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ORGANIZATION OF PRODUCTION ACTIVITIES OF A REGIONAL COAL-MINING COMPLEX

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ABSTRACT

Objective is to propose a new approach to investment allocation in the group of coal-mining enterprises.
Methods. To solve the specified objective, a complex approach has been applied including assessment of enterprise investment attractiveness, determination of production potential, and definition of the possibility to switch to a break-even mode. The process of planning the ways to save industrial potential of coal-mining regions may be considered as the representation of multidimensional space (initial and design values) in terms of the one-dimensional (amount of investment money) one.
Findings. It has been established that the stage dealing with the development of a model for managing processes for mine unprofitability reduction should involve consideration of 8-10 factorial features, which may determine the formation of economic potential, taking into account peculiarities of the remaining deposits and their quality, as the integral assessment of mine potential in terms of both state and non-state investments. The formulated objective means selection of the minimum number of factors, which would reflect in the most adequate way the internal potential of a mine expressed by economic added value – as a consequence of interaction of factors of coal mine economic activities in specific mining, geological, and technological conditions.
Originality of the research is in the fact that it is expedient to use an indicator of economic reliability, which synthesizes the capacity of links, economic level of technical and economic indicators, and the amount of remaining deposits, as a complex component of the level of an unprofitable mine. The mentioned indicators determine the residual life of the mine. Their physical content is not identical; and it is the fact that helps (in terms of their joint use) obtain more complete estimate than when using any single indicator.
Practical implications. Practical significance includes actual assessment of the state of Donbas coal enterprises and determination of marginal break-even indicators, which has made it possible to elaborate recommendations for attracting financial resources.

Keywords: coal mines, coal-mining region, break-even, modelling, diversification, potential, reserves

1. INTRODUCTION

Military actions in western regions of the country effect considerably the level of costs for renewal of Donbas in general and coal field in particular. The government assesses the losses to be several billion hryvnas; moreover, the level of destruction is experiencing its constant growth. The European Union is going to send a special mission for stocktaking and cost estimation with the following possible aid rendering. It is obvious that the overall plans of Western Ukraine recovery should include certain measures aimed at coal field revival [1, 2, 3]. That revival of Donbas enterprises and, first of all, coal industry means solution of certain social problems, which are stipulated by the following:

- considerable share of social costs in the overall amount of costs for renewal of state mines damaged by the war;
- great difference between actual financing and the industry needs as for the support of each ton of production capacity; and
- negative effect of previous restructuring upon a social-economic situation of the mining mono-production towns, being shown in terms of growing unemployment, reduced industrial production, and low level of population income in those towns.

Nowadays, Ukraine has 450 town; 344 of them belong to the category of small ones: their population of less than 50 thous. people. Generally, about 6.5 mln people are living there, accounting for 13.5% of the whole population of the country. Only 7% of small towns can characterize their life as more or less comfortable. The rest belongs to so-called depressive ones as they belong to the category of mono-functional settlements, which life is supported by one or two functioning enterprises. Talking about some specific things, main problems being faced by the citizens of Shakhtarsk, Dzerzhynsk, Ukrayinsk, Torez, Snizhne and many others are as follows: low income (50.3% of the respondents) and unemployment [4].

As before, unemployment is still one of the main unsolved problems in Donbas. If it could be solved, many other problems might be eliminated. Thus, while answering the question about the things, which the towns lack to improve living conditions of their citizens, the majority of respondents (48.6%) say that they lack financial resources for social support as well as investment in the town economy (22%). Currently, depressive territories include settlements where coal-mining and coal-processing enterprises have been experiencing their liquidation since 1996. The town of Snizhne is a bright example of such territory in Donetsk Region where seven mines were operating at the rise of Independence. Today, only one mine is operating there with the unemployment reaching up to 75%. The same situation can be observed in the town of Torez where only three mines are operating among the 13 ones; even those three mines have stopped their activity after being damaged due to military actions [5].

In this regard, state support of coal-mining Donbas regions, where the majority of population is involved in coal mine operation, will be reduced to reaching complete employment for the residents. In this context, due to lack of budgetary funds, it is directed investment that is required most of all [6, 7], i.e. selection of a corresponding region, evaluation of its degree of negligence as well as prospects of its mines [8, 9] from the viewpoint of their coal reserves quality [10].

