustainable development goals by mining companies in Poland. The conclusions drawn have been based on a review of sustainable development reports. And although the research concerns selected entities, their diversity allows for an assessment of the current situation. This article presents a change in the awareness of mining enterprises operating in Poland about sustainable development, the way of formulating, defining and emphasizing activities in line with the specific goals of SD. National plans for the sustainable use of natural resources support the achievement of the goals (UN 2019), which is why the legal framework and regulations in this respect have been reviewed. The article is a continuation of the research carried out so far.

## 1. Justification of the subject study

### 1.1. Literature review

Conducting research on sustainable development at the national level is legitimate because it allows to understand the impact of local (small-scale) decisions on a larger scale whilst having an impact on their management (Leal Filho et al. 2018). And thus, the related effectiveness of proceedings according to sustainable development principles will largely depend on local level decisions and actions (UN 2012). On the other hand, the need to conduct research on the scope of the implementation of SD goals was emphasized by Lange Salvia et al. (2019). Although these are not the first works carried out for the mining industry (Monteiro et al. 2019; Endl et al. 2019; Dubiński 2013), they do not exhaust the subject and, secondly, there is no clear definition in the Polish mining of the mining sector activities with respect to SD goals or the assessment of the scope of their implementation.

Sustainable Development (SD) according to the report of the World Commission on the Environment and Development: “Our Common Future” (UN 1987) is understood as a process of change ensuring that the needs of the present generation are met without the negative impact on the development opportunities of future generations due to, among others, integrated actions in the scope of economic, social and environmental development. “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Over the years, this was not the only attempt to describe the concept of SD. Analyzing the existing definitions it was found (Tajvidi Asr et al. 2019) that the concept of SD is holistic and covers all aspects of social, environmental, economic, cultural and other needs.

The 2030 Agenda for Sustainable Development (Agenda 2030 (2015)) presents 17 Sustainable Development Goals (SDGs, APPENDIX Table A1) and 169 related tasks that form a continuation of the Millennium Development Goals (UN-MDGs 2000). They are more detailed and present a more realistic view of the complex challenges facing the world (Lange Salvia et al. 2019) The goals are global and universal, taking the diversity of countries in terms of existing realities, available opportunities and levels of development into account.

The concept of sustainable development constitutes an integral part of Corporate Social Responsibility (CSR) and, likewise, the implementation of CSR tasks is in line with the SD principles. The idea of CSR is recognized all over the world, equally so when it comes to developed and developing countries. CSR awareness is increasing and has been gaining more and more acceptance (this also applies to the mining sector), whilst the policy is formalized (Pactwa 2019). Virgone et al. (2018) discussed the use of non-financial reporting standards (GRI as the dominant approach) conducted as part of CSR to assess sustainable development in mining.

There is a view that the strength of sustainable development is the involvement of many stakeholder groups in discussing, developing a contact platform and conducting debates (Robinson 2004). Departure from the concept of sustainable development only as a scientific

concept and basing it on dialogue allows one to abandon the rigid framework and attempts to define the concept while transferring issues related to it to wider and active fields of action. The consequence of changes taking place in the surrounding world are new challenges posed to SD. The analysis of complex SD issues requires a pluralistic and transdisciplinary approach, i.e. allowing many stakeholders to take their stand, considering a wide spectrum of issues (Sneddon et al. 2006). In this view, one can easily draw reference to the idea of Elkington (1998) referring to economic, social and environmental partnership. Partnership as an agreement and cooperation facilitates development in line with the SD concept. Time is of the essence in achieving the goals. Long-term contracts are conducive to the consistent performance of tasks and the implementation of decisions. The heart of the partnership is making decisions in consultation with all stakeholders, listening to their reasons without marginalizing or discriminating against vulnerable groups, and making informed decisions, given the possibility of their modification in the event of changing circumstances arising from the given economic, environmental, social or legal situation.

A large number of works related to the topic of sustainable mining testifies to the importance of the issue and continuous exploration of this research area (De Mesquita et al. 2017) in individual research centers and as a result of cooperation resulting both from the interdisciplinary nature of the issue and the narrow authors specialization (Bemke-Świtilnik et al. 2020). Therefore, many of them revolve around narrow, specialized issues. Literature on mining activities in Poland in the context of sustainable development, by scientists from indigenous centers applies to, among others: resource policy (Galos 2009), energetics (Gawlik and Soliński 2004), exploitation of lignite deposits and the restrictions resulting from environmental protection (Naworyta 2009), the functioning of hard coal mining in a changing reality (Ogrodnik and Mieszaniec 2013), the use of solutions aimed at eliminating waste in the enterprise, as well as improving working conditions due to the use of a high-quality product, the discussed problem concerned mining machine components (Bołoz and Midor 2019), sustainable management of regional rock raw materials (Błachowski and Buczyńska 2020), the landscape, natural and cultural attractiveness of post-mining areas and views on mining as creating a new value for the natural environment (on the example of rock raw material mines) (Nieć et al. 2008), providing underground tourist routes from underground mining (Syposz-Łuczak 2008), the need to create value of the company in accordance with the concept of sustainable development, this is important because running a business in a socially responsible and environmentally friendly way has an impact on the share price of companies and can be a source of competitive advantage (Lorenc and Kustra 2015; Hałasik and Kulczycka 2016) and the strategy of mining companies realizing the idea of CSR by implementing good practices in line with the idea of sustainable development (Kulczycka and Wirth 2010; Bluszcz and Kijewska 2015; Woźniak 2019; Sukiennik and Bąk 2019).

