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COAL OF PETROŞANI BASIN, A DESIDERATUM BETWEEN SUSTAINABLE EXPLOITATION AND ENERGY SECURITY

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ABSTRACT. – Coal of Petroşani Basin, a Desideratum between Sustainable Exploitation and Energy Security. Along with the market economy, sustainable development, ecological balance, property, economic freedom, financial system, social protection and scientific research, the natural resources of a country are the basis for building a modern, stable and strong economy. So, natural resources, including energy security are among the values of economic interest for national security. Being deeply interdependent, any malfunction in one of these areas significantly influences the other components of economic security. This paper aims to present the strategic role of the coals quartered in Petroşani Basin based on analyzes and highlighting the economic problems raised by the close of mining in the context of sustainable development of the region. The statistics show that in Petroşani Basin, the hard coal can also be extracted for approximately 60 years.

Keywords*: coal, mining activity, coal, Petroşani Basin, energy, sustainability.*

1. INTRODUCTION

Petroşani Basin, generically named "Jiu Valley" is the main bituminous coal resource of the country, which until 1990 provided raw materials for steel, metallurgy and energy (Pop, 1993). The national program has been operational since 1970 and 1980 providing a considerable increase in the quantity of coal to power plants and the use of oil and natural gas for electricity should have decreased from 50% in 1981 to 5% in 1990, while that, at those years, coal production was about 11 mil. tons/year. The transition from planned economy to market economy has led to a decrease in mining, ie the number of employees and hence the production of coal. Currently, the staff numbers from the production is 4700 people.

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Jiu Valley mining has a history of over 200 years and the Romania's industrialization could not be achieved without the deposit from here. During the economic boom, there were 48 active mines, four coal pits and five processing plants. In 2015 functioned seven mines and a processing plant at Vulcan. Currently only four mines are considered viable: Lonea, Livezeni, Vulcan and Lupeni (figure 1). Although the state is no longer interested in the Romanian domestic coal, the coal deposit is far from finished.

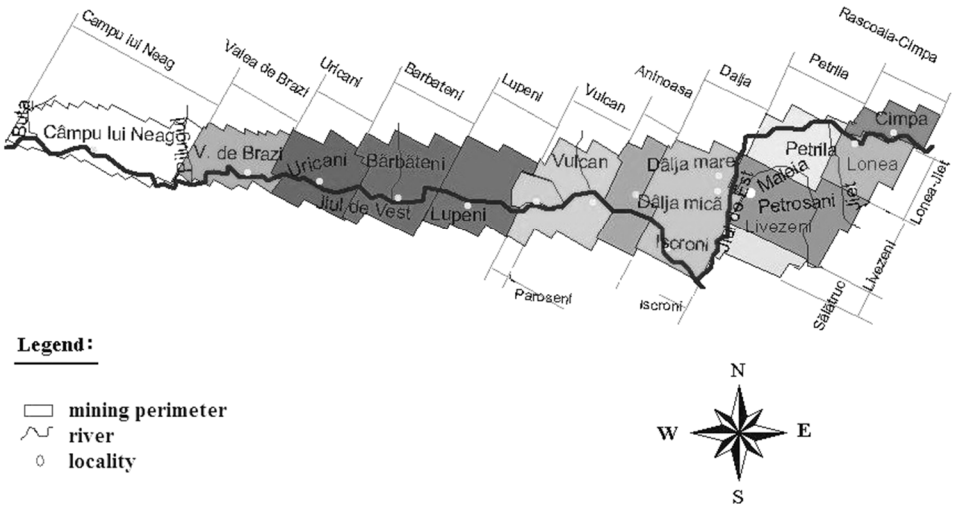

Fig. 1. Mining perimeters from Petroşani Basin
(Source: Nimara, 2010)

Given the characteristics of coal extracted from Petroşani Basin (energy coal with calorific value of 3650 kcal / kg) its use in power plants can only be equipped for this fuel and located as close to suppliers (Fodor, Pleşea, 2006). Currently, in Romania there are four power plants that use coal, two of which are in Hunedoara County (Paroşeni and Mintia). For these reasons, coal is a captive primary energy carrier and can not be subject to coal market in the true sense of the word.

Romania's coal deposits are located in complex geo-mining conditions and mineralogical characteristics that influence the quality are at the lower end. In terms of economic and energy for electricity production, indigenous coal, without subsidies becomes a marginal source.

2. SUSTAINABLE EXPLOITATION IN THE CONTEXT OF ENERGY SECURITY

Energy has become a strategic factor in global politics, a vital component for economic development and progress of society as a whole, generating a number of concerns worldwide since the immediately period following World War I.

