

ZBIGNIEW KASZTELEWICZ*, MIRANDA PTAK**

Condition of the mining and energy sectors based on brown coal and conditionings of their development in Poland

Introduction

The duty of providing energetic safety lies on the state authorities, but in an indirect way also on all entities that are associated with coal and energy sectors. Polish energy sector – as described in the assumptions of the new project of Energetic Policy from January 2009 – stands before the necessity of pointing new directions and solutions. This is happening in a situation when we are dealing with increasing demand for energy with simultaneous inadequate level of development of production and transportation infrastructure of fuel and energy sectors and with dependence on outside suppliers of gas and oil. The obligations in the environmental protection field accepted by Poland are also essential. Trends observed on the markets of world economy point on the lack of prices stability of energy resources and unfortunately on using energy resources as a tool in the fight for political influence. In general the actions taken as a result of implementing the EU directives are concentrated on producing energy from renewable sources, increasing the energetic efficiency, increasing the security of supply, increasing the competition on energy markets and on reducing the impact of ventures on the environment.

1. The current condition of brown coal sector in Poland

The brown coal mining and energy sector consists of five opencast mines and five power plants fired with brown coal.

* Prof. AGH, dr hab. inż., University of Science and Technology, Cracow.

** Mgr inż., Regional Mining Council, Wrocław.

Particular brown coal mines started stripping overburden and production of coal in the following years:

- KWB „Adamow” – overburden in 1959, coal in 1964,
- KWB „Bełchatow” – overburden in 1977, coal in 1980,
- KWB „Konin” – overburden in 1945, coal in 1947,
- KWB „Turow” – overburden in 1947, coal in 1947,
- KWB „Sieniawa” – the start of production in about 1853.

However the power plants fired with brown coal have the current total power of about 8997 MW started operating in the following periods:

- Power Plant „Konin” 1958, starting power 600 MW, currently 193 MW,
- Power Plant „Adamow” 1964, power of 600 MW,
- Power Plant „Patnow” 1967, power of 1200 MW in Pałnów I and 464 MW in Pałnów II,
- Power Plant „Turow” 1962, power of 2100 MW,
- Power Plant „Bełchatow” 1981, power of 4440 MW.

1.1. The production indicators of brown coal sector in Poland

From the beginnings of operating the total amount of coal produced in Polish brown coal mines is about 2.369 billion Mg and the amount of stripped overburden is about 9.3 billion m³. During this time over 34 233 hectares of terrains were bought for the purpose of mining activity and simultaneously over 16 916 hectares of recultivated terrains were sold or handed over. Only in 2008 59.8 million tonnes were extracted and 242.2 million m³ were stripped. The data describing the total production of coal, the amount of stripped overburden and the grounds management is shown in table 1.1.

TABLE 1.1

The amounts of excavated coal, removed overburden, pumped out water and acquisitions, disposals and possession of grounds in brown coal mines from the beginning of operation to the end of 2008

TABELA 1.1

Ilość wydobytego węgla, zdjętego nadkładu i wypompowanej wody oraz nabycie i zbycie oraz stan posiadania gruntów w kopalniach węgla brunatnego od początku działalności do końca 2008 roku

Mine	Coal	Overburden	Grounds bought from the start of operating	Grounds sold or handed over from the start of operating	Current amount of grounds owned in the end of 2008
	mln Mg	mln m ³	ha	ha	ha
Adamow	177.9	1 170.4	5 850	3 468	2 382
Bełchatow	816.1	3 477.5	10 350	3 823	6 527
Konin	534.9	2 811.1	12 874	7 919	4 955
Turow	840.2	1 841.4	5 159	1 706	3 453
Total	2 369.1	9 300.4	34 233	16 916	17 317

The characteristic indicators for particular mines including the overburden to coal ratio (O:C), the amount of pumped out water and average water inflow ratio are shown in table 1.2.

