



Whither are you headed, Polish coal?

Development prospects of the
Polish hard coal mining sector

Warsaw Institute for Economic Studies
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Summary

- **The Polish hard coal mining is in decline.** In the last decade, despite favorable conditions on the coal market, it did not contribute to the country's economic growth. At the same time, due to its small and continuously declining share in the economy, its impact on the future welfare of the Polish society will be insignificant.
- **Taxation of the coal industry is on the average level for the domestic economy.** Numerous fees specific to the sector do not significantly affect the industry's competitiveness because they are relatively small. At the same time, because of both explicit and camouflaged subsidies, the coal mining contribution to the state budget per employee is only half of the average for the other industries and service sector.
- **The key problem of the Polish coal mining is a very low productivity of coal extraction and the resulting very high unit labor costs.** In order to address this problem, it will be necessary to significantly reduce the employment, including by laying off more than 50% of the workforce in the coming five years. Alternatively, most of the Polish coal mines will have to be completely shut down by 2020.
- **Even successful restructuring will not ensure that the coal industry will continue to operate unaffected in the coming decades.** Due to the wage pressure, productivity of coal extraction will have to continue to improve, which will result in more restructuring of the industry and shutting down of unprofitable mining enterprises.
- **Polish energy and industry policy should take into consideration the declining nature of the Polish hard coal mining.** Realistic measures aimed at balancing the domestic demand and supply of hard coal include the following:
 - employment restructuring accompanied by wage cuts in the industry by 2020;
 - partial replacement of unprofitable mining enterprises with new and more productive ones after 2030;
 - reduction of coal consumption of a magnitude greater than assumed in the state's draft energy policy until 2050, through decarbonization of the fuel mix in the power industry and in households;
 - by 2050, this reduction should reach 70-80% of the current volumes.



1

ROLE OF COAL MINING
IN THE POLISH ECONOMY

Coal mining's negative contribution to economic growth

Because the Polish hard coal industry has for many years been in a state of permanent crisis, many people are asking questions about this sector's importance for the country's economy. Some of the pundits say that during the times of prosperity the coal industry was the driving force of the Polish economy. Are they right? Is the domestic coal mining really the driver of Polish economic growth only temporarily experiencing certain difficulties? Or is it a sinking ship which has its best years already behind it? According to available data, as far as the mining industry is concerned, the latter seems to be the case.

Ten years ago, the coal industry, which is dominated by hard coal mining, was responsible for 1.8% of the added value generated in Poland. Today, this figure stands at only approx. 1%. The mining industry's share in employment and wages also declined, although the strength of the miners' unions slowed down that process. However, this resulted in the industry's problems with costs and the low productivity.

The coal industry's diminishing contribution to the GDP stems from the fact that other, robustly expanding industries pushed the Polish economy forward. Throughout most of the previous decade, the hard coal mining was shrinking and had a negative impact on the country's economic growth. Taking into account periodic increases, after 2005 the industry's average contribution to Poland's economic growth was practically nil.

CHART 1. SHARE OF COAL MINING IN THE POLISH ECONOMY.*

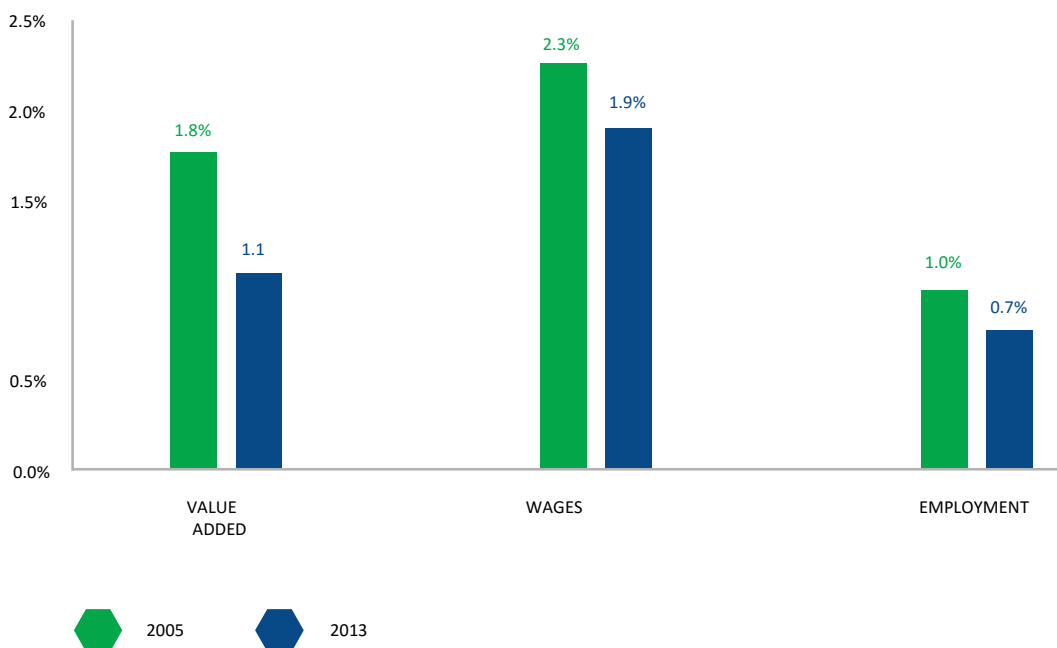
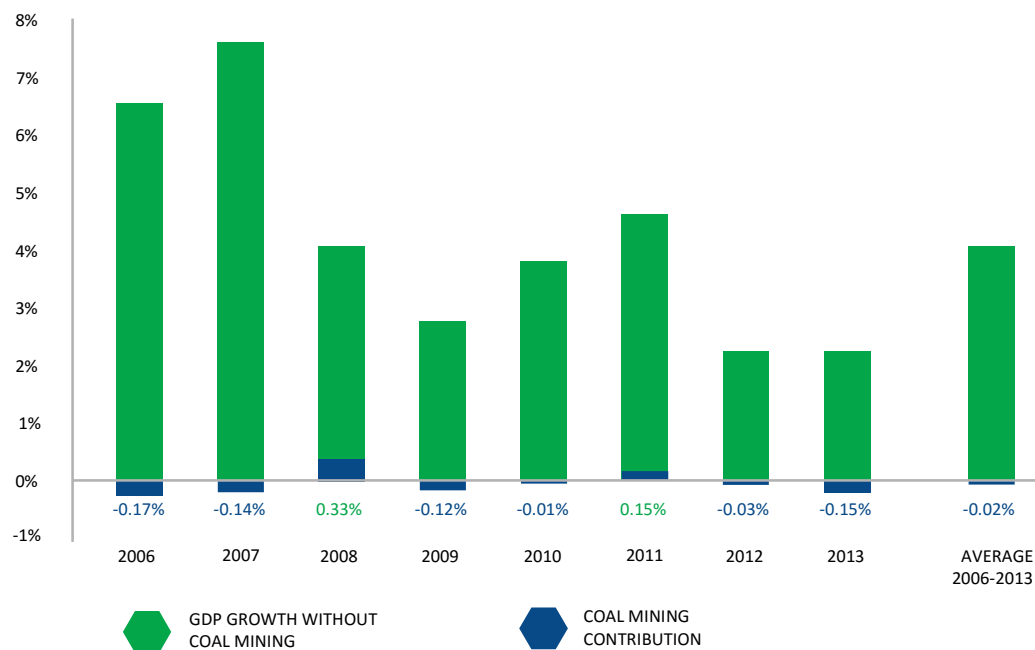


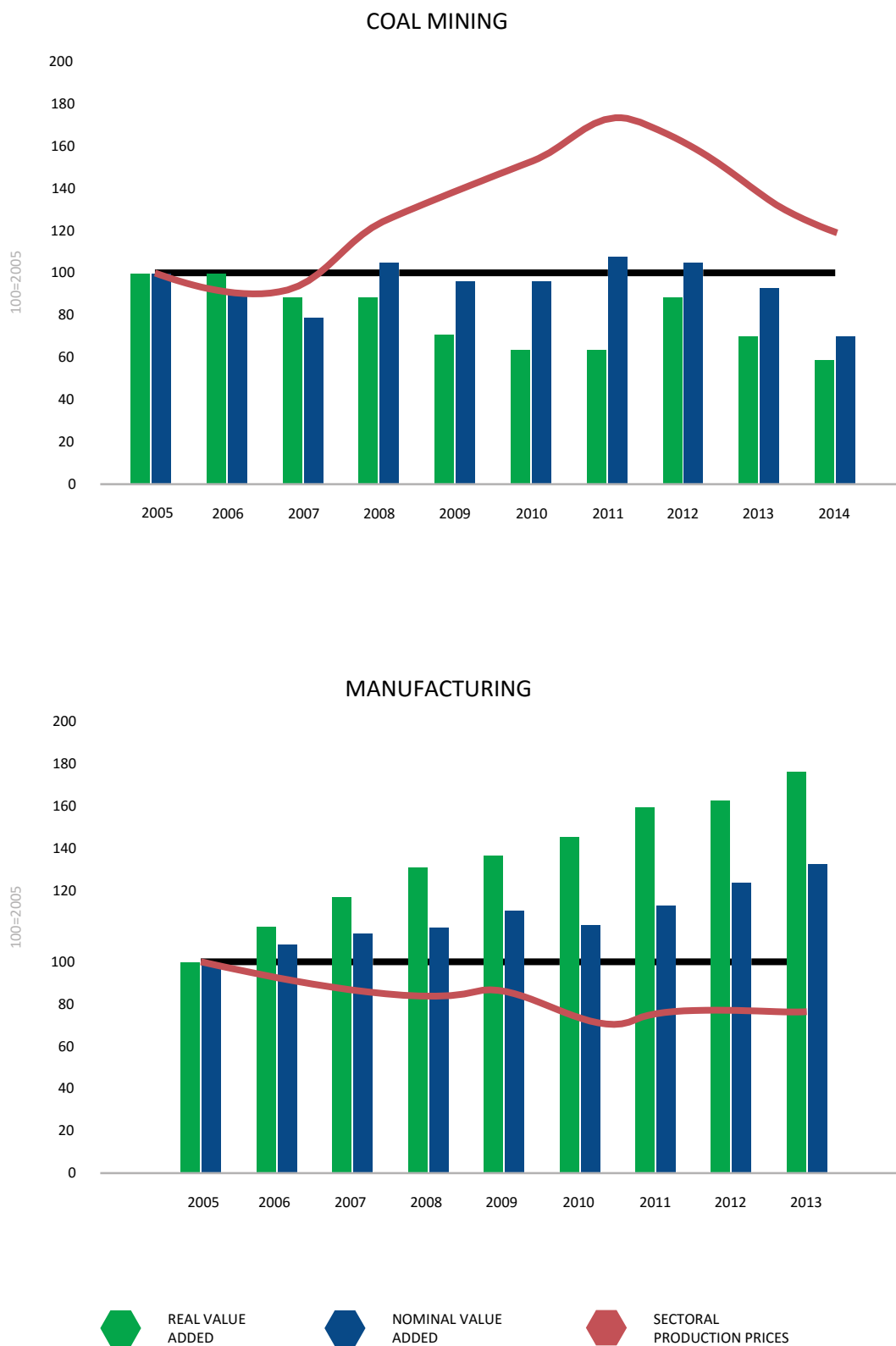
CHART 2. COAL INDUSTRY'S CONTRIBUTION TO REAL GDP GROWTH IN POLAND AFTER 2005.



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE CENTRAL STATISTICAL OFFICE OF POLAND AND EUROSTAT

During the global increase in demand for commodities, when the price of coal increased several times, the value generated by the Polish coal industry remained flat. This means that in the recent ten years, Poland experienced a significant decline in real growth of activity in this industry, by 1/3 in 2005-2013, i.e. before the current wave of crisis. The decline in hard coal prices on global markets in 2014 means that the Polish coal mining will go from stagnation to rapid shrinking.

CHART 3. STAGNATION OF THE COAL MINING AND GROWTH IN MANUFACTURING IN POLAND IN 2005-2013*



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE CENTRAL STATISTICAL OFFICE OF POLAND AND THE MINISTRY OF THE ECONOMY; FOR 2014, WISE INSTITUTE'S FORECAST FOR THE COAL MINING WAS USED

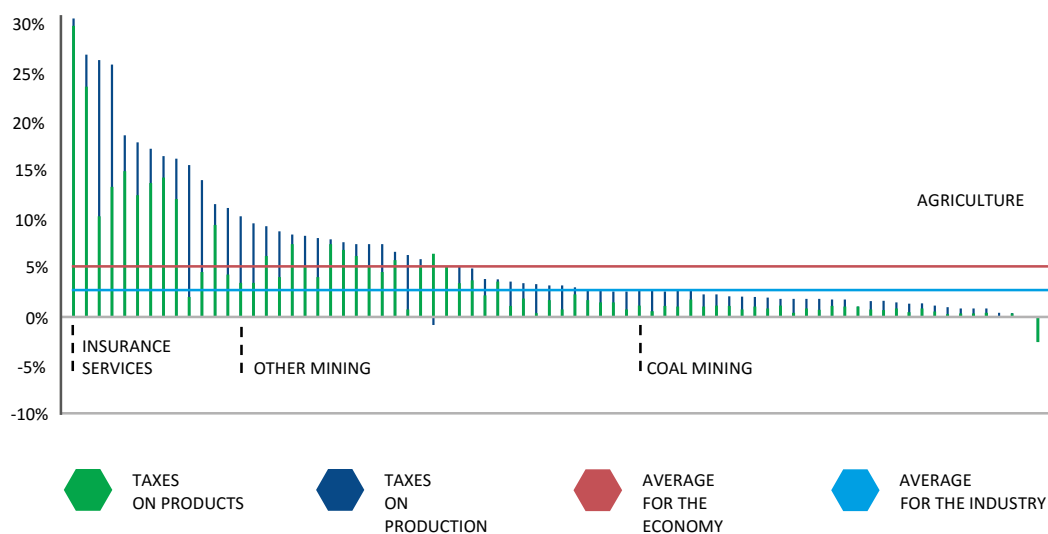
The decline in the coal mining is particularly evident when compared to manufacturing, which in 2005-2013 increased its value added by more than 80% despite the fact that during this period the prices of industrial products were falling. Hence, there is a certain paradox: coal industry operating under very favorable external conditions (rapid increase in the prices of its products) fell into a crisis, while manufacturing experienced a boom despite strong international competition. This is attributable to rapid growth in labour productivity in manufacturing industries and its decline in coal mining.

