Perfection of economic activities of the mining enterprises on the basis of the balanced technological, ecological and economic development

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Abstract: For the decision of significant power problems in Ukraine it is offered to improve ecological, economic, organizational and financial mechanisms of management in using of bowels and savings of resources on the basis of technologies on complex use of bowels (CUB) which introduction results in decrease in volatility of the country and reception of ecology-economic benefit. The principle of outstripping development of non-material actives before material is proved during development and realization of technologies CUB.

Keywords: cogenerating installations; complex use of bowels (CUB); ecology-economic benefit

1 Introduction

Ecological situation and tendencies of its change in Ukraine in many respects are determined by industrial production. Economic activities of the majority of the enterprises are characterized by high parameters resource consumption and, in particular, nature consumption.

Development of manufacture raises a material and power exchange with an environment and results in negative influence on it, that is to a different sort to environmental problems. The decision of these problems causes additional financial charges and, finally, finds illumination in economic parameters of development of the state. As a rule, the increase in a total internal product is accompanied by increase in consumption of energy. The average indicate of power consumption in the industry of the advanced countries of the world makes 0,34. The majority of the countries by introduction modern technologies of savings resources and the equipment constantly reduce the given parameter. And in Ukraine it exceeds average in 2,6 times. Last years the positive tendency to reduction in the given parameter is observed, however it remains high enough (0,86), that puts economy of our country in power dependence on changes of the prices for fuel in the world market through insufficient maintenance with some kinds of own fuel resources. So, for example, in fuel balance of our country natural gas occupies 40 %, while in Europe – up to 25 %. Stocks of natural gas in Ukraine are insufficient for maintenance of requirements of a national economy, and cost of the imported gas every year increases. The principal cause of a high parameter of power consumption consists in use morally and physically out-of-date technological processes and the equipment, and also in view of inefficient functioning the ecological and economic mechanism of the government. The managements generated before structure do not provide performance of principles of integrated approach in systems of management at the enterprises and at the branch approach to the government.

In conditions of economic instability it is very difficult to interest a management of the enterprises in investment of financial assets in the savings of resources and reduction in volatility. Besides a parameter of efficiency of expenses for actions on rational use of natural resources and decrease in ecological damage, as a rule, rather low. In the majority these actions in general economically are not profitable even in long-term prospect, and their realization is effective only from the ecological and social side.

Thus, urgent necessity for development and introduction of the technologies capable considerably to lower volatility of the enterprise from external sources of power supply with simultaneous reduction of negative influence of industrial activity on surrounding natural environment has ripened.

The urgency of development and introduction of such technologies at a micro level and in a branch section confirmed result of the introduction. The problematic of the given research mentions some areas of scientific knowledge. Questions of ecological and economic orientation of economic activities were considered by the

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ukrainian scientists Aleksandrov I., Veklich O., Danilishin B., Doroguntsov S., Melnnic L.[1,4-6,8,12,13].

Necessity of carrying out of a complex estimation of ecological and economic parameters of the savings of resources is proved in works of the following authors: Balatsky A., Blavdzevich A., Breslavtsev A.V., Konishcheva N., Prahovnik A., Sotnik I., etc. [2,3,15,16,20]. As a rule, different authors make accents on separate aspects of activity on maintenance with resources of the enterprises for realization of economic activities, and also under the savings of resources - on ecological, economic or technological. Besides the insignificant attention is given social aspect of the given problem. Therefore the complex approach to the decision of the above-named problem is necessary. We shall consider it by the example of mining sector of economy of Ukraine.

Research problems are: formation of directions of perfection of economic activities of the enterprises of mining branch in view of principles of the balanced technological, ecological and economic development; definition of the maintenance and sphere of application ecologically safe and power savings technologies of use of resources of bowels on the basis of the complex approach; development of functions of the economic - financial mechanism of the government in sphere of using bowels.

2 Experimental

On economically advanced and less developed countries it is necessary approximately 540 billion tons of conditional fuel, including 2/3 of them makes coal. In structure of fuel and energy balance of the world economy coal makes 31 %. In 1990th years consumption of coal in the world made more than 2,3 billion tons one year. Though it is much more than coal (67 %), than oil (18 %) and natural gas (15 %), its stocks are not boundless. Under forecasts of stocks of coal should suffice for 420 years but if consumption will grow present rates they will not suffice and for 200 years [19].