Papers by O.I. Amosha [11], V.G. Griniov [12], D.Yu. Cherevatskyi [13], P.V. Cherepovskyi [14], A.O. Khorolskyi [15] deal with innovative aspects of Ukrainian economy in general and fuel and energy complex in particular. Papers [12, 14] deal with the development of practical recommendations as for substantiation of rational level of production for unprofitable mines of Central region of Donbas; those studies also identify the degree of intensity of use for the fixed capacities. Besides, the represented approaches make it possible not only to develop recommendations but also to make long-term forecast. Thus, to stabilize the industry state, it is necessary to carry out analyses of the balance of labour resources, attracted capital, and end level of mining – such use of the available common world-economy criteria will help solve the problems of effective development of mineral deposits. The logics of those assumptions is explained by the available area of rational projecting [12], i.e. irrespective of mining and geological conditions of the deposit and current technical and economic factors, there is always a set of parameters making it possible to enter a break-even level – that is, to select a rational living format [15].

As for foreign studies analyzing a problem of innovative prospects of the development of coal deposits, they are as follows: Nieć M. [16], C. Cyrnek [17], M. Krzak [18], B. Balusa [19], P. Li [20], and M. Beaulieu [21]. In particular, paper [16] highlights that increase in the production efficiency requires balanced flows of input and output resources depending on the production scenario. The authors of [22] use a retrospective analysis to assume that currently it is impossible to overcome the crisis in the industry without investment attraction. Moreover, further delay will result in stagnation and transit from "stable decay" to uncontrolled closure of production facilities. Thus, it is necessary to develop certain mechanisms of the evaluation of expediency of support for coal mines [23].

2. STATEMENT OF THE PROBLEM

Objective of the research is generalization and development of scientific and methodological basis, elaboration of a toolset and algorithm for modelling interinfluence of the level of population living in coal-mining regions and operation stability of mines and thermal power stations. To renew infrastructure in coal-mining regions, it is necessary to develop scientific basis to support stabilization and augment industrial potential by forming stable connections between mines and related enterprises. That requires the following:

- description of the relation between mines, processing plants, electric power stations – incidence matrix can be applied for this purpose; and
- division of the totality of relations into certain hierarchies, i.e. substitution of positive feedback (the greater the output is, the more electric energy is required) with two negative successive ones (the more coal the mine extracts, the less its unused capacity is; and the less the unused mine capacity is, the more electric energy it requires) – i.e. application of a decomposition method.

3. RESEARCH METHODS

Assume that a group of interrelated enterprises is characterized by certain volume of commercial coal products, and those products can be manufactured only in terms of certain number of enterprises. It is known that the loss norms per product unit vary depending on its production volume. However, in case of unprofitable coal enterprises equipped with unreliable cleaning facilities, production losses in terms of adopted technology and intensity most commonly do not experience visible changes depending on the fact, which machine complexes and which number of those complexes are involved in coal mining [24]. Qualitative evaluation of the conditions of certain technological links determining the production capacity of a mine is the indispensible conditions to identify different trends in coal-mining efficiency increase and capacity growth. The evaluation may be performed with the help of totality of the mentioned parameters; in this regard, specific parameters can be calculated either per unit of the extracted reserves or per unit of the annual volume of coal extraction. Here, the following ratio is true:

$$P_{jz} = \frac{\sum_t P_{jz}}{Z} = \frac{\sum_t P_{jD_t} D_t}{\sum D_t},$$

$$P_{jDt} = \frac{P_{jt}}{D_t},$$

where P_{jz} is j^{th} specific parameter in the calculation per unit of reserves; P_{jt} is j^{th} absolute parameter during t^{th} year of mine operation; Z is reserves being extracted per whole period of the mine (level) operation; P_{jDt} is j^{th} specific parameter as calculated per extraction unit during t^{th} year; D_t is volume of coal extraction of a mine (level) during t^{th} year.

