


## Article

# Is There a Place for Women in the Polish Mines?—Selected Issues in the Context of Sustainable Development

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Received: 13 March 2019; Accepted: 15 April 2019; Published: 30 April 2019



**Abstract:** This article demonstrates the situation of women in the Polish mining industry through the prism of the implementation of sustainable development goals. The conducted analysis allowed us to verify the thesis that the actions that have been taken with the aim of gender equality are not enough, and mining is therefore not sustainable. Despite the fact that regulations have changed over the years, and women are now allowed to undertake jobs in mining plants, the sector is still highly masculinized. This phenomenon was found to be particularly disadvantageous after conducting an analysis of data referring to the number of female students graduating each year in mining and geology majors. It can be concluded, based on information concerning the share of women employed in the mining industry in general, as well as information on several other factors, that the majority of women who have pursued higher education in the field of mining will not find a job in this profession. This phenomenon clearly indicates the necessity of changes in the scope of education, and the need for companies to broaden internship and apprenticeship offers.

**Keywords:** sustainable development; mining; Poland; gender equality

## 1. Introduction

Mining is a branch of industry characterized by many centuries of tradition. The significance of the industry supplying raw materials, which allowed for modern infrastructure development and which are used in modern technologies, electronics, telecommunications, and healthcare, as well as their ability to enable energy independence, is indisputable. However, this industry, as well as its activities (mining, but also the processing and production of energy), were and will continue to be the source of conflict resulting from its interference in the natural environment and its impact on people's health and life, as well as their living conditions. This has resulted in the civic initiatives, social initiatives and employee grassroots movements that monitor and react to undesirable activities of mining enterprises. For the sake of their own image and meeting legal requirements, mining companies must disclose certain information [1,2]. This occurs in the form of integrated reports, which are published once a year. The enterprises are aware of the consequences of their activities. The reports, prepared in accordance with the idea of Corporate Social Responsibility (CSR), deal with issues regarding the implementation of the UN's Sustainable Development Goals (SDGs) by the mining industry. The purpose of the reports is to explain how a given entity contributes to the improvement (or deterioration) of economic, environmental and social conditions, processes, and development prospects at the local, regional, or global level [3]. They present the company's activity strategy, undertaken and planned initiatives aimed at improving relations between the given entity and the groups of stakeholders, which include among others: Employees, suppliers, non-governmental organizations, and local communities. Among

others, the following authors have emphasized the role of sustainable development and corporate social responsibility in scientific publications [4–9].

As part of a study on information published by the biggest mining companies operating in Poland (central and eastern Europe)—Lubelski Węgiel Bogdanka (LW Bogdanka), Kombinat Górniczo-Hutniczy Miedzi Polska Miedź SA (KGHM PM SA), Capital Group Polska Grupa Energetyczna SA (CG PGE), attention was paid to the aspect of gender. After reviewing the data prepared in accordance with the GRI (Global Reporting Initiative), guidelines within the integrated reports concerning selected companies, an analysis was made on the extent to which the mining sector is implementing the fifth goal of sustainable development, i.e., gender equality. This topic seems to be especially important from the perspective of time and changes that have occurred in non-financial reporting related to gender equality [10]. The issues discussed in the article mainly concerned the share of women employed in the mining sector, as well as the amount of pay the women receive. The opportunities created by the labor market in the mining industry will be confronted with the number of female graduates who obtain engineering diplomas and Master's diplomas in mining and geology every year. The chances of employment for current and future female mining apprentices were compared to the current number of women employed by selected mining enterprises. This study was aimed at assessing the current state of affairs, but also the way relevant phenomena may change over time.

The status of women in the context of mining has been presented in the literature in a variety of ways. Some of the various roles are as follows:

- Employees: Agricola has described women as performing tasks associated with the processing of minerals as early as the 16th century [11];
- Debutants: The first women who gained mining skills [12];
- Bosses: The status of women in the mining industry and changes in the mining sector in managerial positions [13];
- Social activists: Supporting movements that oppose exploitation [14];
- Victims: Within the context of health consequences and the impact on the psychophysical condition of women associated with the mining sector, resulting from their work in mining communities [15], but also their exploitation as employees, particularly in the case of small-scale artisanal mining [16].

