DETERMINATION OF ECONOMIC PERFORMANCE IN THE ROMANIAN ENERGY MINING INDUSTRY BASED ON THE PRODUCTION COST

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Abstract

In this study we propose further research on the issue of cost calculation and determination of the production cost of coal in the organization under review. This study uses the traditional approach in order to determine the unit cost per ton of coal mined, highlighting the spending structure so as to render an accurate and timely management organization method, in order to adopt the required measures. The research ends by establishing the differences between budgeted costs and the realized ones and analysis of the causes that led to the planned budget overrun.

Keywords: *Production cost, economic performance, coal, organization,*

Clasificare JEL : M41, Q35, Q40

1. Introduction and context of the study

In a competitive economy, actions of economic entities oriented towards competitiveness causes greater levels of well-being and prosperity of society's members whereas the actions you take contributes to a redistribution substantial financial resources to the population, ensuring sustainable economic development in line alignment with the requirements of best business practices in the E.U.

In this case, achieving that level of competitiveness required by the exigencies of economic transactions request for implementation within the organization of an integrated cost management to obtaining products in the production process to achieve a ceiling cost below that advanced competition for maintaining in market while ensuring development business activities.

This is the starting point for this study, namely to investigate the issue of production costs so as to implement within the organization responsibly optimal method of calculation of cost of production in order to reflect accurate and relevant costs necessary to obtain finite product.

Conducted research concludes outlining the methodology for determining the unitary cost of coal production to organization under review. In this situation the practical application starts with proper positioning of the organization within the branch of activity analyzed on a consolidated mining contributing to ensuring thirds of the electricity supply on the market. In this case it ensures the relevance of the present study by the fact that the subject of applied research is vital to ensure the security and energy independence of the country.

Responsible approach to the production cost of coal has become the priority objective for policy makers because of concerns over the impact of mining on the environment. Thus, pursuing the reduction of environmental footprint as agreed interstate conference participants agreed U.N. climate change in Paris (2015), will result in widespread involuntary reduction of mining activity.

In this context it becomes necessary to limit the effect of these commitments in the economic operator whose socio-economic impact is significant, with action optimum adjustment of operating costs to support balance affected by these changes.

2. Literature review

The etymologically point of view, the cost is of latin origin and is derived from the verb "Constar" which essentially involves "determining", "secure". Economic realities restore later concept of "cost" used to express an occasional production of a good or a service. This leads to the concept of "cost", currently used in the literature.

French author, P. Lauzel defines cost as "expression monetary consumption means of exploitation". In the same research he expose definition of French Accountancy Plan from that period: "The costs are comprised of a set of costs embeddable corresponding to either a calculation on an operation or part of the company or a calculation on an object, benefit service, group of items or services benefits in end-stage or another stage ". [1]

According to the study conducted by A. Kustra, "The costs of each phase of a mining project realization are assigned cost centers which is of particular importance in the exploration and evaluation of the entire project."[2]. In addition, costs account for some centers as centers of grouping these costs allow: identification of costs directly related to the object computing are capitalized and transferred to counting immediately analyze the value of costs incurred to budget assumed (cost centers are treated as budget centers) and profitability control during operation by using a budget, control activities and initiate corrective activities (cost center is being treated as responsibility centers.[3]

The authors Robar P. and S. Bhagwat consider that costing "has a major impact on bilateral transactions mainly oriented on the manufacturing sector (energy). For example, according to studies on the coal sector is known that the achievement of cost estimates for coal mines could be useful in negotiating contracts for the delivery of coal and long-term real estate transactions. Mines with reasonable operating costs are likely to provide more stable contractual conditions than high-cost mines." [4]

In the opinion of professor F. Sgârdea cost "it is an economic category universally accepted implicitly manifested in material production, being directly linked to the value of manifested forms of value. The notion of cost is universal because of the content they express. Cost is manifested as a category distinct values is imposed, on the one hand the need to monitor ongoing consumption values in the production process to reduce systematic, but on the other hand, requirements management enterprise, which involves comparing costs revenues and determining the result."[5]