Hard coal mining's impact on public finance

Is the hard coal industry significantly burdened in terms of taxation compared to other branches of the Polish economy? This question may be answered by analyzing the Central Statistical Office (GUS) data on taxes imposed on products and production processes in specific branches of the economy. Such data do not include corporate income tax (CIT), personal income tax (PIT) or social insurance contributions. They include, among others, real estate taxes, pollution taxes, taxes on financial transactions and insurance premiums, customs duties and excise taxes. This enables a comparison of specific burdens between particular industries. Such a comparison shows that taxation of the coal mining sector is smaller than taxation of the average sector of the Polish economy, although taxation of the manufacturing is at a similar level. Moreover, taxation of the coal mining is smaller than that of other types of mining, despite the imposition of excise tax in 2012 on certain recipients of this type of fuel.

This picture is confirmed by a detailed analysis of the structure of all public levies imposed on the hard coal industry. It is dominated by taxes and contributions which are paid by all sectors of the economy: PIT, CIT, VAT, Social Insurance Institution (ZUS) and health insurance contributions. Burdens which are specific to the industry, such as fees to municipalities, environmental fees, profit sharing or excise taxes, do not exceed 1/10 of total public liabilities of the coal mining. Therefore, the various numerous levies are not a considerable burden to the coal mining sector because they are relatively small.

CHART 4. TAXATION OF INDUSTRIES OF THE POLISH ECONOMY IN 2010*.



NOTE: FOR THE COAL MINING, THE EFFECTS OF THE EXCISE TAX IMPOSED IN 2012 WERE ADDITIONALLY TAKEN INTO ACCOUNT
 SOURCE: WISE'S CALCULATIONS BASED ON DATA FROM THE CENTRAL STATISTICAL OFFICE OF POLAND

However, when examining the rationale for specific levies imposed on the coal industry, it should be kept in mind that coal extraction entails several negative externalities to the enterprise's direct surroundings. The most important of them include (1) landscape deformations, (2) storage of mining waste and (3) release of briny water to surface waters. More and more often, the detrimental impact of coal mines on surface objects results in restrictions on their operations. Costs of winding up coal mining enterprises following the completion of mining operations are also an important factor. In most cases, these costs are, at least to a certain degree, incurred by taxpayers.

The full calculation of costs and benefits of the hard coal mining for public finance should take into account not only taxation of the industry and explicit subsidies but also camouflaged ones. As we have already shown in the report on state support to the coal mining and coal energy sector, in the last decade camouflaged subsidies in the form of subsidised disability benefits and pensions for miners have represented key state aid to the mining sector following the great restructuring completed in 2003 (Bukowski and Śniegocki 2014). Therefore, it is best to compare an average miner's impact on public finance with the impact on public finance of employees in those industries and service sectors which are not provided with subsidised social insurance.

Proceeds from taxation of work and value added generated by the coal industry per employee are higher than in other industries. This is attributable primarily to higher wages in the sector and the fact that coal is taxed with a standard VAT rate, not a reduced one. In the coal industry, other taxes per employee are also higher. This means that an employee declares a higher taxable base because a coal mining worker's wages are higher than in other branches of the economy. On the other hand, proceeds from CIT are lower, which stems from the low profitability of coal mines: the added value is usually transferred to coal mine employees in the form of wages, not to the owner (usually the state) in the form of profits.

BOX 1. COAL MINING'S IMPACT ON THE SURROUNDINGS

Underground hard coal mining causes **deformations of landscape** which in turn results in costs of removal of mining damage, securing objects on the surface and reclamation of land after the completion of mining operations. Mining also alters the land and water conditions and the operation of drainage devices. In 1999-2008, the area of land used by the hard coal mining decreased by 31%, of which 38% was reclaimed during that period (Dulewski et al. 2010). However, this area continues to be significant, and the area of a deposit ranges from 6 to 60 sq. km (Kasztelewicz 2012). The **storage of mining waste**, generated in the course of mining and processing operations, also takes a significant area and alters the landscape of mining regions. The hard coal mining generates approx. one-half of all the mining waste in Poland (Dulewski et al. 2010). Assuming that extracting a tonne of hard coal involves generating 0.4 tonnes of waste (Szpadt 2010), in 2014 that figure stood at 28 million tons. The **discharge of briny water to surface waters** by the hard coal mining results in the killing of microorganisms which are responsible for the self-cleaning of surface waters (Smoliński 2006). In recent years, this problem was partly addressed through the coal mines' compliance with environmental regulations, yet in 2008 the coal mines still released 3.5 thousand tonnes of salt per day to the estuaries of the Vistula and Oder rivers, i.e. only 4% less than in 1999 (Dulewski et al. 2010).

Economic growth in the areas located above the coal mining operations increases the costs of coal mining and gradually decreases its profitability from the point of view of the entire economy. The risk of damage to infrastructure, deterioration of the safety of its users and the costs of securing it or changing its location to avoid coal deposits may be much higher than anticipated profits from coal extraction. Therefore, in the event of a conflict between road or rail networks and coal mines, transportation infrastructure usually has priority in Poland (Tajduś and Misa 2013). The required protection strips along road and rail infrastructure have a width of approx. one kilometer. The restrictions result in a decrease in potential effectiveness of the mining operations or completely prevent the extraction of coal from the deposits. For instance, KW S.A.'s mines operating in the vicinity of the A-1 and A-4 motorways, the S-1 highway and the AGTC railroad, are banned from mining in an area covering approx. 28% of their resources, which significantly reduces the estimated economic life of their deposits (Ziaro et al. 2013).

The winding up of hard coal mines and reclamation of mining areas are very expensive and complex because they involve the shutdown of horizontal and vertical mine workings. In order to secure funding for this purpose, mining enterprises are required to transfer 3-10% of depreciation charges of the mining enterprise's fixed assets to the mining enterprise liquidation fund. However, those charges may turn out to be insufficient. According to estimates of Safuga et al. (2008), several years ago this problem applied to more than one-half of mining enterprises. According to WISE Institute's similar estimates for the currently existing mines, the liquidation fund will not be able to cover the costs of winding up of approx. 1/3 of mining enterprises.

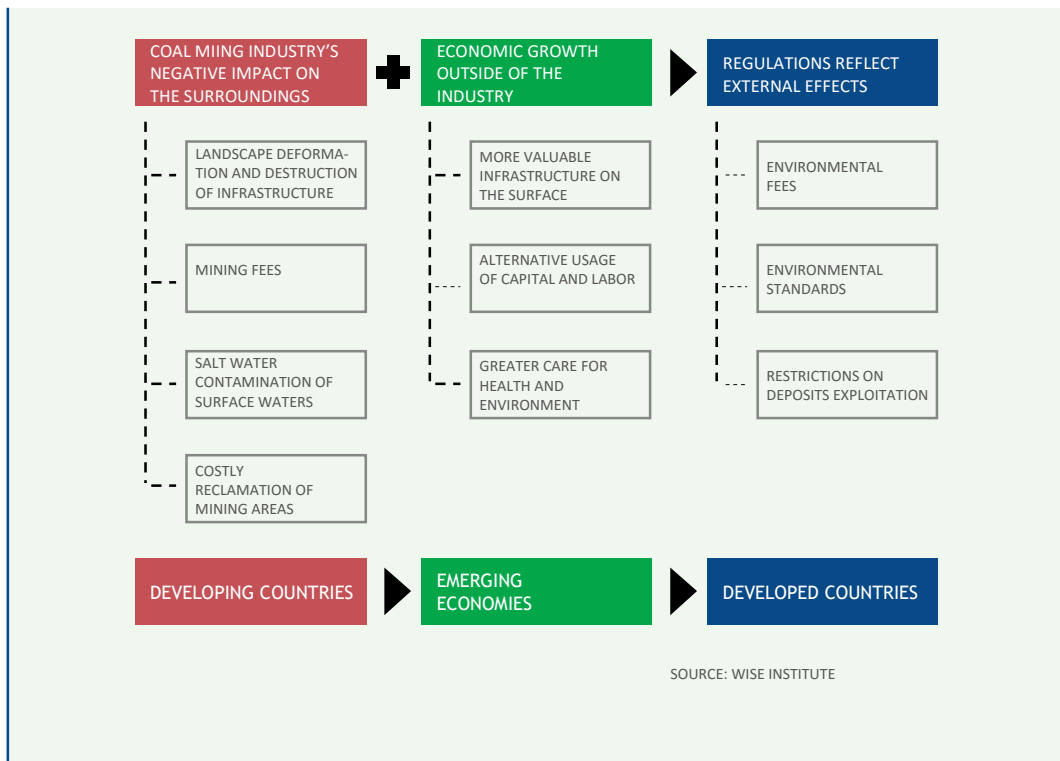
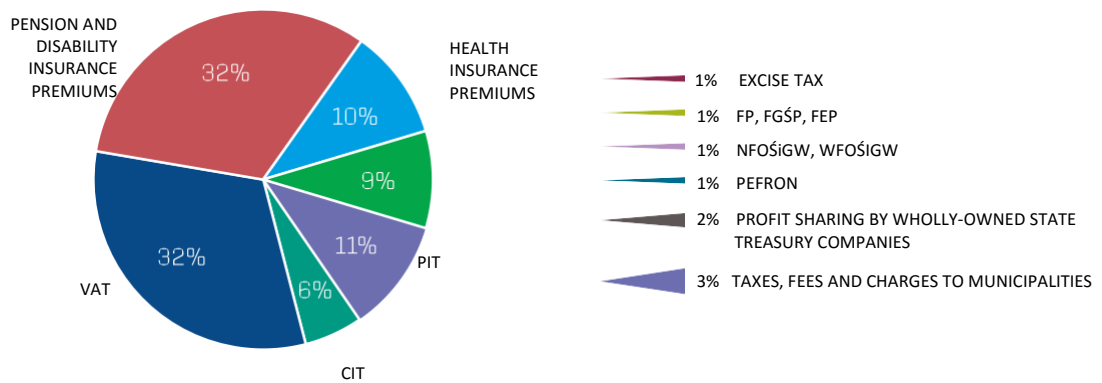


CHART 5. STRUCTURE OF TAX AND PARA-TAX BURDENS OF THE COAL MINING IN 2011-2013



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE MINISTRY OF THE ECONOMY

The inclusion of social insurance contributions in these calculations makes the picture less advantageous to the coal industry. For an average employee in the industrial and service sectors, in each case when an insurance contribution is paid, this creates an obligation on the part of the state for that employee's future. This results from the principles of operation of the public pension system. Therefore, from the perspective of the long-term position of public finance, in most industries ZUS contributions are not considered net proceeds as far as public finance is concerned. The situation is different when it comes to subsidised benefits in the coal industry: funds paid by the mines in the form of ZUS contributions do not cover the state's additional liabilities towards the retired miners. Those liabilities are already being covered by all taxpayers and will have to be covered by them in the future. Hence, the overall position of the mining pension system is negative as far as public finance is concerned.

CHART 6. NET TAX REVENUES PER EMPLOYEE IN THE COAL INDUSTRY AND IN OTHER SECTORS, 2011-2013



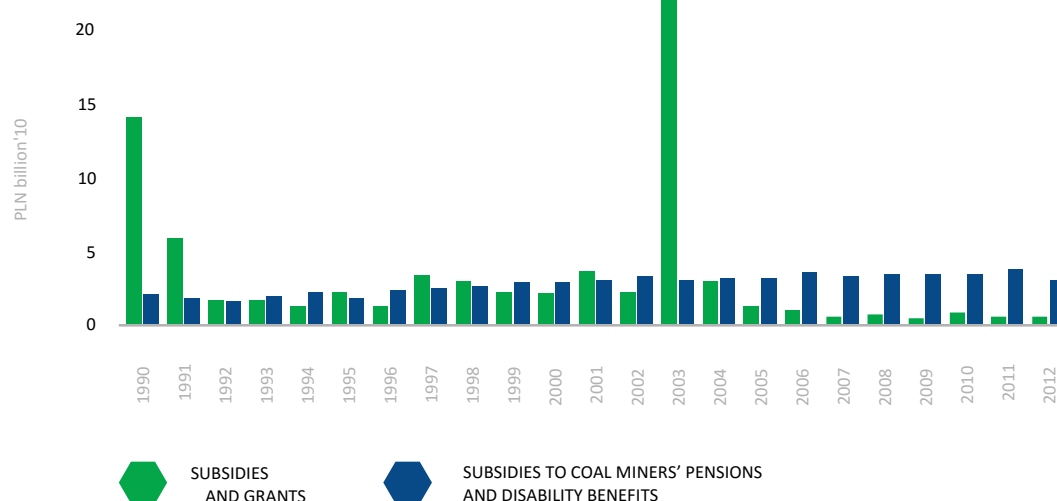
NOTE: OTHER SECTORS EXCLUDING AGRICULTURE

SOURCE: WISE'S CALCULATIONS BASED ON DATA FROM THE CENTRAL STATISTICAL OFFICE OF POLAND AND THE MINISTRY OF THE ECONOMY (SEE BUKOWSKI AND ŚNIEGOCKI (2014))

The complete account of net tax revenues per employee reveals that one coal miner pays approx. one-half of the amount of levies paid by one employee of other branches of the economy, even despite the fact that the miner's wage is twice as high. What is important is that although, in recent years, direct subsidies to the coal industry were relatively low and were mostly transferred to Spółka Restrukturyzacji Kopalń (Mine Restructuring Company), the current difficult situation of the domestic coal mining creates a risk that they will be growing in the coming years. Although EU regulations impose far-reaching restrictions on the member states in this regard, the experience of the most recent crisis in the industry in 2003 shows that a considerable portion of aid in a crisis situation includes cancellations of public liabilities, in particular liabilities towards ZUS.