According to the source literature, the unbeneficial position of women in mining constitutes a cross-border issue. In many countries, women have been excluded from the mining industry because of superstitions, beliefs, traditions, and legal conditions [17]. Working in a mine is largely perceived as a male profession, and women who work in the exploitation of minerals often arouse interest and are treated in a patronising manner [18]. In Australia, for example, there are also issues concerning the very small number of women working in the mining sector. On the basis of statistics, it can be concluded Australia is where the mining industry is the most dominated by men, with women accounting for only 16.1% of all employees. In the entire sector, they constitute 4.5% of technicians, 11.1% of machine operators and drivers, and 13% of manual workers. The share of women in higher positions amounts to 14.8% of managerial staff and 16.3% of all managers. The programs offered by mining plants, which are meant to support people entering the industry, provide a chance to change this state of affairs for Australian women [19]. The decision-makers and the managers of the mines should play a significant role in ensuring the well-being of employees and fair participation of both sexes in the mining industry [20].

The fact that the lack of women in the mining industry is an ongoing problem has been indicated by the authors of a 2019 report on the subject [21]. Women, despite their education, have difficulties getting well-paid jobs and promotions at work. According to UNESCO data, the percentage of female graduates worldwide was on average 54% in 2010. This means that mining companies are not taking advantage of the potential of educated women [22].

What is alarming in the literature devoted to industrial employment issues (generally without indication of a specific industry) in central and Eastern Europe is the fact that neither men nor women

are widely concerned about the situation of gender inequality. Furthermore, non-governmental organizations tend to deal with the consequences, and not the causes of the issue [23]. It is important to include gender issues when policy-makers develop policies to address inequality and social exclusion [24].

The subject area is interesting in relation to Poland, a country located in central and eastern Europe, a country from the former “Eastern Bloc”, a member of the European Union since 2004 and which, since September 2018, belongs to the group of countries with highly developed markets. Up until now, however, no analyses have been carried out in relation to industrial employment and gender equality in either the national or international literature.

Currently, the fifth goal of sustainable development is the implementation of gender equality. In the case of the mining sector, in accordance with the UN’s 2030 Agenda for Sustainable Development [25], the following should be implemented [26]:

- (a) Offering equal opportunities for women, which means:
  - recruiting more women,
  - equal pay for women and men,
  - promoting more women to leadership positions,
  - the adoption (as far as possible) of flexible work schedules for mothers.
- (b) Taking into account both women and men in the entire life cycle of the enterprise and/or the project, which means:
  - ensuring gender-specific planning for career development,
  - taking into account the perspectives of women, men and children in the scope of making decisions concerning the community,
  - including men and women in relevant negotiations.

Moreover, the implementation of sustainable development goals can also be achieved by offering jobs, i.e., equal employment opportunities, training and internship programs (which would be assisted by achieving the first SDG, no poverty) and ensuring decent work (which coincides with the eighth SDG, decent work and economic growth). The achievement of these goals for employed persons should take place regardless of gender. However, it is necessary to pay special attention to already existing inequalities.

The analysis of issues related to employment of women in the mining industry, discussed in this article, is been presented in the context of sustainable development. Selected aspects of implementing the SDGs were chosen and the need for changes in the mining industry were indicated in this respect.

## 2. Materials

The analyses carried out in the article primarily used publicly available data from:

- Eurostat: the database of the Statistical Office of the European Union, the objective of which is to provide high quality, harmonized statistics for Europe. Widely available data, which started to be distributed free of charge in 2004, can be used by decision-makers at national and regional levels, by the business and science and research community and also by the media or the public. The data used in this article related to the value of the Gender Pay Gap ratio, the last update of which took place on 20 September 2018 [27].
- The Central Statistical Office (Poland): Collecting and disseminating statistical data in an aggregated form. The data used in this work came from the annual study ‘Working in the national economy’, containing information on, for example, the number of employees in the national economy, employment status, selected categories of workers, foreigners, disabled persons, retirees, as well as elements of employment movement by recruitment sources and reasons for dismissals [28–30].

The analyzed data cover three consecutive years: 2014, 2015, and 2016.

Detailed data on selected mining enterprises was taken from the integrated reports prepared by the above sources annually. The reporting of non-financial data relating to CSR in Poland is regulated by law and complies with the Accounting Act of 15 December 2016 implementing EU Directive [31]. Since the beginning of 2017, the presentation of these data (referring to social, environmental and corporate governance issues) has become an obligation in the selected field that meet the criteria of the number of employees and the level of finances involved. These data include mining enterprises, and the information related to gender and employment are analyzed in this study. These data were reported within the framework of the aspects belonging to the social category. Non-financial statements were prepared according to G4 guidelines [32]. The reporting principles and indicators are defined by the Global Reporting Initiative (GRI), an international non-profit organization based on cooperation of the stakeholder network. Information available in the analyzed reports is published in two language versions: Polish and English [33–38].