According to the study conducted by Ţegledi A.M., costing "provides the information needed to produce internal reports and analyzes that are used by management in making decisions. Focus on costs is indispensable so that managers have the necessary tool to control economic activity and productive "[6]

Professor Paul Hayne in his "economic way of thinking" defines the cost of production: "The total cost is the cost of opportunity and so it includes not only payments made by the firm to others for goods and services they receive, and default any good - labor, land, capital - the firm itself and it delivers."[7]

American economist Frank Knight show a different approach to the cost of production in "Risk, uncertainty and profit", where costs "represent simply the competition attraction."[8]

Gilbert Abraham-Frois defines cost of production as "all costs required to produce a given volume of production. The entrepreneur uses this purpose, raw materials, energy, elements to be processed, various fluids, equipment, workers of different qualifications."[9].

Another opinion on the definition of cost is the advanced by Schmallenbach who defined cost in this way: "The costs are determined by calculating values for goods consumed by business

enterprises". According to K. Mellerowicz: "Costs are standardized consumption of goods as value, uzinal conditioned ".

According to the definition given by Schmallenbach production cost is the result of calculations and consumption values, as defined by K. Mellerowicz, the cost is limited to the level of normal consumption, the narrow notion of cost, for which it is criticized by some authors: "such a limit consumption of goods (at normal consumption) lead to a narrowing of the concept unscientific and inappropriate virtually overall cost and, therefore, would be impossible for the concept of cost effective".

In contrast to those, Professor C. Olaru believes that: "Cost should not and can not be considered as a result of calculations, but as a general objective appearance of consumption values that gave rise to it."[10]

According to the authors Kowalska I.J., and Turek M, "the main challenge for the mining industry is the need to improve efficiency, as an essential condition for the survival of this industry. Given the importance and timeliness issue threats and opportunities exist in terms of improving efficiency in mining enterprises in terms of production cost management."[11].

3. Research methodology

This study assumed greater knowledge held on the issues of cost calculation inherent economic activity carried out within the coal industry.

The current state of knowledge concerning the calculation of cost of production in mining is revealed by applying scientific documentation, the itinerary in this regard consisting of information presented on bibliographical sources existing data collection, study sources previously identified and performing synthesis of the information obtained or synthesized evaluation results to realize a critical analysis on the current state of knowledge on the area studied.

The scientific approach of this work was conducted by consulting various bibliographical material consisting of books, scholarly articles published nationally or internationally, legislative references and websites specializing in issues studied. Also, documentation practice for this study involved continuous movement to the undertaking of mining to gather cost data selection and advanced correlation with results to ensure accuracy and veracity of data processed in this study.

The foundation's survey was started from the hypothesis that the activity of the organization in accordance with the legal framework, its own statute, on the one hand, and meeting the expectations of shareholders, employees and business partners on the other hand, will be able to keep costs under control, thus contributing to maximizing financial results in line with planned targets. These aspects contribute to ensuring business continuity undertaken in order to provide stability and prosperity in both microeconomic and macroeconomic level.

Develop scientific approach reflects actions taken to achieve a quantitative research combined with qualitative research effectively granting a study with considerable values.

Qualitative research conducted in this study allows content deductive approach, based on concepts, theoretical concepts and specific regulations of the study area and continuing with examples on how to apply within the economic entity. Analysis of the methods and techniques of production cost issues within this scientific approach, include: observation, comparison, plotting and rates method. The research method graphic representation allows emphasizing evolution / of indicators covered by any analysis is an effective way to present the company's performance. Regarding rates method this is useful because the this study aimed at obtaining information on a report of two specific indicators of overall performance reflecting the views of the organization on economic performance.