In connection with the above, it was concluded that this article will fill the research gap by presenting a comprehensive approach to issues related to sustainable development in the mining sector in Poland. The comparative analysis several companies from the industry, provides new, previously unpublished information in this regard. The diversity of companies and a look

at the issue over the few years is a summary and evaluation of the current state of implementation of sustainable development goals and allows for the identification of problems and issues requiring further work. At the same time, it is considered important to increase the scope of research on sustainable industry in Poland. Scientific development and the implementation of good practices while minimizing or eliminating activities harmful to the environment and society are possible thanks to an open exchange of thoughts and experiences, being a contribution to the discussion.

### 1.2. Sustainable development – Polish provisions and regulations

Since in order to achieve the goals of sustainable development at both a national and global level, it is necessary to develop a framework for political reforms and social changes (Constanza et al. 2016). It is justified to refer to legal acts, whereby references to sustainable development can be found. Such a review allows for assessing whether the national law is adapted to European and global trends.

The European Union is committed to ensuring sustainable development goals. In its 2016 communication: “regarding steps towards a sustainable future for Europe”, the European Commission committed itself to applying the principles of sustainable development in all EU policies and initiatives (EC 2016). The Council of the European Union encouraged this in its conclusions on sustainable development in 2017 (EC 2017). The document Communication from the Commission – Guidelines on non-financial reporting: Supplement on reporting climate-related information (EC 2019) relating to the issues of sustainable development is also relevant. It is designed to assist interested companies to disclose non-financial information in an appropriate, useful, consistent and more comparable manner. Despite improvements in the presentation of information by enterprises in recent years, gaps remain and improvements are needed in terms of quantity, quality and comparability of disclosures. The recommended indicators related to climate issues are a step in this direction.

In Polish legislation, the term “sustainable development” appears in the Constitution of the Republic of Poland of April 2, 1997, Chapter I The Republic of Poland art. 5 (CRP 1997): “The Republic of Poland safeguards the independence and inviolability of its territory, ensures human and citizen freedom and rights and the security of citizens; protects the national heritage and ensures environmental protection, guided by the principle of sustainable development”. This statement is particularly important in the face of the changing law at global and European level emphasizing the issue of sustainable development. Currently, they should be treated as priority and focus on compliance with the principles (implementation of SDGs). The term ‘sustainable development’ also appears in the following documents (Wodzickowski 2012; Olejarczyk 2016; Pabiś 2017):

- ◆ The Act of April 27, 2001 – Environmental Protection Law (consolidated text) (EPL 2001) – appears here several times and means “such socio-economic development, in which the process of integrating political, economic and social activities takes place,

maintaining natural balance and sustainability of basic natural processes, in order to guarantee the ability to meet the basic needs of individual communities or citizens of both the modern generation and future generations”. This definition is very similar to that in the report of the World Commission on Environment and Development.

- ◆ The Act of April 10, 1997 – Energy Law (consolidated text) (EL 1997), Art. 1 – “The purpose of the Act is to create conditions for sustainable development of the country, ensuring energy security, economical and rational use of fuels and energy, development of competition, counteracting the negative effects of natural monopolies, taking into account environmental protection requirements, obligations arising from international agreements and balancing the interests of energy companies and fuel and energy consumers”.
- ◆ The Act of July 6, 2001 on the Preservation of the National Nature of the Country’s Strategic Natural Resources (consolidated text) (PNNCSNR 2001), including Art. 3 – “The management of strategic natural resources is carried out in accordance with the principle of sustainable development in the interest of the general good”. Art. 4 – “To achieve the goal set out in art. 3 competent public administration bodies and other entities exercising management based on separate regulations on natural resources listed in Art. 1 are obliged to: 1) maintain, enlarge and improve renewable resources; 2) use mineral deposits in accordance with the principle of sustainable development”. Thus, it is a direct reference to the mining industry.
- ◆ The Act of March 27, 2003 on Spatial Planning and Development (consolidated text) (SPD 2003), which specifies: “1) policy making principles by territorial self-government units and government administration bodies, 2) the scope and methods of proceeding in matters of allocating areas for specific purposes and determining the principles of their development and management – assuming spatial order and sustainable development as the basis for these activities”.

Bearing in mind the need to define and implement problems in accordance with the objectives of sustainable development, in 2018 the following report was published: ‘Implementation of sustainable development goals in Poland’ (RSDGs 2018). It was prepared with an intention of reviewing the implementation of SD objectives discussed in the UN Resolution (Agenda 2030, 2015). ‘Strategy for responsible development’ (SRM 2017) adopted by the Polish government, was used, among others, as a source of reference upon its study. The authors of this study indicate that of crucial significance from social point of view is the reduction of social exclusion, poverty, inequality also in the territorial dimension, which in turn will improve the quality of life of citizens. In addition, care for the development of human capital will take place through access to knowledge and education. In the economic dimension, the emphasis is placed on building a strong, modern industry and supporting entrepreneurship. The focus ought to be put on investments in innovation, the development of modern technologies and products as well as the development of information technologies. In terms of the environment, Poland is striving to improve the state of the environment and the sustainable management of resources. This aspect concerns, among others, the rational

management of natural and geological resources and effective waste management. Improving air quality remains a priority. The implementation of these tasks will be supported by the efficient operations of state institutions. Action lines include, for example, improving the quality of law and strengthening the system of the strategic management of development processes. Issues regarding the implementation of sustainable development goals in Poland are particularly important in the context of the mining sector's activities interfering with the natural environment, but also because of the investments undertaken to improve the living conditions of the citizens.