Information on the number of students with regard to gender division originate from the “Perspektywy” Education Foundation report [39]. The foundation is a non-profit organization founded in 1998. A significant aspect of its activity is promoting the participation of women in Science, Technology, Engineering, Mathematics (STEM), as well as encouraging them to continue their education in the exact sciences. In addition, materials made available by the parent university of the author have been applied within the analysis. They concern the number of graduates in the field of mining and geology in the fifty-year history of the Faculty of Geoengineering, Mining and Geology of the Wrocław University of Science and Technology [40]. The list, when it was presented, maintained the anonymity of the graduates.

The presentation in the form of tables and graphs, based on data from the above-mentioned sources, constitutes the author’s own elaboration, similar to all analyses, discussions, and conclusions.

### 3. Results and Discussion

While reviewing the data concerning the employment of women, the thesis was formed that in this scope the mining sector is not sustainable. In order to analyze this issue in detail, first the data concerning the number of employed persons in the selected branches of national economy was used.

#### 3.1. Mining in Poland—The Structure of Employment by Gender

Table 1 presents the number of persons employed in the mining industry, including the share of women employed in this sector. The values for the mining and quarrying industry were compared with the following branches of the national economy: Production and supply of electricity, gas, steam and hot water, (this is a related branch due to production of electricity from fossil fuels), construction (section with a large share of the private sector 97.4% in 2016), education (share of the public sector 89.2%), healthcare, and social assistance. The data originates from the Central Statistical Office (CSO). The employed persons were understood as, among others, the persons employed based on the employment relationships, employers and self-employed persons. Data on the employed persons based on the employment relationship refer to the employment as of 31 December of the given year—full-time and part-time employees in the main place of work (the principle of one-time listing of persons was adopted). The included data did not differentiate jobs in terms of the number of employed persons. All economic entities are taken into account in the statistics.

**Table 1.** Number of employed persons in selected branches of the economy; own elaboration based on [28–30].

Employed Persons Divided into Branches of the National Economy		2014		2015		2016	
		-	%	-	%	-	%
in total	in total	14,563,387	100	14,829,792	100	15,293,341	100
	number of women	6,874,471	47	6,996,727	47	7,195,754	47
Mining and quarrying	in total	160,235	100	148,021	100	139,796	100
	number of women	17,230	11	15,829	11	14,700	11
Production and supply of electricity, gas, steam and hot water	in total	130,516	100	125,221	100	123,217	100
	number of women	26,747	20	25,623	20	25,426	21
Construction	in total	819,997	100	839,998	100	879,283	100
	number of women	94,565	12	98,789	12	102,334	12
Education	in total	1,124,156	100	1,137,763	100	1,152,896	100
	number of women	872,032	78	883,850	78	896,376	78
Healthcare and social assistance	in total	827,259	100	841,959	100	866,103	100
	number of women	663,592	80	673,770	80	691,015	80

After taking into account persons working in all sectors, it can be concluded that nearly half of them are women. In the sector of raw materials, this share amounts to 11% (it has not changed in three years). Among the afore-mentioned industries, the following are also overwhelmingly male: production and supply of electricity and construction. A different situation can be noticed in education and healthcare, which are dominated by women. The percentage of women working from 2014 to 2016 has not changed in any of the above-mentioned industries. The percentage of employed women can be explained by the specificity of individual industries. Mining and construction are identified with physical work, which is often carried out in difficult conditions. Physical strength and endurance are required to perform these professions. However, it should be emphasized that the limitations of the past are not applicable anymore. The first issue consists of legal regulations that prevent women from working in mines. In the list of jobs that are prohibited to women [41], those performed underground, below ground, and at heights are listed, including underground work in all mines, except for jobs:

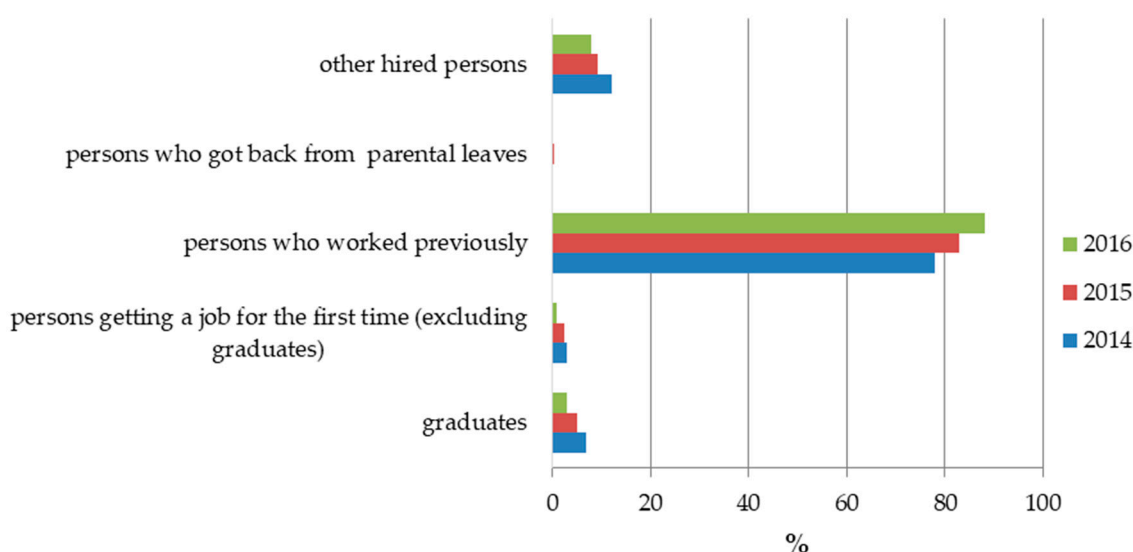
- (1) in managerial positions that do not require continuous presence underground and the performance of physical work,
- (2) in healthcare,
- (3) in the course of studies during vocational training,
- (4) performed casually and not requiring physical work.

The next amended list did not concern any prohibited jobs, as before. It focused instead upon jobs that are particularly arduous or harmful to women's health [42]. Work in the mine was still listed in the notice, which already has the status of repealed act (date of repeal: 1 May, 2017). In the currently applicable regulation [43], the underground jobs in all types of mines are considered to be arduous, dangerous or harmful jobs that are associated with the risk of severe physical or mental injuries to pregnant and breastfeeding women. Mitigation of regulations and above all the lack of gender disqualification for persons working as miners, are compliant with the principles of sustainable development. These changes are justified especially in the ongoing computerization and automation of many works, including those performed underground. It is necessary to remember that a job in the mining and quarrying industry also consists of surface work, often requiring specialized preparation and knowledge of IT tools (e.g., for the modelling of mining and geological issues). Limitations in terms of gender are not justified in this case. The reasons that a small number of women are still employed in the industry, as well as the possibilities of changes, will be discussed further on.

After comparing the number of employed persons (Table 1) with the summary that takes into account the number of employed persons in full-time equivalents, in the case of economic entities with more than nine employees [44] due to the small difference (approx. 3%) in the total number of

employed persons in the mining industry, it can be concluded that the majority of people are full-time employees. This is confirmed by the summary [29,30] referring to the number of full-time and part-time employees. Part-time employees account for approximately 1% of the industry in the last three years. It should be assumed that the mining industry is a basic place of work for people in the industry. Citing the analogous summaries: part-time employees in construction amount to approximately 6%, 14% in education, and approximately 8% in healthcare. Thus, it can be stated that economic growth and decent work are the implemented goals. Stable full-time employment should be considered an important component of ensuring decent work.

The subsequent discussed topic concerns the relationship of hired persons to the layoffs (staff liquidity) in the mining and quarrying industry. The linear correlation coefficient between the number of hired persons and laid-off persons within the aforementioned three-year period is high, and amounts to 0.99. Along with the increase in the number of laid-off persons, the number of hired people also increases. The biggest change in the number of hired new employees in the raw materials industry was noted in 2016, in relation to 2015. At that time, over three times more people were employed than in the previous years. This was associated with the increase in vacancies resulting from, among others, termination of the contract by the employer or by an employee, incapacity to work, retirement, termination of the contract by mutual agreement of the parties, use of parental leaves, completion of the term of the contract. The share of women in the groups of hired and laid off employees did not significantly differ during the analyzed period (1%–2%). Changes in the number of women hired in the discussed sector are small: 9% (2014), 10% (2015) and 11% (2016). Data concerning the number of hired persons, i.e., demand of the labor market, was confronted with the supply, i.e., the number of female graduates of mining and geology major, entering the labor market. The characteristics of hired full-time employees are shown in Figure 1.



**Figure 1.** Hired full-time employees in the years 2014–2016 in the mining and quarrying industry; own elaboration based on References [29,30].

