

PUBLIC SECTOR ENVIRONMENTAL ACCOUNTING: THE EXAMPLE OF LITHUANIAN MINERAL RESOURCES

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Abstract

The article analyzes the aspects of environmental accounting of public sector. The topics of investigation and assessment of mineral resources, their sparing usage, and balanced expansion have been widely discussed in the scientific literature. As the mineral resources are the exclusive property of each country, thus the State also is obliged to use them in moderation and to reveal this information to the concerned groups.

According to the statistical data of the year 2007, the mineral resources surveyed in detail make 30,5% of the total Lithuanian national property, whereas the taxes paid by the mining companies for the usage of mineral resources refill the municipal and State budgets every year. In order to guarantee the balanced and sparing usage of mineral resources, the public sector should disclose the information about the present values of mineral resources, their increase and decrease with regard to the entire society. Thus the analyzed scientific problem is the determination and recording of present value of mineral resources and disclosure of such information in financial reports. The purpose of this article is to analyze the accounting aspects of mineral resources and to present the calculation of present values of mineral resources for the period of the years 2012-2017.

According to the research results, it is meaningful to apply the method of present value for accounting of mineral resources because it allows assessing the amount of future taxes of the obtained resources. Following this methodology, in case of other constant conditions the value of mineral resources is growing because the moderate increase of tax rates for public mineral resources has been applied in Lithuania since 2012. As the result it would be possible to use these resources economically if the export of draining natural resources is limited.

Keywords: environmental accounting, mineral resources, public sector.

JEL Classification: M41, M48, N50, Q56.

Introduction

The topics of investigation and assessment of mineral resources, their sparing usage, and balanced expansion have been widely discussed in the scientific literature. It is possible to consider the principle of harmonious global development as the point of departure of this topic (it was published by the United Nations), which aim is to preserve the natural resources for future generation through moderate satisfaction of present needs. As the mineral resources are the exclusive property of each country, the State also is obliged to use them in moderation and to reveal this information for the groups of interested persons.

Scientific problem. The tendencies of expansion of environmental accounting related to the accounting of mineral resources are topical and predominant with regard to the development level of the country, its strategic goals and ecologic orientation. According to the scientific literature and valid legal provisions of the country, the mineral resources are classified and may be accounted using the physical accounting units and expression of value. The geological agencies or other agencies responsible for accounting of mineral resources of many countries (Lithuania including) present this information about register of earth depths, i.e. amounts of explored and obtained mineral resources, to all the groups of the interested persons.

At the same time there are numerous standards and codes, which encourage universal initiative of accounting for minerals that was caused through the interaction of governmental institutions and business organizations (Global Mining Initiative (GMI), Committee for Mineral Reserves International Reporting Standards CRIRSCO, International Council on Mining & Metals (ICMM), The Extractive Industries Transparency Initiative, United Nations Framework Classification for Solid Fuels and Mineral Commodities UNFC). Essentially the objective of these organizations and initiatives is similar – to concentrate on harmonious development of this industrial branch with regard to the environment, and to determine the principles, which improve the activity results of mining industry of mineral resources, and their contribution to sustainable development.

However, the issue of valuation of mineral resources and incorporation of this value into the financial accountability of the public sector is not less important because the mineral resources are exclusive property

of the State (Constitution of the Republic of Lithuania, art. 47, Law on earth depths of the Republic of Lithuania, art. 20). Thus their accounting and disclosure of information about usage of mineral resources to the entire society is the object of public interest. The mineral resources of earth depths are important for the State and society, because it is attempted to create the usage strategy of the resources of earth depths, to maintain the achieved living standard of the country, to receive benefit, and to progress. According to the report of Habil. Dr. A. Laurinavičius and Dr. S. Skrinskas made on October 28, 2008 “Mineral resources – rational usage and national public welfare”, the mineral resources explored in detail make 30,5% of the Lithuanian national property. Their effective and sparing usage has positive effect on biovariety and landscape, whereas the taxes paid by the mining companies for usage of resources refill the budgets of the municipalities, where the resources are obtained, and these of the States. In order to provide the State budget with “pro-ecologic” orientation, which essence is “Green Budget Reform”, the State should increase gradually the comparative weight of ecologic taxes in the budgetary revenues by introducing the ecologic taxes (Čekanavičius *et al*, 2005).