4. Considerations on the global cost calculation method in the mining romanian mining industry

In research conducted by professor M.Epuran entitled "*Accounting and Management Control*" global method, called the method of calculation or simple direct division consists of "collecting all the production costs of a reporting period incurred to produce goods, the global level workgroup, department, company, the calculation items.[12]

Unitary cost (uc) of the product resulting from reporting embeddable total cost (direct and indirect) the quantity of products produced (Q F), expressed in natural units, according to:

$$uc = \frac{\sum Cd + \sum Ci}{Qf}$$

It is applicable mainly in establishments manufacturing one product, or service work such as the energy-producing oxygen extraction units (coal, oil) cement, bricks, transport etc. where there are no blanks or work in progress at period end, and if it is constant or nesemifabricată there. Author A. Kustra, advancing the concept of full cost analysis of a mining project. Thus, the full cost method is based on the activation of all costs incurred in relation to search, pursuit and development of mining effects independent of labor performed. Stopping costs increase the value of the exploitation perimeter discovered. Cost allocation is directed to the cost centers that are not identified with a particular operation but refers to major cost centers strengthened.[2]

The authors Popa-Paliu I. and Dina L., said that the global method "involves determining the full cost of products and services is considered absolutely necessary tool to determine and analyze the marginal profitability of a product or service. In this respect, the full cost composition are summarized raw materials and materials, direct labor, indirect costs of the department, workshop, the share of general administrative expenses and marketing costs."[13]

Although the total product costs have character direct costs and indirect production costs, however, the General Administration of indirect costs to assimilate knowledge on cost calculation items, recorded under collection known. At the end of the month these costs are passed entirely on account of calculation of the product.

In case of coupled production, the effective cost of the product is determined by the coefficients of equivalence.

Professor C. Olariu expose two variants of the global method "global calculation the types of costs and calculation of global cost places or sectors.[14]

Global cost calculation can be done in two ways:

a) Separation of total production costs in the course of each reporting costs and cost as the quantity of finished products obtained during the period. Unitary cost resulting from the relationship:

$$cu = \frac{C\ m.p.}{Qf} + \frac{Cs}{Qf} + \frac{Cp.s.}{Qf} + \frac{Ci.p}{Qf} + \frac{C\ gad}{Qf}$$

where:

Cm.p., Cs, Cp.s. represents direct costs of raw materials, wages, social protection etc..;

Ci.p., C gad – indirect production costs and general administration;

Qf – total quantity of products manufactured

b) Separation of total production costs on the kinds of costs and quantities of products manufactured and sold. Thus, the direct production costs relate to the quantity produced and the indirect quantity sold during the period.

In this case the unitary cost calculation is as follows:

$$cu = \frac{C\ m.p.}{Qf} + \frac{Cs}{Qf} + \frac{Cp.s.}{Qf} + \frac{Ci.p}{Qv} + \frac{C\ gad}{Qv}$$

where Qv – is the total quantity of products sold.

Calculation of cost global locations can be applied only in companies where a single product is obtained in a technological process conducted over several successive stages of processing. At each stage or place of cost, product processing machine reaches a certain degree of moving to the next step and the last step resulting finished product.

Variant is characterized in that it aims to determine the unit cost separately on each stage and level of technological process considered place or sector spending and the product.

By adding the unit costs of all places of adding costs and general administration costs resulting cost of enterprise product. The formula for calculating the unit cost per item (u.c.) follows:

$$cu = \frac{C1}{Q1} + \frac{C2}{Q2} + \frac{C3}{Q3} + \frac{Cn}{Qn} + \frac{Cgad + Cd}{Qf}$$

in which:

C_1, C_2, C_3, C_n – It is the total cost of the place 1,2,3...n;
C_{gad} – general administration costs;
C_d – expenses and selling costs;
Q_1, Q_2, Q_3, Qn – the total cost worked in every place;
Q_f – The total amount of end products produced."

5. Determining the production cost of coal in energy mining industry

Unitary cost of production of coal within the organization analyzed it is obtained by dividing the total costs recorded in the accounting entity to total lignite mined.

In order to substantiate the analysis on determining the cost of production per ton of coal is required by emphasizing balance sheet items results of comparing the amounts realized on categories of results against the budgeted at the end of the last financial year, according to data submitted in Table 1.