A worrying signal in that regard was the adoption, in July 2014, of legislation to defer the repayment of the industry's overdue liabilities (mostly of Kompania Węglowa S.A.) towards ZUS until 2016. A deferral of the payment of contributions constitutes state aid because it is a form of loan granted to the company by the state. According to calculations by UOKiK, in the case of Kompania Węglowa, the deferral of the payment of liabilities of more than PLN 280 million by 1.5 years (without extension fees) amounts to public aid to KW S.A. of more than PLN 20 million.

CHART 7. SUBSIDIES TO THE HARD COAL MINING, 1990-2012



SOURCE: BUKOWSKI AND ŚNIEGOCKI (2014)

Available data do not confirm the assertions that the hard coal industry is excessively burdened and that it has a particular significance to public finance. As compared to other industries, coal mining is not excessively burdened with public dues. Moreover, the coal miners' high contributions to ZUS paid today will result in disproportionately higher disbursements in the future. Because of this, an average coal miner makes smaller contributions to the state budget than an average employee of other industries and service sectors. Regardless of any opinion on the rationale for subsidising social insurance contributions paid by the coal miners, the problems of the Polish hard coal mining do not originate from the Polish state's fiscal policy but from the coal industry itself.



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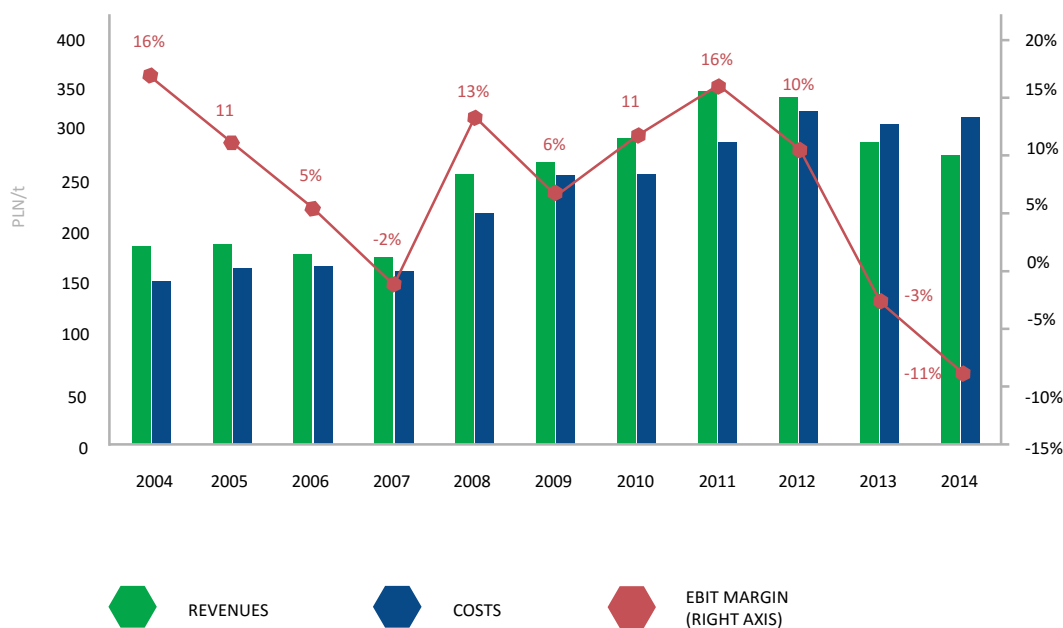
CAN HARD COAL MINING
IN POLAND BE
ECONOMICALLY VIABLE?

Reasons for the low profitability of the Polish coal mining sector

A comparison of revenues from coal sales and costs of coal extraction in the recent ten years demonstrates that problems of the Polish coal mining are attributable to an increase in unit extraction costs in 2007-2012. This period witnessed a boom on the global coal market during which the prices of coal were several times higher than a decade before. The impact on the Polish coal mines of the so-called Great Recession, which affected the OECD countries in 2007-2010 leading to a significant drop in the prices of fossil fuels on the global markets, was mitigated by the simultaneous weakening of the Polish zloty against the euro and the U.S. dollar. This allowed the industry to maintain growth in sale prices of coal until 2012. However, 2013-2014 witnessed a rapid decline in prices of raw materials on the global market, and the foreign exchange mechanism could no longer serve as an effective buffer protecting the Polish coal industry from disturbances in the global economy. The economic slowdown and the saturation of demand on the emerging markets, especially in China, as well as an increased coal supply from the exporter countries, including the United States, which were forced to export part of their domestic production, permanently altered the global coal market.

The Polish coal mining was completely unprepared for such a turn of events. Even under favorable market conditions, the average margins of coal mining enterprises remained low, because growth in prices resulted in pro rata growth in costs, mostly wages. The uptrend on the coal market resulted in higher wages of coal miners and, by and large, the coal mines did not invest in increasing the productivity of extraction or building any buffers to safeguard them from the effects of a crisis. This resulted in present-day problems with profitability of the industry and the growing conflicts around reducing the costs of labour in the mines.

CHART 8. REVENUES AND COSTS PER TONNE OF COAL AND THE EBIT MARGIN IN THE POLISH HARD COAL MINING



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE MINISTRY OF THE ECONOMY

TABLE 1. VARYING PROFITABILITY OF THE POLISH COAL INDUSTRY – EBIT MARGINS OF KEY COAL-MINING COMPANIES

	2011	2012	2013	2014
KOMPANIA WĘGLOWA	5%	2%	-12%	-15%
KHW	6%	4%	6%	5%
JSW*	29%	15%	3%	-11%
BOGDANKA	20%	21%	22%	18%

*INCLUDES THE ENTIRE JSW CAPITAL GROUP WHICH, IN ADDITION TO HARD COAL MINES, ALSO INCLUDES COKING PLANTS

SOURCE: WISE INSTITUTE BASED ON FINANCIAL STATEMENTS OF THE COMPANIES AND DATA FROM THE MINISTRY OF THE ECONOMY

Not all Polish coal mining companies were affected by the downtrend on the coal market in the same way. The last two years were the most painful to enterprises owned by the State Treasury, including the largest company, i.e. Kompania Węglowa S.A., whose Earnings Before Interest and Taxes (EBIT) did not exceed 5% even when the coal prices were high. Under new market circumstances, such poor performance resulted in huge losses, leading Kompania to the verge of bankruptcy and forcing the government to intervene. On the other hand, Lublin’s Bogdanka coal mine had completely different performance indicators. Thanks to investments, labor productivity increased and costs of coal extraction were kept under control. It consistently recorded high profit margins during periods of both favorable and unfavorable conditions on the coal market.

What specifically is the cost advantage of Lublin's Bogdanka coal mine? When comparing the structure of coal extraction costs, we can see that Bogdanka has much lower costs of labor, attributable mostly to a much greater productivity of extraction. Bogdanka extracts more than twice the amount of coal per employee than the average for all Polish coal mines. Other categories of costs, including taxes and fees, are also much lower. This stems from much more efficient coal extraction and management in Lublin's Bogdanka coal mine as well as different geological conditions in the Lublin region than in Silesia. The only cost category which is higher than in the rest of the sector is depreciation. This stems from a greater usage of machines in production, which translates into a lower employment and the company's lower costs of labour. In addition, the costs of third party services and costs of consumption of materials and energy are not much different from the average. After combining all those factors, it may be inferred that the company is very effective in replacing the costs of labour with machinery and outsourcing.

CHART 9. COSTS OF EXTRACTION PER TONNE OF COAL IN THE POLISH MINES IN 2014.

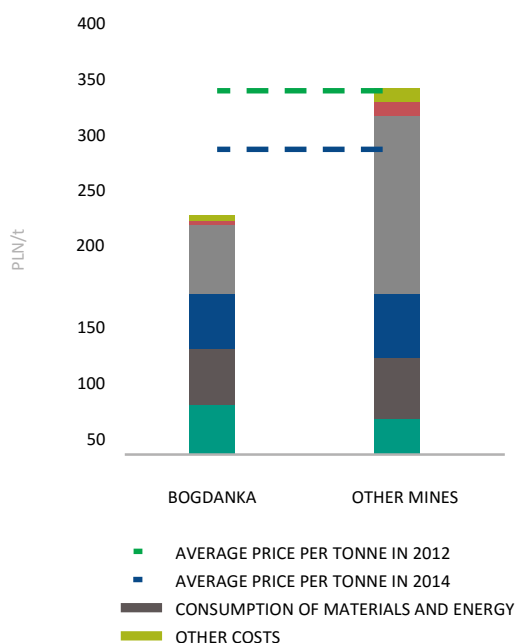
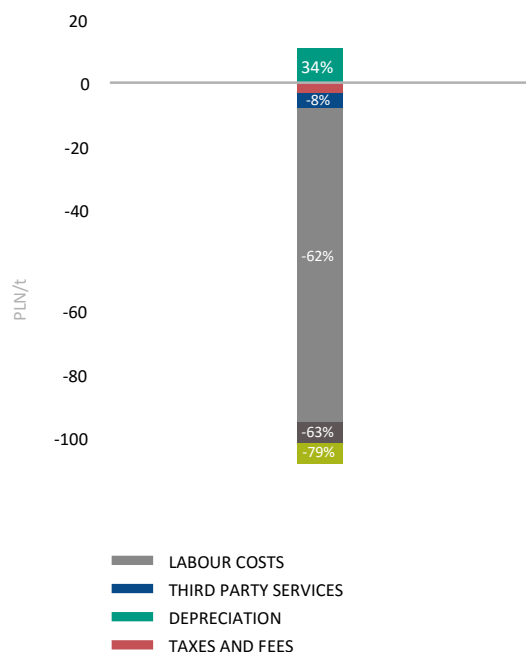


CHART 10. DIFFERENCE IN COSTS OF EXTRACTION PER TONNE OF COAL BETWEEN THE BOGDANKA COAL MINE AND THE REST OF THE SECTOR IN 2014.

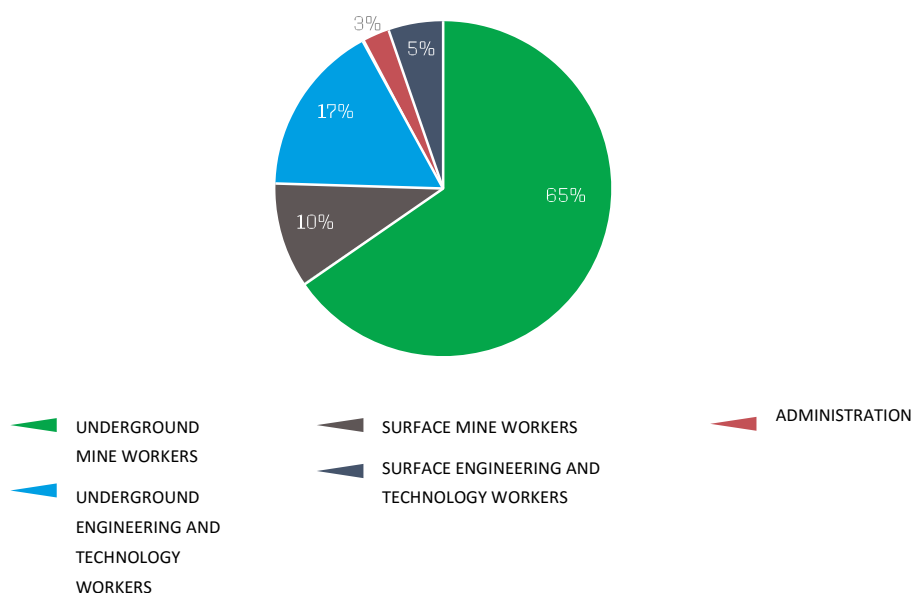


SOURCE: WISE INSTITUTE BASED ON DATA FROM THE MINISTRY OF THE ECONOMY AND BOGDANKA S.A.

The main factor determining the costs of extraction per tonne of coal, and therefore profitability of coal mines in case of a decline in coal prices, is the unit cost of labor. It is impossible for the Polish coal industry – which currently faces bankruptcy – to regain profitability without a radical reduction in the unit cost of labour. But what type of labour are we talking about here? Is it possible to achieve that effect only through limiting administrative expenses or will those reductions also have to include workers and specialists employed in the mining companies? On the basis of publicly available data on the employment structure and average wages, we estimated the structure of labour costs in the Polish coal industry. The results show that the share of administration in the payroll is small, but the share of wages of underground miners in the entire labor expenses of coal mining companies

in the entire labor expenses of coal mining companies is dominating and accounts for 2/3 of those expenses. Therefore, remedial actions will have to involve not only cuts of wages and/or employment in administration but also in other professional groups, including underground miners. The largest problem of unprofitable Polish mines is a low productivity of coal extraction across the entire labour force – not overstaffing in administration or too high administrative expenses.