TABLE 1.2

The amounts of excavated coal, removed overburden, pumped out water and average indicators of overburden to coal (N:W) and water inflow from the beginning of operation to the end of 2008

TABELA 1.2

Ilość wydobytego węgla, zdjętego nadkładu i wypompowanej wody oraz średnie wskaźniki N:W i zawodnienia w kopalniach od początku działalności do końca 2008 roku

Mine	Overburden to coal ratio	Amount of pumped out water	Average water inflow ratio
	m ³ /Mg	mln m ³	m ³ /Mg
Adamow	6.58	2 911	16.36
Belchatow	4.26	7106	8.71
Konin	5.25	4 368	8.17
Turow	2.19	886	1.05
Total	3.93	14 539	6.14

As the data mentioned above points the most coal was extracted in Turow mine – 840 mln Mg, the least in Adamow mine – 178 mln Mg. The most overburden was stripped in Belchatow mine – 3478 mln m³ and the least in Adamow – 1170 mln m³. While analyzing the overburden to coal ratio (O:C) one may notice that the most favorable value of this parameter is in Turow mine – 2.19:1, Belchatow and Konin have visibly worse values of O:C and the worst value is in Adamow – 6.58:1. It is over three times higher than in Turow mine. When taking the amount of pumped out water into consideration Belchatow mine is first and Turow is last. When comparing the water inflow ratio one may notice the best value is assigned to Turow, then Konin, Belchatow and Adamow. The water inflow ratio in Adamow is almost 15 times bigger than in Turow mine – table 1.2. The differences in indicator values causes that it is not possible to compare Polish mines in a direct way.

2. The assets of brown coal industry in Poland

Our country has all the assets to base its development primarily on own (domestic) energy resources, particularly on hard coal and brown coal. Reserves of the latter are qualified as one of the biggest in Europe. While looking at Polish brown coal mining industry one must admit that its greatest assets are: known deposits, experienced technical and engineering staff, managers who represent European level, young and educated workers and – what cannot be overvalued in the age of implementing new technologies – research and technical background represented by universities which strictly cooperate with industry and numerous research and design institutes working on behalf of the mining industry.

In a few years Poland will face the problem of insufficient supply of electric energy and after 2020 also of significant decrease of brown coal production what will reduce the production of currently cheapest electric energy. Because of this fact it should be the strategic goal to inter alia prepare the possibility of managing perspective deposits for the purpose of exploitation and production of cheap and clean energy to ensure Poland's energetic safety in the nearest future.

Because of long time needed to prepare and accomplish mining investments (from a few to over a dozen of years) it is necessary for the Polish government to accept a development program for the energy sector basing primarily on hard and brown coal.

The brown coal industry has all the most important assets which favour its development, including primarily:

- documented and perspective deposits of brown coal,
- research and design background together with companies of technical background and experienced staff,
- positive achievements in the field of reclamation and revitalization of post-mining terrains,
- lowest costs of producing electric energy in comparison to other fossil fuels and renewable sources.

2.1. The resource base

There are over 150 recognized deposits and coal-carrying areas in Poland. Over 14 billion Mg are documented in certain deposits, over 60 billion Mg in estimated resources and over 140 billion Mg is the estimated number in potential coal-carrying areas (Kasiński, Mazurek, Piwocki 2006).

Among numerous Polish brown coal deposits the Association of Brown Coal Producers acknowledged those situated in Legnica and Gubin areas as mostly predisposed for future exploitation. Situation is similar for the deposits located near active mines:

- Zloczew deposit for PGE KWB Belchatow,
- Radomierzyce deposit for PGE KWB Turow,
- Kozmin, Rogozno, Grochowy-Siaszyce, Tomislawice, Oscislowo, Piaski, Deby Szlacheckie deposits for Konin-Turek's mining area, namely KWB Adamow and Konin – table 2.1 and figures 2.1 and 2.2.

2.2. Research and design background and the technical background companies

Poland has specialized research and design background as well as production background in the field of machines and devices for opencast mining. The research background consists inter alia of: University of Science and Technology in Krakow, Wroclaw University of Technology, Silesian University of Technology in Gliwice and numerous other technical



Fig. 2.1. The localization of Legnica, Gubin and Radomierzyce deposits in Turoszów deposit area

Rys. 2.1. Miejsce występowania złóż legnickich i gubińskich oraz złoża Radomierzyce w rejonie złóż turoszowskich

TABLE 2.1

The main geological and mining parameters of chosen perspective brown coal deposits

TABELA 2.1

Główne parametry geologiczno-górnictwa wybranych perspektywicznych złóż węgla brunatnego

