

COAL – THE MAIN ENERGETIC RESOURCE AT NATIONAL AND WORLD LEVEL

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ABSTRACT. In the near future, the fossil energetic coal, oil and gas shall have the highest weight in energetic resources. Coals continues to be the main energetic resources for making electric power all over the world.

Key words: Coal, energetic area, natural resources, solid fuel, energetic technologies, energetic system.

ВЪГЛИЩАТА – ОСНОВНАТА ЕНЕРГИЙНА СУРОВИНА НА НАЦИОНАЛНО И СВЕТОВНО НИВО

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Резюме. В близкото бъдеще изкопаемите горива, нефта и газа ще имат най-голяма тежест като енергийни ресурси. Въглищата продължават да бъдат основния енергиен източник за получаване на електроенергия на всякъде по света.

Ключови думи: Въглища, област от енергетиката, твърди горива, енергийни технологии, енергийна система.

Introduction

The increase of the global request for energy is generated by the demographic increase and by the process of increasing the economic difference in the third world countries. In this case, more energy would solve global problems, especially social ones, taking into consideration that, nowadays, almost 2 billion people do not have access to the so called commercial energy. Under this economic and ecologic aspect there is a request for continuous and sustained improvement of the energetic efficiency, by researching and developing new energetic technologies because the production and consumption of energy is among the significant indicators of the civilisation level reached in every country's development, being frequently used in international comparisons.

The energetic field has a strategic significance for every state, as the economic and social development depend undoubtedly of it. We cannot conceive a modern economy in evolution without an efficient energetic field, capable to provide and support different economic branches and social development with energy. Due to the impact it has in the economic, political and social, ecologic field, the problem of energy has become the major imperative of world economy, being of concern in all the states.

Coal as the main source in the world energy production

The demographic forecast appears as an increase of the planet population of almost 6 billion to almost 8 billion in 2020. In its estimations, The World Energy Council supposes an increase by more of 50% of the electric power by 2020. This forecast is seen as a careful estimation, because it supposes,

among others, that the developing countries and Eastern European countries shall rapidly reach to the standard of energetic efficiency with an already high level in the Western industrialized countries.

The estimation of the International Energy Agency, AIE, until 2020, certifies at the same time that for solving the issue of a sufficient reserve of energy in the case of energetic consumption increase, there is not necessary to make any major structural changes between energetic resources.

The contribution of unconventional resources, like the wind, the sun, the water, the biomass, shall absolutely increase, but shall play a minor part in the future.

A restructuration of energetic systems for alienating fossil resources seems possible, in the view of the last Energy World Conference, not later than the second half of the future century, and only if adequate efforts shall be made immediately. At the same time, forecasts imply also the fact that energetic policies options require a provision of global energetic resources. Of the entire volume of energetic resources identified by geologic exploitations over 12.400 billion te.c (coal equivalent tones), almost 90% (meaning 11.580 billion te.c) are potential resources and only approximately 10% are economically exploitable resources. Therefore, nuclear cola and fuel together with water shall be the basis for producing electric power and the future increase of the request for energy shall lead to an increase of the global production of coal. This is supported by the fact that, in comparison with the global request of primary energy, the electric power request shall powerfully increase and coal will make a contribution to the production of electricity by over 50%.

The coal market shall know structural alterations in the future, while the economic increase rates in the third world

countries shall be significantly higher than those in the advanced countries. Coal is an attractive source of energy both in third world countries and the developing ones, in the industrialized ones, at the same time with a global increase of the consumption of coal, the lignite shall win some field. The mine industry in Europe and in other countries in the world undergoes significant structural changes, therefore due to the decline of the mine activity in Europe, at present the most significant trend is represented by the geographic movement of the coal extractions activities towards the Latin America, Australia and Asia. In this context, the increase of coal imports in Europe can especially be explained by the continuous decline of the pit coal production in the EU countries (from 105 Mtcc in 2000, at cca 70 Mtcc in 2020). In general the coal world market and thus the pit coal world market shall be high. We can say that given the powerful increase of the energy request and the lack of alternatives, we need a general agreement that the coal shall play an important part as a source of energy, for covering the need for energy until 2020. Therefore, coal is and shall remain the main energy source with a future.