CHART 11. STRUCTURE OF LABOR COSTS IN HARD COAL MINING

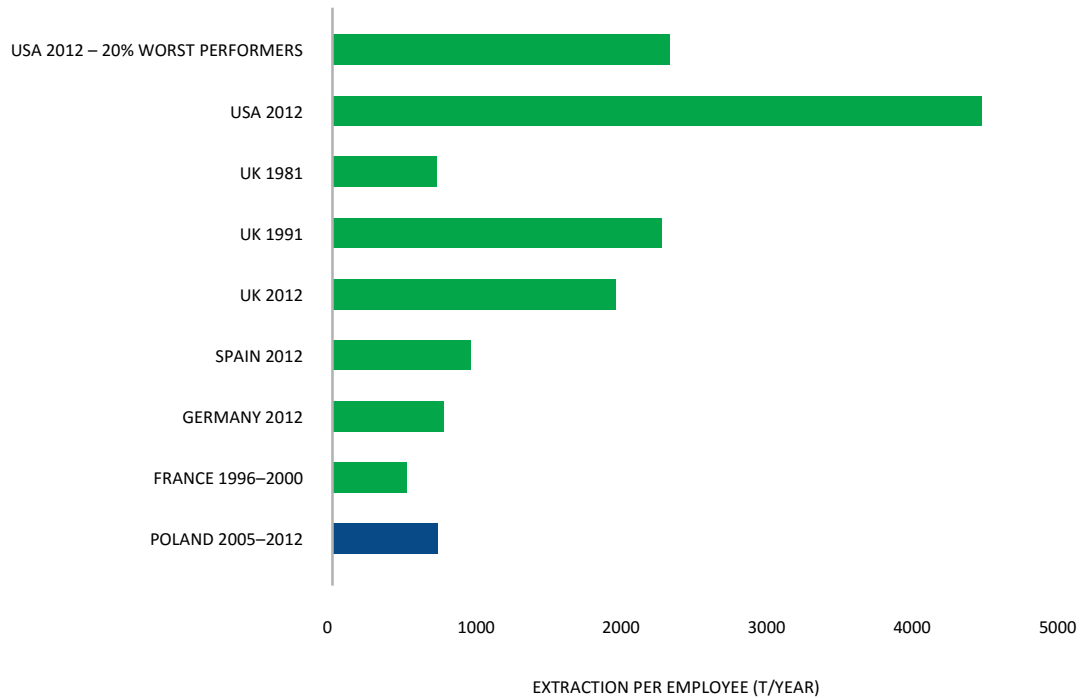


SOURCE: WISE INSTITUTE BASED ON DATA FROM THE MINISTRY OF THE ECONOMY AND COAL-MINING COMPANIES

The scale of the challenge to improve productivity may be illustrated by comparing Poland to the economies of developed countries with underground coal mining operations. The average productivity of coal extraction of 700 tonnes per employee may be compared only to old Western European mines which have been subsidized for many years and which are scheduled to be wound up before 2020. A significant improvement in coal mining productivity was achieved only in the UK during the times of Margaret Thatcher’s government. However, this involved termination of coal mining operations in unprofitable mines and conflicts with trade unions. A gradual depletion of the remaining deposits and the wage pressure from the services sector caused the British coal mines also to lose their ability to compete on the global market. A different situation is in the United States which still has very large resources of easily accessible hard coal. Operations in the U.S. coal mines are characterized by significant mechanization and good organization of the coal extraction process. The U.S. underground coal mines are much more productive than European ones, and even the ones recording the worst results are three times as profitable as the Polish average. Thanks to this, the U.S. underground coal mining sector may operate despite considerably higher wages than in Poland.

Because improvement in productivity of the Polish coal industry is crucial for its future, the next part of this study will focus on the possibilities of improving the current situation and the challenges facing the domestic coal mines in the context of economic processes and geological conditions.

CHART 12. PRODUCTIVITY OF UNDERGROUND HARD COAL MINES IN EUROPE AND THE USA



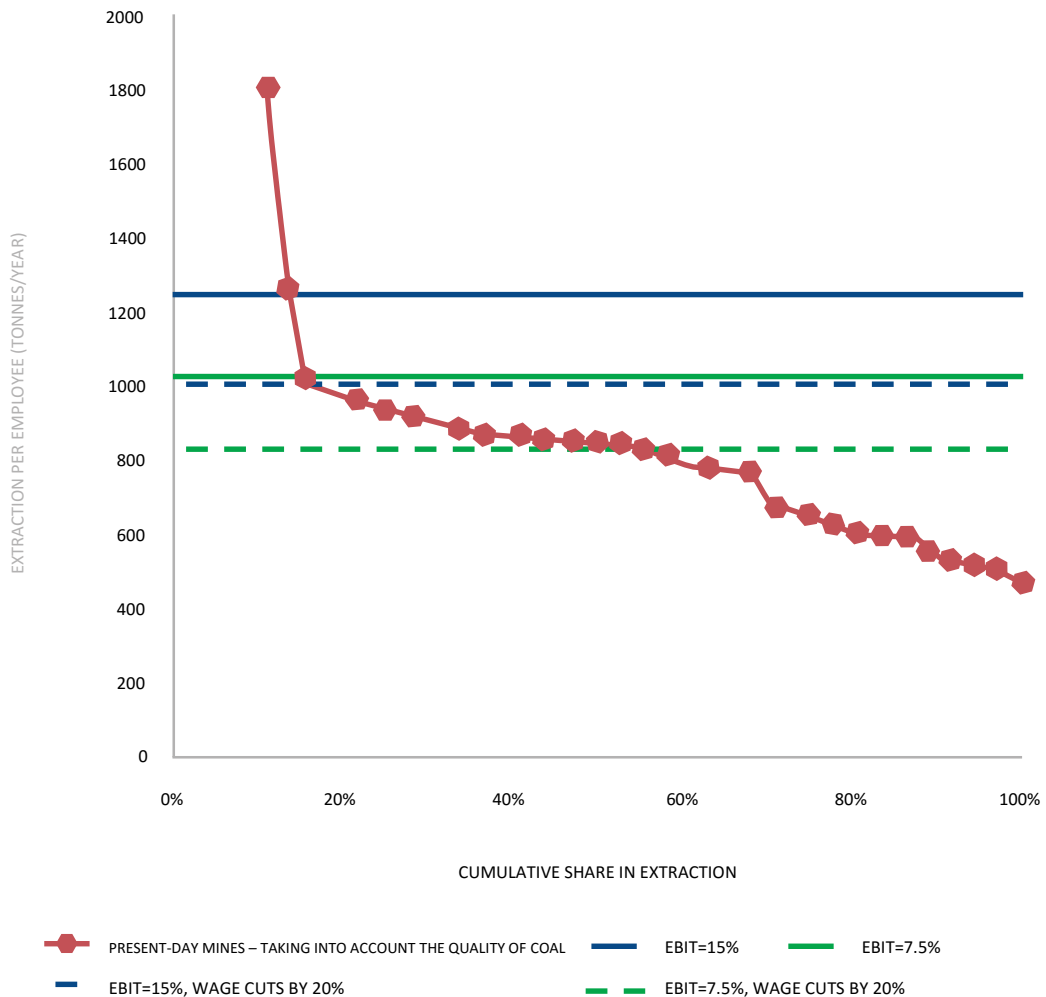
SOURCE: WISE INSTITUTE BASED ON DATA FROM EUROSTAT, DECC AND EIA

Quick reform of the coal mining sector – challenge until 2020

The public debate regularly sees postulates to improve the efficiency of the domestic coal mining sector as a condition for maintaining the coal mining operations in Poland in the perspective until 2020. Those postulates indicate the general direction of changes but they do not precisely define the extent of the necessary corrections. To make up for it, we have estimated the minimum productivity which the coal mining companies should achieve in order to become sustainably profitable. To this effect, we have made the following assumptions:

- after the reform of state-owned mining companies, the relation of non-payroll expenses to revenues will be consistent with the best domestic practices (Bogdanka);
- costs of labour may be adjusted only through improvement in productivity, i.e. a change in the ratio of extracted coal to the number of employees, not through wage cuts;
- in order for the necessary investments in modernization and maintenance of coal mines to be justified from the market standpoint, the EBIT margin should be at least 15%. A single-digit result on coal sales will not be enough for the company to cover the costs of loans and secure the minimum rate of return for the investors; under such circumstances, investments will not be sufficient and the production will quickly die down.

CHART 13. CURRENT MINIMUM PRODUCTIVITY OF SUSTAINABLY PROFITABLE COAL EXTRACTION AND CURRENT PRODUCTIVITY OF THE POLISH COAL MINES



NOTE: ALL FIGURES APPLY TO THERMAL COAL WITH STANDARD CALORIFIC VALUE

SOURCE: WISE INSTITUTE BASED ON DATA FROM THE MINISTRY OF THE ECONOMY AND COAL-MINING COMPANIES

The focus must be on employment reduction while maintaining production (in the short term) because an alternative option, i.e. increasing production while maintaining the employment, is quite unlikely. This is also confirmed by experience from previous years when increased production – despite much more favorable market conditions – only led to increased reserves of unsold coal. A decrease in unit costs was not enough for the coal to become competitive in terms of prices in areas beyond the close proximity of the mining enterprises. Therefore, we could see a demand barrier there.

The estimated minimum productivity of a coal mine will be achieved if the relation of extraction to employment allows the mine to maintain wages at the current level, cover other expenses – on the condition of efficient management of the extraction process, and offer the investors a return on invested capital adequate to the market risk incurred by them. Our estimates also take into account varying values of different types of hard coal.

The minimum productivity, as defined above, currently stands at approx. 1,250 tonnes per employee while the average productivity of the domestic coal mining sector stands at approx. 700 tonnes per employee. Only 20% of domestic production has productivity greater than the threshold, and this applies mostly to Lublin's Bogdanka coal mine. More than 80% of production is attributable to mines which are significantly below the indicated level of productivity. The least productive 20% of Polish coal mines would have to improve their productivity more than twice to achieve sustainable profitability.

How will the performance change if wages are reduced or if there is an investor (e.g. the State) willing to accept a lower rate of return on capital? In order to answer this question, we conducted an additional sensitivity analysis with a reduction in the EBIT margin by one-half and wage cuts in the coal mines by 20%. Both changes have a similar impact on minimum productivity, bringing it to a level of approx. 1000 tonnes per employee. However, this does not result in a significant growth in the share of sustainably profitable coal mines in Poland. Only preferential terms for the financing of investments in the coal mining combined with considerable wage cuts will make a noticeable change. However, under this scenario, only one-half of the Polish coal industry will be sustainably profitable.

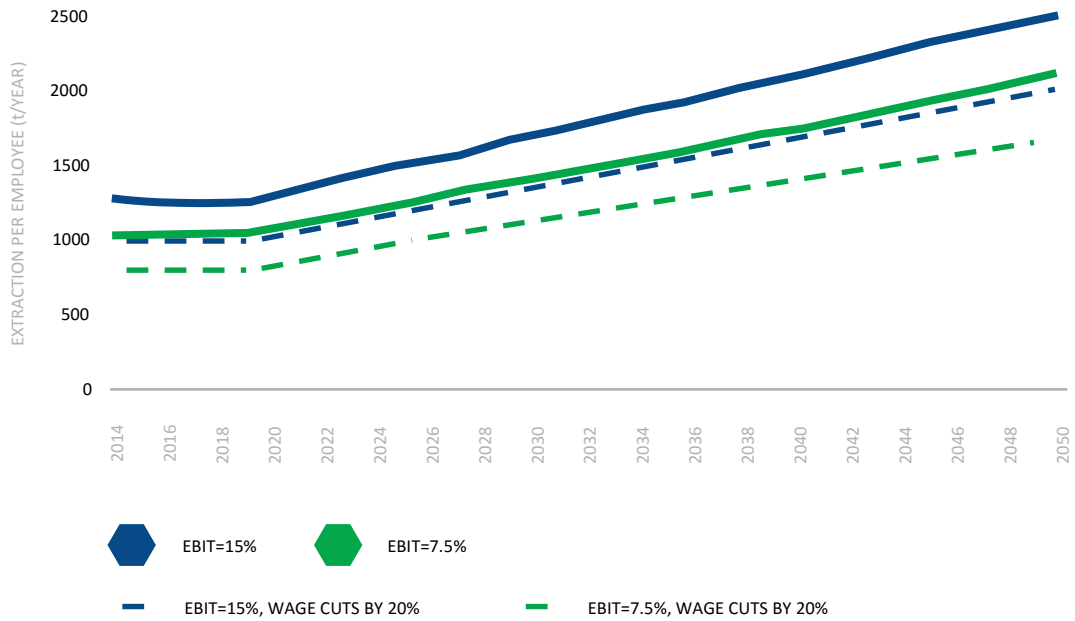
The foregoing estimates show the extent of adjustments which have to be made in the Polish coal industry. An effective restructuring of the coal mining requires a qualitative change leading to a major improvement in labor productivity.

Continuous productivity improvement – challenge for the future

The above-described radical improvement in efficiency will be the first step to be taken by those coal mines which intend to stay on the market after 2020. Economic growth means a gradual increase in the average wages in the economy. Hence, there will be a wage pressure from the robustly expanding industries and service sectors where the improvement in labour productivity is greater than in coal mining. This pressure forces the industries exposed to international competition – which cannot transfer the costs of increasing wages onto end users – to continuously restructure their costs. The hard coal mining is an example of such an industry.