Name of deposit/deposit complex	Recognition category	Geological resources [mln Mg]	Heating value [kJ/kg]	Sulphur [%]	Ash [%]	Linear overburden to coal ratio (O:C)
Legnica-Ścinawa	from B to D ₂	14 522	8 500–9 996	0,54–2,58	11,20–18,58	6,6 do 9,1
Gubin–Mosty–Brody	from B to D ₂	4 215	9 204–9 550	0,55–1,26	14,10–19,58	6,7 do 11,7
Złoczew	C ₂	486	8 462	1,18	21,67	4,5
Deby Szlacheckie–Izbica Kujawska	C ₁	113	8 377	1,46	25,19	9,0
Rogozno	from C ₁ to D ₁	623	9 265	2,32	21,73	4,3
Radomierzyce	D ₁	180	7 880	0,65	31,61	4,3
Tomislawice	B+C ₁	55	8 967	0,49	10,8	6,9
Piaski	B+C ₁ +C ₂	114	8 194	0,69	12,1	7,7
Oscisłowo	C ₁	50	8 626	1,15	13,57	8,7
Makoszyn-Grochowiska	C ₁ +C ₂	50	8 009	0,38	12,1	7,8
Grochowy-Siaszyce	E	estimated 103	7 928	1,33	34,4	-



Fig. 2.2. Active and perspective deposits in “Adamów”, “Konin” and “Belchatow” brown coal mines

Rys. 2.2. Złóża eksploatowane i perspektywiczne KWB „Adamów”, KWB „Konin” i KWB „Belchatów”

universities educating engineering staff for mines as well as other institutions and science institutes working on behalf of the brown coal industry. The main entities of designing background are: Poltegor – Projekt and Poltegor – Instytut in Wrocław, SKW Zgorzelec and Central Mining Institute in Katowice. In the area of constructing machines and devices the leading roles are assigned to: FUGO S.A. in Konin, KOPEX – FAMAGO in Zgorzelec, FAMA S.A. in Kluczbork, SEMPERTRANS Belchatow, Conveyor Belts Factory Stomil Wolbrom S.A., Stalowa Wola Steelworks S.A., MAAG GEAR ZAMECH, BOT KWB Belchatow S.A. – Production and Repair Facility, ENERGOPROJEKT Warszawa and many other companies that produce devices, their parts and subassemblies.

The fact that Polish designers and engineers built one of the biggest mines and power plants in Belchatow is one of the indicators showing the design and production possibilities of Polish fuel and energy sectors’ background. Polish solutions are used in many countries worldwide. Greece or India may be an example. Polish engineers design and build machines and devices for both brown coal mining and energy sectors. Current modernizations of power plants in the fields of adjusting power stations to the requirements of dust, SO₂ and CO₂ emissions are conducted by Polish companies (RAFAKO in Raciborz). Machines and devices built for the brown coal mines during few last years are not inferior to the ones constructed by reputable international producers. Bucket-wheel excavators KWK-1400,

1500 and lately KWK-910 or spreaders ZGOT-11400 and 15400 as well as transporters for drive stations and modern conveyor belts may serve as examples (Kasztelewicz, Koziół W., Zajączkowski 2007; Kasztelewicz, Koziół W., Koziół K., Klich 2007).

These achievements are the guarantee that Polish economy is able to build new mining and energy region in Legnica, Rogozno or Gubin on its own.

2.3. Positive achievements in the field of reclamation and revitalization of post-mining terrains

The brown coal industry has systematically and accordingly to the mining art conducted reclamation and management of terrains “regained” as the exploitation fronts moved. The conducted works are on high European level ensuring the use of terrains for agricultural, forest or other – including recreational – activities (Kasztelewicz 2007; Ptak 2007).

Konin mine implemented the rule of UST’s rector and professor: „What a man destroyed, a man has to fix” and as first in Polish brown coal industry started reclamation of post-mining terrains in the middle of XX century. At the turn of the 50s and 60s research works were started. Detailed directions of organizing the experimental base were developed by UST’s Department of Soil Sciences in 1960.

From the beginnings of operating Polish brown coal mines bought over 34 233 hectares for mining activity, simultaneously selling or handing over 16 916 hectares, including 11 066 hectares of reclaimed terrains – table 2.2.