At the same time, to eliminate the most possible number of intermediate production stages from the consideration, it is convenient to express costs of labour items entering an enterprise from outside, and costs of primary resources by means of linear function of end ("product") output of that enterprise. To do that, apart from the linear dependence of costs on the output (processing) volume during all stages, it is required that the enterprise does not get any products, which it can manufacture by itself, from outside [24]. Thus, it is expedient to introduce a concept of production unit along with the concept of enterprise into the conditions of model development. The concept of production unit is understood as a group of production sites, for which the following conditions may be considered as the feasible ones:

1) if a production unit can manufacture products of the specific type, then it does not get it from outside; and

2) technological norms of costs per production unit of the specific type do not experience any changes depending on the changes in production volume or distribution of that product throughout the production unit equipment. According to that definition, an enterprise, at which, for instance, any further stage of production can be provided with raw materials from the previous stage only

partially, and the shortage is covered by supplies from outside, cannot be considered as a production unit, but it is considered as their totality.

Such a definition of a production unit demonstrates one of the differences of statement of real problem from the internal production tasks of linear programming for the best equipment use. If that concept was not introduced, the proposed tasks would transform into a problem of specialization for certain mines or sites of mine fields of a concrete group of enterprises. Volumes of products of i^{th} type manufactured for the supply to other national regions are the unknowns of that problem related immediately to certain production units.

4. RESEARCH RESULTS

In the context of the situation of renewal of social stability and potential of coal-mining Donbas regions ruined by the war, a multistage distribution problem should be considered. The essence of the problem is as follows: it is required to renew enterprises considered as sources of energy carriers and as electric energy consumers by the end of a planned period within the spatially separated points of a certain region. Possible variants of the mine potential renewal are known as well as their maximum possible capacity.

Introduce the following designations: X_{li}^{2j} is volume of coal supplies of i^{th} mine to j^{th} electric power station; X_{2j}^{s} is output of electric energy from j^{th} electric power station to s^{th} consumer; X_{2j}^{li} is unused capacity of l_i^{th} mine; f_1 is costs for production of 1 thous. t of coal in terms of i^{th} mine; f_2 is costs for production of 1 mln of kW-h of electric energy of j^{th} electric power station; u_i is costs for transportation of 1 t of coal from i^{th} mine to j^{th} electric power station; λ_i is costs of electric energy and costs for its transmission from j^{th} electric power station to s^{th} consumer; M_i ,Mj, M_{2i} are maximum possible capacity of mines, electric power stations, and processing plants respectively; Ds is demand of s^{th} consumer; γ_i is need of i^{th} mine in electric energy; l_{1i}, l_{2i} are labour productivity in terms of i^{th} mine and processing plant respectively; L_R is amount of employable population of the region.

The problem is described by the following system of correlations.

To minimize in terms of the following:

$$F = \sum_{i=1}^{n_1}\sum_{j=1}^{n_2}\left[f^{1i} + u_{1i}^{\ 2j} + \lambda_{1i}^{\ 2j}\right]X_{1i}^{\ 2j} + \sum_{j=1}^{n_2}\sum_{s=1}^{n_3} u_{2j}^{\ s} + \sum_{j=1}^{n_2}\sum_{i=1}^{n_1} u_{2j}^{\ 1i} X_{2j}^{\ 1i} = \min \quad , (1)$$

$$\sum_{j=1}^{n_2} X_{1i}^{\ 2j} + X_{1i} = M_{1i} \sum_{i=1}^{n_1} \lambda_{1i}^{2j} X_{1i}^{\ 2j} + X_{2j} = M_{2j} \quad , \qquad (2)$$

$$\sum_{s=1}^{n_3} X_{2j}^{\ s} + \sum_{i=1}^{n_1} X_{2j}^{\ 1i} + X_{2j} = M_{2j} \quad , \qquad (3)$$