In Ukraine now coal, despite of its high cost price, it is necessary to consider as a strategic resource which use considerably reduces power dependence of a national economy on state-exporter energy resource – the part of coal in power supply of the country makes from 65 up to 90 %. For Ukraine use of coal is the optimal way for satisfaction of requirement for energy carriers for the industry in view of stocks of this useful mineral (the general – 117,3 billion tons of which 6,5 billion tons makes industrial stocks on working mines) and significant changes in the price for natural gas in the world market [7]. [7]. Last years in the country the tendency to decrease in volumes of its extraction is observed – since 1990 for 2008 the coal mining has decreased more, than twice (tab. 1).

Table 1 The coal mining in Ukraine (on the data the Ministry of the coal industry)

Volume of a coal mining, million tons / year	2005	2006	2007	2008
Coked	32,617	30,145	28,489	26,637
Power	45,393	50,112	47,065	51,018

It is caused by significant deterioration of the mine equipment (about 80 %), that results in backlog in preparation new clearing working faces and start-up of new lavas. Use of the worn out equipment promotes increase of breakdown susceptibility and an industrial traumatism, and also brings to ruin miners. The state every year increases the financial help to the mining enterprises. By results of audit of Accounting chamber of Ukraine amount of public funds what to fall to 1 ton of extracted coal, in 2007 made 36,7 grn., and to 2008 it has been planned at a level 42,6 grn. (in the state budget of Ukraine for this purpose it has been incorporated more than 3,8 billion grn.)[19]. Despite of budgetary grants, the coal branch remains in crisis position. Financial grants are used inefficiently – the state investments do not go on construction of new mines and purchase of the high-tech equipment.

Except for problems with a coal mining, the tendency to reduction in its quality is marked – ash content power coal makes 40 %, and the international norm is equaled 25 %. If to recalculate the extracted coal in view of the world standards to a parameter ash content it is possible to speak about decrease in volumes of extraction on 12-14 %.

Thus, the tendency to reduction in volumes of a coal mining and, accordingly, to increase of deficiency of the given kind of fuel is traced. There is a necessity for use of other kinds of mineral fuel (gas, black oil, oil), biofuel, and also in transition to non-polluting kinds of energy, such, as solar, geothermal, a wind power, etc.

The first stage on a way to rational use of mineral fuel, in our opinion, is transition from traditional manufacture of energy and heat (fig. 1а) to use cogenerating installations (fig. 1б).

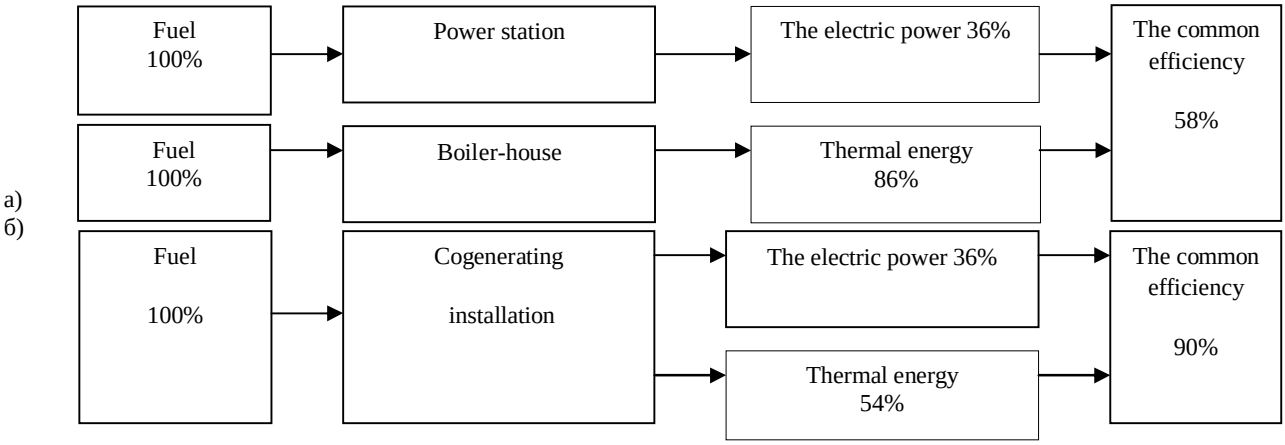

Figure 1 – The circuit of reception electric and thermal energy: a) traditional; б) on a basis a cogeneration