In order for the domestic coal mining to overcome the wage pressure, there will either have to be favorable external conditions, i.e. growth in coal prices, or the mining enterprises will have to increase real labour productivity. However, international forecasts show that, in the long term, the prices of hard coal imported to Europe will be increasing at a much slower rate than wages in Poland.

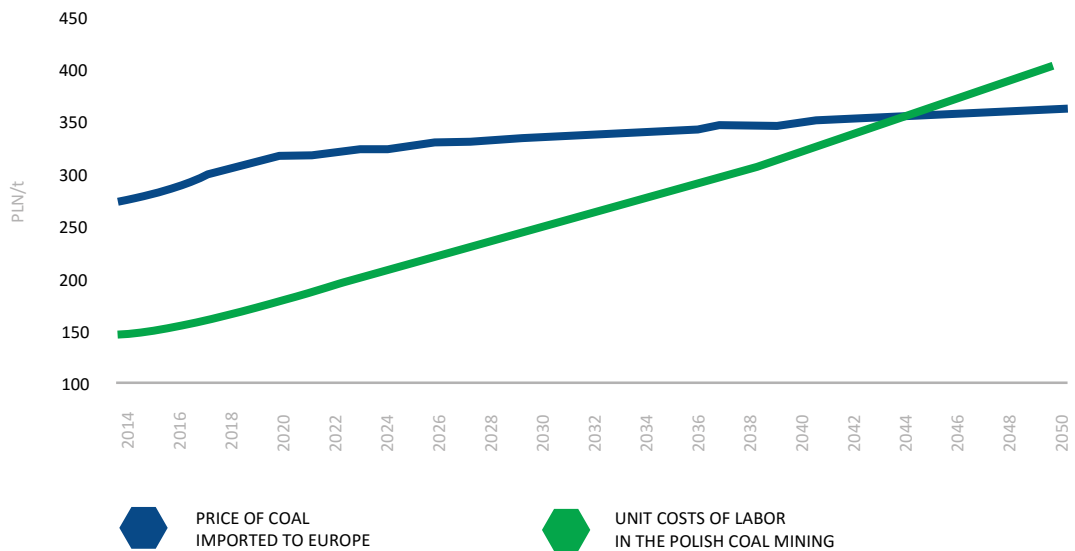
CHART 14. MINIMUM PRODUCTIVITY AT WHICH EXTRACTION WOULD REMAIN SUSTAINABLY PROFITABLE, 2014-2050.



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE MINISTRY OF THE ECONOMY AND COAL-MINING COMPANIES;

NOTE: CALCULATIONS FOR HARD COAL WITH STANDARD CALORIFIC VALUE

CHART 15. GROWTH IN COSTS OF LABOR IN THE POLISH COAL MINING AT CONSTANT PRODUCTIVITY OF COAL EXTRACTION, AND PRICE OF COAL IMPORTED TO EUROPE



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE MINISTRY OF THE ECONOMY, THE MINISTRY OF FINANCE AND THE INTERNATIONAL ENERGY AGENCY

However, domestic coal mines cannot wait through the period of low prices and regain profitability in the future only thanks to better external conditions. The International Energy Agency forecasts that growth in coal prices will not catch up with growth in wages in Poland (as forecasted by the Ministry of Finance) until 2020. In the years to come, costs of labor in the Polish coal industry will be growing at a much faster rate than the prices of coal, leading to greater losses in the industry. This means that:

- for the standard EBIT margin and taking into account the absence of wage cuts, the average efficiency of Polish coal mines will have to reach a level of at least approx. 2,500 tonnes per employee in 2050. This level is close to the best ratios in the European Union (United Kingdom);
- for a reduced EBIT margin and one non-recurring wage cut during the initial restructuring, the average productivity in 2050 would have to exceed 1,650 tonnes per employee, i.e. slightly less than the current productivity of the most productive Polish coal mine;

The Polish coal mining will have to endure not only the “sprint race” of a difficult restructuring process until 2020 but also an equally demanding “marathon” of continuous improvement in profitability in the coming decades.



3

PROSPECTS OF THE
POLISH HARD COAL
MINING UNTIL 2050

The productivity of coal mines depends on both economic and geological factors. The geological factors include the type of the mine (for instance, open-cast mines have lower costs of extraction) and the characteristics of the deposit (depth of the deposit, thickness of the seams, etc.). The economic factors include primarily organisation of work and mechanisation – because the higher the labour costs, the more profitable it is to replace manual labour with machinery. In order to precisely define the geological and economic potential for restructuring of the Polish coal mining, we would have to carry out an in-depth analysis at the level of individual mining enterprises. Instead, here we present a thorough sensitivity analysis the assumptions for which are based on detailed publicly available data:

- **Coal prices**, non-payroll expenses and the growth rate of wages will be consistent with the estimates of the International Energy Agency and the Ministry of Finance presented earlier;
- By 2020, the full **reform process** of state-owned mining enterprises will be completed. After that date, only those mines which achieve the minimum productivity to ensure sustainable profitability and which have adequate coal resources to be mined will continue their operations;
- The **distribution of productivity** of coal extraction in the restructured mines reflects different geological conditions and, as such, remains constant. However, thanks to economic restructuring the productivity of labor consistently improves;
- Productivity is improved through a **reduction in employment**;
- Productivity in the industry steadily grows as a result of **organizational progress**, technological progress and the mechanization of coal mining operations. In 2050, the best coal mine in the country will achieve a productivity of 2,500 tonnes per employee;
- On the demand side, forecasts take into account the **differences on the domestic market** attributable to transportation expenses: in this respect, domestic coal mines have a cost advantage when meeting demand in the south-western regions of the country but do not have such an advantage in the northern and eastern parts of the country.

The results of the forecast show that it is very likely that by 2020 the domestic hard coal production will see a significant decline. Maintaining the production at a level similar to the current one would require – in addition to considerable restructuring efforts – significant wage cuts or an investor willing to accept low rates of return on investments in the domestic coal mining. A combination of these two very demanding factors would give a short-lived breathing space to the Polish coal industry. In subsequent years, the wage pressure will begin to grow and – in combination with deteriorating geological conditions and depletion of the mines’ current resources – will translate into significant declines in production, regardless of other assumptions. It is very likely that after 2040 the Polish hard coal industry will completely cease to exist. It should be expected that by 2030 the production will fall by 2/3.

Changes in employment will be even more far-reaching. If there are no wage cuts and if there is no access to cheap financing, then by 2020 the headcount in the hard coal mining will have to decrease by 3/4. Employment reductions in the coal industry may be temporarily mitigated by wage cuts and/or favorable terms of financing provided to coal mining enterprises (e.g. through maintaining state ownership), however a cut of 40-50% should be considered minimum in the assumed price scenario.

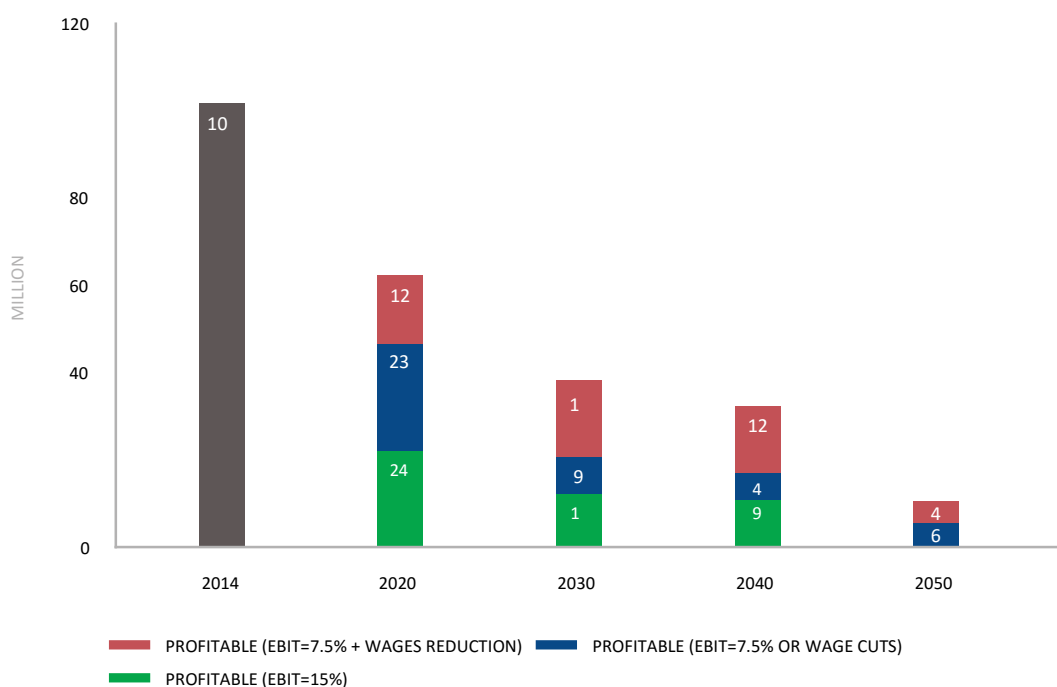
In 2030, the industry is likely to employ fewer than 20,000 miners. To verify the sensitivity of the results of the forecast, we considered – in addition to the central scenario presented above – also four additional scenarios. Two of them refer to uncertainties associated with geological conditions (see box 2) and the other two with the coal mines’ market environment.

CHART 16. DOMESTIC HARD COAL SUPPLY (FORECAST IN THE CENTRAL SCENARIO)



SOURCE: WISE INSTITUTE

CHART 17. EMPLOYMENT IN THE HARD COAL INDUSTRY (FORECAST IN THE CENTRAL SCENARIO)



SOURCE: WISE INSTITUTE

Under the scenario which assumes that a **geological barrier** is encountered, the productivity of the best mine ceases to increase after 2020 and does not exceed 2,000 tonnes per employee. Under the scenario which assumes the **opening of new mines**, new locations are gradually opened until 2050. The potential of those investment projects corresponds to the ratio of reserves that have not yet been used to the deposits from which the coal is currently mined or was mined in the past. Under the scenario which assumes **low coal price**, the coal price is 20% lower than in the central scenario, which results from an unfavorable situation on the global coal market and/or strengthening of the Polish currency which will reduce the price of imported coal expressed in PLN. On the other hand, under the scenario which assumes **high coal price**, it is 20% lower than in the central scenario as a result of a global uptrend on the coal market and/or the weakening of the Polish zloty.

The results of the sensitivity analysis show that there are no qualitative differences between the different scenarios: the domestic hard coal mine extraction and employment will decline. The greatest drop in production will take place before 2030 and the largest headcount reduction will occur already by the end of this decade. In the coming years, the most important factor will be coal prices. However, in the coming decades, geological factors will be just as important as economic ones.

TABLE 2. DOMESTIC HARD COAL SUPPLY – ALTERNATIVE SCENARIOS OF THE FORECAST

	2014	2020	2030	2040	2050
HIGH COAL PRICE	71	68	36	25	11
NEW MINES	71	48	30	27	6
CENTRAL SCENARIO	71	48	25	21	0
GEOLOGICAL BARRIER	71	48	12	10	0
LOW COAL PRICE	71	23	10	10	0

TABLE 3. EMPLOYMENT IN HARD COAL MINING – ALTERNATIVE SCENARIOS OF THE FORECAST

	2014	2020	2030	2040	2050
HIGH COAL PRICE	101	34	16	11	5
NEW MINES	101	24	13	11	2
CENTRAL SCENARIO	101	24	11	9	0
GEOLOGICAL BARRIER	101	24	6	5	0
LOW COAL PRICE	101	11	4	4	0

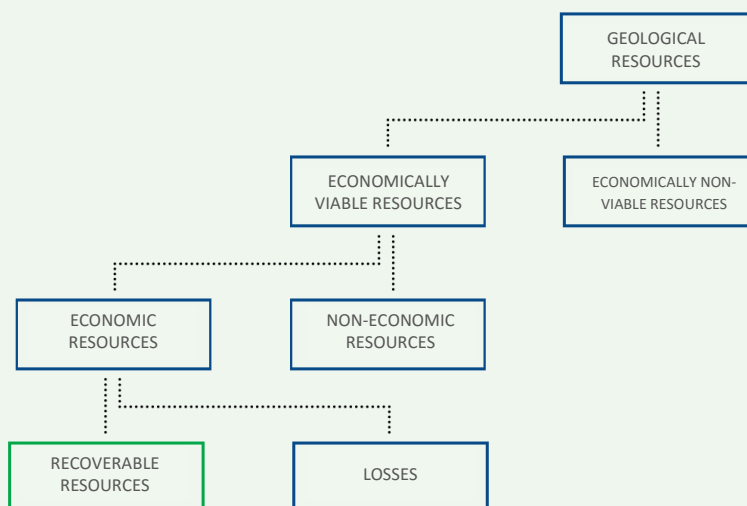
NOTE: FOR ALL SCENARIOS, THE REQUIRED EBIT = 15% AND NO WAGES REDUCTIONS WERE ASSUMED

SOURCE: WISE INSTITUTE

BOX 2. GEOLOGICAL BARRIERS TO DEVELOPMENT OF THE POLISH COAL INDUSTRY

Any analysis of development prospects of the Polish hard coal mining sector should take into account the geological potential and barriers of this industry. Different types of coal resources should be distinguished. They are divided into economically viable resources which can be mined because of favorable natural conditions and non-economically viable resources. A large quantity of economically viable resources, which currently stands at approx. 51.3 billion tonnes, could be misleading because the resources which can actually be mined are much smaller. Economically viable resources consist of economic resources, i.e. resources which can be profitably mined according to the conditions outlined in the deposit development plan, and non-economic resources. The quantity of coal to be actually mined is determined by recoverable resources which are equal to economic resources minus losses generated in the course of the mining. On the other hand, recoverable resources are divided into the part that can be mined according to the licenses in effect – currently, approx. 2.6 billion tonnes – and other resources.