TABLE 2.2

The disposal and donation of grounds in Polish brown coal mines from the beginning of operation to the end of 2008

TABELA 2.2

Sprzedż i przekazywanie gruntów przez kopalnie od początku działalności do końca 2008 roku

Grounds management [ha]		Adamow	Belchatow	Konin	Turow	Total
Handed over/sold	total	3 468	3 823	7 919	1 706	16 916
including:	not transformed	1 224	2 249	2 125	252	5 850
	reclaimed	2 243	1 574	5 794	1 454	11 066
Grounds owned at the end of 2008		2 382	6 527	4 955	3 453	17 317

KWB Konin is the leader when it comes to the amount of reclaimed terrains. It has conducted about 50% of reclamation works in the whole brown coal industry. KWB Adamow is second, followed by Belchatow and Turow. The leading places occupied by Konin and Adamow are a result of the fact that these mines are typical multi-pit mines which use small brown coal deposits. New pits opened in these mines “help” to reclaim “old” post-mining pits by moving overburden masses or waters from the opening cuts to the pits that are being closed.

The reclamation works conducted in Polish mines are highly valued by Polish and foreign specialists. It is an European level. Polish reclamation may and should be an example for other European countries which use opencast mining.

2.4. Lowest costs of electric energy production in comparison to other energy carriers

Brown coal is currently the cheapest primary energy carrier used for production of electric energy in Polish energy sector. Current level of production will be stable for about 15 years and then it will start to decrease unless production from perspective deposits like Legnica-Scinawa or Gubin-Mosty is started. While identifying the sources from which Polish energy demand will be fulfilled one should decide that the decisive criterion is the economic factor combined with maximum use of domestic resources. Proper approach to this subject will allow to maintain professional activity of thousands of people associated with exploitation and processing of domestic energy resources to electric energy (Kasztelewicz 2007; Kasztelewicz, Koziol W., Zajaczkowski 2007). While considering the criteria of economic competition one must state that brown coal is the leader in this category because the costs of producing energy from this fuel are about 30% lower than the same costs from hard coal what results in the fact that the energy from power plants fired with brown coal is about 30% cheaper than from power plants fired with hard coal.

The above-cited facts should be decisive when it comes to building new energetic strategy for Poland for the next 20–30 years. Currently there are voices telling about liquidation of Polish mining sector, substituting domestic coal with imported one or building gas and atomic power plants. Therefore they propose that the production of energy should be more expensive and depending on external suppliers of energy resources.

2.5. Forecasts of electric energy demand in Poland

The energetic safety is defined as ensuring stable supply of fuels and energy on the level assuring the fulfillment of domestic needs and with economically and socially accepted prices with the assumption that domestic energy reserves are being used optimally and the sources of supply (oil, liquid and gas fuels) are diversified [Energetic Policy].

The modern world has huge energy needs that have tendency for constant grow. Forecasts for the world predict the increase of primary energy consumption of 25% every 10 years. However the electric energy demand will be even higher. It is estimated at over 30% every 10 years. It is assumed in Energetic Policy accepted by Polish government on 4th January 2005 that the demand for electric energy will increase on average by 3% every year until 2025. To fulfill this demand it is necessary to build new power plant with installed power of 4 to 5 thousand MW (similar to Belchatow power plant) every 5 years. Today a question arises if these power plants should run on coal, including brown coal, gas, oil or atomic power?

TABLE 2.4

Predicted demand for brown coal based on the assumptions of Polish Energetic Policy [amounts in mln Mg]

TABELA 2.4

Prognozy zapotrzebowania na węgiel brunatny na podstawie założeń Polityki Energetycznej Polski [mln Mg]

Assumptions of Energetic Policy from	2008	2010	2015	2020	2025	2030
2004/2005 r.	59.8	63.0	64.0	59.5	66.8	-
January 2009r.	59.8	55.4	52.3	42.1	35.7	32.5
March 2009r.	59.8	52.8	57.2	44.2	52.7	45.7
Brown coal industry strategy January 2009 r.	59.8	65.8	65.4	88.4	112.0	117.5

When analyzing data in above-cited table one may notice that the assumption of up-to-date Energetic Policy from 2004 and two last project of this Policy from 2009 do not predict the use of the cheapest domestic energy resource for the production of electric energy. Current assumptions of industry's strategy from January 2009 predict that the level of production will be almost three times higher than the demand shown in Energetic Policy from March 2009.