Sustainable development is related to the issue of mineral resource management. For several years, efforts have been aimed at adjusting the regulations and the legal framework in this area (SRMP 2019). Activities targeted at preparing the Polityka Surowcowa Państwa project by the Ministry of Environment began in 2005. Subsequently, after 11 years (sic), the Government Plenipotentiary for the Raw Materials Policy and the Interministerial Team for Raw Materials Policy were appointed. Activities related to the implementation of the raw materials policy implemented by the Polish state are designated to serve the purpose of rational management of mineral extraction and mineral resources, in accordance with the principles of sustainable development (SRMP Pilar VII 2019). There is still no version of the State's Raw Material Policy that would extend beyond the project zone.

The 17 Goals Campaign is in place in Poland (<https://kampania17celow.pl>). It is an initiative that aims to encourage business representatives to engage in learning about and achieving the goals of sustainable development. Its first edition was implemented in 2018. The campaign is an educational program that presents ways to integrate sustainable development goals into the company's strategy. The published information on companies representing various industries includes information on one of the mining sector's representatives – the CEMEX company: a producer of cement, ready-mixed concrete and aggregates as implementing good practices in accordance with SDGs. Yet another mining company, Polska Grupa Energetyczna, operating in the field of mining and energy declared, as one of the first, to use the new Impact Barometer tool which was created as part of the 17 Goals 2019 Campaign in cooperation with Statistics Poland, following extensive expert consultations. This tool is used to measure the impact of business on the implementation of the 2030 Agenda in Poland. Any company can use it for free. Bearing in mind that the 17 Goals Campaign was recently established, it should be assumed that in the future it will become a database containing more information in the field of mining and energy. The dissemination of knowledge about sustainable development in business through its popularization increases the awareness of the importance of this issue. In addition, by offering solutions for companies, it supports them in conducting activities towards SD.

To sum up the above, legislators are aware of paying attention to issues related to SD, but in the case of those regarding mineral deposits, and thus the mining industry, there is no envisaged finalization. The protracted design phase of the study may facilitate the clarification of regulations, including by way of expert or social consultations, but also the lack of a final, binding version does not encourage carrying out activities for the benefit of SD.

## 2. Materials and methods

The article is a case study presenting issues related to the implementation of sustainable development goals by the mining industry in Poland. In connection with the above, all the materials used and the collected data relate to the activities of companies and applicable regulations in Poland.

An introduction to the planned research, the content of unified texts of legal acts, reports adopted by the Council of Ministers and the draft of the State Raw Material Policy were analyzed. All of the above-mentioned studies contained references to sustainable development, which was also the criterion for their selection. This allowed for an in-depth analysis of the concept, also in the context of the industry in question, and an assessment of the status of work on regulations concerning resource policy.

Additionally, based on the previously published definitions and studies (MMtoSED 2016), a collective list of activities of the mining sector enterprises towards sustainable development goals was prepared (Table 1A).

The implementation of sustainable development practices by the mining industry was described on the basis of information published by mining companies reporting non-financial data (according to the Global Reporting Initiative (GRI) standards (<https://www.globalreporting.org/>)). Non-financial data reporting in Poland is regulated by law and is in accordance with the Accounting Act (AA 2016) implementing the EU Directive (EU Directive 2014). An analysis was conducted as to how often authors of reports refer to the concept of sustainable development and whether and to what extent they declare the implementation of SD goals.

Materials provided by the following three mining companies were selected for analysis: LW Bogdanka, KGHM and Górażdże HeidelbergCement. Basic information about the companies can be found in Table 1.

The choice was dictated by the variety of raw materials. Publicly available material published on companies' websites was verified by comparing the latest information with the oldest ones. In the case of LW Bogdanka, the most recent reported data concern 2018 (Integrated Report 2018 CG LW Bogdanka), and the oldest (first published report) – years 2012–2013 (Responsible Business Report 2012–2013 CG LW Bogdanka), KGHM – the most recent data concern year 2018 (Sustainable Report KGHM 2018), whilst the oldest – years 2010–2011 (CSR KGHM 2010–2011); Górażdże has so far published two reports for 2016–2017 (SD Report Górażdże 2016–2017) and 2014–2015 (SD Report Górażdże 2014–2015). In each of the mentioned reports (Polish version, pdf format), the word “sustainable” was searched for (Polish language search required considering declination). For this purpose, search options available in the Adobe Acrobat Reader software were used to obtain information on the number of occurrences of a given word or its fragment.

Table 1. Characteristics of the analyzed mining companies (data for 2018 for LW Bogdanka and KGHM, for 2017 for Górażdże)

Tabela 1. Charakterystyka analizowanych firm górniczych (dane za 2018 rok dla LW Bogdanka i KGHM za 2017 dla Górażdże)

Company name (full name)	Lubelski Węgiel Bogdanka SA	KGHM Polska Miedź SA	Górażdże HeidelbergCement Group**
Exploited mineral	hard coal	copper ore	natural aggregate (sands and gravels), limestone
Location	Lubelskie Zagłębie Węglowe (Lublin Coal Basin) (Southeast Poland)	Legnicko-Głogowski Okręg Miedziowy (Legnicko-Głogowski Copper District) (Southwest Poland)	mainly Western and Southwest Poland
Production	9.007 million tons of commercial coal	Copper mining in the excavation 452 thousand tons Production of electrolytic copper and oxygen-free copper wires Moreover, the production of silver, gold, molybdenum, rhenium and others.	Sand and gravel extraction approx. 7.5 million tons Limestone and marl approximately 4.5 million tons
Net profit	PLN 48.6 million (50.8 million*)	PLN 1,658 million*	no data
Number of employees	4,750 (5,398*)	18,331 (34,386*)	1,247

\* For the Capital Group together with its subsidiaries and jointly controlled entities.