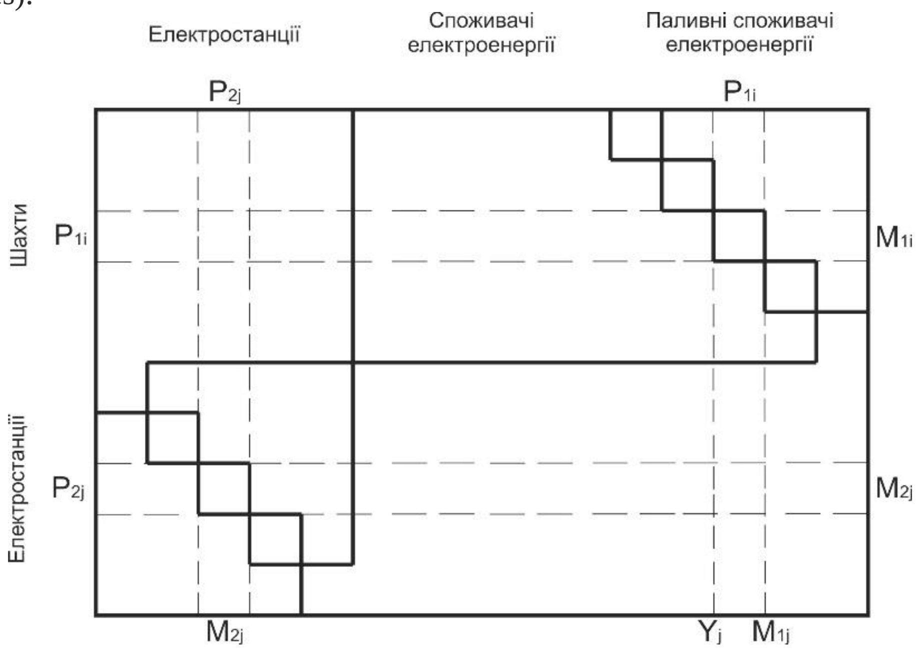
$$\sum_{j=1}^{n_2} \lambda_{2j}^{\ s} X_{2j}^{\ s} = D_s \quad , \qquad (4)$$

$$\sum_{j=1}^{n_2} \lambda_{2j}^{\ s} X_{2j}^{\ s} = D_s \quad , \tag{5}$$

$$\sum_{j=1}^{n_2} \lambda_{2j}^{\ 1i} X_{2j}^{\ 1i} = \gamma_i \sum_{j=1}^{n_2} X_{1i}^{\ 2j} \quad , \tag{6}$$

$$\sum_{i=1}^{n_1} \frac{M_{1i}}{l_{1i}} + \sum_{i=1}^{n_2} \frac{M_{2i}}{l_{2i}} \le L_R \tag{7}$$

A matrix (Fig. 1) built on the basis of a model (1) – (7) makes it possible to formulate a series of important principles of stabilization of a situation within a specific region. The essence of those principles is in the substitution of positive feedback (the more coal the mine extracts, the more energy it needs) with two negative successive relations (the more coal the mine extracts, the less its unused capacity is; and the less the unused mine capacity is, the more electric energy it requires).

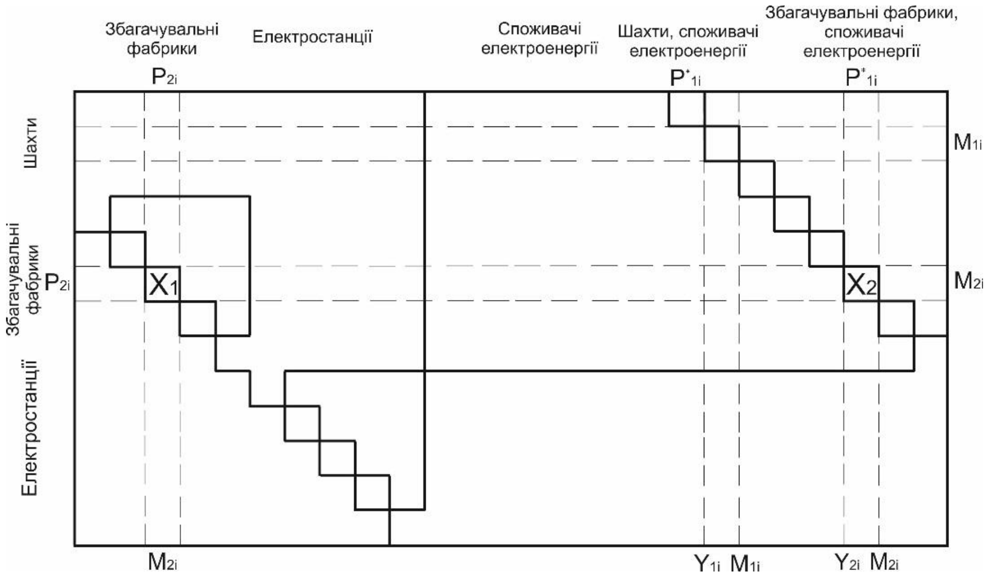


***Електростанції* – Electric power stations**
***Шахти* – Mines**
***Споживачі…* – Consumers of electric energy**
***Паливні…* - Fuel consumers of electric energy**

