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ASSESSMENT OF THE VALUE OF LAND SITES UNDER OIL-AND-GAS PRODUCTION FACILITIES

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Abstract

The issue of assessing the cadastral and market value of industrial land sites intended for mining is considered. The purpose of this article is to determine the cadastral value of land sites occupied for mining. This goal is achieved by solving the following tasks: determining sources of information on the assessment of cadastral value, a brief graphoanalytical analysis of the state of the cadastral valuation of land in the mining zone and additional justification of the methodology for assessing the cadastral value of land occupied by mining. Access is given to the most reliable sources of information on the assessment of both the market and cadastral value of real estate represented by the Federal State Registration, Cadastre and Cartography Service (Rosreestr). A brief graph-analytical analysis of the state of the cadastral valuation of land in the mining zone is presented using a Bing-card. An additional substantiation of the methodology for assessing the cadastral value of land sites used for mining is based on the basic principles of real estate valuation. The studies cover the period from 2013 to 2014. The calculation data are taken from reliable sources and previously published materials. Based on the given market parameters, based on recognized fundamental publications in the field of economics, a conclusion is drawn about the lower cost of land under oil and gas facilities in comparison with industrial lands. This allows us to judge about the higher priority of investments in industry in the future than in the oil and gas complex.

Keywords: Cadastral value, information, industrial land, land, oil and gas facilities, real estate valuation.

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1. Introduction

The purpose of this article is to determine the cadastral value of land sites used for mining. The following tasks are solved.

1. Determination of sources of information on the assessment of cadastral value.
2. Graphical analysis of the state of cadastral valuation of land in the mining zone.
3. Improving the methodology for assessing the cadastral value of land sites used for mining.

Insufficient attention has been paid to the determination of cadastral value of land sites used for mining. Although there are studies on the economy of minerals (Dunayev, 2006), the determination of market and cadastral values for groups of land sites close to the lands of mining (Svitelskaya, 2016, 2017b, 2019; Leliukhina & Fedorova, 2012), the distribution of industries including oil and gas production at the average rate of return (Sorokin, 2017) and territorial analysis of market phenomena (Yarmolenko, Putintseva, & Pisetskaya, 2019). However, the place of the market and cadastral value of land sites of mining of minerals is not accurately defined in comparison with other lands, for example, industrial lands.

2. Problem Statement

Since natural resources, including oil and gas are the decisive source of replenishment of the federal budget in the Russian Federation, the fundamental problem is determining the priorities of the country's economic development with a prospect for the next century. In this case, it is necessary to compare the development efficiency of oil and gas sectors with other industrial sectors. The development efficiency of these sectors determines the current market and cadastral value of land under the objects of oil and gas and industrial complexes, respectively. Based on a comparison of the market value of the land sites of these industries, it is necessary to determine the priority investment in the raw material sectors of the economy, or in industry, that is, those that will increase the value of land sites and objects of the corresponding industries in the future.

3. Research Questions

In connection with the foregoing in the introduction of this article the following questions are posed for solution.

3.1. Graphoanalytical analysis of the state of the cadastral valuation of land in the mining zone based on reliable information.

3.2. Additional substantiation of the methodology for assessing the cadastral value of land sites used for mining.

4. Purpose of the Study

The purpose of this article is to determine the cadastral value of land sites used for mining.

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5. Research Methods

The studies were carried out using the methods of geoinformation modeling, theoretical analysis based on reliable statistical data.

6. Findings

We will consider the solution of the problems in the order of their sequence.

6.1. Identification of information sources of cadastral evaluation

The most reasonable source of information on assessing both the market and cadastral value of real estate is the data of the Federal State Registration, Cadastre and Cartography Service (Rosreestr). The State Cadastral Assessment Data Fund can be accessed at https://rosreestr.ru/wps/portal/cc_ib_svedFDGKO. Then it is possible to select the desired report on the assessment of the cadastral value of land sites in a particular region. In this case, the cadastral value of land sites as part of industrial and other special purpose lands of the Khanty-Mansiysk Autonomous Okrug is considered.

6.2. Graphical-analytic analysis of the state of cadastral evaluation of land in mining zone

According to (Svitelskaya, 2016, 2017a; Postanovleniye Pravitel'stva Khanty-mansiyskogo avtonomnogo okruga – Yugry. 2014) land sites are divided into seven groups, each of which includes land sites for allocation of the following respectively:

- the first – ground-based objects of space infrastructure, energy, air transport;
- the second - objects of capital construction of industry;
- the third – objects of road transport;
- the fourth – facilities for the development of minerals, including transport and urban infrastructure;
- the fifth – communication facilities, transport – rail and road, pipeline, water – zones with special conditions of use;
- sixth – defense facilities.