\*\* It belongs to the HEIDELBERGCEMENT international corporation present in several dozen countries.

Source: *Integrated Report 2018 CG LW Bogdanka*; <https://www.lw.com.pl>; *Sustainable Report KGHM 2018*; *KNF19*; *SD Report Górażdże 2016–2017*; *PIG-PIB 2019*.

### 3. Results

The analysis was started by checking how often the authors of the reports refer to the concept of sustainable development.

The search results for three selected mining companies have been presented in Table 2.

In company reports, the word sustainable was most often used in combination with sustainable development, but also:

- ◆ sustainable production, sustainable economic growth, sustainable implementation of economic, social and environmental objectives, sustainable investments – LW Bogdanka,

Table 2. Frequency of occurrence of the word “sustainable” (in Polish version “zrównoważony”) in the reports of selected mining companies

Tabela 2. Częstość wystąpienia słowa „sustainable” (w wersji polskiej „zrównoważony”) w raportach wybranych przedsiębiorstw górniczych

Company name (full name)	Lubelski Węgiel Bogdanka SA	KGHM Polska Miedź SA	Górażdże HeidelbergCement Group
Latest report*	26	47	32
Oldest report*	8	27	28

\* As per the status on 16.04.2020.

- ◆ sustainable value chain, sustainable management, sustainable approach to business, sustainable use of resources, sustainable report – KGHM,
- ◆ sustainable way, sustainable activities, sustainable practices, sustainable building materials – Górażdże.

In view of the above, one may note a greater awareness and need to take sustainable development issues into account in company studies or communications. This is (number of SD phrases found) not synonymous with achieving sustainable development objectives. The expression “sustainable development” makes sense when it translates into real action and effects consistent with the three pillars of sustainable development: environment, society and economy. Declarations of the companies in question as regards the scope of implementation of SDGs were therefore traced. Only the identification of the activity of companies often presented as good practices will confirm the level of sustainability of companies.

It can be stated that in the most recent reports (this is particularly evident when compared with those of previous years) sustainable development issues are strongly emphasized. References to specific objectives are clearly formulated and easy to find.

And so, in the LW Bogdanka report ([Integrated Report 2018 CG LW Bogdanka](#)) a separate subchapter is devoted to the implementation of the seventeen sustainable development goals. The company declares actions in accordance with:

- ◆ goal 1 – through high salaries (higher than the average salary for the Lubelskie Voivodeship, where the company is located), bonus system, additional benefits,
- ◆ goal 3 – through health support programs, presence of medical services on the premises, training in pre-medical first aid, financial assistance for the county hospital, organization of blood collection or registration of bone marrow donors, health prevention programs for employees and the local community,
- ◆ goal 4 – by supporting education in local schools, cooperation with universities, offering scholarship and internship programs, promoting lifelong learning through cooperation with the University of Continuing Education,
- ◆ goal 8 – by supporting economic and social development through offering decent working conditions, cooperating with a large group of suppliers of goods and services or investing in technologies,

- ◆ goal 12 – by the more efficient use of energy, water and other raw materials (manifested by the Water Treatment Station which enables the reuse of mine and rain water), the implementation of circular economy principles, monitoring of the environmental impact of the company's activities, digital document circulation.

KGHM declares (Sustainable Report KGHM 2018, <https://kg hm.com/>) the implementation of many of SD goals through:

- ◆ reduction of poverty, elimination of hunger and the development of areas in the company's environment by offering many jobs and cooperation with other companies – these activities should be attributed to goals 1 and 2,
- ◆ care for health and quality of life (goal 3) of employees and their families and all inhabitants of the region by offering pro-health programs, subsidies to medical institutions, or running the Copper Health Centre, a company 100%-owned by KGHM Polska Miedź SA,
- ◆ good quality of education (goal 4) which influences the wealth of the region's inhabitants (the argumentation makes it possible to consider the company's indirect influence), further actions include cooperation with schools from several districts undertaken in 2018 as part of a project assuming the creation of industry-profile classes, where future employees of the plant will be educated,
- ◆ reducing inequality (goal 5) – the justification of which is (again) access to health care, decent work and education,
- ◆ sustainable cities and communities (goal 11) – according to KGHM, its presence in the Legnica-Głogów Copper District, which is the driving force behind the region's development, is decisive and allows for development,
- ◆ responsible consumption and innovative production (goal 12) – striving to make the technological chain optimal, safe, innovative and sustainable, and seeking to minimize waste
- ◆ cooperation with institutions to which the idea of sustainable development is equally close, thus achieving goal 17.

The Sustainable Development Council was established at KGHM at the beginning of 2018 (<https://kg hm.com/>). The main purpose of the Council is to ensure transparent communication and to create an open forum for sharing knowledge and promoting SD-compatible activities. The Council draws attention to the objectives which strengthen the sector: clean and accessible energy, economic growth and decent work, innovation, industry, infrastructure; furthermore, it strives to support the efforts to achieve them. It also notes that measures related to climate, land life, clean water and sanitation can undermine the company's image through the specifics of the industry and the strong environmental impact. In the years 2016–2018, the KGHM Group identified and reported the following key sustainable development indicators in three areas: society (4 indicators: 1) maintaining the position in the RESPECT Index, 2) 0% of investment activity without the social dialogue policy, 3) concluding and maintaining long-term contracts and achieving an appropriate sales structure ensuring long-term relations with customers, 4) sponsorship and charity activities in the area of building socially responsible business), resource efficiency (4 indicators: 1) maintaining the date

of resource adequacy at the level of year 2055 or beyond, 2) extraction of output calculated per employee of the mine [t], 3) production of electrolytic Cu calculated per employee of the Company/smelter [t], 4) maintaining Cu outputs [%]) and safety (1 indicator: LTIRFKGHM (Lost Time Injury Frequency Rate KGHM)).