***Figure 1. Matrix of incidences "mines – electric power stations"* [25]**

Fig. 2 considers more complex case when the scheme includes not only mines but also processing plants, being provided with electric energy from those very electric power stations. The unused capacity of those plants should play a double role here: first, it provides correspondence between the amounts of raw coal being delivered to the plant; second, it represents real energy demand of the plant.

As a rule such kind of distribution problems with additional limitations of $X_i = X_2$ type is solved by block methods.



Електростанції – Electric power stations
Збагачувальні… - Processing plants
Шахти – Mines
Споживачі… – Consumers of electric energy
Шахти споживачі… - Mines, consumers of electric energy
Збагачувальні фабрики споживачі… - Processing plants, consumers of electric energy

***Figure 2. Matrix of incidences "mines – processing plants - electric power stations"* [25]**

Identification of homogeneous groups of mines and determination of their costs for the increment of each production capacity ton, basing on the dependence of capital investment upon mining and geological factors, effecting them, is the simplest method of specifying the transformation indices (in this case, that is capacity increment depending on the level of capital assets). However, due to very complicated and joint influence of natural factors on capital investments while mine restructuring, it is practically impossible to perform quantitative evaluation of the effect of each of them in its pure form. In its turn, that prevents from forming homogeneous groups in terms of great variety of natural conditions of deposits and separate sites.

Analysis of the estimated cost of modernization of various-capacity mines within one and the same mining-geological site has made it possible to identify that corresponding investments can be divided conventionally into three parts: the ones changing directly proportionally to the mine capacity; the ones, experiencing their changes but with some delay from the capacity growth; and the ones being practically independent from the mine capacity. In this context, mine capacity affects the costs for improvement of general mine links. The indicated principles of modernization can be expressed by function $\phi_i(X) = \overline{1, n-1}$ that identifies maximum increment of mine capacity in terms of corresponding allocation of X investment among i mines. That is why a value of function $\varphi_n(X)$ is calculated only for value $X = S$ since the amount of investments allocated for all n mines is equal to S.

We have studied the effect of the investment level on the capacity increment. Modelling of the output data was used as the basis to develop dependences of changes in productivity growth upon the attracted money for three state mines.

Table 1. Output data of dynamic modelling of the capacity increment of mines of State Enterprise State Coal Company

Volume of investments X_i (UAH mln)	Increment of mine capacity $f(X_i)$ depending on the investment volume		
	Pivdennodonbaska #3	*Pivdennodonbaska #1*	*Kapitalna*
50	86.8	1.6	24.2
100	222.6	99.3	148.9
150	302.1	156.5	221.9
200	358.5	197.1	273.7
250	402.2	228.5	313.9
300	437.9	254.2	346.7
350	468.2	276.0	374.4
400	494.3	294.8	398.5
450	517.4	311.4	419.7
500	538.1	326.3	438.6
550	556.7	339.7	455.8
600	573.8	352.0	471.4

We propose a simplified approach to the determination of the methods for investment redistribution depending on the level of economic reliability of mines. The problem is formulated as follows. To increase the volume of coal extraction by mines, capital investments are allocated in the amount of S UAH mln. Use of x_i UAH mln from the indicated investment by i^{th} enterprise ensures increment of extraction being determined by the value of nonlinear function $f_i(X_i)$. It is required to identify the capital investment distribution among the mines that will ensure maximum increase in the output of finished coal products. Thus, the statements can be generalized from the viewpoint of modelling of trends in mine restructuring before the moment when diversification of mining regions will become a well-planned and time-controlled process [26]. European practices have proved that hasty and unarticulated shutdown of closing mines cannot be considered as expedient due to the necessity to compensate the outgoing capacities with the imported energy carriers [27, 28].