Table 01 shows the cadastral value of land sites in the industrial and other special purpose lands of the Khanty-Mansiysk Autonomous Okrug. Regarding the cadastral value of these land sites, this article will determine the cadastral value of land sites intended for mining of minerals. The industry lands in this table are highlighted in group 2, and for mining in the form of a group 4.

Table 01. Cadastral value of land sites as part of industrial and other special purpose lands of the Khanty-Mansiysk Autonomous Okrug

№	Name of municipality	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
1	Beloyarsky municipal district	–	84.57	–	38.97	84.57	43.83
2	Berezovsky municipal district		52.50	–	47.59	52.50	21.53
3	Kondinsky municipal district		78.89	286.76	75.46	78.89	21.80

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4	Nefteyugansk municipal district		141.00	1125.58	123.67	141.00	35.28
5	Nizhnevartovsk municipal District		156.55	506.83	143.59	156.55	12.60
6	Octyabrsky municipal district		97.54	476.15	81.30	97.54	31.60
7	Soviet municipal district		86.74	163.07	77.58	86.74	115.67
8	Surgut municipal district		114.60	910.73	134.93	114.60	1.22
9	Khanty-Mansiysk municipal district		77.00	472.79	106.81	77.00	35.89
10	Nizhnevartovsk		216.01	129.04	122.43		68.82
11	Surgut		228.06		126.01	228.06	7.47
12	Raduzhny		198.45				
13	Urai				90.95		4.35
14	Nyagan		132.52		79.82		
15	Kogalym			47.94			
16	Pokachi						15.48
17	Average for the subject of the Russian Federation		110.23	724.78	122.01	112.53	6.36
18	Minimum for the subject of the Russian Federation		21.81	34.75	21.81	52.50	0.09

Figure 01 shows the geographical distribution of the cadastral value for all groups of land sites in a mapping environment Bing (Yarmolenko, Putintseva, & Pisetskaya, 2019).

The excess of the cadastral value of group 4 over group 2 on average amounts to 122.01 / 110.23 = 1.107 or 10.7 percent in the subject of the Russian Federation. It is associated with risk to take such a ratio as the basis in calculation of the cadastral value relative to industrial land without additional justification because the maximum value of the cadastral value for industrial land is 156.55 (Nizhnevartovsk municipal district) and more than the same value of 143.59 for land sites occupied under mining. Here 156.55/143.59=1.090, which equals 9.0%. Therefore, additional studies are needed to justify the methodology for assessing the cadastral value of land sites used for mining, relative to industrial land.

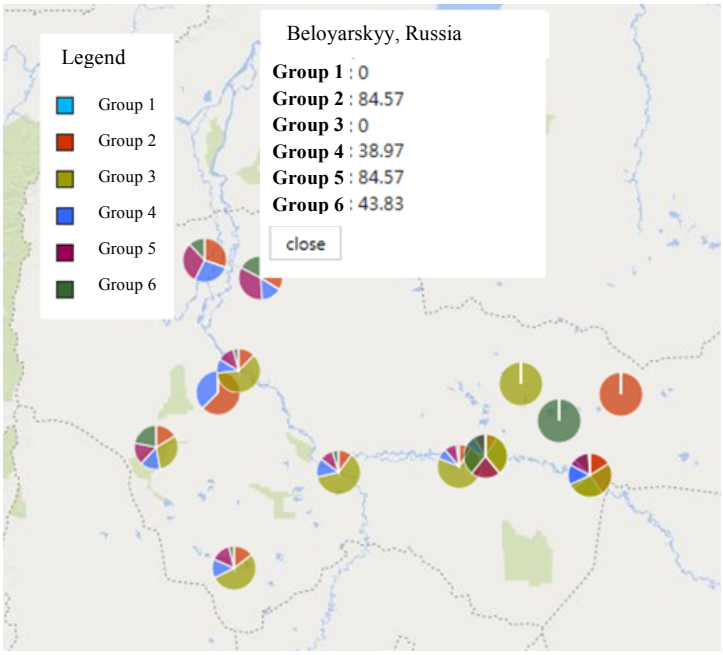

Figure 01. Geographical distribution of cadastral value

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6.3. Additional substantiation of the methodology for assessing the cadastral value of land sites used for mining

We will take the basic provisions of the income method for assessing the value of real estate as the basis of the research (Gribovskiy, 2001).

The value of the land of the second group – land sites occupied by industrial facilities – can be written as:

$$V\_2=I\_2/i\_2 , \quad (1)$$

where V_2 – the value of the land of the second group,

I_2 – profit received from the land site of the second group,

i_2 – rate of return from the land of the second group.