Góraźdże also attributes actions to specific SD objectives, recognizing that (SD Report Góraźdże 2016–2017):

- ◆ goals 9, 8 and 11 are achieved by paying taxes, offering jobs, and completing supply mainly by domestic suppliers,
- ◆ goals 4 and 3 are achieved by decreasing the accident frequency ((LTI FR – Lost Time Injury Frequency Rate) and decreasing the severity of accidents (LTISR – Lost Time Injury Severity Rate),
- ◆ goals 6, 7, 9, 12, 13, 15 are accomplished by the lack of environmental penalties, spending more and more money on environmental protection,
- ◆ goals 12, 8 and 11 are achieved by increasing the amount of alternative fuels used compared to previous years, increasing the number of mineral additives used, decreasing the amount of coal used,
- ◆ goals 17 and 4 are achieved by transferring funds for local purposes, involving employees in volunteering, supporting development projects and programs,
- ◆ goals 5, 16 and 17 are implemented by familiarizing employees with the anti-corruption procedure, compliance of activities with laws and socio-economic regulations, no cases of corruption.

The company informs about the action plans that are to be implemented in the future in order to achieve the objectives of sustainable development.

Thus, it should be recognized that each of the discussed companies operating in Poland 1) is aware of the SD issues, and this awareness has improved over the years 2) realizes the need to report good practices, emphasizing their compliance with sustainable development objectives. The scope of the implementation of sustainable development goals in accordance with the reports of the analyzed companies is presented in Table 3.

The company declaring the implementation of the largest number of sustainable development goals is Góraźdże HeidelbergCement Group (13 SDG out of 17) representing open-cast mining, the next is KGHM Polska Miedź SA with the number of 8 goals and the last one is Lubelski Węgiel Bogdanka implementing 5 goals. Both KGHM Polska Miedź SA and Lubelski Węgiel Bogdanka exploit minerals using the underground method, which is reflected in a smaller number of goals being implemented. All of the companies in question declare the implementation of goals 4 Quality Education and 12 Responsible Consumption and Production. This means that as a result of their actions (SDG 4) they support education, which can be understood as taking care of the preparation of current and future staff, but also influencing the level of education in the region. Meanwhile, SDG 12 is implemented through the optimization of the technological line (KGHM Polska Miedź), reduction of harmful emissions (Góraźdże HeidelbergCement Group) or the more efficient consumption of energy, water and other raw materials (Lubelski Węgiel Bogdanka). As part of this goal,

Table 3. Implementation of sustainable development goals by selected mining companies based on data from sustainable development reports

Tabela 3. Realizacja celów zrównoważonego rozwoju przez wybrane firmy górnicze na podstawie danych z raportów zrównoważonego rozwoju

Number of SDG	Lubelski Węgiel Bogdanka SA	KGHM Polska Miedź SA	Góraźdze HeidelbergCement Group
1	x	x	
2		x	
3	x	x	x
4	x	x	x
5		x	x
6			x
7			x
8	x		x
9			x
10			
11		x	x
12	x	x	x
13			x
14			
15			x
16			x
17		x	x

x – means that the given goal is being implemented.

the introduction of the circular economy principles is also declared. However, taking into account that the mining sector in Poland produces the most waste (Woźniak and Pactwa 2018), it should be recognized that in this respect increased expenditure on the implementation of new solutions is required.

In mining companies reports, the implementation of SD goals is presented clearly. Descriptions of activities were found in each of them. An attempt to quantify SD should be considered as a positive change. This is the case of KGHM Polska Miedź, which has defined indicators in three areas of activity: society, resource efficiency and security.

## Conclusions

Mining companies face the need to operate in accordance with sustainable development. This is particularly related to climate issues or waste management. The companies reports

address issues concerning the impact of particular SD objectives on the mining industry. While clean and accessible energy, economic growth and decent work, innovation, industry and infrastructure strengthen the industry, actions on climate, land life, clean water and sanitation can undermine its image. However, this happens in the context of direct influences and in the short term – after all, it can be assumed that care for the environment is in the interest of all the groups. In the case of a contractor, it directly involves higher costs, but indirectly means implementing new technologies, engaging research units in cooperation and acting on behalf of residents, who are often employees of mining companies. Many of the activities of companies presently interpreted in the context of SD have already appeared many years ago. However, companies, being aware of existing laws and policies, take the next steps and implement good practices. They formulate indicators that promote objective evaluation. By sharing information about their activities, they do it in a wider and wider range, and the form of presentation gains readability.

None of the companies in the report complies with the implementation of all SDGs, and two goals (SDG 10 and SDG 14) are not implemented by any of them. The goals which are synonymous with pro-environmental activity (SDG 7 and SDG 13) are carried out by one company (exploiting rock raw materials). Considering that defining the concept of sustainable development in the context of mining drew attention to the environmental aspect, it is these issues that deserve the special attention of the mining industry. The analysis of reports show that each company implements the idea of sustainable mining to a different extent.

In addition, it should be noted that the motives of the actions will never be clear. Is the most important image promoted not only on websites, but also in social media current legal regulations (as analysed in the article requiring constant intensive work), political commitment, economic issues or perhaps social acceptance? Each of these factors probably has its share, but at this stage it is important to identify the activities carried out, together with their scope of implementation. Therefore, it is advisable to work on legal regulations regarding the state's raw material policy.