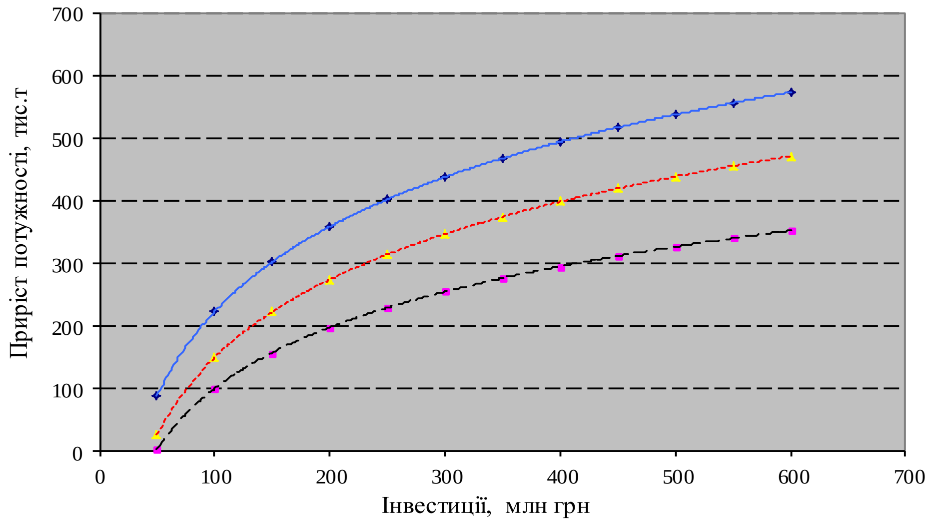
Fig. 3 shows that each enterprise reacts to the investments depending on the state of mining economy, mining-geological conditions of occurrence, and technologies of deposit development. That is explained by the fact that there is a certain level of economic reliability for each enterprise being determined by the formula

$$K_{ент}=K_{mt}\times K_{et}+K_{ɛt}, \quad (8)$$

where $K_{ент}$ is index of economic reliability of a mine at the point of time or within a period *t; K_{mt}* is coefficient of technological reliability at the point of time *t*; K_{et} is coefficient of economic level at the point of time *t*; $K_{зt}$ is index of the level of reserves left at the point of time *t*.

Technical and economic value of the index of economic reliability is in the fact that it is a complex evaluation of a mine in terms of the totality of its technical level and economic results of its functioning. That circumstance is of great practical importance. If we determine the economic reliability indices for regional mines, we can gain an objective situation of the mine fund. In addition, we will get a quantitative evaluation as only expert subjective or emotional estimations are often used. The available objective and complex evaluations help approach the solution of problems concerning priority of privatization of mines in the most substantiated way.

In particular, *Kapitalna* mine, which index of economic reliability is higher than the one of *Pivdennodonbaska* #3 and *Pivdennodonbaska* #1, ensures more efficiently the capacity increment. Basing on the regularities determined by us (Fig. 3) and depending on the level of economic reliability of mines, proceed to the solution of a problem concerning redistribution of UAH 600 mln meant by the plans of development of *State Enterprise State Coal Company* for completing the reconstruction of *Pivdennodonbaska* #1, *Pivdennodonbaska* #3, and *Kapitalna* mines, i.e. to the determination of, first, conventionally optimal and, then, optimal investment distributions among the enterprises.



Capacity increment, thous. t
Investments, UAH mln

Figure 3. Capacity increment of the mines depending on the investment volumes

In terms of other variants of mine (mines) restructuring, the amount of capital investments for mining operations is determined basing on the calculated value of capital investments for mining operations in percentage of the mine capacity. The amount of capital investments for mining operations in percentage points grows along with the increasing mine capacity; possible risks of the environmental pollution should be also taken into consideration [29, 30, 31].