Apparently from figure, at use cogenerating installations are reduced volumes of received heat, however the common efficiency volumes of necessary heat for processing fuel increase considerably and reduced. It is necessary to note, that as fuel thus it is used its not so traditional kinds, and mine methane, that considerably reduces the cost price of production and rendered ecological damage. Besides the additional income of realization of power resources after satisfaction of own needs of the enterprise takes place [17–18].

The following aspect, demanding more steadfast attention on the part of scientists and experts, use of technologies on underground gasification of coal (UGC), unduly forgotten after significant researches the last century and received then a scientific recognition is. Such large research establishments as Moscow scientific research institute «VNIIpodzemgaz», state project institute «Gspropodzemgaz» (Donetsk), the Moscow state mining university were engaged in development of technology. Today in our volatile country there is no enterprise on gasification of coal. While the large coal-mining countries of the world began to show actively interest to UGC. In Austria in 2003 the large enterprise of the given structure has been constructed, and in China for last years 10 industrial stations PGU are constructed. Show interest to the given technology in India, the Korean national democratic republic, South Korea.

By predicted estimations of the National academy of sciences of Ukraine, in our bowels lie tens billions tons low-grade and extrabalance coal, which at realization of underground gasification quite would suffice to provide the country with energy more than for 100 years. The technology of underground gasification of coal consists in burning coal directly on its place залегания. And the generating gas formed at it moves on a chink on a surface. It can be used for the power purposes - manufactures of the electric power, pair, hot water.

In 11 areas of Ukraine it is located 156 sites satisfying criteria of mining-geological conditions of gasification of coal layers about 20 billion of tons of stocks of coal, from them 27 sites are in Donetsk area with stocks 2,5 billion tons. Besides the scientific and technical potential available in the country allows to organize own manufacture corresponding installations of gasification. According to the National academy of sciences of Ukraine in institute of geology and geochemistry of combustible minerals already there are solid operating time on creation of technologies of ground and underground gasification of coal [11]. During spent re-structuring the coal industry in Ukraine on this technological decision it is necessary to pay steadfast attention, taking into account a significant amount of the left non-working layers. Restoration of industrial activity for completion of these layers by usual way economically is not effective, and carrying out of underground gasification will allow to receive ecological and economic benefit.

3 Results and discussion

But the most important with ours of sight is transition to complex use of bowels. Today, emphasizing on a coal mining, we disregard other resources which can be used simultaneously or after extraction of a useful mineral. And in the given approach are incorporated significant ecological, social and economic benefits for the enterprises of branch. Introduction of technologies on complex use of bowels (CUB) allows to receive to the enterprise the additional income of nonbasic activity, to lower the cost price of extracted coal and to reduce negative influence by surrounding natural environment [10,17,18,21].

At the enterprises of mining branch as a result of introduction of technologies CUB it is

possible to receive the following kinds of additional production:

- geothermal energy of bowels;
- methane (for use in systems cogeneration);
- waste products of manufacture, especially breed (as raw material in building sphere);
- valuable both rare minerals and gases;
- advanced from coal gas, a floor coke, pitches;
- the cleared mine waters, etc.

It is necessary to note, that technologically suggested decisions are proved full enough. Problem there are questions of legal, economic and financial character which in the greater degree depend on efficiency of functioning of a machinery of government of management of use of bowels.

During development and introduction of technologies CUB outstripping development of non-material actives before material is necessary. For such direction of activity as complex use of bowels of the most powerful is an innovative component. This field of activity basically uses material actives of the mining enterprises already created earlier (machines, the equipment, tools). As to an innovative direction of this activity it requires in application high technology and technologies of savings resources which are non-material actives (HMA). But that these technologies effectively worked first of all it is necessary highly skilled experts and the intellectual property in sphere CUB. It is necessary to speak any more about HMA, and to use wider concept « the intellectual capital » (IC). If the enterprise successfully shows the IC and proves, that in it is necessary to put means, despite of absence arrived in short-term prospect the company will be attractive to investors. Introduction of technologies CUB requires significant investments and consequently the investor should own the information be relative IC the enterprises.