Energy security occupies a key position on the international agenda and in the Romanian Energy Policy, its strategic goal is to ensure energy security, based on an efficient supply of primary resources (fossil energy resources and renewable resources), the production, distribution and supply, ensuring a continuous supply of all consumers in terms of accessibility, availability and affordability of prices, taking into account the evolution of environmental quality.

Romania has a wide range, but reduced quantity of primary fossil energy resources and minerals: oil, natural gas, coal and uranium, as well as an important potential of renewable resource. A fair assessment of the possibilities coverage requirement of primary energy resources must start from the current situation of proven reserves, coupled with realistic estimate of potential resources and in close correlation with consumption forecasts of resources determined by final energy demand. From this point of view at the moment it can be made the following estimation:

- lignite reserves can still ensure efficient exploitation for about 40 years at a production level of about 30 mil. tons/year (www.wmc.org.pl). The extraction of lignite in the level of state intervention is reduced, being limited to subsidies only for the exploitation of underground subsidy will be eliminated over time;

- in terms of coal reserves, restriction and closure of non-performing mining perimeters led to a situation where only 30% of the total geological reserves of coal are found in the concession perimeters of CEH. According to the guidelines, U.E. allows the coal subsidy to continue the operation for 2018 and this condition of strict implementation of a program of closing loss-making mines. It can be estimated that changes in production costs, the extra cost of CO_2 emissions and the removal of subsidies on production (required by the E.U.) will reduce the competitiveness of domestic production of hard coal and therefore the significant restriction of production (Proiect SPOS, 2008).

Even if they were closed based on economic or political issues, the mining perimeters still have important geological reserves that could be operated (table 1, table 2) (Buia et al., 2014):

Table 1. Situation of geological reserves from the closed mining perimeters (thousand tons)

Category	Câmpu lui Neag	Valea de Brazi	Aninoasa	Dâlja	Petrila Sud	Lonea Pilier
Probable geological reserves	978	18,355	99,678	24,254	27,209	41,693
Total geological reserves from mining perimeter	1,748	88,352	99,849	84,367	87,063	94,353
Energy value (kcal/kg)	4,776	5,343	5,539	5,434	5,566	5,788

Table 2. Situation of geological reserves from the closed mining perimeters, considered to be profitless (thousand tons)

Category	Uricani	Paroşeni	Petrila
Probable geological reserves	62,924	19,039	69,720
Total geological reserves from mining perimeter	110,769	41,473	88,457

The Romanian Government concluded that it can not endlessly keep alive the companies that go to loss. Currently, CEH is an insolvent company with a debt to the state budget of 165 981 506 lei and 2 180 403 lei from local budgets and short-term domestic bank loans of 486 320 182 lei and long-term bank loans of 117 240 591 lei.

In the last 20 years ago one could discuss the social impact of mine closure (dismissal of miners). Miners who currently were working in 1990 almost all of them got retired, considering that the retirement age is 45 years. So miners who will lose their jobs are those employed after the moment when the decision factors knew that mining should be restructured. As early of 2004 it was known that for 1000 lei of useful product from CEH is spent 4000 lei and CEO is the only coal mining company which still has competitive sides.

The electricity production from fossil fuels represents an important share in Romania. Much of this production is represented by the coal, which is a cheap fuel. In recent years there have been successes in terms of combustion gases remediation, for example at Paroşeni and Mintia power plants, which have gone through stages of refurbishment, which imposed long periods of stagnation of electricity production based on coal. Given that these steps were perfect, yet only four mines remain in operation, as shown below (figure 2):