According to the present edition of the 16th Standard of Public Sector and Financial Accountability “Biological Property and Mineral Resources”, the mineral resources may be recognized as the property of the subject of public sector if their value may be determined reliably. Due to the lack of valuation methodology, the mineral resources are registered only in the non-balance accounts. Therefore, *the determination and accounting of present value of the mineral resources and disclosure of such information in the financial reports is the topical problem in the public sector.*

Object of the article – mineral resources and their value in the accounting.

Objective of the article – to analyze the accounting aspects of mineral resources and to present the calculation of present values of mineral resources for the period 2012-2017.

The **research methods** applied in this article are the analysis of regulation of legal acts, logical and comparative analysis of scientific literature in the topic of accounting of mineral resources, and the calculation method of present value.

Theoretical aspects of accounting of mineral resources

The resources of earth depths are the part of natural resources, which covers the composition and constitution elements of the earth depths – solid bodies, liquids, gas or energetic fields, which the human may use and which amount or quality change because of this. The resources of earth depths, which are the best known for the society, are the minerals and underground water.

The adequate usage of the minerals with regard to environment is closely related to the phenomenon of socially responsible activity. The modern scientific literature speaks about social responsibility of the companies in the industry of minerals precisely. Jenkins & Yakovieva (2005) were analyzing what social and environmental information is disclosed to the interested persons by ten biggest mining companies. The aspects of environmental accounting were researched by: environmental costs and environmental economic indexes – Bartelmus (2009), scenarios of usage intensity of mineral resources within the European and international context – Giljum *et al* (2008), accounting methodologies of mineral resources – Kellenberg (1996), Lange (2003), accounting problems of mineral resources on the national level were examined by Radwanek-Bąk (2008). The Lithuanian scientists in their articles present various evaluation provisions and models of mineral resources, but they are mainly related to specific mathematical models meant for evaluation of potential usage possibilities in order to achieve sustainable development with environment. Juodkazis, Klimas and Gregorauskas (2008) were assessing the exploitation resources of underground water and determined the principal restrictions related to intensive extraction of underground water. However there are no researches on the present value of underground water as one of mineral resources in the financial reports. Skrinskas, Gasiūnienė and Laurinavičius (2010) were examining the possibilities of maximal benefit for the interested groups provided by the Lithuanian mineral resources used for road building.

When the legal acts regulating accounting of mineral resources are analyzed, the 6th International Standard of Financial Accountability “Research and evaluation of mineral resources” should be mentioned first of all. Following the initiative of the Committee for Mineral Reserves International Reporting Standards CRIRSCO it was decided to expand the application possibilities of the classification of mineral resources in financial accounting, and at the same time in the financial reports. As the result of mutual negotiations, in December 2004 the Board of International Accounting Standards adopted the 6th ISFA. The aim of this standard is to provide guidelines for the business companies, which have the permits to explore the earth depths for mineral resources and their recognition as property or expenses. The companies engaged in

extraction of mineral resources apply various accounting practice: the expenses of exploring and evaluation activity are recognized as balance property or expenditure – it depends on the selected accounting policy. Various debates and considerations related to the publication of the 6th standard caused staying with the provision that ISFA would allow applying the same varying practice further. So the standard does not present any particular provisions of accounting policy in this area and the provided motivation is that the particularity of disclosure of this information may depend only on the needs of the interested person. However, it is recommended in the standard to attribute the exploring and evaluation property of mineral resources to tangible or intangible property depending on the features of the acquired property. This classification should be followed consistently.

The 6th ISFA standard does not analyze, what values should be used for assessment of exploring and evaluation expenses of mineral resources. It simply presents the list, where the cost price of certain expenses (taking into account particular accounting policy of certain company) could be recognized as the elements of explored and evaluated property. For example, the acquisition of exploring rights, topographical, geological, geochemical and geophysical studies, investigational drilling expenses, etc.

There are no approved Business Accounting Standards in Lithuania, which would regulate the activity of business companies engaged in exploring of mineral resources. However the Committee of accounting standards has already initiated the project considerations regarding preparation of separate standard for exploring costs of mineral resources, or supplement of the 13th standard “Intangible property”.

Thus, the term “mineral resource” is found only in the Standards of Public Sector and Financial Accountability. This is understandable because mineral resources in the earth’s subsurface are an exclusive property of any state. The accounting of mineral resources is regulated by the 16th Standard of Public Sector and Financial Accountability “Biological Property and Mineral Resources”. According to the edition of this standard valid until 2012, the mineral resources had to be reflected only in the extra-balance accounts. In other words, this property was not reflected as the public property in the financial reports. This provision was changed in the new edition of the standard, but currently there are no methodical recommendation of accounting in Lithuania governing mineral resource exploration, evaluation and presentation in the accounting.