DIAGRAM 2. FROM GEOLOGICAL TO RECOVERABLE RESOURCES OF THE MINING INDUSTRY

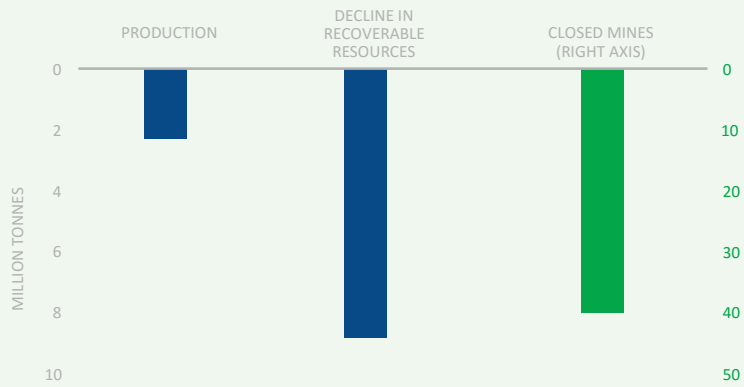


SOURCE: WISE INSTITUTE

Even the recoverable resources will not necessarily be mined – this depends on economic factors. In 1990-2011, recoverable resources of hard coal decreased in Poland at a rate approx. 4 times higher than the scale of the mining operations would suggest. This may be attributed to: (1) shutdown of 40 out of 147 mines, (2) the remaining mines' efforts to improve profitability through consolidation of coal extraction, and (3) reclassification of some deposits in the course of economic transformation (Paszczka 2012).

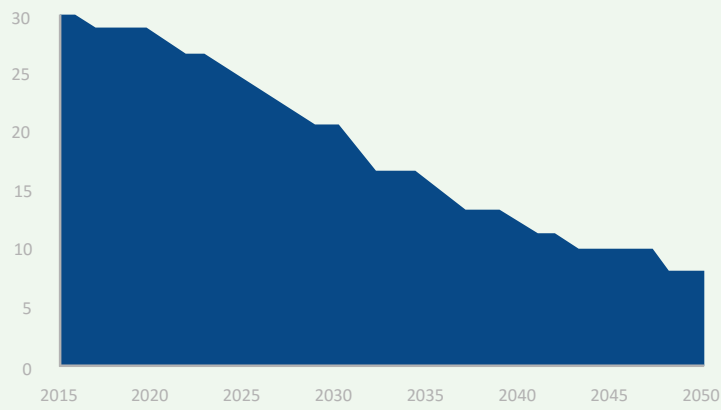
Assuming that the mines will retain the current level of coal production and not taking into account the issues related to profitability, after 2020 the mines' resources will begin to run out rapidly. Strictly for geological reasons, in 2020, 27 mines will be able to continue production, however their number will decrease to 20 in 2030, 13 in 2040 and 9 in 2050.

CHART 18. POLISH HARD COAL MINING IN 1990-2011



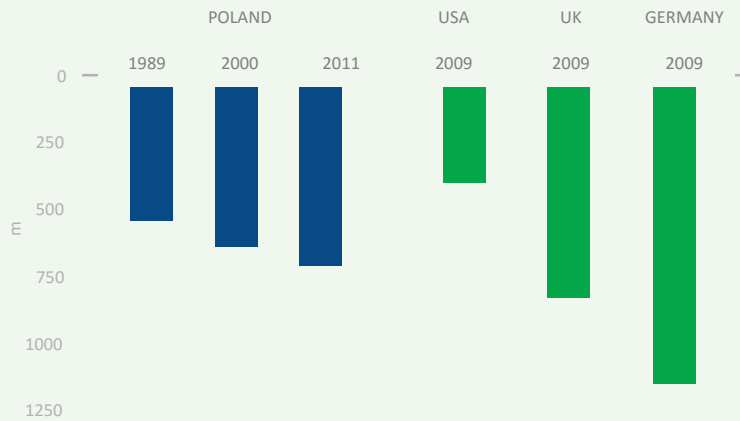
SOURCE: WISE INSTITUTE BASED ON DATA FROM DUBIŃSKI AND TUREK (2012) AND THE MINISTRY OF THE ECONOMY

CHART 19. NUMBER OF COAL MINES WITH RESOURCES SUFFICIENT TO CONTINUE PRODUCTION



SOURCE: WISE INSTITUTE BASED ON DATA FROM DUBIŃSKI AND TUREK (2012) AND THE MINISTRY OF THE ECONOMY

CHART 20. AVERAGE DEPTH OF EXTRACTION IN UNDERGROUND HARD COAL MINES



SOURCE: WISE INSTITUTE BASED ON DATA FROM DUBIŃSKI AND TUREK (2012) AND PRUSEK (2010)

Because the resources are being depleted, extraction has to be carried out at greater depths, which decreases profitability and reduces the potential for improvement in efficiency. From 1989 to 2011, the average depth of coal extraction in Poland increased by 181 meters. Poland is getting similar in this respect to countries like the United Kingdom or Germany which have already shut down almost all of their hard coal production.

If no significant investments in new deposits are made, in the coming 20 years almost one-half of Polish coal mines will lose their capacity to conduct hard coal production strictly as a result of the depletion of resources. In addition, adverse external effects of underground coal mining will lead to more restrictions on the extent of permitted mining operations, thus shortening the economic life of coal mines (Ziarno et al. 2013). Under such circumstances, it may be unfeasible for technical reasons or unattractive for economic reasons to undertake any investments to improve productivity of the existing coal mines. Moreover, new coal mines, like the old ones, may encounter similar conflicts in several places with the already existing surface infrastructure. Due to the significant discrepancy between the quantity of all of the Polish coal resources and the resources which are actually extracted in a profitable way as well as a long history of coal mining operations in the course of which a large part of the easily accessible resources have already been mined, the coal mines are reaching the end of their economic life and are running out of possibilities in terms of new investments in the mining industry.

Implications and forecasts

IMPLICATIONS FOR THE STATE'S ENERGY POLICY

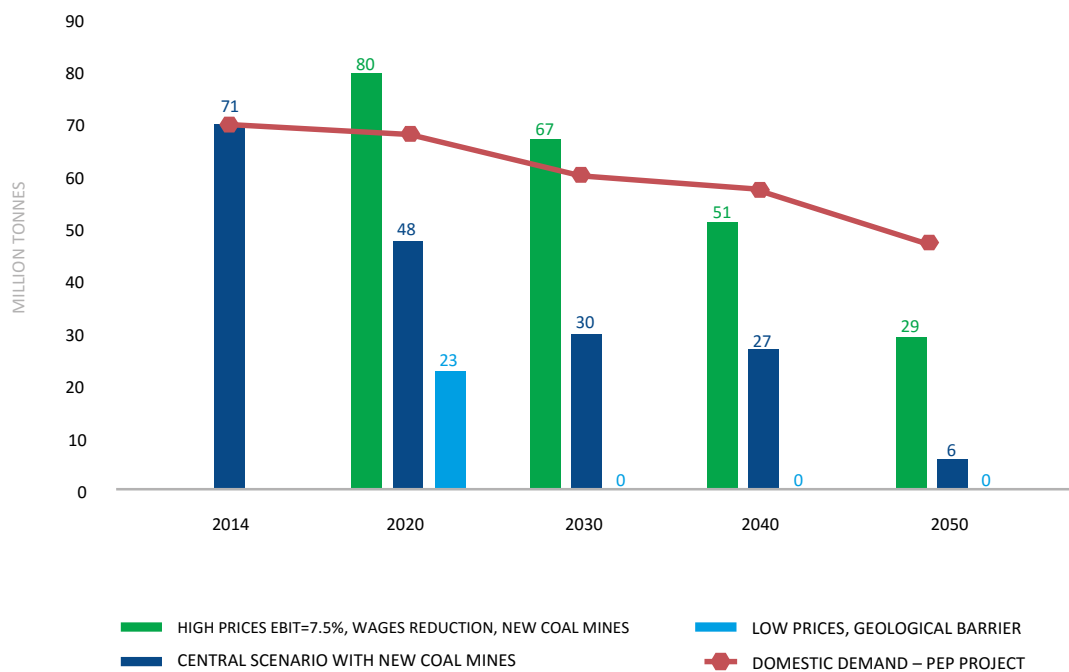
Poland's current energy policy assumes a gradual diversification of the energy balance and replacement of old coal-fired power plants with more efficient ones. This will result in a steady reduction of demand for hard coal in the coming decades. Will the rate of this reduction be consistent with the rate of reduction of domestic production output?

According to our forecasts, this will not be the case. Already in 2020 the restructured Polish coal mines will produce much less coal than today. Unless technological changes in the energy sector are implemented at a faster rate than contemplated in the government's strategic documents, the Polish coal mining will be able to satisfy only a small portion of the domestic demand for coal.

This may not be the case only if the following favorable circumstances occur simultaneously: (I) efficient restructuring of the sector, encompassing wage cuts, (II) large increase in coal prices on global markets, (III) no geological barriers that would prevent the opening of new mines, and (IV) possibility of obtaining financing for some investments on preferential terms from the State or the banking sector.

However, even if the foregoing circumstances occur, after 2040 Poland will be forced to import large quantities of coal. This may seem like a long period of time but, given the long period of construction and operation of mines and power plants, in order to ensure the State's energy security, we should make forecasts for at least the next 25 years.

CHART 21. DOMESTIC HARD COAL SUPPLY UNDER VARIOUS FORECAST SCENARIOS AND DEMAND UNTIL 2050 FORECASTED UNDER THE POLISH ENERGY POLICY PROJECT.*



SOURCE: WISE INSTITUTE

The possibility of materialization of the pessimistic scenario should not be ruled out. Due to limited growth in coal prices on global markets as a result of supply exceeding demand in global terms, the fact that most Polish coal mines are encountering geological barriers and the fact that the possibility of financing costly investments in the power sector and the mining sector is limited, in the next dozen or so years the Polish coal mining operations will be practically discontinued.

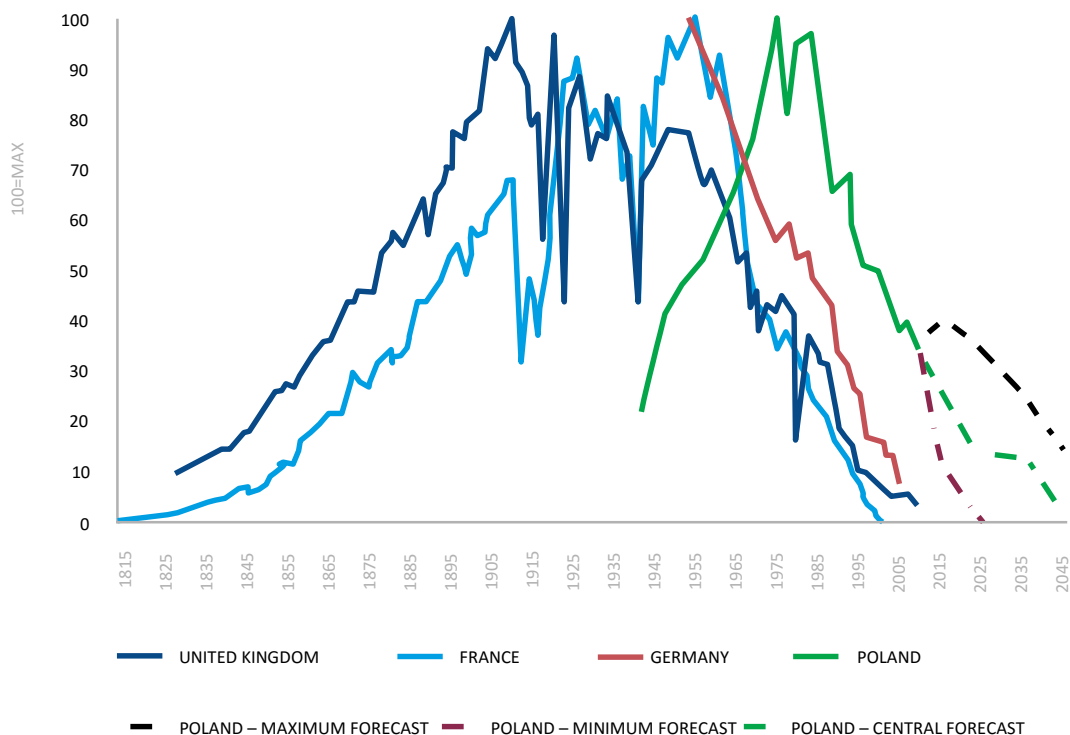
The scenario which is the most likely to materialize is the intermediate scenario under which the restructuring of the sector will face numerous difficulties but some of the mines will be able to adapt to new market conditions and new investment projects in the Lublin region will replace the dwindling mining operations in Silesia.

Under this scenario, hard coal will still be mined in Poland in an economically viable way but the volume of coal production will be gradually decreasing, forcing either imports of coal or decarbonisation of the Polish power sector at a rate much faster than that assumed by the government.