For a site of the fourth group – land sites occupied for mining – we can write:

$$V\_4=I\_4/i\_4 , \quad (2)$$

where V_4, I_4, i_4 – the same values assigned to the land site of the fourth group.

Based on expressions (1) and (2) we can find

$$V\_4=V\_2 \ I\_4/i\_4 \ \ i\_2/I\_2 \quad (3)$$

Profit values in (3) will be determined on the basis of real data for 2017 taken from (Sorokin, 2017). Tables 02 and 03 show the values of revenue and net profit for enterprises in the oil and gas brunch and industry, respectively, at the end of 2017 for this.

Table 02. Revenue and net profit of enterprises in the oil and gas industry

Business entity	Revenue as of December 31, 2017, thousand rubles	Net profit as of December 31, 2017, thousand rubles	Source of information
Gazprom	4 313 031 616	100 297 977	http://stocks.investfunds.ru/issuers/21/fin_accounting/?period%5B%5D=2015-12-31&period%5B%5D=2014-12-31&period%5B%5D=2013-12-31
Public Joint-Stock Oil Company Rosneft	4 892 934 388	138 968 980	http://stocks.investfunds.ru/issuers/128/fin_accounting/?period%5B%5D=2015-12-31&period%5B%5D=2014-12-31&period%5B%5D=2013-12-31
LUKOIL	223 419 850	204 363 706	http://stocks.investfunds.ru/issuers/765/fin_accounting/?period%5B%5D=2015-12-31&period%5B%5D=2014-12-31&period%5B%5D=2013-12-31
NOVATEK	468 541 723	120 532 304	http://stocks.investfunds.ru/issuers/765/fin_accounting/?period%5B%5D=2015-12-31&period%5B%5D=2014-12-31&period%5B%5D=2013-12-31
Surgutneftegas	1 144 372 835	149 736 588	http://www.edisclosure.ru/portal/files.aspx?id=312&type=3;http://stocks.investfunds.ru/issuers/3694/fin_accounting/?period%5B%5D=2014-12-31&period%5B%5D=2013-12-31
JSC TATNEFT n.a. V.D. Shashin	581 536 880	100 022 216	http://stocks.investfunds.ru/issuers/30/fin_accounting/?period%5B%5D=2014-12-31&period%5B%5D=2013-12-31; http://www.edisclosure.ru/portal/files.aspx?id=118&type=3
PJSC JSOC Bashneft	558 568 027	129 325 054	http://stocks.investfunds.ru/issuers/3706/fin_accounting/?period%5B%5D=2015-12-31&period%5B%5D=2014-12-31&period%5B%5D=2013-12-31
Average value	1 740 343 617	134 749 546	

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Table 03. Revenue and net profit of industrial enterprises

Business entity	Revenue as of December 31, 2017, thousand rubles	Net profit as of December 31, 2017, thousand rubles	Source of information
PJSC "Khimprom"	9 580 352	705 717	http://www.himprom.com/company/corp/corp_element.php?IBLOCK_ID=8&SECTION_ID=282
PJSC "Kuibyshevazot"	43 012 605	3 114 729	http://www.edisclosure.ru/portal/files.aspx?id=703&type=3
Public Joint Stock Company Mining and Metallurgical Company	455 921 197	130 038 748	http://stocks.investfunds.ru/issuers/1546/fin_accounting/?period%5B%5D=2015-12-31&period%5B%5D=2014-12-31&period%5B%5D=2013-12-31
PJSC Chelyabinsk Zinc Plant	29 669 509	5 378 546	http://www.edisclosure.ru/portal/files.aspx?id=258&type=3
PJSC "Ruspolimet"	8 505 419	427 916	http://www.edisclosure.ru/portal/files.aspx?id=7466&type=3
PAO "Severstal"	359 530 414	130 178 855	http://www.edisclosure.ru/portal/files.aspx?id=30&type=3
OSTANKINO MEAT PROCESSING PLANT JSC	39 336 549	213 653	http://www.edisclosure.ru/portal/files.aspx?id=316&type=3
"Krasnyj Octyabr" PJSC	12 414 462	1 200 477	http://www.edisclosure.ru/portal/files.aspx?id=468&type=3
Average value	119 746 313	33 907 330	

In order to compare the data in tables 02 and 03, the volumes of revenue and net profit of industrial enterprises will be reduced to data on enterprises in the oil and gas industry. We define the correction factor as the quotient of dividing the average revenue of oil and gas enterprises by the average revenue of industrial enterprises (1 740 343 617/119 746 313 = 14.53) for this. By multiplying this correction factor by the average value of net profit of 33,907,330 industrial enterprises, we get the reduced average value of net profit of these industries equal to 33,907,330 * 14.53 = 492,795,175.8. Then we can find the relationship.