Entrepreneurs are aware of the issue. However, the mere use of the phrase “sustainable development” in the reports is not enough. Only activities consistent with the SD objectives will improve the image of the mining industry. Reliable verification of the implementation of activities in accordance with the UN provisions would be facilitated by sustainable development indicators. An example is the ones used by KGHM PM SA.

The diagnosis of the current state should be a contribution to further discussions in the scientific circles, but also the decision-makers influencing real actions. Let it promote, but above all understand the problem. It is also worth noting that sustainable development issues do not only concern active mines. Closing plants, as in the operational phase, should be characterized by an approach that takes economic, environmental and social factors into account. Unfortunately, this has not been noticed in company reports, despite emphasizing the need for action in the entire value chain and life of companies.

*Funding: Ministry of Science and Higher Education Subsidy 2020 for Department of Mining and Geodesy WUST.*

## Appendix

Table A1. Scope of anticipated activities of mining sector enterprises from the perspective of achieving sustainable development goals (SDG)

Tabela A1. Zakres przewidywanych działań przedsiębiorstw sektora górniczego z perspektywy realizacji celów zrównoważonego rozwoju

SDG1 – NO POVERTY	SDG2 – ZERO HUNGER
<ol style="list-style-type: none"> <li>1. Payment of taxes and maintenance fees and disclosing the amounts paid to public.</li> <li>2. Offering jobs               <ul style="list-style-type: none"> <li>◆ equal chances in employment,</li> <li>◆ trainings and internships.</li> </ul> </li> <li>3. Use of services and supplies implemented by local, regional and domestic entrepreneurs               <ul style="list-style-type: none"> <li>◆ development of local supplier's skills in a way that will allow him to serve other sectors,</li> <li>◆ consolidation of local value chains,</li> </ul> </li> <li>4. Prospective planning for access to areas for mining activities               <ul style="list-style-type: none"> <li>◆ start planning land/area access at an early stage of planning,</li> <li>◆ considering social interests of the resettled groups.</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Favoring the synergy of mining and agriculture               <ul style="list-style-type: none"> <li>◆ water resource management in a transparent way (in connection with mine drainage and sewage disposal),</li> <li>◆ minimizing land use,</li> <li>◆ sharing infrastructure benefits with agricultural community,</li> <li>◆ supplying substrates for production of fertilizers.</li> </ul> </li> <li>2. Keeping farmland free of contamination               <ul style="list-style-type: none"> <li>◆ conducting basic and current geochemical research,</li> <li>◆ regular monitoring of water quality and soil fertility.</li> </ul> </li> <li>3. Supporting programs aimed at reducing malnutrition and hunger among children.</li> </ol>
SDG3 – GOOD HEALTH AND WELL-BEING	SDG4 – QUALITY EDUCATION
<ol style="list-style-type: none"> <li>1. Improvement of occupational health and safety conditions               <ul style="list-style-type: none"> <li>◆ promotion of behaviors that increase safety in the workplace,</li> <li>◆ establishing rigorous monitoring and reporting on health and safety in the workplace.</li> </ul> </li> <li>2. Offering and encouraging preventive care               <ul style="list-style-type: none"> <li>◆ prevention of non-communicable diseases (civilizational, i.e. heart, respiratory and cancer diseases) and occupational diseases by education and supporting the healthcare system,</li> <li>◆ providing meals for employees,</li> <li>◆ prevention of toxic emissions to the environment.</li> </ul> </li> <li>3. Increasing mental health awareness               <ul style="list-style-type: none"> <li>◆ holistic approach to health,</li> <li>◆ establishing confidential advisory programs.</li> </ul> </li> <li>4. Promotion of physical activity.</li> </ol>	<ol style="list-style-type: none"> <li>1. Co-creation and support of educational programs dedicated to different levels of education.               <ul style="list-style-type: none"> <li>◆ partnerships with high schools to develop the curriculum,</li> <li>◆ participation in classes and training workshops,</li> <li>◆ sponsorship of internships and financing of scholarships for graduates.</li> </ul> </li> <li>2. Employee training and education               <ul style="list-style-type: none"> <li>◆ in technical skills and management,</li> <li>◆ providing training opportunities for employees at all levels and in all environments.</li> </ul> </li> </ol>
SDG5 – GENDER EQUALITY	SDG6 – CLEAN WATER AND SANITATION
<ol style="list-style-type: none"> <li>1. Offering of equal chances for women               <ul style="list-style-type: none"> <li>◆ recruiting larger numbers of women,</li> <li>◆ equal salaries for women and men,</li> <li>◆ promoting more women to leadership positions,</li> <li>◆ adoption (if possible) of flexible work schedules for mothers.</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Saving water and its recycling               <ul style="list-style-type: none"> <li>◆ processing and / or recovery of metals from wastewater,</li> <li>◆ limiting water usage,</li> <li>◆ use of alternative water sources (e.g. grey water/ grey sewage).</li> </ul> </li> </ol>