3. The strategic conditionings of brown coal industry in Poland

Nowadays the questions from which fuel we should produce energy arise. Should we build power plants that use renewable sources or maybe hard or brown coal? Or maybe we should base on gas or oil? It is necessary to state that the range of our country's energy needs is so wide that production of energy from every possible source is necessary and expected. Poland's energetic safety requires diversification of energy sources. In this holistic system of diversified sources brown coal should play significant role because of its resources. Current production of electric energy is based in 95% on coal (34% is brown coal). The price of energy produced from brown coal is about 30% lower than the price of energy produced from hard coal and two times lower than the price of energy produced from gas or wind power. Taking those facts into account the authors have formulated a set of the most important conditionings of brown coal industry. Brown coal had, has and will have in the future basic significance in providing country's energetic safety (Kasztelewicz, Uberman, Ostrega, Ptak 2008; Kasztelewicz 2007; Kasztelewicz, Koziol W., Koziol K., Klich 2007).

1. Polish energy sector should be based in the first place on domestic energy resources, namely hard and brown coal.

It would be a huge economic mistake not to use „Polish gold” – the coal and to base the development of energy sector on imported resources. The use of domestic energy resources – which reserves are one of the biggest in Europe – during next few dozen years provides the stability, safety, partially independence in the face of “political and energetic terrorism” of

external suppliers and – what is not irrelevant – the employment for several dozen thousands in mining, energy and cooperating sectors. During the talks on EU level it is necessary to present Polish specificity of “a country that stands on coal” to negotiate advantageous conditions for the development of mining sector. During the time of economic crisis every country protects its branches and specialties. Mining is the Polish specialty and this includes mining universities, the research and design background as well as the technical background companies. This is why one cannot let to waste the potential we have.

2. Acceptance of adequate law regulations in new Poland’s Energetic Policy and in the Conception of Country’s Spatial Development.

One should pursue accepting regulations in new Energetic Policy until 2030 and in longer time horizon. Those regulations should define that the development of Polish energy sector should be based primarily on domestic energy resources, namely brown and hard coal. Furthermore Energetic Policy should point the need of building new mines and literally mention the brown coal deposits for future exploitation. The preparation of new mining and energy regions has fundamental meaning for the existence and further development of Polish energy sector. Those regions should provide coal and energy for replacement of the ones that are now active, but which will be depleted in the future. According to present knowledge the deposits most suitable for future exploitation are those located in Legnica (about 14,5 billion Mg of reserves) and Gubin (about 4,5 billion Mg) areas. Those reserves are a few times bigger than total amount of coal ever excavated in Poland. The Minister of Economy should develop a program of energy sector’s development basing on brown coal that would have a status of government task and serving a public purpose. This program should state that it is necessary to build new energy and mining regions. **The Conception of Country’s Spatial Development should clearly describe the range of this Program which in turn should be based on directions accepted in Energetic Policy.**

3. The protection of documented deposits against surface and infrastructure building.

For the purpose of protecting documented deposits Country’s Main Geologist should prepare a ranking list together with valorization of identified brown coal deposits and define a list of deposits that should be strictly protected because of their strategic character. This will ensure the possibility of their future use. At present there are no effective regulations that would protect documented deposits against surface and infrastructure building (i.e. like those concerning agricultural and forest terrains). This situation makes new investments in mining more expensive or even impossible (social protests) – Legnica and Rogozno may serve as examples. Protection of deposits against surface and infrastructure building is essential not only for country’s sustainable economic development but also for the rational use of the funds purposed for the infrastructure development.

4. Verification of brown coal reserves balance sheet and supplementing deposits for which the geological studies were made but no geological documentation was created or was created, but not approved.

The current balance sheet of brown coal deposits does not match the real number of reserves. Numerous large deposits do not appear in the reserves’ balance sheet and this is

why it is necessary to conduct a review of “old” geological studies results. With the help of National Fund of Environmental Protection and Water Balance the geological and documenting studies should be finished and documentations created this way should be approved. Results of these studies should be introduced to the reserves balance sheet. It is also necessary to conduct interdisciplinary studies for the purpose of developing straightforward geological criteria for the conduction of tests and pilot experiments of underground coal gasification together with introduction of formal balance criteria for deposits that are especially useful for this technology.

5. Regulation of brown coal deposits ownership.

This subject has been raised multiple times by academic and mining entrepreneurs circles. Unfortunately the demands for a change in current law regulations did not find understanding in parliament circles despite the great importance of this issue. Brown coal deposits should be owned – as brown coal is a strategic resource for energy sector – by the State Treasury and not by the owner of the ground estate. One have to admit with regret that the ownership law regulations in Poland are not met in any other country namely that the way of exploitation decides about the ownership. Brown coal should be necessarily included to the group of resources owned by the State Treasury – independently from the way of exploitation. These changes must be implemented in Mining and Geological Law act.