Consequently, solution of the problem of dynamic programming is expedient to start with the determination of optimal solution at the last n^{th} step, i.e. for one mine [32]. To find that solution, one is obvious to have different assumptions as for how the next-to-last step can be completed and select the control providing maximum value of function $W_n(X^{(n-1)}, u_n)$. Such control selected in terms of certain assumptions, concerning the fact how the previous step is completed, is called conventionally optimal control. Thus, a principle of optimality requires determining conventionally optimal control at every step for each of the possible results of a previous step [33].

According to the determined algorithm, the first step involves consideration of possible investments for *Pivdennodonbaska* #1 mine followed by the investment distribution between *Pivdennodonbaska* #3 and *Kapitalna* mines. Move on to the calculation of values, using the corresponding data of previous calculations

$$\varphi_3(X) = \max\{f_3(X_3) + \varphi_2(X - X_3)\}. \quad (9)$$

The calculations prove that maximum capacity increment of the three mines can be at the level of 829.2 thous. t in terms of investment distribution in the proportion of UAH 200 mln for each mine during a six-year restructuring period. Table 2 represents the data concerning capacity increment of *Kapitalna* mine.

Table 2. Conventionally optimal volume of investments, in terms of Kapitalna mine

Amount of investments X_i, (UAH ml.)	Maximum increment $\varphi_2(X)$ of capacity, thous. t	Conventionally optimal volume of investment, in terms of *Kapitalna* mine, UAH mln
100	222.6	0
200	358.5	0
300	457.8	100
400	555.5	200
500	635.0	200
600	692.2	300

The performed calculations of optimal values of the mines demonstrate potentials of the *State Coal Company* mines, which contain considerable reserves and have quite high level of economic reliability [34].

5. DISCUSSION OF THE RESULTS

Living standards of the population is the best index of the development of any region. This index is of complex nature. It is based on the level of monetary income of the population. However, that level is also nonuniform as it includes incomes from both production and non-production activity. Finally, they are reduced to the necessity of providing certain living standards for all members of society so that it would not be worse than in other regions. That is the idea, in terms of which we should talk about the uniform development of coal-mining regions. Those requirements are implemented in the organization of production of each region, which is a specific territorial economic complex. That provides maximum efficient development of productive forces aimed at complete satisfaction of national needs in finished coal products manufactured in the region and meeting the local needs to the fullest extent. Those are the key moments of planning the regional economies differing with their monoproducts – coal mining. During the studies, it has been identified that the level of ultimate production depends not only on the level of mechanization and organization of enterprise operations but also on the quality of the commercial deposit development. To solve a problem of effective allocation of funds between the groups of enterprises in terms of one legal entity, one should apply complex evaluation in terms of the “economic reliability” parameter, which takes into consideration quality of deposit development and level of concentration of operations. It has been determined that the most effective variant of transformation of coal-mining region’s mines is as follows: compensation of possible reduction in output volumes, their required increment at the expense of additional load on the most efficient operating mines, and, as a rule, with less capital costs.

6. CONCLUSIONS

During the research, we have specified that a mechanism of evaluation concerning the decision-making on enterprise support means the overall estimation. The initial stage includes not only estimation of enterprise potential in terms of the available reserves, conditions of mine and production capacities, but also the involvement of an enterprise in social relations; possibility of diversification should also be considered for unprofitable enterprises. The following results have been obtained:

- currently, only one mine among the analyzed ones has good prospects; in this context, UAH 1.5 bln should be attracted for the development and implementation of design capacity for *Kapitalna* mine. This sum is higher than the volumes allocated by the state to support all the coal mines; consequently, the situation in Donetsk Region will not improve in the near future, conversely – a process of uncontrolled closure of production capacities will begin;
- increment of enterprise productivity depends on the level of attracted investments; however, the level of productivity implementation is different for each enterprise. That is explained not only by the level of currently attracted investments but also by the current state of an enterprise, being expressed by the degree of reserves preparation for extraction, length of mine workings, and level of work organization: all these can be evaluated by the universal parameter – economic reliability of an enterprise;
- mechanism of evaluation of coal enterprises means auditing of the production capacities, further modelling of the return from the level of involved resources as well as evaluation of economic reliability;
- paying attention to the fact that enterprises are involved not only in the process of coal extraction but also in the system of energy and metal production,

further studies and conclusions concerning the expediency of enterprise functioning should be made, basing on the analysis of changes in the state of reserves during the transition from coal to metal or from coal to electric energy.