Out of the groups listed in Figure 1, the most numerous group consists of the persons who have already worked before and have professional experience. The percentage of women in this group amounts to: 9%, 11%, and 11% in subsequent years (2014–2016). The group of people starting the professional careers (people who get a job for the first time, including graduates) amounts to (respectively): 10%, 7%, and 4% of all those hired within three years. The larger part: 7%, 5%, and 3% constitute graduates of universities, vocational schools, and high schools. Women in the group of all graduates constitute about a few dozen people, i.e., 5%, 6.5%, and 4.5%. Therefore, the market demand for university graduates is even smaller. Employment in the mining and quarrying section



in the years 2014–2016 was obtained by 491 persons in 2014 (including 37 women, which constitutes 7.5%), 386 persons in 2015 (including 13 women, which constitutes 3.4%), 151 people in 2016 (including 45 women, which constitutes 30%). This current situation was compared with the state from 2004. In 2004, the hired graduates of universities constituted nearly 7% of persons employed in the mining sector—791 persons, including 78 women, which nearly amounts to 10%. The share of working women in the analyzed sector in total amounted to 11% during that time, i.e., exactly the same as 10 years later. The absolute values of the number of hired persons decreased. In 2014, 16% fewer people were employed compared to 2004.

The low demand on the labor market for graduates of technical universities signifies that their skills and knowledge acquired during their studies remain unused. The small share of women in the group of employed engineers is not compatible with achieving the goal of gender equality.

### 3.2. Education of the Staff

The analysis of supply can be demonstrated based on the share of studying women and, above all, women graduating the majors that educate personnel for the mining industry.

In universities with technical profiles, the women studying constitute the following percentage: 32.5% at Wrocław University of Science and Technology (relative change in the share of women compared to the base year 2007/2008 +33.3%), 33.9% at Silesian University of Technology (relative change—13.5%), 34.85% at AGH University of Science and Technology (relative change +12.6%) [39]. The educational offer of the aforementioned institutions includes majors, whose graduates are prepared for the work in mining plants. Changes in the share of female students in the academic years 2014/2015, 2015/2016 and 2016/2017 at faculties conducting education in the scope of mining at the above-mentioned universities are shown in Table 2.

In every faculty, the number of students in subsequent years was smaller and smaller. This results from demographic changes [45]. The share of women in the total group of students at AGH was increasing, while at the Silesian University of Technology and the Wrocław University of Science and Technology it remained at a constant level.

Among others, this situation may result from the large-scale action called “Girls as Engineers”, which was implemented for the first time in the academic year 2007/2008. It was initiated by the Conference of Polish Rectors and the Educational Foundation “Perspektywy”. This initiative is under the patronage of the Ministry of Science and Higher Education, and the Ministry of National Education. The universities participating in this program include: Wrocław University of Science and Technology, Silesian University of Technology, AGH University of Science and Technology in Kraków and many others. In the course of this action, i.e., within 10 years, the number of students in Poland decreased due to the demographic decline, which was described earlier. The smallest decrease in the number of students among all university profiles was observed at technical universities. In 2017, the share of women studying at technical universities amounted to 37% (and it was an increase compared to the base year) [39]. The Polish initiative was inspired by the German Girls’ Day, which is addressed to young women from both academic centers and enterprises. In the framework of this action, the presentation of job offers is the most important, which results in an increase in the interest of women in internships and trainings, that in turn leads to the increase in employment opportunities [46].

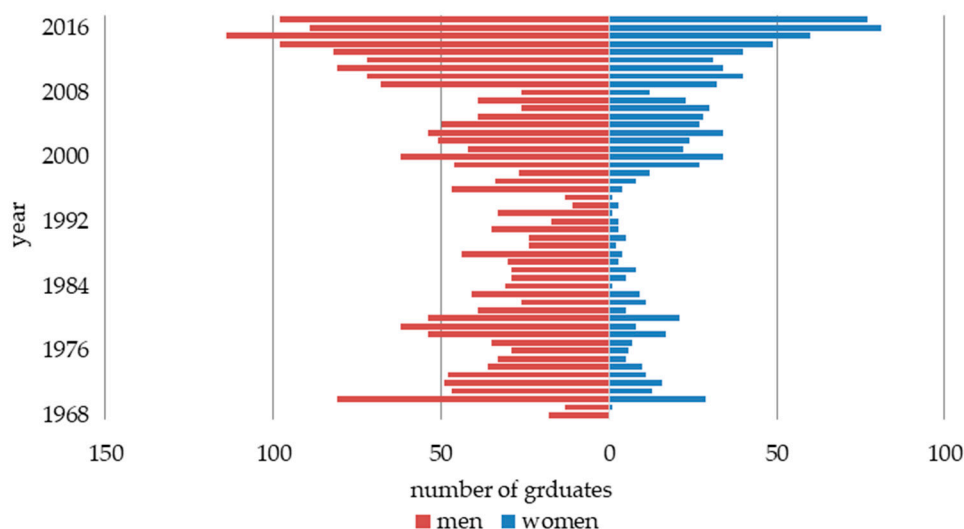
Changes in the number of students graduating from mining and geology major were analyzed in a much larger time period covering the years 1968–2017, on the example of the Wrocław University of Science and Technology. Such a time period allows us to conclude which factors have an impact on the number of graduates and the percentage share of women in this group. Only those graduates who obtained a diploma were included in the analyses. It was assumed that they often search the labor market for employment compliant with their education. The number of women and men graduating from the Faculty of Geoengineering, Mining, and Geology (former Faculty of Mining), in the scope of a full-time course, is shown in Figure 2.