$\frac{I_4}{I_2} = \frac{134749546}{492795175.8} = 0.27$, where I_4 is given in table 02 as the corresponding average.

Since net profit is calculated as the difference between profit and its 20 percent value, the replacement of profit ratios by the ratio of net profits is justified here.

We now can calculate the ratio $i_2 i_4$. According to (Sorokin, 2017), the profit margin i_4 in the mining sectors, we assume equal to 19.2%, and in the industries i_2– equal to 12.5%.

The we have $\frac{i_2}{i_4} = \frac{12.5}{19.2}$ =0.65 and in accordance with (3):

$$V_4 = V_2 \cdot 0.27 \cdot 0{,}65 = V_2 \cdot 0{,}18.$$

Now we will consider the same situation at the beginning of the crisis period, that is, at the end of 2013. Similar data are given in Tables 04 and 05.

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Table 04. Revenue and net profit of enterprises in the oil and gas industry

Business entity	Revenue as of December 31, 2013, thousand rubles	Net profit as of December 31, 2013 thousand rubles	Source of information
Gazprom	3 933 335 313	628 311 221	http://stocks.investfunds.ru/issuers/21/
Public Joint-Stock Oil Company Rosneft	3 544 443 140	136 278 784	http://stocks.investfunds.ru/issuers/123/
LUKOIL	260 008 509	209 870 651	http://stocks.investfunds.ru/issuers/128/
NOVATEK	245 077 487	72 258 978	http://stocks.investfunds.ru/issuers/765/
Surgutneftegas	814 187 839	256 516 510	http://stocks.investfunds.ru/issuers/3694/
JSC TATNEFT n.a. V.D. Shashin	363 531 273	63 850 140	http://stocks.investfunds.ru/issuers/30/
PJSC JSOC Bashneft	517 486 718	69 124 363	http://stocks.investfunds.ru/issuers/3706/
Average value	1 382 581 468	205 172 950	

Table 05. Revenue and net profit of industrial enterprises

Business entity	Revenue as of December 31, 2013, thousand rubles	Net profit as of December 31, 2013, thousand rubles	Source of information
PJSC “Khimprom”	5 669 350	40 307	http://stocks.investfunds.ru/issuers/4375/
PJSC “Kuibyshevazot”	28 045 053	2 576 536	http://stocks.investfunds.ru/issuers/1128/
Public Joint Stock Company Mining and Metallurgical Company	272 585 141	78 305 295	http://stocks.investfunds.ru/issuers/1546/
PJSC Chelyabinsk Zinc Plant	10 672 514	64 846	http://stocks.investfunds.ru/issuers/3139/
PJSC “Ruspolimet”	8 779 248	232 692	http://stocks.investfunds.ru/issuers/4386/
PAO “Severstal”	212 897 869	8 055 121	http://stocks.investfunds.ru/issuers/255/
OSTANKINO MEAT PROCESSING PLANT JSC	27 240 150	958 705	http://stocks.investfunds.ru/issuers/9517/
“Krasnyj Octyabr” PJSC	9 078 023	986 915	http://stocks.investfunds.ru/issuers/221/
Average value	71 870 919	11 402 552	

The correction factor as the quotient of dividing the average revenue of oil and gas enterprises by the average revenue of industrial enterprises according to Tables 04 and 05 is 1,382,581,468 / 71,870,919 = 19.237. By multiplying this correction factor by the average value of the net profit of 11,402,552 industrial enterprises, we obtain the reduced average value of the net profit of these sectors equal to:

11,402,552 * 19.237 = 219350991.9.

Then we can find the ratio $\frac{I_4}{I_2} = \frac{205172950}{219350991,9} = 0.94$, where I_4 is given in table 04 as the corresponding average.

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Accepting the rate of return for the period from the end of 2013 to the end of 2017 constant for the above sectors of the economy, we assume that $\frac{i_2}{i_4} = \frac{12.5}{19.2}$ =0.65 and in accordance with (3):

$$V_4 = V_2 \cdot 0.94 \cdot 0{,}65 = V_2 \cdot 0.61.$$

7. Conclusion

The work on the basis of reliable statistical information proved the low cost of land allocated for the placement of oil and gas industry objects. Moreover, over time, it fell from 0.61 to 0.18 of the value of industrial land. This is primarily due to a decrease in average profits in the oil and gas industry. In our opinion, this should be taken into account when assessing the cadastral value of land allocated for oil and gas industry facilities. This is also confirmed by the fact that the cost of land is negligible in the cost of the right to use deposits, usually obtained at auctions.

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