After the reconnaissance investigation was done regarding the permits issued for the users of earth depths and cavities in the period from 2001 until 2010, it is possible to state that the interest in the survey and extraction of resources in Lithuania is growing every year (Figure 1).

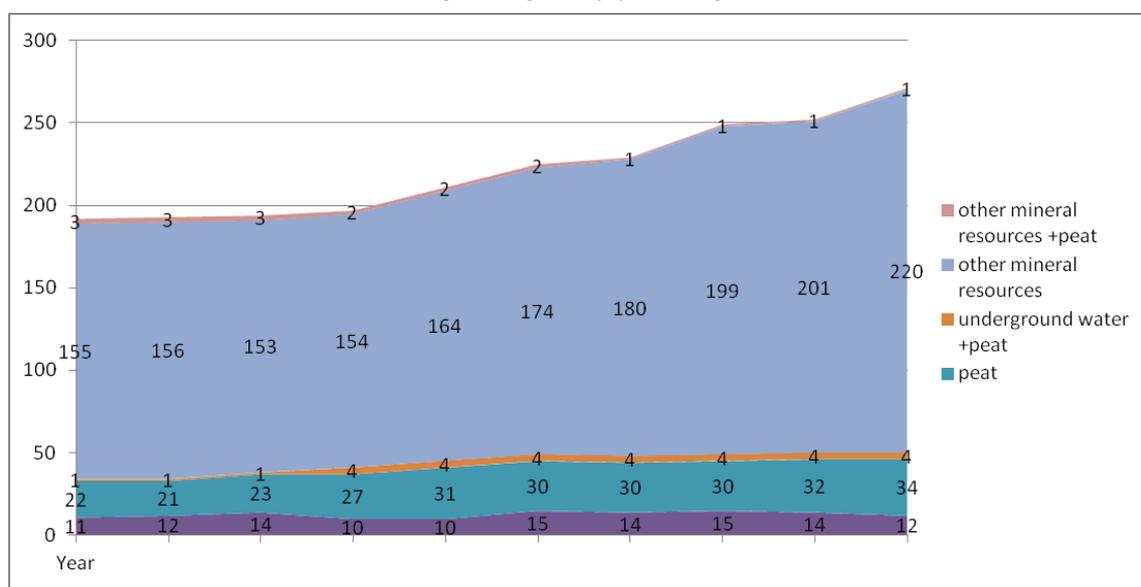


Figure 1. Number of permits issued for usage of earth depths and cavities
(Made by the authors according to Lithuanian Geological Explore. Annual Reports 2001-2010)

The number of the companies, which have permits to extract solid minerals, was changing little during the analyzed decade. The exception is the year 2008, when the growth of the companies’ number was indirectly induced by the ending processes of land reform, which stimulated the companies to receive permits for usage or detailed exploring of mineral resources located in the still remaining areas of free State

land. In the end of 2010, 270 legal entities and 1 group of legal entities had the valid permits for usage of the resources of earth depths and cavities. The group was acting on the basis of the contract of joint activity. 7 permits were meant for exploring and others for extraction.

Research of accounting methodology of mineral resources

The accounting methodology of mineral resources in the public sector consists of the following prerequisite:

- According to the current edition of the 16th Standard of Public Sector and Financial Accountability “Biological Property and Mineral Resources”, the mineral resources may be recognized as the property of the subject of public sector if three criteria for property’s recognition in the accounting are satisfied. First of all, the subject of public sector should have a possibility to dispose the property, including the right to limit its usage by other persons and to control it. As all the mineral resources are exclusive property of the State, this condition of the property’s recognition is satisfied unambiguously.
- Besides, the following condition for recognition of mineral resources as the property in accounting should be satisfied: the usage of such property should bring economic benefit or the property should be used for social, cultural, environmental, legal or cognitive purposes. The economic benefit of the mineral resources is manifested through 1) collection of payments for permits to explore and extract mineral resources; 2) collection of taxes for public natural resources. Thus, when the mineral resources are evaluated with regard to economic benefit, the amounts of mineral resources explored in detail are topical, because only the mineral resources explored in detail may be used (extracted) and accordingly the State may receive economic benefit for their usage in the form of taxes for public natural resources. In this area it is possible to use the researches of the Lithuanian Agency of Geology, articles published by Januška and Gudonytė (2010) on the base of Lithuanian mineral resources and analysis of its development. Juodkazis (2010) was analyzing the situation of various minerals in Lithuania, according to the amounts and level of exploration in various years. The Lithuanian Agency of Geology also submits annual reports about the base of Lithuanian mineral resources and analyses its development.
- The third criterion that causes the most discussions is the possibility to determine the real value of the property or purchase cost price reliably. The provisions of this standard are applied for the biological property, as well, because it is certainly no meaning to speak about the cost price of mineral resources, because the countries extract the mineral resources present in their territories.
- Thus when the present (real) values of mineral resources are calculated, the verified tax rates for national natural resources shall be followed (Law of taxes for national natural resources of the Republic of Lithuania).
- With regard to the determination of present value of mineral resources, according to the data of the conclusion of national audit concerning the report on the property that belongs to the State for the year 2010 (November 25, 2011, No. FA-P-60-2-66), the value of the resources in depths explored in detail makes 62 459 mln. Lt; and the main part of this property was formed by the value of underground water in the amount of 30 828 mln. Lt. The empirical research was used to calculate the present values of solid minerals. Besides, it is presumed in that empirical research that the accounting present value of mineral resources is the present value of future income in the form of taxes.

Empirical research

According to the researched published by the Lithuanian Agency of Geology, there are 17 sorts of minerals in Lithuania, from which 9 sorts (chalk-stones, dolomite, sand, gravel, clay, chalk marl, peat, sapropel and oil) are exploited. The resources of solid minerals are classified, according to 3 criteria: geological investigation, exploration of usage possibilities, and economic value. According to the classification of solid minerals of the Republic of Lithuania (17/09/1999, No. 39), following the exploration of usage possibilities the mineral resources may be supposedly predictive, detected predictive, preliminary explored and explored in detail; accordingly on the basis of the effectiveness of economic usage, the mineral resources may be supposedly valuable, potentially valuable, and valuable. The classification system of mineral resources is topical for both: users of information disclosure and with regard to accounting. As it will be necessary to reflect in detail the present value of mineral resources explored in detail in the accounting on the basis of value of

future taxes for natural resources, according to the 16th Standard of Public Sector and Financial Accountability; therefore it is necessary to know the real potential of the mineral resources to be used.

As the economic value and usage possibilities most frequently depend on the development level of the technologies, economic condition of the country and changes in market, and as they are variable, the external changes have little effect on geological exploration. When the accounting problems of mineral resources are being solved, the amounts of mineral resources are topical with regard to the exploration level, which are presented in Table 1.

Table 1. Amounts of mineral resources on 31/12/2010

Mineral resource	Exploration level of resources, mln. m ³			In total, mln. m ³
	In detail	Preliminary	Predictive	
Anhydrite	80,694	n/d	n/d	80,694
Gypsum	16,823	n/d	n/d	16,823
Dolomite	109,086	140,000	305,000	554,086
Peat:	n/d	n/d	n/d	0
Small-decomposing	415,624	173,000	n/d	588,624
Other	1,286,910	1,920,000	n/d	3,206,910
Amber (1.1 t/m ³)	n/d	108	200	308
Chalk-stone	194,266	368,000	886,000	1,448,266
Freshwater chalk-stone	585	n/d	n/d	585
Chalk marl	8,060	3,815	25,780	37,655
Clay	145,631	93,000	110,000	348,631
Opoka	19,395	n/d	n/d	19,395
Sapropel	4,610	15,900	156,000	176,510
Sand for glass making	4,128	120 years	will not be	4,128
Sand for silicate products	n/d	n/d	18,000	18,000
Other sand	174,000	252,000	905,000	1,331,000
Gravel	688,188	714,000	2,173,000	3,575,188
In total	3,148,000	3,679,823	4,578,980	

n/d – no data

Source – Activity results of the Lithuanian Agency of Geology in 2010. *Annual report 2010*. http://www.lgt.lt/uploads/1309777832_Lgt_2010_veiklos_rezultatai.pdf