**Table 2.** The share of women in relation to all students at the universities, which include the mining and geology major; own elaboration based on [39].

		2014/2015			2015/2016			2016/2017		
		Number of Students	Including Women	Share of Women %	Number of Students	Including Women	Share of Women %	Number of Students	Including Women	Share of Women %
AGH	Faculty of Mining and Geoengineering	3688	1160	31.5	3121	1052	33.7	2768	1009	36.5
	mining and geology major	X	X	X	X	X	X	929	146	15.7
SUT	Faculty of Mining and Geology	3035	648	21.3	2133	477	22.4	1549	327	21.1
	mining and geology major	X	X	X	X	X	X	1310	214	16.3
WUST	Faculty of Geoengineering, Mining and Geology	1432	492	34.4	1309	465	35.5	1168	400	34.2
	mining and geology major	X	X	X	X	X	X	885	239	27

AGH—Akademia Górniczo-Hutnicza University of Science and Technology, SUT—Silesian University of Technology, WUST—Wrocław University of Science and Technology.





**Figure 2.** Number of graduates of the mining and geology major at the Faculty of Geoengineering, Mining and Geology of the Wrocław University of Science and Technology—structure by gender; own elaboration based on Reference [40].

The smallest number of people (fewer than twenty graduates total) completed their studies in the following years: 1968 (zero women), 1969 (one woman), 1994 (three women), and 1995 (one woman). In the 1960s, the Faculty of Mining was graduated by the first graduates. Views on women in the mining sector from this period can be considered anachronistic. Over 50 years ago, Przedpelski wrote about the industry branches dominated by men [47]—mining and metallurgy constituted an example. He justified this state of affairs by citing the physiological differences of each gender, resulting in his opinion that women cannot be employed in hard jobs. The smaller share of women employed in some sectors was also dependent on the prevailing tradition, and the existence of the so-called women's professions. This may result in lower popularity of mining majors among women. Moreover, the beginning of functioning of the mining studies, first conducted as a specialty at the Faculty of Construction, and then as a separate faculty, certainly was also significant. Especially that the subsequent years were characterized by a significant increase in the total number of graduates. Also the number of women increased to 29 in 1970. The reason for the decrease in the number of students in the early 1990s can be argued in the following manner: in 1967 the number of births decreased, and subsequently increased very gradually [45]. Graduates of full-time studies from 1994 and 1995 are people born during that time. Secondly, the exploitation in the Lower Silesian Coal Basin ended. (The decision to liquidate the basin was made in 1990.) It should be assumed that this was not without significance to the interest in the discussed major at the university located in the same region, in which the exploitation was abandoned. A significant increase in graduates was noted in 2009. However, this cannot be considered a success of the "Girls as Engineers" or related "Girls go Science" action, but rather the effect of changes in the educational system, which was changed into three-level system. In the case of technical universities, the first level consists of engineering studies, and the second level: master's studies. (The third, doctoral studies, were not included in the statistics.) This results in the fact that from this year some graduates appear twice in the lists, if they decide to complete the second level of education. The inflated absolute values do not compromise analyses regarding the relative percentage share of women in the discussed group. The smallest share of women not exceeding 10% occurs in the following years: 1968, 1969, 1984, 1987, 1988, 1989, 1991, 1993, 1995, and 1996. Since 1998, the share of women among graduates has not dropped below 30%. The largest one (54%) was noted in 2006. Therefore, it was before the start of initiatives encouraging women to study at technical universities in the country.