6. Buying estates for mining investments that have the status of public purpose of national meaning.

Buying estates for mining activity is one of the most difficult stages of an investment. This issue is strictly connected to the planning and spatial development act. With the assumption that above-cited changes will be introduced it would be possible to buy estates basing on one administrative decision, just like it is solved in the act from 10th April 2003 about the detailed rules of preparing and realizing public roads investments (Law Journal No. 80, pos. 721 with further changes). In this case the concession would be the decision that allows buying estates for huge opencast brown coal pits. According to the authors also the solutions setting the compensation levels may be taken from the mentioned act as those regulations are proven to be effective in practice. Without those regulations the road investments would still be in a standstill just like it is presently in the field of brown coal mining investments.

7. The changes of law regulations in Mining and Geological Law act and other acts that do not work out in practice.

A. The right to geological information

Current regulations concerning the right to geological information procure many “difficulties”. One of the proposals of system regulating of this issue says that the fees for the geological information would be dependent on the size and category of recognition of the deposit and would be collected together with the concession fee.

B. Mine Liquidation Fund

The valid regulations concerning the mine liquidation fund are proven in practice to have many defects. Those are inter alia:

- the lack of possibility to voluntarily increase amount of money designed for this fund over the level defined in Mining and Geological Law act. From the mines' point of view it is relevant to allow them to increase payments for the liquidation fund over the mentioned level;
- the lack of possibility to invest the money from mine liquidation fund into saving bonds and treasury bonds emitted by the State Treasury. This fact should be changed and the mines should be allowed to buy this kind of financial instruments. It would result in increasing the interest rate and safety of the resources gathered in the fund.

C. Exploitation fees

The regulations in Mining and Geological Law concerning the income from exploitation fees should be changed. The proposed changes include the fact that the commune's income from those fees should be proportional to the area of mining terrain on its territory. It can be an exception for opencast brown coal mines where the ranges of influence are from their nature very wide. At present there are some illogical situations when the preparing and accessible works are conducted on one commune's territory, but the exploitation fee is rightful only to the commune on which territory the deposit is situated.

D. Accompanying minerals

Despite the regulations concerning the necessity and need of rational minerals management, including accompanying minerals (Mining and Geological Law and Environmental Protection Law acts), there are no mechanisms that encourage entrepreneurs to use the anthropogenic deposits or dumps of accompanying minerals. In example there is no possibility of releasing from exploitation fee or to get a refund from the National Fund of Environmental Protection and Water Balance. This condition serves neither the environment protection nor realizes one of the basic rules – the rule of sustainable development. The legislator should take on the initiative towards this direction to encourage mining entrepreneurs to use the accompanying minerals.

E. The procedures in environmental impact assessment and conflicts with the areas of European network Nature 2000

At the present state of law, shaped by the act¹ from 3rd October 2009 about sharing information about the environment and its protection, the participation of society in protection of the environment and the environmental impact assessments and with association to the act² about the change in the act concerning nature protection act and some other acts, the whole procedure was excluded from Environment Protection Law act. The introduced changes were necessary to implement the regulations of European Communities directives³.

¹ Law Journal No. 199, pos. 1227 so called uoos act.

² Law Journal No. 201, pos. 1237.

³ Council Directive 79/409/EEG from 2nd April 1979 about the protection of wild birds (EU Law Journal L 103 from 25.04.1979, page 1, with further changes.; EU Law Journal Polish special edition, chapter 15 vol.1, page 98 with further changes) ; Council Directive 92/43/EEG from 21st May 1992 about the protection of habitats and wild fauna and flora (EU Law Journal L 206 from 22.07.1992, page 7, with further changes.; EU Law Journal Polish special edition, chapter 15 vol. 2, page 102, with further changes).

It is very important for the access to new brown coal deposits to know how to proceed and conduct environmental impact assessment when the venture affects Nature 2000 area.

Furthermore the procedure ends with the issuing of environmental conditionings decision, which is an attachment to the application for the concession accordingly to art. 72 sec. 3 of uoos act. In the case of Nature 2000 areas it is important to raise the issue of designed areas that may – but do not have to be – considered by European Commission as ones that have significant value for EU. The list of these areas is sent to EC by the Minister of Environment after consulting it with the government. During this time the area is “dead” for any investment because there is risk that the protecting actions will prevent possible exploitation. One must add that in the act from 16th April 2004 about the nature protection the legislator stated that “Special areas of habitats’ protection are designed by the minister of environmental issues after consulting with European Commission in 6 years from the day of Commission’s approval for the particular area as an area that has significant meaning to EU”.