Table no. 1 Calculation of unit cost of coal as traditional approach to organization analyzed (thousand ron)

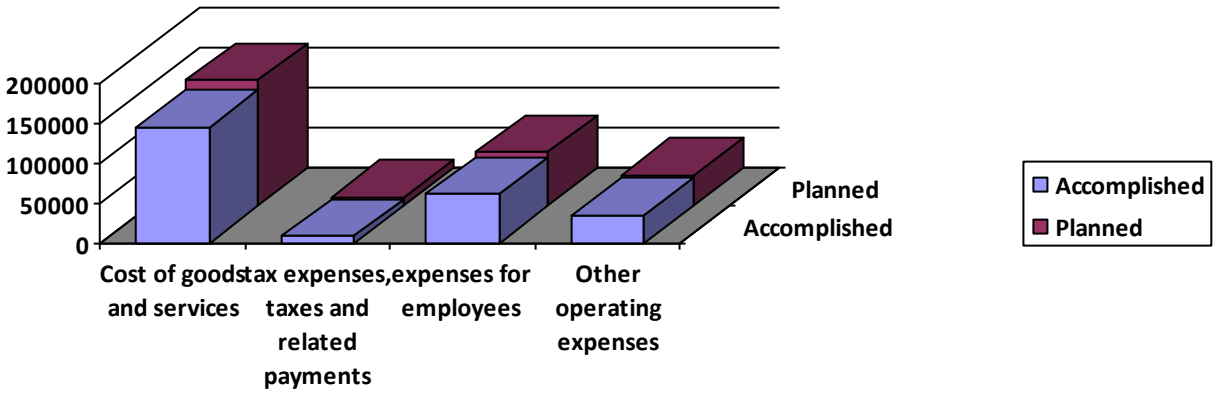
Indicators	Planned	Accomplished
I. TOTAL INCOME	158.160,58	141.353,73
1. Operating income	158.160,58	141.353,66
a) of production sold	0	371,03
b) income from sale of goods	85	11,31
c) Domestic coal production immobilized	148.458,23	130.618,58
d) Investment in own capitalized production	8.017,35	9.589,45
e) other operating revenues	1.600	763,30
2. financial income	0	0,07
II. TOTAL EXPENSES	157.071,71	143.998,73
1. Operating expenses	156.045,70	143.588,25

A. Expenditure on goods and services	41.871,02	38.086,84
A1. Expenditure on stocks	29.629,22	27.779,38
A2. Expenditure on services provided by third parties	483,18	175,82
A3. Expenses other third party services	11.758,62	10.131,65
B. Tax expenses, taxes and similar	9.980,52	8.910,43
C. Expenses for employees	66.731,87	61.003,33
D. Other operating expenses	37.462,28	35.587,66
2. financial charges	1.026,01	410,48
III. GROSS PROFIT (profit / loss)	1.088,87	-2.645
COAL PRODUCTION OF OWN thousand tons	3.300	2.388,33

Source: own processing on the basis of the entity's accounting

Structure of total costs involved in the types of activities is shown in Figure no. 1

Figure no. 1 The level of achieved indicators to the scheduled one (thousand RON)

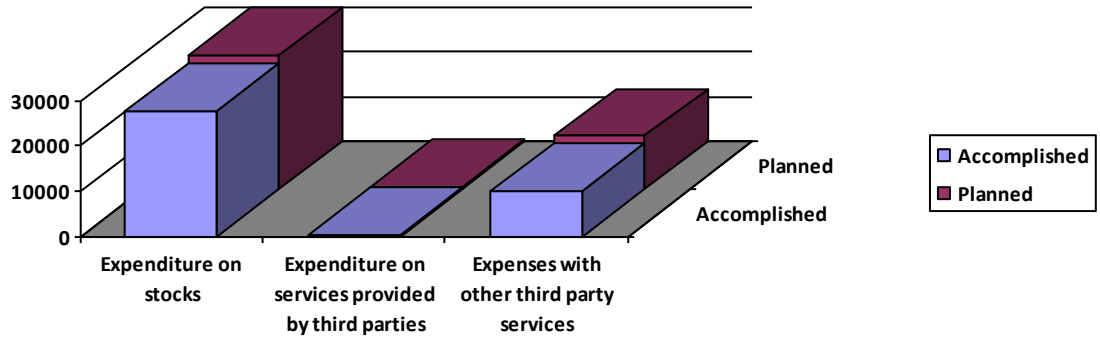


Source: own processing

Figure 1 show that the largest share in total spending is the spending on goods and services followed by expenses for employees.