Pointing out the aspects related to education is also an important issue in the context of achieving the goals of sustainable development (SDG4 good quality of education). In order to increase the chances of graduates on the labor market, cooperation between enterprises and universities is recommended, for example, in order to develop curricula or through participation of representatives of the mining industry (including women) in lessons and workshops. The implementation of activities in this area would increase the attractiveness of the field of mining and geology among students, and future employers, having a real impact on the education program, would probably be more likely to recruit graduates of technical universities in the future. It is also suggested to shape social attitudes regarding gender equality at all levels of education, so that attitudes consistent with the principles of sustainable development existing in the consciousness of future generations.

### 3.3. Remuneration

Persons employed in the mining industry can still count on a higher pay than the average pay in other branches of the economy. For example, in 2016 the general average monthly gross pay amounted to 4052.19 PLN (approximately \$1,066), while in the mining and quarrying industry it amounted to 6830.55 PLN (approximately \$1,797). This amount will change, if small mining plants employing up to nine persons will be included in the calculation. However, earnings in the mining sector will still be higher than the general average. Looking through the prism of sustainable development, it is necessary to note the amount of earnings in terms of the gender of the employee. For comparisons in this scope, the indicator of Gender Pay Gap (GPG) is used. This indicator is calculated in accordance with the following definition:  $GPG = ((\text{average hourly gross earnings of men} - \text{average hourly gross earnings of women}) / \text{average hourly gross earnings of men})$  expressed in %. The average earnings used in GPG are calculated as arithmetic averages. Data for selected industries in Poland is shown in Table 3.

**Table 3.** Indicator of the gender pay gap in Poland in the years 2014–2016; own elaboration based on Reference [27].

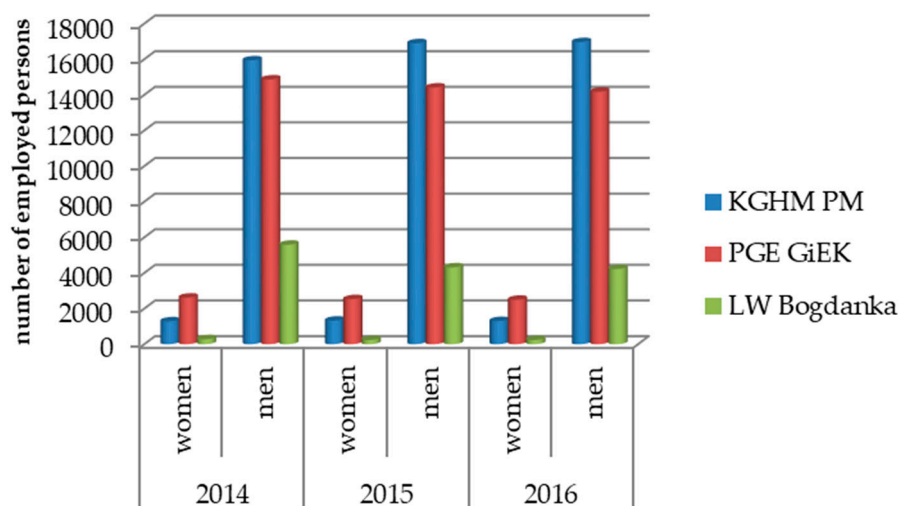
Branches of the National Economy	2014	2015	2016
	%		
mining and quarrying	21.5	18.8	16.1
production and supply of electricity, gas, steam and hot water	1.7	3.2	4.6
construction	−11.4	−13.1	−14.8
education	5.1	4.9	4.8
healthcare and social assistance	17.4	15.5	13.6

In the scope of mining, the value of GPG indicator decreases in the discussed time period, however it is higher than the indicator in total, which in 2016 amounted to 7.2% in Poland. According to the statistics, women earned on average 16.1% less than men for hour of work in 2016 in the mining and quarrying industry. Thus, speaking of equal pay for men and women is groundless. The SDG5 target is not implemented in this respect.

### 3.4. Structure of Employment in Mining on the Example of Selected Enterprises

Data published by entrepreneurs in integrated reports was used for the analyses. Data concerning the years 2014–2016 was compared. The structure of employment taking into account the division by gender is demonstrated in Figure 3 on the example of three selected companies:

- KGHM Polska Miedź S.A. (KGHM PM), which is engaged in the mining (underground exploitation) and processing of copper ore,
- PGE Górnictwo i Energetyka Konwencjonalna Spółka Akcyjna (PGE GiEK), which is a member of the CG PGE: the industry leader of the lignite mining with the use of opencast method,
- LW Bogdanka: One of the leaders of hard coal mining in Poland.