After the exploration level has been reviewed, it is possible to state that the exploration consistency is not undivided, i.e. some larger areas have been explored of certain minerals, their usage succession has been provided, and the predictive amounts of other present resources are learnt only during their extraction. As it is stated in the “Study of possibilities to increase taxes for national natural resources” (2011), the mineral resources, which have been explored in detail and which economic value and usage amount are the most important, take some 0,4 per cent of the Lithuanian territory. These are mainly minerals meant as building materials for industry or road building. Nevertheless, the mines of minerals and the distinguished predictive areas of their spreading occupy only 4,3 per cent of the country’s territory, whereas the pools of preliminary explored minerals occupy 2 per cent of the country’s territory. When the data on minerals’ usage is analyzed, it becomes evident that the most used resource is gravel, which is used in local industry, whereas its reclamation possibilities are much restricted by the fact that the majority of unused gravel mines are in private land, forests of national significance, or in the protected territories. The second – peat, which are saleable not only in our country (about 10 per cent are sold), but also abroad, thus the major part is exported, as it is indicated in the study done by the Association of Peat Companies – starting with the year 2005 the sale volumes in the money expression were gradually growing, while the taxes to the State budget were decreasing. Thus the real potential of mineral resources consists of resources explored in detail and preliminary, whereas the predictive resources are the reserve for the future.

When the foreign experience in usage of natural resources was analyzed, the necessity rouse to review the taxes applied in our country for the obtained national natural resources. As the State aims to use

economically these resources taking into account the reserves of the resources, and to restrict the export of draining natural resources, and to consider the financial and other obligations, it was determined that the Lithuanian tax rate for national natural resources is too small and it is necessary to review its limits for each resource separately.

According to the study performed by the Ministry of Environment regarding taxation for national natural resources in the EU Member States, it was determined that the tax rate has to be increased gradually, i.e. moderate increase of rates through laying out the predicted increase for the period of five years, 20% every year. It is planned to leave the same declaration system without changing the requirements for submission of tax returns, calculation and payment procedure. It is considered that in such a case the business will be able to prepare for the changes of rates in advance and to adjust to them.

With regard to the moderate increase of tax rates for natural resources for each resource individually, the present value of resources explored in detail for the next periods is presented in the Figure 2.

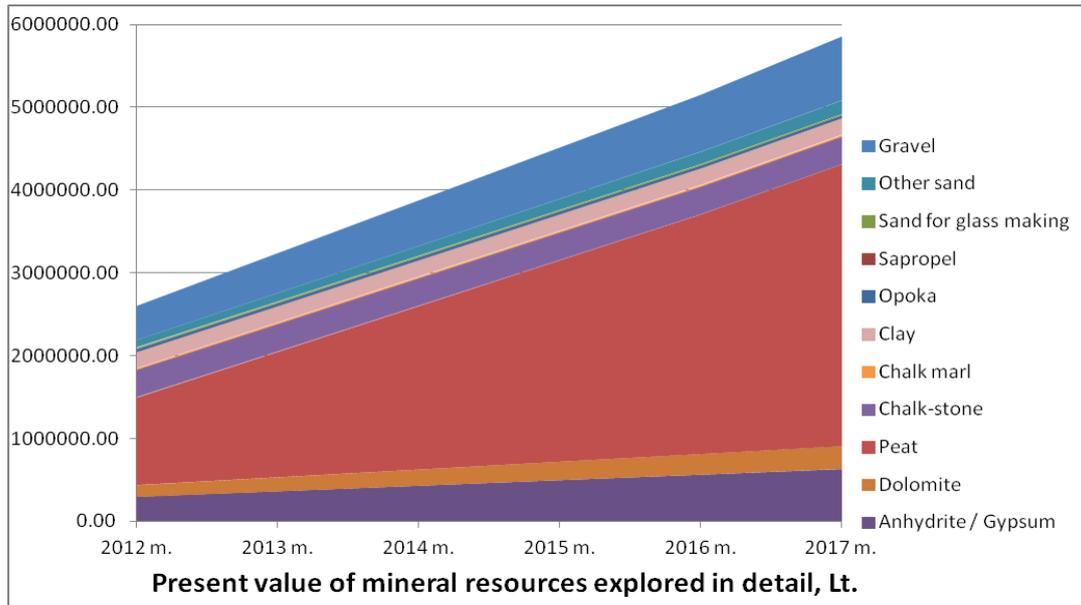


Figure 2. Present value of mineral resources explored in detail (created by the authors)

The research revealed that the main comparative part is made by the tax for peat resources. Even 95 per cent of these resources are exploited. The present value of other resources during the analyzed period is also increasing, but not so significantly, because smaller amounts of the material are received and now the tax rates similar to the neighboring EU states are applied.