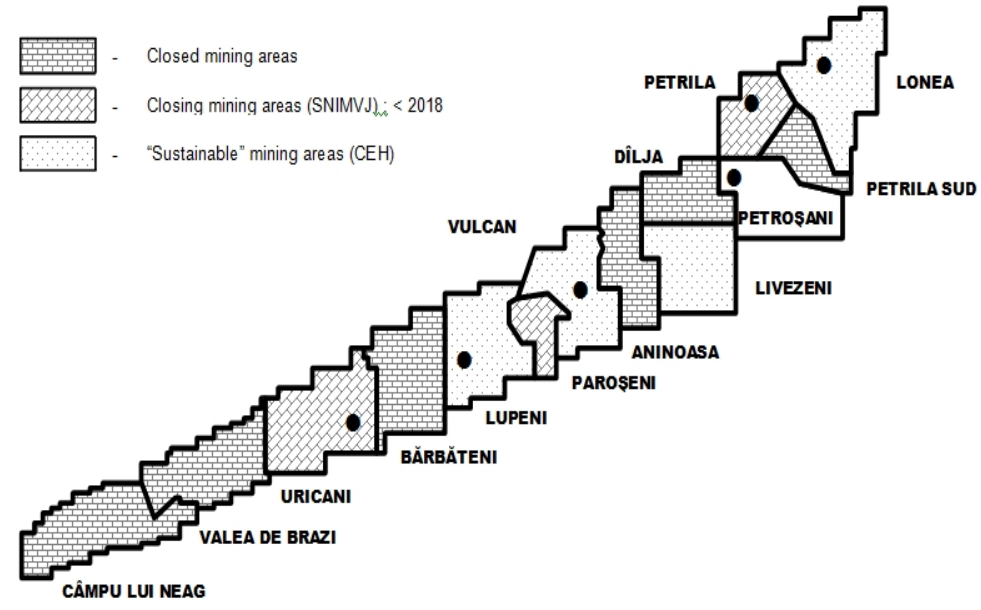

Fig. 2. Present situation of mining perimeters in Petroşani Basin (Source: Buia Gr. et al., 2014)

The Mining Division of Hunedoara Energy Complex has over 87927 m of underground workings (shafts, galleries, inclined planes etc.) and the construction area (administrative buildings, fans stations, mechanical and electrical workshops etc.) to all of the four mines. Currently, Branch Mining Division has two coal faces with mechanical complex (E.M. Livezeni and E.M. Lupeni), equipped with SVJ pillars and GSA beams.

According to statistics, the total exploitable geological reserves from the reliable mining perimeters are considered to be 154 377 million tons (see table 3) and from the perimeters considered unsustainable are 89.016 million tons (www.cnhd.ro).

According to the Romania's energy development strategy, was established as a strategic objective, the improving energy efficiency in the whole system: natural resources, production, transport, distribution and final use, through optimal use of mechanisms of market economy, with an estimated reduction of 3% per annum in energy intensity of the national economy by 2020.

Table 3. Situation of geological reserves from the reliable mining perimeters (thousand tons)

Category	Lupeni	Vulcan	Livezeni	Lonea
Certain geological reserves	31,676	23,569	76,484	22,648
Probable geological reserves	35,547	33,570	93,200	44,425
Total geological reserves	67,223	57,139	169,684	67,073

The coal offer of the Romania's producers is 33 mil. tons, with about 5 mil. tons less than estimated demand for the period 2010-2020 and the level of insurance production is 38.6 years for coal to 14 years for lignite. Industrial reserves of Petroşani Basin coal is 56 mil. tons and the average production capacity is about 1.5 mil. tons / year.

In terms of social and economic development of the Petroşani Basin, the strategy of mines closure policy has taken into account the possibility of retraining of unemployed persons. Given the location of the mining basin in a mountain Basin with a real potential tourism, it was often put the issue of economic and professional integration of former miners in the tourism sector.

Professional conversion of the employees from mining sector and integration within the tourism sector in our view is a difficult and very slow process. This resides in the fact that we are dealing with two different economic sectors (mining-secondary sector and the tertiary sector, tourism), the preparation of human relations is different; most often acquired through education, culture, experience and not accessed in a short time, as is the case of training courses in tourism. For this reason, allocated funds for vocational retraining should be rethought somewhat.

3. CONCLUSIONS

Delayed restructuring and privatization of energy sector, were made at the insistence of international organizations (EU, World Bank, IMF, USAID), with modest results. Major issues of the energy sector (great energy losses in industry and residential sector, settlements heating the deficiencies of the energy market, the higher impact of energy on the environment, sources of low investment and others) make it to be unsustainable today and this is largely due to the absence of an adequate institutional framework (Tofan, 2016).

The coal from Petroşani Basin is an average quality coal with high extraction costs, requiring subsidies of about 40-50%. Low domestic production of coal (deliberately), requires an appreciably higher coal import. Instead, lignite is lower quality coal, with a low calorific value, high humidity and ballast is obtained from surface exploitation without the necessary subsidies. Lignite remains profitable in economic terms if it is extracted at the surface, the transport cost being prohibitive.

Sustainable economic and social development of Petroşani Basin on medium and long term is conditioned by mining activity, being related to a performing energy sector, which in turn is determined by a modern institutional and legislative framework, aligned to energy policy and environmental policy of E.U.

The key question to be answered by a country's energy strategy is the cost limit on and can it afford to increase its energy security, in terms of economic efficiency. To a similar question will be answered in the case of environmental protection, aspect which usually conflicts with a policy of minimizing costs.

In conclusion, energy security is a complex concept: political, technical, economic, commercial and social. As an axiom, there is no absolute energy security. It can be achieved at a level of acceptable risk, with an acceptable cost.

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