SDG5 – GENDER EQUALITY	SDG6 – CLEAN WATER AND SANITATION
<p>2. Considering participation of both women and men throughout the life cycle of the company and the project</p> <ul style="list-style-type: none"> <li>◆ ensuring gender-based career development planning,</li> <li>◆ considering the perspective of women, men and children in making decisions about the community,</li> <li>◆ including both men and women in negotiations.</li> </ul>	<p>2. Monitoring of water quality</p> <ul style="list-style-type: none"> <li>◆ monitoring water reservoirs primarily near the mine,</li> <li>◆ community involvement in monitoring and sharing water data.</li> </ul> <p>3. Water resources management including social, cultural and technical aspects</p> <ul style="list-style-type: none"> <li>◆ identifying high-value water areas,</li> <li>◆ planning and monitoring of water balance during project implementation,</li> <li>◆ reporting water usage degree.</li> </ul> <p>4. Support for drinking and sanitary water infrastructure in the area along with participation in costs.</p>
SDG7 – AFFORDABLE AND CLEAN ENERGY	SDG8 – DECENT WORK AND ECONOMIC GROWTH
<p>1. Improving energy efficiency</p> <ul style="list-style-type: none"> <li>◆ conducting energy audits,</li> <li>◆ taking care of energy infrastructure,</li> <li>◆ reduction of energy demand on site.</li> </ul> <p>2. Commitment to renewable energy issues</p> <ul style="list-style-type: none"> <li>◆ participation in renewable energy production through own initiatives and support of local projects,</li> <li>◆ diversifying power sources to reduce downtime.</li> </ul>	<p>1. Understanding the limits and possibilities of the economic impact of mining on the economy</p> <ul style="list-style-type: none"> <li>◆ ensuring decent work,</li> <li>◆ generating direct (goods and services purchased by the mining company), intermediate (goods and services purchased by suppliers of mines) and induced (goods and services purchased by employees for household needs) the economic impacts carrying contribution to the local and national economy.</li> </ul> <p>2. Driving economic growth through local procurement and supplier development strategies</p> <ul style="list-style-type: none"> <li>◆ diversification of local economies,</li> <li>◆ making auctions available to local contractors,</li> <li>◆ training local suppliers on how to meet companies' supply requirements.</li> </ul> <p>3. Fostering local development</p> <ul style="list-style-type: none"> <li>◆ cooperation with local chambers of commerce, financial institutions and non-governmental organizations,</li> <li>◆ establishment of business incubators.</li> </ul>
SDG9 – INDUSTRY, INNOVATION AND INFRASTRUCTURE	SDG10 – REDUCED INEQUALITIES
<p>1. Cooperation with local suppliers</p> <ul style="list-style-type: none"> <li>◆ expanding the expertise of local suppliers,</li> <li>◆ improving the quality of locally produced goods,</li> <li>◆ providing support to local suppliers in relation to mine service.</li> </ul> <p>2. Caring for infrastructure</p> <ul style="list-style-type: none"> <li>◆ contribution to the construction of infrastructure by providing the necessary raw materials,</li> <li>◆ infrastructure investments resulting from the needs of enterprises and the removal of damages resulting,</li> </ul>	<p>1. Anticipating risks of inequality</p> <ul style="list-style-type: none"> <li>◆ sensitization to local wage disparities,</li> <li>◆ preventing conflicts with local communities related to inequality.</li> </ul> <p>2. Activities to support local community</p> <ul style="list-style-type: none"> <li>◆ recruitment among social groups suffering from inequality (see SDG1 SDG5),</li> <li>◆ support for local suppliers and business incubators to increase the chances of developing vulnerable, excluded groups (see SDG1 SDG8),</li> </ul>

SDG9 – INDUSTRY, INNOVATION AND INFRASTRUCTURE	SDG10 – REDUCED INEQUALITIES
<ul style="list-style-type: none"> <li>◆ from mining activities throughout the life cycle of the enterprise,</li> <li>◆ providing access to railway, road, energy, water and ICT infrastructure.</li> <li>◆ cooperation with R&amp;D units for innovation and inter-sectoral cooperation (industrial clusters).</li> </ul>	<ul style="list-style-type: none"> <li>◆ investment in knowledge and skills development; training and recruitment of marginalized groups (SDG4),</li> <li>◆ working with the authorities to promote the reinvestment of mining revenues back into the region of operation.</li> </ul>
SDG11 – SUSTAINABLE CITIES AND COMMUNITIES	SDG12 – RESPONSIBLE CONSUMPTION AND PRODUCTION
<ol style="list-style-type: none"> <li>1. Planning of land use throughout the life cycle of the mine           <ul style="list-style-type: none"> <li>◆ drawing up a plan for the use of land after exploitation,</li> <li>◆ minimizing the impact of the mine on the occupied areas,</li> <li>◆ taking care of post-mining facilities as cultural heritage,</li> <li>◆ cooperation with local authorities to develop post-mining areas for rest and recreation.</li> </ul> </li> <li>2. Mine of unconventional resources           <ul style="list-style-type: none"> <li>◆ waste recycling,</li> <li>◆ municipal waste as source of raw materials (municipal mining).</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Rational use of raw materials and sustainable production management.</li> <li>2. Minimizing resource consumption           <ul style="list-style-type: none"> <li>◆ reducing the use of water, energy, land and chemicals,</li> <li>◆ reduction of waste, sewage, emissions,</li> <li>◆ waste reuse – circular economy.</li> </ul> </li> <li>3. Environmentally friendly waste management throughout its life cycle.</li> </ol>
SDG13 – CLIMATE ACTION	SDG14 – LIFE BELOW WATER
<ol style="list-style-type: none"> <li>1. Reducing emissions           <ul style="list-style-type: none"> <li>◆ improving energy efficiency,</li> <li>◆ the use of renewable energy,</li> <li>◆ the use of low emission fuels,</li> <li>◆ measurement and reporting of direct, indirect and product-related emissions.</li> </ul> </li> <li>2. Taking climate change and emissions regulations into account when planning and undertaking investments.</li> <li>3. Participation in climate related research, development and pilot projects (emissions trading, CCS projects).</li> <li>4. Engaging in dialogue on climate issues within and between sectors.</li> </ol>	<ol style="list-style-type: none"> <li>1. Taking underwater life/sea ecosystems into account in assessing the impact of mining activities           <ul style="list-style-type: none"> <li>◆ proper waste disposal,</li> <li>◆ assessing social and environmental impact on the maintenance of fishing and shipping,</li> <li>◆ mapping of breeding grounds and migration routes of underwater species.</li> </ul> </li> <li>2. Careful approach to seabed mining           <ul style="list-style-type: none"> <li>◆ protecting the marine life,</li> <li>◆ minimizing habitat disturbance,</li> <li>◆ conducting a sensitivity analysis in terms of short- and long-term effects.</li> </ul> </li> <li>3. Cooperation with local authorities to establish protection areas and marine reserves.</li> <li>4. Develop coastal management plans.</li> </ol>
SDG15 – LIFE ON LAND	SDG16 – PEACE, JUSTICE AND STRONG INSTITUTIONS
<ol style="list-style-type: none"> <li>1. Caring for biodiversity.</li> <li>2. Assessment of the impact of the activity on the ecosystem with an attempt to mitigate its effects (comprehensive environmental impact assessment).</li> <li>3. Restoring historical habitats and engaging in reforestation and poaching prevention activities.</li> <li>4. Cooperation with research units.</li> </ol>	<ol style="list-style-type: none"> <li>1. Prevention and early response to conflicts           <ul style="list-style-type: none"> <li>◆ establishing a formal and accessible complaints mechanism,</li> <li>◆ introduction of a system for assessing conflicts arising from both environmental and social impacts.</li> </ul> </li> <li>2. Ensuring a peaceful working environment and good social relations.</li> <li>3. Preventing corruption.</li> </ol>