When the modeling was done for each resource, according to the changing limits of suggested tax rate, the changes of resources' present value during the analyzed period are presented in the Figure 3.

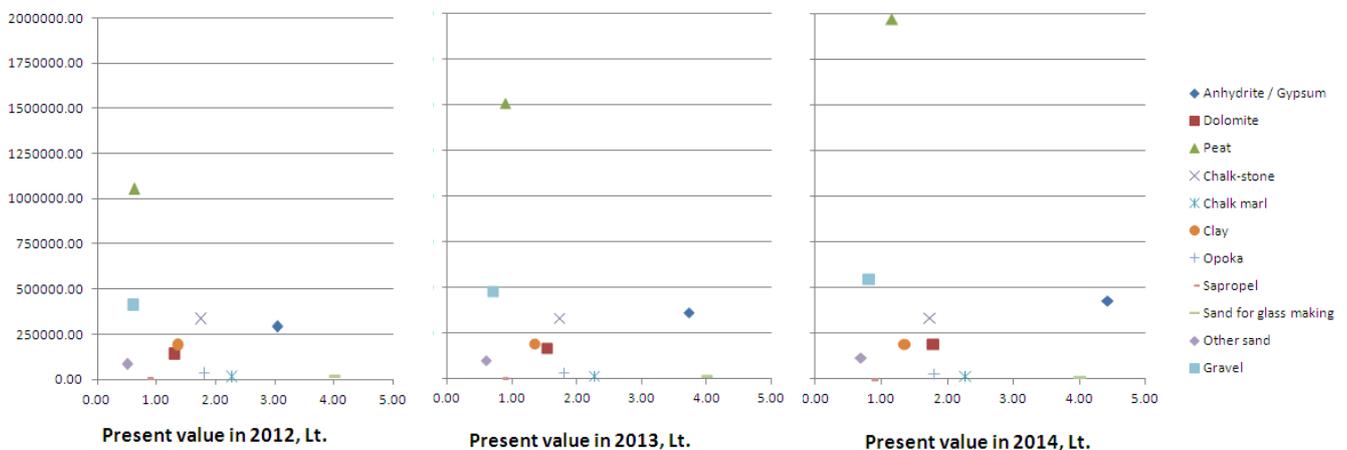


Figure 3. Present value of mineral resources in 2012-2014 (created by the authors)

The done researches allow stating that the increase of rates has direct influence of present value of mineral resource for certain year and allows making it closer to the wholesale price of resources in present market, which is higher by several tens of times, according to the "Study of possibilities to increase taxes for national natural resources" (for example, the tax rate for peat is 0,62 Lt/m³, whereas its wholesale price varies from 20,71 Lt/m³ to 34,53 Lt/m³). The present value also has direct dependency on the extracted amount of mineral resource. For example, the extraction volumes of peat are the biggest, thus the present value in certain period is also the highest. There have been found large areas of anhydrite in Lithuania, but it is not extracted yet. It is of high quality, can be widely used in building sector, which increases its demand in entire Europe. Therefore the planned tax rate of this resource is 6,50 Lt/m³ (i.e. 5 per cent from the sale price of resources) and it is determined, according to the rate applied in the neighboring country (Poland) (8,8 Lt/m³), when the sale price is 120 Lt/m³. As the mineral resources obtained in Lithuania are mainly exported abroad and are draining in Lithuania, the selected moderate increase of tax rate would allow preserving draining resources through their reduced usage. Besides, it is noticed that the tax rate occupies a very small part in the sale price of the resources as raw material, and thus the benefit received by the State is very small (if compared to the benefit received by the user of resources).

Conclusions

While analyzing the mineral resources' accounting, the following conclusions were made:

- The accounting problems of mineral resources do not receive enough attention in the extent of public sector. The aforementioned problems are mainly related to the difficulties to satisfy the criteria of property recognition, i.e. to determine the real (present) value of mineral resources.
- This article and the legal act regulating accounting of mineral resources (i.e. 16th Standard of Public Sector and Financial Accountability) discuss the recognition of solid mineral resources as property and its accounting in financial reports; at the same time water forms a big part of mineral resources.
- It is meaningful to apply the method of present value for accounting of mineral resources, because it allows assessing the total future taxes for extracted resources. According to this methodology, in case of other constant conditions, the value of mineral resources is increasing, because since 2012 the moderate increase of tax rate for national natural resources has been applied in Lithuania. As the result it would be possible to use these resources economically by limiting the export of draining natural resources.