The status of the world consumption of fuels for energy is structured as follows (fig.1)

• oil	38%
• coal	26%
• natural gases	24%
• nuclear fuel	6%
• renewable	6%

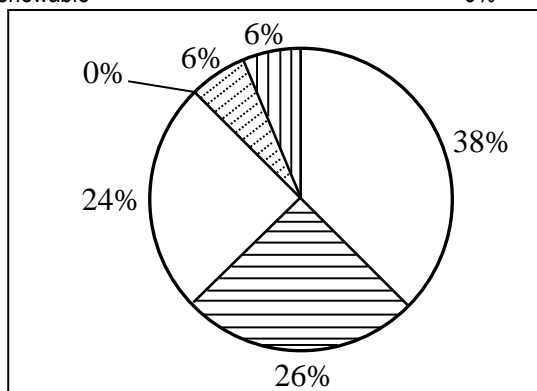


Fig.1 The status of the world fuels consumption

The status of the fuels consumption in Europe (15 states) is structured as in (fig.2):

• oil	40%
• coal	15%
• natural gases	24%
• nuclear fuel	15%
• renewable	6%

The enlargement of the European Union, brings the issue of coal in political debates upon the energy supply in Europe that would redefine the solid fuel as a primary source of energy for a long term.

For implementing the Kyoto Protocol (1997), it is necessary to develop the world climate protection policies, without exercising discriminations against coal.

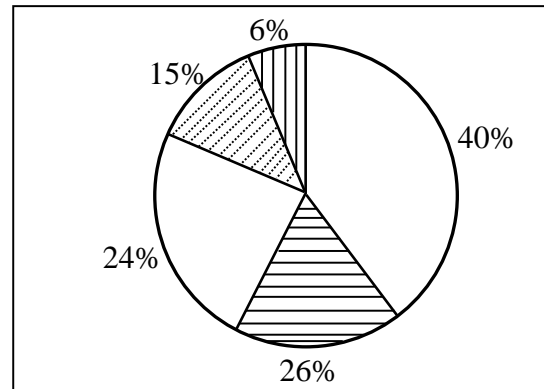


Fig.2 The status of the consumption of fuel for energy in Europe

The trade with emissions is a way through which greenhouse gases emissions can be reduced, without excessively disturbing the energy market.

The debates regarding the Clean Technologies of Coal for generating coal based electricity, has an enormous potential for innovation. Even at present, steam power plants can reach output levels over 40% for lignite and approximately 45% for pit coal, and therefore the priority is to create favourable conditions for modernization, there is a huge potential for reducing the CO₂ emissions by investing in modern technology.

We mention that almost all lignite and pit coal producers in Europe, both in the Community of the 15 member states in the European Union and within the EU adhering countries are now members of the European Association of Coal and Lignite EURACOAL, to which Romania is affiliated.

The role of coal in energy production in Romania

Investments and SEN safety has allowed for the Balkanic Area to EU, as Romania became a full rights member from the energetic point of view ever since 2004.

Recently, the reorganization and restructuring of lignite based electric power production has been achieved, by creating Energetic Complexes (CE), at Rovinari, at Turceni and Craiova, where lignite quarries are integrated as cost centres of the energy producer. Table 1 indicates the energy production for the period 2005-2020 in Romania.

Considerations referring to the use of internal energetic resources at big burning plants in Romania are the following: coal (lignite, pit coal) existent in our country is used by great steam power plants (CTE) of the national energetic system provided with performant plants for producing electric power; natural gases in the country and from import, meaning the main fuel taken into consideration for providing the primary energy for medium term in Romania suppose the extension and development of transport networks, underground storage spaces; burning oil import is a significant issue on an unpredictable market.

Based on the analyses established due to the improvement trends in the last few years, the actual significant aspects regarding the Romania extractive industry are as follows:

- The natural resource, meaning that coal provides a great part of the

necessary raw materials for the energetic field, which has an enough absorption capacity on the internal market;

➤ There is a significant capacity potential, partially worn from the physical and moral point of view and incompletely used, with a structure that is insufficiently adapted to the new competitiveness and safety requirements, in comparison with the EU producers in other developed countries;

➤ The performances of devices and technologies can be substantially improved, through an accelerated effort of re-technologization and selective modernization of the production capacities that have real chances of viability;

➤ Qualified manpower and technical specialties comparable to that in developed countries are available, etc.