## SDG17 – PARTNERSHIPS FOR THE GOALS

1. Organization of financial data and technology
  - ◆ by making data on payments to governments transparent,
  - ◆ data collection and statistical analysis capacity,
  - ◆ technology transfer,
  - ◆ engaging in public-private partnerships.
2. Making geo-data available
  - ◆ improving knowledge of mineral wealth,
  - ◆ improving trust between government and society.
3. Dialogue between government, citizens, society and development partners.
4. Use of SDG indicators.

Own study based on: [Agenda 2030 2015](#); [Pactwa 2019](#); [MMtoSED 2016](#).

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**ACHIEVING UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS  
BY THE MINING SECTOR – A POLISH EXAMPLE****Key words**

sustainable development, sustainable mining, non-financial reporting; mining industry, Poland

**Abstract**

The article attempts to define issues related to sustainable development (SD) in the context of the mining industry. The purpose of this publication is to analyze the implementation of sustainable development goals by mining companies in Poland, including Lubelski Węgiel Bogdanka SA, KGHM Polska Miedź SA and the Góraźdże HeidelbergCement Group. The work is based on a review of previous research, formulating the activities of the mining industry in accordance with each of the seventeen goals presented in the Agenda 2030. Non-financial reports were used to analyze the scope of implementation of SD goals in Poland, an expert assessment was used, which allowed the strengths and weaknesses of the industry in this particular area of interest to be formulated. A change in awareness towards SD in environmental, social and economic domains has undeniably taken place. Reports published by the companies inform about activities consistent with the particular SD objectives. The scope of their implementation varies across the analyzed entities. Increasing the exposure of the discussed topic improves the image of companies, but also allows to notice their efforts whilst indicating real actions that are deemed as good practices. Mining entrepreneurs struggle with limitations and difficulties in implementing changes. The main challenge is the environmental aspect. Undoubtedly, the means of persuasion (also in this regard) are legal regulations that require finalization, especially when it comes to the mining industry and the state's raw materials policy.

**REALIZACJA CELÓW ZRÓWNOWAŻONEGO ROZWOJU ORGANIZACJI NARODÓW  
ZJEDNOCZONYCH PRZEZ SEKTOR GÓRNICZY – PRZYKŁAD POLSKI****Słowa kluczowe**

zrównoważony rozwój, zrównoważone górnictwo, raportowanie niefinansowe,  
przemysł górniczy, Polska

**Streszczenie**

W artykule podjęto próbę zdefiniowania zagadnień związanych ze zrównoważonym rozwojem (ang. *sustainable development*, SD) w kontekście górnictwa. Celem niniejszej publikacji jest analiza realizacji celów zrównoważonego rozwoju przez wybrane spółki górnicze prowadzące swoją działalność w Polsce, w tym Lubelski Węgiel Bogdanka SA, KGHM Polska Miedź SA oraz Góraźdże HeidelbergCement Group. Praca opiera się na przeglądzie dotychczasowych badań, formułując działania górnictwa zgodne z każdym z siedemnastu celów przedstawionych w Agendzie 2030. Do analizy zakresu realizacji celów SD w Polsce wykorzystano raporty niefinansowe, co pozwoliło na

zaprezentowanie mocnych i słabych stron przemysłu w tym konkretnym obszarze zainteresowań. Niezaprzeczalnie nastąpiła zmiana świadomości w zakresie zrównoważonego rozwoju w obszarach środowiskowych, społecznych i ekonomicznych. Raporty upubliczniane przez spółki informują o działaniach zgodnych z poszczególnymi celami SD. Zakres ich realizacji jest zróżnicowany w analizowanych podmiotach. Zwiększenie eksponowania omawianego tematu poprawia wizerunek firm, ale też pozwala zauważyć ich starania, wskazując realne działania będące dobrymi praktykami. Przedsiębiorcy górniczy borykają się z ograniczeniami i trudnościami we wdrażaniu zmian. Wyzwaniem jest głównie aspekt środowiskowy. Niewątpliwie środkiem perswazji (również w tym zakresie) są regulacje prawne, które wymagają finalizacji, zwłaszcza jeśli chodzi o górnictwo i politykę surowcową państwa.