References

1. Bernatonyte, D., & Simanaviciene, Z. (2008). Cases Study of Corporate Social Responsibility in Lithuania Business Society. *Business and Management – 2008*, 501-505.
2. Cardebat, J.M., & Sirven, N. (2010). What Corporate Social Responsibility Reports Adds to Financial Return? *Journal of Economics and International Finance* (2). Retrieved from <http://www.academicjournals.org/JEIF>
3. Čekanavičius, L., Semėnienė, D., Lenkaitis, R., Varneckienė, J. (2005) Aplinkos apsaugos ekonominių veiksmų strategija. Retrieved from <http://ebookbrowse.com/15-aplinkos-apsaugos-ekonominiu-veiksniu-strategija-doc-d77606352>.
4. Dagiliene, L. (2010). The Research of Corporate Social Responsibility Disclosures in Annual Reports. *Inžinerine Ekonomika-Engineering Economics*(2), 197-204.
5. Dagiliene, L. (2009). The role of voluntary disclosed information in financial valuation. *Social Research*, 17(3).
6. Dėl kietųjų naudingųjų iškasenų išteklių klasifikacijos // Lietuvos geologijos tarnybos prie Lietuvos Respublikos aplinkos ministerijos direktoriaus įsakymas, 1999 m. rugsėjo 17 d., Nr.39.
7. Grogorauskas M., Juodkazis V., & Klimas, A. (2008). Požeminio vandens eksploatacinių išteklių vertinimo nuostatos // *Geologijos akiračiai*, 3-4.
8. IFRS 6 Exploration for and Evaluation of Mineral Resources.
9. Januška V., Gudonytė J. (2010). Lietuvos naudingųjų iškasenų išteklių bazė ir jos raidos analizė. *Geologijos akiračiai* (1-2), 51-54.
10. Jenkins, H., & Yakovleva, N. (2005). Corporate social responsibility in the mining industry: Exploring trends in social and environmental disclosure. *Journal of Cleaner Production*, vol.14, issues 3-4. Retrieved from <http://www.sciencedirect.com/science/article/pii>.

11. Juodkazis, V. (2010). Naudingų iškasenų tausojantis naudojimas. *Geologijos akiračiai* (1-2), 18-25.
12. Laurinavičius, A., Skrinkas, S. (2008). Mineraliniai išteklių- racionalus naudojimas ir šalies visuomenės gerovė. Retrieved from www.nsm.lt/mpranesimas_20081028.ppt.
13. Lietuvos geologijos tarnybos veiklos rezultatai. *Metinės ataskaitos*. Retrieved from: [http:// www.lgt.lt/uploads/](http://www.lgt.lt/uploads/)
14. LR Aplinkos ministerija. Racionalus žemės gelmių išteklių naudojimas. Retrieved from <http://www.am.lt/VI/index.php#a/6810>.
15. LR Mokestis už valstybinius gamtos išteklius. Retrieved from http://www3.lrs.lt/pls/inter3/dokpaieska.susije_1?p_id=1153&p_rys_id=15.
16. Mokesčių už valstybinius gamtos išteklius didinimo galimybių studija (2011). Aplinkos ministerija. Retrieved from <http://www.am.lt/VI/files/0.285827001303474287.pdf>.
17. Radwanek-Bąk, B. (2008). Some problems of sustainable management of mineral resources in Poland. *Estonian Journal of Earth Sciences*, 57 (2), 75–79.
18. Skrinkas, S., Gasiuniene, V.E., Laurinavicius, A., & Podagelis, I. (2010). Lithuanian mineral resources, their reserves and possibilities for their usage in road building. *The Baltic Journal of Road and Bridge Engineering*, vol. V, no.4.
19. Viešojo sektoriaus ir finansinės atskaitomybės standartai. 16-asis VSAFAS “Biologinis turtas ir mineraliniai išteklių”. Retrieved from http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_1?p_id=377941&p_query=&p_tr2=
20. Wynne, A. (2004). Is the move to accrual based accounting a real priority for public sector accounting. A century of innovation and responsibility in accounting 1904-20. Retrieved from http://www2.accaglobal.com/doc/publicsector/ps_doc_009.pdf