Table 1 (Gwh)

Total production	2005	2010	2015	2020
	76000	88000	102000	112000
Steam power plants	74500	86300	100000	110000
Other producers	1500	1700	2000	2000
Hydroelectric power plants	13700	14200	14600	15000
Coal steam power plants	31000	33000	35000	35000
Hydrocarbons and nuclear steam power plants	29800	39100	50400	60000

For a long time, coal has been the energetic resource for Romania. The status of the fuels consumption for energy in Romania has the structure as in (fig.3)

• burning gas	3%
• coal	38%
• natural gases	16%
• nuclear fuel	11%
• renewable	28%
• other conventional sources	4%

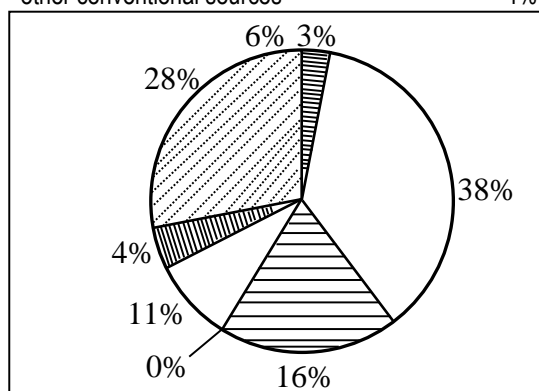


Fig.3 The status of fuel consumption for Romania

Under the conditions of a tight competition on the energetic market, when the ecologic restrictions are unfavourable for energetic complexes, in Romania, where the main solid fuel is the lignite, when the price for solid fuels, natural gases and oil products respectively is continuously increasing, the economic agents of energetic complexes are seeking to take improved organization measures for a technical and technological restructuring. These measures aim finally the decrease of the specific cost of energy especially due to the decrease of the cost of lignite. The lignite extracted in Romania has a less caloric power than the one processed in other European countries, with a high content of ash, and the CTE output is lower comparing to the output of those using pit coal or hydrocarbons. Lignite based energy production in the lignite quarries has the following advantages: production costs closed

to the burning oil production ones; providing the internal resources and reducing hydrocarbons imports; lower investments comparing to the nuclear energy groups for hydroelectric steam power plants with the same installed power; providing employment in the area and thus solving an important social aspect; cancelling the dependence on electric power imports; the possibility to produce thermal energy in cogeneration; environment issues minimization in current technologies.

The adaption of surface mining in Romania to the requirements of the market economy, under the conditions of some major issues of technological and old endowments with quarry machines can be made through a group of restructuring measures and actions aiming the managerial, technological, but especially technical, mining and ecologic components.

European directives focused on the mining activity

The main instruments for transposing European legislations requirements into those of Romania are the European goals. Among the European goals with an impact upon the mining legislation for extracting useful substances we mention: 94/22/CE Directive for the conditions for granting and using permits for hydrocarbons exploitation; 92/91/CE Directive referring to the minimum requirements for improving the employees' safety on the branches of extractive industry; Directive proposal for the waste management in extractive industry.

Conclusions

In the future, coal shall have the main part in producing electric power.

An active energy saving policy shall be applied rather than that of producing it, through a complex process of replacing

energy consuming technologies and by restructuration of the economy.

Internal resources availability is: lignite for the following 60 years at a 30-35 million tones/year production in surface exploitations and 3,5 million tones of pit coal in exploitation from the Jiu Valley underground.

Recommended for publication
of Editorial board

References

- [1]***European Communitarian Acquis requirements
- [2]***CESCO Consultative Committee Statement regarding the Role of Coal in 21st century Europe (July 1999)
- [3]***EUROCOAL Report – PATROMIN Magazine
- [4]***Law 3/2001 The ratification of the Kyoto Protocol at The Convention of the United Nations On climatic changes
- [5]Orban M.Coal as the main energy producing source
Popescu C.World and National Electric Power – Mines magazine