For maintenance of the state control over use created due to public funds of scientific and technical production and objects of the intellectual property it is necessary to develop the automated system for the account of their movement in the internal and external markets that will allow to generate the state monitoring system behind the economic manipulation of results of scientific and technical activity in sphere of wildlife management, as a whole, and in sphere of use of bowels, in particular. As stimulus for the enterprises for introduction of technologies CUB it is necessary to consider various fiscal methods, including tax privileges for such subjects of economic activities. It is necessary to make changes to the order of the taxation of the profit of the mining enterprises and to improve mechanisms of formation of their financial and statistical reporting.

Today to speak about mines as about attractive objects for investment it is rather difficult. However, if to consider mine not only as the enterprise on a coal mining but also as a source of reception of additional energy, rare and valuable metals, gases, and also the cleared water then it is possible and it is necessary to speak about investment appeal of the enterprises of the mining industry. In this case the investor will be confident in stable reception of the profit. Thus it is necessary to note, that operation of technologies CUB will bring to the investor though and not "fast" dividends, but in long enough period of time and even after a conclusion of mine from economic activities. So, after working off of layers the produced space is possible for using as a source of geothermal energy without restriction in time [9–14]. Mine water which pump out from the closed mine, it is possible to use as the heat-carrier or to clear and direct for household needs. Thus, extraction from bowels of various resources, except for coal, and their use for own needs or realization to other consumers enables the enterprise to reduce considerably the cost price of end production and to receive the additional income. Thus the economy on capital expenses for introduction of technologies CUB will be significant in view of an opportunity of use of already existing basic industrial means of the enterprises (after modernization). Besides the current expenses will be reduced due to economy of means for purchase of power resources for maintenance of economic activities of the enterprise [18–21].

As to the structural capital for the state creation of a databank of technologies CUB and information on the patents received in this field of activity is important. The information should be accessible to the enterprises of mining branch and potential investors. Thus it is necessary for state to develop system of maintenance of the property right to innovative technologies and inventions in view of the economic interest. As to instructions and techniques of work in this field of activity it also is the competence of the state on behalf of the specialized ministries and departments.

4 Conclusions.

The decision of a problem of the savings of energy is impossible in that economic system in which there is no support on the part of the state. In other words, perfection of existing mechanisms of the government in sphere of realization power savings projects is necessary on the basis of development of new technological, organizational-economic and financial tools. Already today in the advanced countries by means of such tools those enterprises which introduce power savings projects are based on the state. In Ukraine such mechanism while is absent and, it is necessary to note, it will

take place only at presence of effective ecological and economic policy of the state. For motivation of activity under the savings of resources and introduction of technologies CUB is counted expedient use of the following tools:

1. To give privileges under the profit tax to those enterprises which will introduce technologies on complex use of bowels. The privilege should be essential (less than the rate of the tax existing today (25 %) approximately twice) and to be given for concrete term (or for the term of a recoupment of the project, or for longer term depending on introduced technological decisions).
2. With the purpose of significant decrease in capital expenses for purchase of the necessary equipment it is necessary to abolish duties at import of the given equipment and the value-added tax to it.
3. Except for fiscal methods it is necessary to develop the effective mechanism of bank crediting of the enterprises which have intentions concerning introduction of technologies CUB. That is, credit rates which are offered by domestic banks, should take into account a special-purpose designation of the credit - in case of use of means for purchase of technologies and the equipment on complex use of bowels to give preferential credit rates and conditions of crediting. During development of this mechanism it is necessarily necessary to take into account, that credit privileges are especially important for the enterprises of mining branch and they, in view of their strategic value for the country, require in additional attention on the part of the state.
4. Also it is counted possible and expedient to develop an organizational - legal mechanism of use of means from budgetary ecological funds as introduction of technologies CUB will allow to receive significant ecological effect. These means can be directed on target financing or to consider as granting of the ecological credit on the part of the state with the help of its financial establishments.
5. During development of toolkit of ecological, economic and organizational and financial mechanisms of the government in sphere of complex use of bowels it is necessary to turn special attention to observance of a principle about outstripping development of non-material actives before material.

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