Regarding the structure of expenditures on goods and services, it manifests a significant share in total expenditure on goods and services according to the data in Figure no. 2.

Figure no. 2 The actual level of expenditure indicators goods and services to realize the program (thousand RON)



Source: own processing

Figure no. 2 shows that the entity has a significant amount of expenditure on stocks in total spending on goods and services due to the specific activity.

Considering the above, we determine the production cost of coal based on the information from Table no. 2.

Table no. 2 Calculation of unitary cost of production to organization under review

Indicators	Planned	Accomplished
II. TOTAL EXPENSES – thousand RON	157.071,71	143.998,73
COAL FROM OWN PRODUCTION – thousand tons	3.300	2.388,33
The total unitary cost RON/ton	**47,60**	***60,29***

Source: own processing

After analyzing the data from Table 2 we can say that achieving within the organization analyzed lignite is achieved with a unit cost of 60.29 lei per ton above the level of 47.60 lei per ton budgeted. Exceeding budgeted unitary cost occurred due to difficult operating conditions determined by the structure of increasingly complex layers of coal.

Determining unitary cost of production to company analyzed conducted to appreciation of the economic performance for all activities effort and to show the current situation in mining. In this situation we appreciate the organization economic performance following a downward trend given the key results indicators. In order to increase economic performance both at the organizational level and at the level of activity we consider necessary to development and implementation programs for a coherent and consistent investment program to increase profitability by reducing unit costs to all involved in the work.

6. Conclusions

The development of this study was a sustained and deepening knowledge documentation held on the issue of cost calculation of energy production in the energy mining industry.
We believe that objective during this scientific approach was conducted study on debuting with a concise analysis of the traditional calculation of production cost by applying the global method.

In the global method cost calculation, the focus is on determining complete cost of products and services in the composition of which are summarized raw materials and materials, direct labor, indirect costs of the department, workplaces and share with general administrative expenses and costs marketing. The method involves costing the global cost ways and places cost or cost sectors. Global cost calculation ways each category is determined by dividing the cost (raw materials, wages, social protection, indirect production expenses and general administrative expenses) to total manufactured goods. Alternatively universally accepted calculation takes into account the kinds of costs, in addition to the quantity of products manufactured and sold quantity of production. Thus, the calculation of cost per unit is determined by dividing the cost of raw materials, wages and social protection in the manufactured production and indirect production costs with the general administration in the total quantity of products sold. Regarding the calculation of global job costs, the cost per unit of product by dividing each cost at the place of consumption to total processed every place cost plus percentage of overheads for administration and cost of sales quantity total finished products manufactured.

The study assumed applied to the cost of production of coal (lignite) mining within the organization under analysis, basic component within the largest state owned enterprises in Romania.

The research was directed to the correct positioning of the reference entity analyzed in the study. In this respect, notaries in the study emphasizes that its parent organization the responsibility which is analyzed unit is the largest of its kind in Romania with over 13,000 employees engaged in order to achieve the object of activity represented by the extraction and preparation of coal (lignite)

on the one hand, and electricity and heat production based on lignite on the other hand. Thus, electricity can go up to 40% of the national energy system.

According to the traditional approach opts for the organization under review, the unit cost of production of coal (lignite) by dividing total expenses of the entity on the total amount of coal in tonnes recorded during the reference entity.

Perimeter exploitation is difficult to operate so that the work of extracting coal is expensive. According to budget execution at the end of the previous year, they were extracted 2.388.330 million tons of coal with 900,000 tons below the budgeted level.

The unit cost per tonne of coal as determined in the present study include the cost of ballast (mixture of sand and gravel) distorted to some extent the actual cost per ton of coal mined, taking into account that the average ratio of ballast / coal is 5.8 cubic meters per ton.

The economic performance of the organization obtained by determining the cost of coal production is declining but with real prospects of recovery in terms of implementing a consistent investment effort.

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