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ABSTRACT (IN UKRAINIAN)

Мета. Запропонувати новий підхід щодо механізму оцінки доцільності підтримки виробничих потужностей збиткових шахт Донецької та Дніпропетровської областей.

Методика. Для вирішення поставленої проблеми застосовано комплексний підхід, який включає оцінку інвестиційної привабливості підприємства, визначення виробничого потенціалу, визначення можливості переходу на беззбитковий режим. Процес планування шляхів збереження промислового потенціалу вуглепромислових регіонів може розглядатися як відображення багатовимірного простору (початкових і проектних величин) в одновимірний (суму інвестиційних коштів).

Результати. Встановлено, що на стадії побудови моделі управління процесами зниження збитковості шахти необхідно розглянути 8-10 факторних ознак, які можуть визначати формування економічного потенціалу з урахуванням особливостей залягання запасів, що залишилися та їх якості, як інтегральної оцінки потенціалу шахти в частині сприйняття інвестицій (державних та недержавних). Поставлена задача зводиться до відбору найменшого числа факторів, які б найбільш адекватно відображали внутрішній потенціал шахти

у виразі економічної доданої вартості – як наслідок взаємодії факторів економічної діяльності вугільної шахти в конкретних гірничо-геологічних і технологічних умовах.
Наукова новизна полягає в тому, що в якості комплексної складової рівня стану збиткової шахти доцільно використати показник економічної надійності, який синтезує пропускну здатність ланок, економічний рівень технікоекономічних показників і обсяг запасів, що залишилися. Останні визначають залишковий термін служби шахти, фізичний зміст запропонованих показників неоднаковий, і саме ця обставина дозволяє при їх спільному використанні отримати більш повну, ніж при використанні якого-небудь одного показника, оцінку.
Практична значимість полягає у проведенні фактичної оцінки стану вугільних підприємств Донбасу та визначенні граничних показників беззбитковості, що дозволило сформувати рекомендації по залученню об'ємів фінансових ресурсів.
Ключові слова: вугільні шахти, вуглепромисловий регіон, беззбитковість, моделювання, диверсифікація, потенціал, запаси

ABSTRACT (IN RUSSIAN)

Цель. Предложить новый подход к распределению инвестиций в группе предприятий по добыче угля.
Методы. Для решения поставленной проблемы применен комплексный подход, включающий оценку инвестиционной привлекательности предприятия, определение производственного потенциала, определения возможности перехода на безубыточный режим. Процесс планирования путей сохранения промышленного потенциала углепромышленных регионов может рассматриваться как отражение многомерного пространства (начальных и проектных величин) в одномерный (сумму инвестиционных средств).
Результаты. Установлено, что на стадии построения модели управления процессами снижения убыточности шахты необходимо рассмотреть 8-10 факторных признаков, которые могут определять формирование экономического потенциала с учетом особенностей залегания оставшихся запасов и их качества, как интегральной оценки потенциала шахты в части восприятия инвестиций (государственных и негосударственных). Поставленная задача сводится к отбору наименьшего числа факторов, которые наиболее адекватно отражают внутренний потенциал шахты в выражении экономической добавленной стоимости – как следствие взаимодействия факторов экономической деятельности угольной шахты в конкретных горно-геологических и технологических условиях.
Научная новизна заключается в том, что в качестве комплексной составляющей уровня состояния убыточной шахты целесообразно использовать показатель экономической надежности, который синтезирует пропускную способность звеньев, экономический уровень технико-экономических показателей и объем оставшихся запасов. Последние определяют остаточный срок службы шахты, физический смысл предложенных показателей неодинаков, и

именно это обстоятельство позволяет при их совместном использовании получить более полную, чем при использовании какого-либо одного показателя, оценку.

Практическая значимость заключается в проведении фактической оценки состояния угольных предприятий Донбасса и определении предельных показателей безубыточности, что позволило сформировать рекомендации по привлечению объемов финансовых ресурсов.

Ключевые слова: угольные шахты, углепромышленный регион, безубыточность, моделирование, диверсификация, потенциал, запасы

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