Another regulation which is discriminatory for mining entrepreneurs and for potential investors concerns the compensation for the reduced rights in use i.e. land use. The act gives the new body – Regional Director of Environmental Protection – the right to sign an agreement “if the economic activity (...) requires to be adjusted to the needs of Nature 2000 area protection on which the programs of compensation for reduced incomes cannot be implemented the regional director of environmental protection **may** sign an agreement with the land owner – excluding the administrators of State Treasury’s estates – that contains the list of necessary actions, ways and deadlines of their conduction and terms and deadlines of payoffs for conducted actions as well as the value of **compensation** for lost income resulting from introduced constraints”. This regulation suggests that the decision will be administrative and optional and only for the lost income.

8. Investments and involvement of Polish economy, including brown coal industry, in clean coal technologies

Clean coal technologies allow reducing the onerous impact of coal mining and energy sectors on the environment in example by reducing emissions of greenhouse gases to the atmosphere. Nowadays the optimal way of brown coal deposits use cannot be associated only with traditional technologies of its exploitation and processing. It is necessary to support and increase funds for research and development studies over the clean coal technologies, including the technologies that allow producing liquid and gas fuels from coal, reducing energy production process’ impact on the environment as well as for coal fuel cells. The technical development and changing situation on the market of energy resources favor the search for new possibilities of domestic brown coal deposits usage. Among the perspective directions the following are mentioned: processing the coal excavated by opencast methods, underground gasification of coal in order to get cleaner fuel for energy and chemical industries and cooperation in the area of possible CO₂ sequestration in conjunction with underground brown coal gasification. The increasing role of brown coal should be seen in its processing to liquid and gas fuels, including hydrogen and synthesis gas and in producing coal dust or briquette.

9. Finishing the ongoing organizational and structural changes in the industry

In economically justified cases one must allow forming capital groups on the base of coal and energy companies after consulting these decisions with public partners in the entities involved. These actions are necessary to cope with new challenges and to increase efficiency and competitiveness. Reorganization has to be conducted in active mines and power plants but with simultaneous consideration of new mines and power plants. The most important issue is to continue the restructuring and consolidation of Polish Energy Group (PGE) as well as in the entities from Konin and Turek areas.

10. The dialogue with society concerning reclamation and revitalization of post-mining terrains in Polish brown coal mines.

In country's information circulation brown coal mines are depicted as "devastated terrains with no future use". But the truth is completely different. As the exploitation fronts move forward the mines consecutively conduct reclamation works and plan the use of post-mining terrains. The conducted works are on high European level, that ensures the reclaimed terrains will be useful for agricultural, forest or other kind of activity, including recreational activity. This is why the industry should do some radical changes in the area of communication with the society. For this reason a special Information Cell should be created. It would show and inform about the actions taken in the area of reclamation and revitalization of post-mining terrains in Polish and foreign opencast brown coal mines.

Summary

The brown coal industry faces a great development chance. This chance is given by the greatest brown coal reserves in Europe. This is number one asset of Polish mining industry, simultaneously followed by active mining universities, design and research background, magnificent staff and factories of technical background that produce machines and devices that are not inferior to those created by the best companies in the world. Brown coal industry is not afraid of the main subject raised by its opponents, namely the CO₂ emissions. The world is working to develop new emission-free technologies of coal burning, so called Clean Coal Technologies. Despite numerous Polish and worldwide objective reasons for the further development of brown coal industry, there are opinions in Poland suggesting that brown coal mining industry should be cut down and domestic energy sector should be based on imported resources. These opinions are visible during the work over assumptions of Energetic Policy until the year 2030. This argument does not bother the industry in Germany where the production of brown coal in the next 50 years is planned on a stable level of 180 million Mg per year – far more than planned production in our country. The realization of above-cited strategy will save few dozen thousands of workplaces both in mines and power plants as well as in research and design background and in numerous companies producing machines and devices for this industry. The relevant aspect of domestic brown coal deposits is their localization, wide spread across the country, in far distance from hard coal deposits. This

allows building energy sector objects in different parts of Poland, shortens the electricity transport paths and increases the safety of supply. The development of brown coal mining and energy sectors should respect the safety of the environment and society should be informed about the benefits and downsides associated with this sectors' development.