If the goal of the Polish energy policy is to adapt the domestic energy sector to the potential of the Polish coal industry, then it should emphasize technological diversification and reduction of emissions in the Polish energy sector to a much greater extent. A decrease in domestic demand for coal by more than 60% by 2040 and by more than 80% by 2050 will enable Poland to continue to rely on domestic coal resources and thereby maintain the current level of independence in the power sector as far as coal supplies are concerned.

Poland’s power sector will also have to transition to other sources of energy or cut its dependence on coal imports. Such changes, albeit new for Poland, will be the same as the changes which have already been implemented by other EU member states. Analysis of long-term trends of coal production in Poland shows that the dwindling down of the coal mining is somewhat similar to the path travelled by the UK and Germany 20-30 years ago. Similar processes, i.e. the depletion of easily accessible deposits, an increase in labor costs and pressure from international competition, occurred in Western European countries in the past. In order to predict the future of the Polish coal industry in 2015-2030 or by 2040, we may take a look at the restructuring experience of Western European countries in the 1980s and 1990s.

CHART 22. “PEAK COAL” – EXTRACTION OF COAL IN WESTERN EUROPEAN COUNTRIES AND IN POLAND

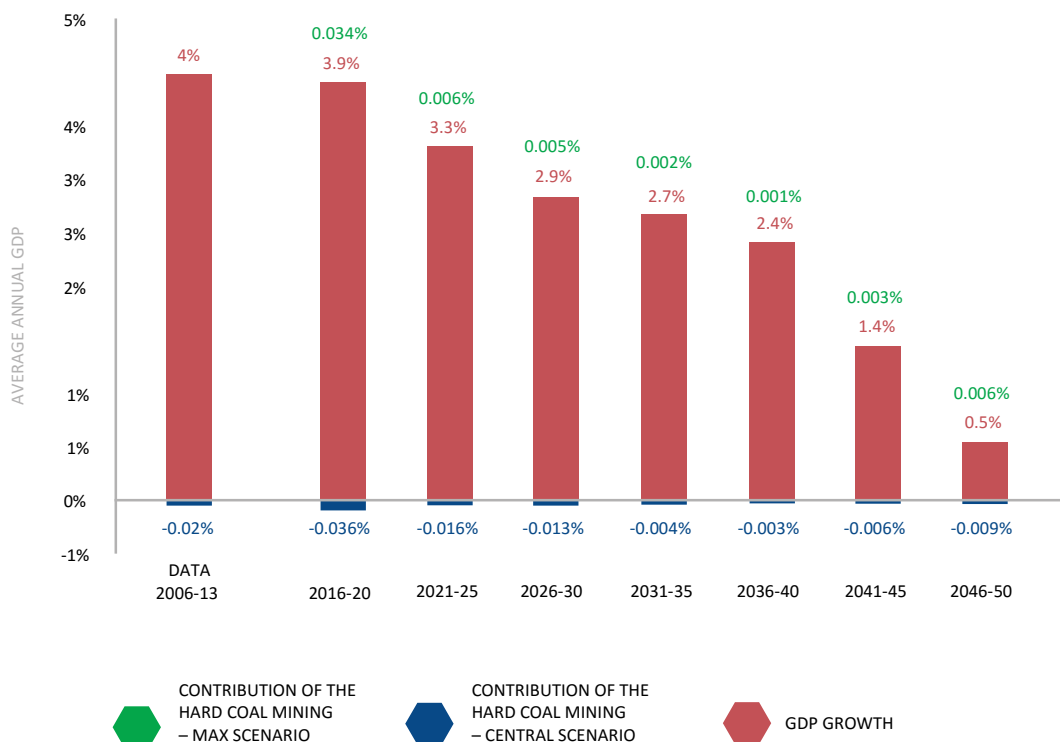


SOURCE: WISE INSTITUTE BASED ON OWN FORECAST AND POLAK (2009); RUTLEDGE (2010); UK DECC; STATISTIK DER KOHLENWIRTSCHAFT E.V.

IMPLICATIONS FOR THE POLISH ECONOMY

In the decades to come, the hard coal mining will not become the driving force of the Polish economy. Its impact on GDP growth and wages will be negligible. Under very favorable circumstances, the coal industry will make a positive contribution to the Polish economy, but it should be expected that the industry's value added will be growing at a much slower rate than in other sectors. Under the central scenario, which is the most probable one, the coal mining will continue to have a slight negative impact on Poland's economic growth, however this adverse effect will be diminishing because the sector's share in the economy will be declining. The industry will have a noticeable impact on the economy only under the negative scenario assuming a complete failure of the restructuring process and discontinuation of the coal mining until 2030: in 2015-2020, the average annual GDP growth rate will be 0.1% lower as a result of the shutdown of most of the mines – as compared to the scenario assuming a successful restructuring of the sector. However, this impact will be temporary and small compared to other economic processes, in particular further improvement in efficiency of Polish manufacturing.

CHART 23. CONTRIBUTION OF THE HARD COAL MINING TO GDP GROWTH UNTIL 2050 UNDER VARIOUS SCENARIOS



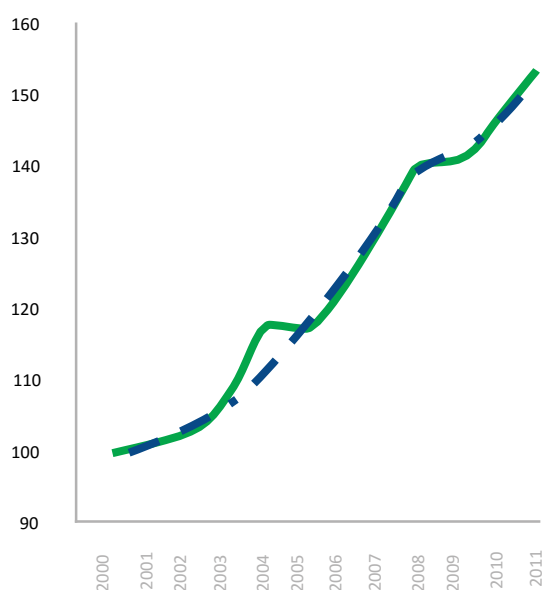
SOURCE: WISE INSTITUTE

IMPLICATIONS FOR LOCAL ECONOMIES

Despite the fact that the inevitable decline in the Polish hard coal mining will have a marginal impact on the economic development of the entire country, it will be a significant challenge locally. The restructuring of the industry has primarily affected and will affect Śląskie voivodship: out of its 167 municipalities, 60 are mining municipalities, i.e. municipalities in which coal mining is or was conducted.

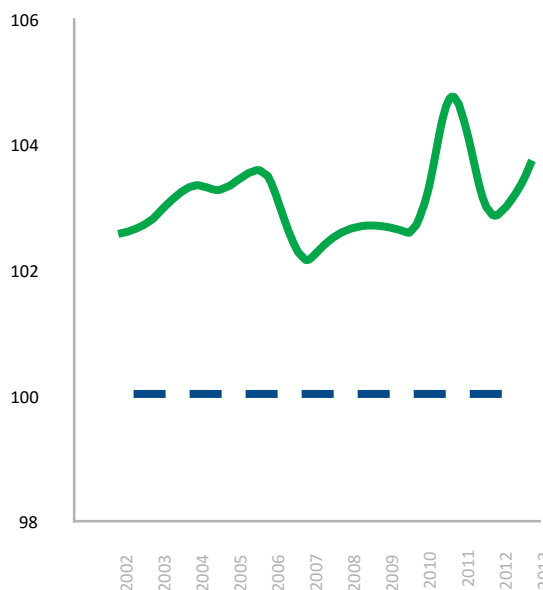
The region's previous experience in this area gives rise to optimism. Since the beginning of economic transformation in Poland, the employment in the coal industry decreased from 416 thousand persons in 1989 to 101 thousand in 2014, i.e. by more than 3/4. In spite of that, currently Śląskie voivodship ranks third in Poland in terms of GDP per capita and the growth rate is no different than in the rest of the country. It also ranks above the national average in terms of average wage. The advantages of Śląskie voivodship include robust development of manufacturing, made possible thanks to Poland's inclusion in the value chains of European enterprises after the country's accession to the EU (Bukowski and Śniegocki 2011).

CHART 24. GDP PER CAPITA GROWTH RATE IN POLAND AND ŚLĄSKIE VOIVODSHIP (2000 = 100)



SOURCE: WISE INSTITUTE BASED ON DATA FROM EUROSTAT AND THE LOCAL DATA BANK OF THE CENTRAL STATISTICAL OFFICE OF POLAND

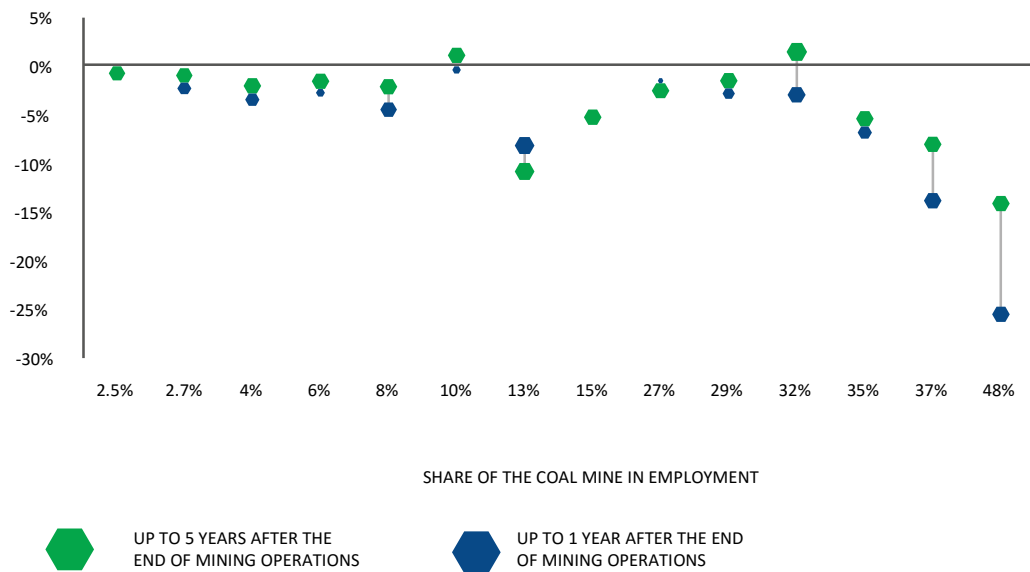
CHART 25. AVERAGE WAGE IN ŚLĄSKIE VOIVODSHIP (POLAND = 100)*



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE LOCAL DATA BANK OF THE CENTRAL STATISTICAL OFFICE OF POLAND

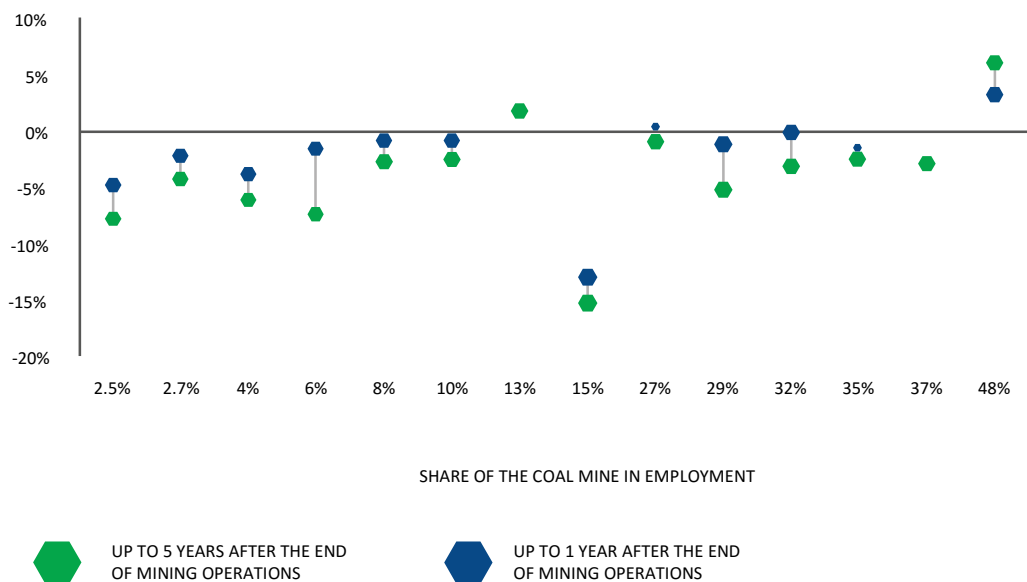
The effects of restructuring of the coal mining are the most visible at the level of municipalities, not voivodships. Accordingly, we analyzed 14 coal mine liquidation cases from 1997-2005 in terms of their impact on employment and population in municipalities. In both cases, we focused on the period starting 1 year before the commencement of the mine liquidation process to 1-5 years after the end of the mining operations.