**Figure 3.** Employment in selected enterprises—structure by gender; own elaboration based on [33–38].

In all three companies, the majority of employees are men. The percentage of women in the analysed time period did not change in any of the companies and it amounted to 7% in KGHM PM, 15% in PGE GiEK and 5% in LW Bogdanka. Only in PGE GiEK, where in addition to mining, electricity and heat are also generated, the percentage of employed women is higher than in the mining and quarrying sector (Table 1). Among newly hired employees in 2016, 63 women were hired in KGHM PM, 56 in PGE GiEK, and 11 women in LW Bogdanka.

KGHM has employed the largest number of women and at the same time this employer regularly wins the ranking of Randstad Employer Brand Research and gets the title of the most attractive employer. The company offers students the opportunity to participate in internships, provides materials for writing diploma theses and provides awards for the best ones. Participation in an internship or getting a job is attractive for graduates of the faculty of mining and geology. However, only few of them get a job. Moreover, it should be taken into account that the positions offered to women are not only those with the requirement of mining education, but also office work, work in the HR departments, or accounting. Therefore, the actual number of positions offered to female graduates of the mining and geology major consistent with their education is smaller.

The offer of PGE is addressed to young people at the beginning of their professional careers and it also includes an internship program—“Energy for the future”, which is addressed to students of the largest Polish universities (including those discussed in this article) that educate students on faculties with the mining profile. 30 positions are offered as part of this program. In addition to PGE, the Ministry of Energy, and Polish enterprises: Polski Koncern Naftowy ORLEN SA, as well as Polskie Górnictwo Naftowe i Gazownictwo SA are participating in this program [48].

Whereas in LW Bogdanka, the cooperation with AGH was established. As part of this cooperation, the internships and apprenticeships are offered to students. The company also participates in job fairs organized by AGH in Kraków.

The sustainable development goals: gender equality and less inequality do not apply only to the share of employed women or the amount of their pays. Activities of the companies carried out within the principles of equal treatment include, among others: Trainings in the scope of discrimination and mobbing, equal access of women to decision-making processes, promotions and managerial positions, striving to maintain diversity of the personnel composition in terms of gender and age. While the companies [34,36] declare their efforts in this scope, at the same time they do not clearly state the implementation of the discussed sustainable development goals in their message (whether in the form of integrated reports, or information provided on their websites). Changes conducive to the implementation of sustainable development goals can be supported by projects similar to the “International Women in Mining”, which is a platform aimed at women employed in mining, the aim of

which is to increase the number of women in management boards, women performing at conferences, as well as to help them develop their careers through a global mentoring program, conducting research and drawing up reports on women's contribution to mining [49].

#### 4. Conclusions

After analyzing over the years the percentage share of women working in the mining sector, as well as the amount of pay they receive, the general structure of employment in the industry, and on the example of selected enterprises, it can be clearly concluded that the goal of gender equality (SDG5) is not implemented. Although high pay and stable employment are proposed in the mining sector (SDG1 and SDG8), disproportions in the earnings of women and men are still occurring. Despite changes in the legal regulations in Poland, women constitute 11% of all persons employed in this sector. Although the above-mentioned companies (LW Bogdanka and KGHM PM) declare their efforts in the scope of implementation of the SDGs, at the same time they do not clearly state the implementation of discussed sustainable development goals (above all SD5) in their message (whether in the form of integrated reports, or information provided on their websites).

The mining companies in Poland should to pay more attention to the structure of employment, and to encourage women to participate in internships and apprenticeships. This is particularly important because female graduates of the mining and geology major leave the university walls every year. Unfortunately, they often do not have the opportunity to get a job in their profession.

Based on the research presented in the article, it can be concluded that the mining industry in Poland, as in many other parts of the world, does not employ women. It might take decades to change these practices, because it is the transformation of the way of thinking that is crucial here. Starting from the education system and raising citizens' awareness that gender does not have to be associated with strictly defined roles, through political elites, decision makers, directors, and managers who will stop thinking about the limitations, but rather about the possibilities of women. Educated staff, in the form of graduates of mining and geology, are an opportunity for the development of the industry in accordance with the principles of sustainable development.

**Funding:** This scientific work was financed within Statute Research Studies order 0401/0048/18: New measuring, analytical, simulation and experimental research methods in mining and geology, as well as in geodesy and cartography.

**Conflicts of Interest:** The author declares no conflict of interest.

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