Science work financed with funds assigned for science in the years 2008–2011 as a research project.

REFERENCES

- Kasztelwicz Z., Gawlik L., Ptak M., Zajączkowski M., 2008 – Wydobycie węgla brunatnego jako nadrzędny interes publiczny. Kraków (praca niepubl.).
- Kasztelwicz Z., Uberman R., Ostrega A., Ptak M., 2008 – Wykonanie optymalizacji ścieżki dojścia do uzyskania koncesji dla złoża węgla brunatnego „Legnica” wraz z opisem procedury postępowania w kontekście przepisów o planowaniu i zagospodarowaniu przestrzennym. Materiały niepublikowane, Kraków.
- Kasiński J.R., Mazurek S., Piwocki M., 2006 – Waloryzacja i ranking złóż węgla brunatnego Polsce. Państwowy Instytut Geologiczny, Warszawa.
- Kasztelwicz Z., 2007 – Węgiel brunatny – optymalna oferta energetyczna dla Polski. Związek Pracodawców Porozumienie Producentów Węgla Brunatnego. Redakcja „Górnictwo Odkrywkowe” Bogatynia-Wrocław.
- Kasztelwicz Z., Kozioł W., Zajączkowski M., 2007 – Rola węgla brunatnego jako bezpiecznego i taniego źródła zaopatrzenia w energię pierwotną w Polsce i Unii Europejskiej. Górnictwo Odkrywkowe 5–6, Wrocław.
- Kasztelwicz Z., Kozioł W., Kozioł K., Klich J., 2007 – Energetyka na węglu brunatnym – perspektywy rozwoju. Polski Kongres Górniczy, Polityka Energetyczna t. 10, z. spec. 1, Wyd. IGSMiE PAN, Kraków.
- Ptak M., 2007 – Ochrona środowiska jako prawny, techniczny i ekonomiczny czynnik procesu projektowania odkrywkowego zakładu górniczego, zarys problemu. Kopaliny Podstawowe i Pospolite Górnictwa Skalnego, nr 1 (44).
- Żuk S., Kaczorowski J., Kasztelwicz Z., 2008 – Założenia nowej Polityki Energetycznej Polski w odniesieniu do sektora węgla brunatnego w XXI wieku. Węgiel Brunatny nr 4(65), Porozumienie Producentów Węgla brunatnego, Bogatynia.

CONDITION OF THE MINING AND ENERGY SECTORS BASED ON BROWN COAL AND CONDITIONINGS OF THEIR DEVELOPMENT IN POLAND

Key words

Opencast mining, design of mines, energetic policy, forecasts of brown coal production

Abstract

The article presents the condition of Polish brown coal industry in reference to present and predicted country's energy demand. The possible scenarios of continuation of brown coal extracting in active and perspective areas are shown on the background of resources base. By presenting such assets as: documented deposits, exploitation experience, adequate research and technical background, competitive price of energy produced from brown coal the necessity of government taking up action towards developing and approving essential policies and programs concerning the brown coal mining and energy sectors was justified. The most important conditionings that have to be fulfilled for possible development of brown coal mining and energy sector in the first half of XXI century are also described.

Słowa kluczowe

Górnictwo odkrywkowe, projektowanie kopalń, polityka energetyczna, prognozy wydobycia węgla brunatnego

Streszczenie

W referacie przedstawiono stan górnictwa węgla brunatnego w Polsce w odniesieniu do aktualnych i prognozowanych potrzeb energetycznych kraju. Charakteryzując bazę zasobową wskazano możliwości kontynuacji wydobycia węgla brunatnego w rejonach czynnych kopalń oraz rejonów perspektywicznych budowy nowych kopalń. Prezentując takie atuty jak: udokumentowana baza zasobowa, doświadczenie w zakresie eksploatacji, odpowiednie zaplecze naukowo-techniczne, konkurencyjna cena energii wytwarzanej z węgla brunatnego uzasadniono **konieczność podjęcia przez rząd działań w zakresie opracowania i zatwierdzenia** niezbędnych polityk i programów rozwoju sektora górnictwo-energetycznego węgla brunatnego. Przedstawiono najważniejsze uwarunkowania, które należy spełnić dla rozwoju górnictwa i energetyki na węglu brunatnym w I połowie XXI wieku w Polsce.