CHART 26. COMPOUND ANNUAL GROWTH RATE (CAGR) OF EMPLOYMENT AS COMPARED TO NATIONAL AVERAGE (0% LINE) IN MUNICIPALITIES IN WHICH COAL MINES WERE CLOSED



SOURCE: WISE INSTITUTE BASED ON DATA FROM THE LOCAL DATA BANK OF THE CENTRAL STATISTICAL OFFICE OF POLAND, SIEMIENIEC ET AL. (2005), JURECZKA AND GALOS (2007) AND SAŁUGA ET AL. (2008)

CHART 27. COMPOUND ANNUAL GROWTH RATE (CAGR) OF POPULATION AS COMPARED TO NATIONAL AVERAGE (0% LINE) IN MUNICIPALITIES IN WHICH COAL MINES WERE CLOSED

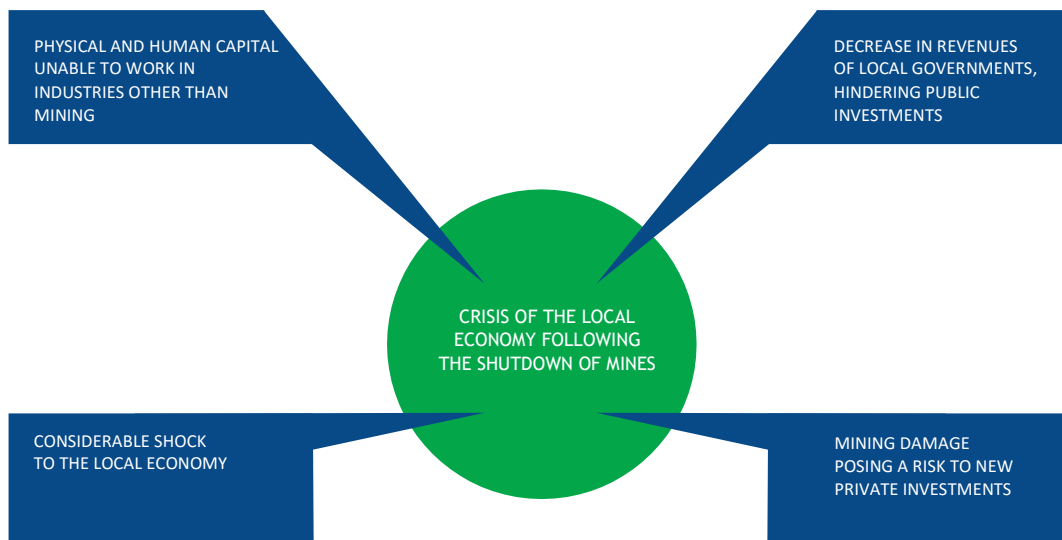


SOURCE: WISE'S STUDY BASED ON DATA FROM THE LOCAL DATA BANK OF THE CENTRAL STATISTICAL OFFICE OF POLAND, SIEMIENIEC ET AL. (2005), JURECZKA AND GALOS (2007) AND SAŁUGA ET AL. (2008).

In most cases, the winding-up of coal mining resulted in a rapid decline in employment in the municipality within one year after the end of mining operations. After five years from the end of mining operations, the situation usually improved but, generally speaking, the local labor market was still below the national average. A drop in employment was considerably lower in municipalities where less than 10% of the population worked in the mines. This indicates the risk of industrial monoculture to local economies: municipalities where a plant employing several dozen percent of professionally active population is closed down find it much harder to absorb the sharp increase in unemployment rate than municipalities where people also work in other industries.

Difficult situation on the local labor market results in intensification of migration processes. Within one year after the end of mining operations, the deviation of the population growth rate in municipalities from the national average was approx. 3 times lower than that of employment. However, within five years after the end of mining operations, population was decreasing at a rate very similar to employment. Nevertheless, there is no clear correlation between the share of employment in a mine and the impact of the mine's liquidation on the population of the municipality. This is primarily related to the fact that, in the past, the majority of miners from liquidated coal mines were able to retire early and, secondly, because of the large population density in Silesia people commuted to work from nearby locations. In 71% of municipalities from the 2011 sample, more people commuted to work in other locations than into those municipalities.

DIAGRAM 3. IMPACT OF COAL MINE SHUTDOWNS ON LOCAL ECONOMIES



SOURCE: WISE'S STUDY

The data presented are consistent with patterns observed in large industrialized regions in Western countries which had to go through a difficult restructuring process (Bukowski and Śniegocki 2011). The shrinking of the local economic base is a considerable shock to the local labor market that results in a drop in employment and an increase in the unemployment rate. As time goes by, local communities adapt to the new situation in two ways: through migrations and through development of new branches of the economy. However, this is a long-term process and its successful outcome is uncertain. In the West, examples can be found of either successful transformations (the Ruhr region, Pittsburgh) or a permanent social and economic collapse (Detroit). A significant challenge is posed by the fact that physical capital and the peoples' skills are oriented towards the previously thriving industry. In this case, the most important factor includes investments in the base for new industries and services to ensure diversification of the economy. Good-quality infrastructure as well as institutions educating qualified staff capable of carrying out R&D activities are equally important. A considerable challenge includes obtaining funds for those investment projects which are characterized by long payback periods. The financing capability of local governments is limited due to a decrease in their revenues. Mining municipalities also have to deal with an additional specific problem which does not occur in other industrial areas: a negative impact of mining damage on the region's attractiveness in terms of investments. The risk of destruction of infrastructure as a result of landscape deformations caused by mines which are still operating or have been shut down deters private investors, especially if they intend to use complex, expensive machinery which can be easily damaged. This problem is particularly visible in the city of Bytom where the surface infrastructure is continuously being damaged as a result of mining operations conducted below the urban area.

BOX 3. OPINION OF THE GENERAL PUBLIC ABOUT RESTRUCTURING OF THE COAL INDUSTRY

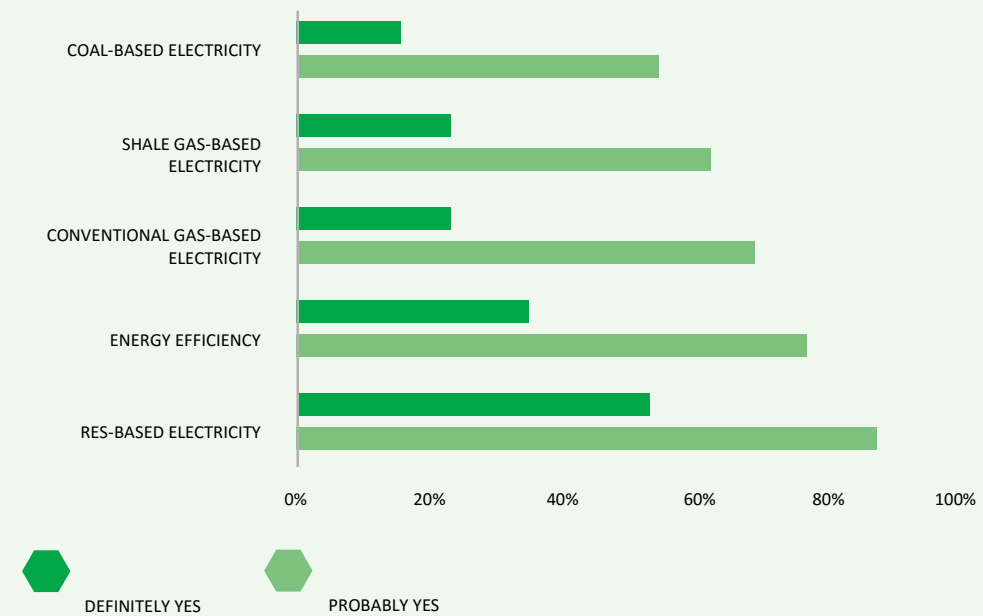
The extent of the necessary restructuring of the coal industry and the State's role in this process has remained an important element of public debate since problems in the industry emerged. How important is this issue to the general public? What will be their response to the difficult reforms of the Polish coal mining? What do they expect from the State under the current circumstances? The survey "Polish people's attitudes towards the coal industry", conducted by the CEM Institute in March 2015, answers these questions.

RESULTS OF THE SURVEY "POLISH PEOPLE'S ATTITUDES TOWARDS THE COAL INDUSTRY"

	WEIGHT OF THE ISSUE
ENERGY PRICES	4.46
ENERGY SECURITY	4.43
IMPACT OF COAL BURNING ON HEALTH	4.15
IMPACT OF COAL BURNING ON THE ENVIRONMENT	4.11
ECONOMIC SITUATION OF THE COAL INDUSTRY	3.61

SCALE: 1 – COMPLETELY UNIMPORTANT, 5 – VERY

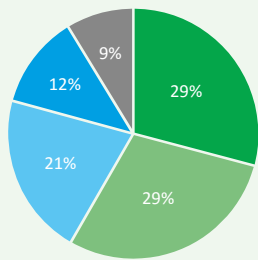
SHOULD THE GIVEN TYPE OF ELECTRICITY GENERATION BE SUBSIDIZED?



Polish people express much smaller interest in the economic situation of the Polish coal industry than in two other priority issues: energy prices and domestic energy security. It should be noted that the impact of coal burning on health and the environment is much more important to them than the condition of the industry. Hence, the Polish people are willing to evaluate the sector through its impact on their own welfare and security. At the same time, coal-based energy is not considered to be the preferred source of energy for Poland. In fact, the opposite is the case: 57% of respondents, when asked for a desired development direction for the domestic energy industry, indicated development of renewable energy sources, 16% mentioned nuclear energy and only 9% – coal-based energy. Subsidies to coal-based energy also enjoy considerably lower support than RES and energy efficiency.

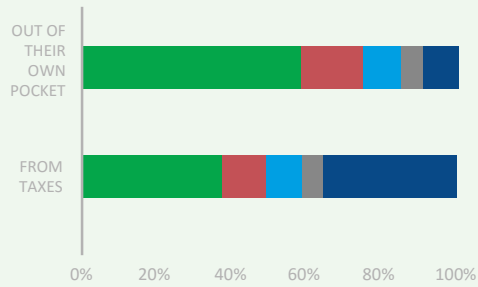
Only 25% of respondents support social privileges to coal miners and 64% want coal mines to operate on the same principles as other enterprises. However, 65% support subsidising the coal industry and purchasing more expensive domestic coal by the power plants to improve the State's energy security. The answers provided by the respondents also indicate solidarity with laid-off miners – the majority of respondents support shielding programs and the creation of new jobs in municipalities affected by restructuring. At the same time, they do not support the acquisition of unprofitable mines by State Treasury-owned entities. Most respondents are also of the opinion that unprofitable mines should be shut down. They also would not like to support the mines with their own money or with taxes paid by them. This means that the Polish society is ready to accept an ambitious coal industry reform program aimed at improving profitability of the mines and taking into account shielding programs for laid-off miners, however without permanent dependency of the industry and its employees on subsidies from the State budget.

SHOULD THE UNPROFITABLE MINES BE SHUT DOWN?



- ▶ DEFINITELY YES
- ▶ PROBABLY YES
- ▶ PROBABLY NO
- ▶ DEFINITELY NO
- ▶ I DON'T KNOW

HOW MUCH ARE THE POLISH PEOPLE WILLING TO PAY FOR THE COAL MINING PER MONTH?



- ▶ PLN 0
- ▶ UP TO PLN 10
- ▶ PLN 11-15
- ▶ ABOVE PLN 50
- ▶ I DON'T KNOW

METHOD OF SOLVING PROBLEMS OF THE COAL INDUSTRY	WEIGHT OF THE ISSUE
REMEDIAL PROGRAM FOR THE COAL MINING COMPANIES	77%
VOLUNTARY DEPARTURE PROGRAM FOR THE MINERS	75%
CREATING JOBS IN MUNICIPALITIES WHERE MINER LAYOFFS ARE ABOUT TO TAKE PLACE	74%
PRE-RETIREMENT BENEFITS PLAN FOR LAID-OFF MINERS	70%
ESTABLISHMENT OF A NEW MINING COMPANY WITH PARTICIPATION OF POWER COMPANIES	64%
WINDING UP UNPROFITABLE MINES	61%
SALE OF UNPROFITABLE MINES TO PRIVATE ENTERPRISES	56%
EMPLOYMENT REDUCTION	54%
SALE OF UNPROFITABLE MINES TO ENTITIES OWNED BY THE STATE TREASURY	49%

SOURCE: WISE INSTITUTE BASED ON THE RESEARCH OF THE CEM INSTITUTE (2015)



CONCLUSIONS

Polish coal mining is a declining industry which has a marginal impact on the country's economy. This stems from the size of the sector and from its development potential. Nowadays, the Polish coal industry is on the path already travelled by Germany or the UK in 1980-2000: a gradual shutdown of coal mining operations as a result of geological limitations, increasing costs of labour and stronger global competition.

The economic difficulties of the Polish coal mining are not attributable to excessive tax burdens. Quite the contrary: subsidised social insurance constitutes significant hidden support for the industry. The problems originate from high wages, overstaffing, insufficient mechanisation and poor labour management.

The condition for the industry to regain its economic viability is a significant improvement in productivity of coal production and the associated in-depth restructuring of employment, affecting underground miners. One-off wage cuts may reduce the extent of the necessary layoffs, but, in the long-term, pressure on wage increases in the whole economy will force further improvement in productivity and more layoffs in the coal mining. International and domestic examples demonstrate that some Polish coal mines might significantly improve the productivity of coal extraction, but the rest will encounter insurmountable geological barriers.

The success and swiftness of the coal industry's reform, the opening of new mines or geological and economic factors which are beyond the control of the domestic coal industry may affect the profitability of coal production but cannot reverse its decline in the long term. The Polish coal mining is very likely to experience a considerable decrease in production already before 2020, and it will inevitably decline by 2030.

Although, in terms of the whole economy, the decline in the coal mining will go almost unnoticed, it will be a large problem in municipalities which so far relied on coal monoculture. Polish and international experience demonstrates that revival of the local economy is possible, but it is a long-term process which requires support and involves migration to other regions.

Declining domestic demand for hard coal in the long term is consistent with the potential of the domestic coal mining. The State's current energy policy is too conservative in this respect as it assumes a relatively slow decline in demand for coal which will inevitably lead to an increase in coal imports in the near future.

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