

The Market of Energy Capacities: Development and Recent Economic Opportunities

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Abstract: The main objective of the study was to assess the market of energy capacities for the development of crop production in Russia. As a result of the study, the dynamics of updating the fleet of agricultural machinery is assessed. Based on a detailed analysis of the intensity of production of energy carriers for crop production in Russia, as well as mechanisms of state support for agricultural engineering, recommendations are given on the formation of import substitution conditions in the markets of self-propelled vehicles in the country. We concluded that the production of crop production, due to its technological specificity, is energy-intensive, from the point of view of the need to provide energy capacities. Self-propelled machinery (self-propelled harvesting equipment - combines, tractors of various draft classes, and other self-propelled machinery for technological operations) form energy capacities in crop production. Based on the analysis, the article shows the availability of energy capacities of agricultural producers, the share of imported equipment as an element affecting food security, offers on the development of the agricultural machinery market in the context of the implementation of the import substitution policy.

Keywords: agrarian economy, agricultural engineering, agro-industrial resource markets, agricultural energy efficiency, government support.

I. INTRODUCTION

This : the formation of the basis for food security of the

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country is possible only with the intensive development of agricultural engineering. Moreover, this development should be comprehensive and develop all technological elements, as well as all cultivated crops. The peculiarity of Russia is a wide variety of types of agricultural products and conditions of its production. In this regard, the comprehensive development of agricultural machinery is of particular relevance, especially in the implementation of the policy of import substitution in the resource markets.

II. LITERATURE REVIEW

Theoretical sources for the development of the problem of development of the market of power capacities for agriculture were modern concepts, Federal and regional programs for the development of the industry, methods of economic evaluation of the efficiency of the use of agricultural machinery. The issues of development of agricultural mechanical engineering is reflected in the writings: Suh K., Suh S., Walseth B., Bae J., Barker R., [1] Henning, N., Christianson S., Kofod S, [2] Graeme R. Quick, Wesley F. Buchele [3], Dong F., Hennessy D. A., Jensen H. H., Volpe R. J [4], Lapple, D. and Thorne, F. The Role, Bekker, M. G., Collins R. A, Lapple, D. and Thorne, F. [5], N. D. Avarskiy [6], [7], A. G. Papcov [8], V. V. Taran [7]. Problems of increase of efficiency of use of technical potential of agricultural organizations is investigated in the works of: Polukhin A.A [9], [10], Alpatov A. V., Stavtsev A. N. [9], Lisutsenko N. N. [11] Alekseev, K. I., Miroshnikov A. G., Klimova S. P., Parfenov A. S., Fedotenkova O. A., Borkhunov N. A. Polshakova N. V. Altukhov A.V. [9]; Yerseitova, A., Issakova, S., Jakisheva, L., Naurzybekova, A., Moldasheva, A. 2018 [12]; Vlasov, A.I., Shakhnov, V.A., Filin, S.S., Krivoshein, A.I. [13]. As most scientists, we considered this problem from the standpoint of analyse comparability reasonmag support measures for agricultural engineering and target indicators implemented strategic development programs.

III. PROPOSED METHODOLOGY

A. General description

Research is carried out in the framework of the thematic research plan of GNU FNTS vniiesh. The object of study was the market of energy capacity for the crop industry. Sources of empirical information were official statistics, data from the National report on the implementation of the state Program 2013-2020, data from the Ministry of agriculture of the Russian Federation.

Mathematical and statistical data processing was carried out

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using generally accepted methods of economic analysis. The monographic method, methods of expert assessments, analysis and synthesis were used to substantiate the directions of development.

B. Algorithm

At the initial stage, a brief comparative analysis of the provision of agriculture in Russia and the EAEU countries with equipment was carried out. Further documents of strategic development of agriculture and agricultural engineering were studied, measures of support and indicators of development were estimated. The study is a logical continuation of the earlier work on the study of the organizational and economic mechanism of energy saving in agriculture [11, 9, 10] a comparative economic assessment of the energy efficiency of agriculture abroad and in Russia [7].

The impact of measures of state support of agricultural machinery on the development of the industry was assessed. Conclusions are presented and proposals for diversification of targeted support for agricultural machinery in Russia are substantiated.

Table 1: Economic assessment of the presence of the main carriers of the energy capacity of crop production

Types of equipment	Availability of equipment, units*		Share of foreign-made equipment, % [4],[15]	
	2017	2018	2017	2018
Tractors	389831	387000	68	68,8
Combine Harvesters	130121	131188	22	23
Forage harvesters	14784	14676	21	21,6

It is important to point out that the Ministry of agriculture of Russia conducts an objective assessment of the shortage of energy capacity for optimal energy supply of agriculture. So the estimated need to upgrade the fleet of agricultural tractors-at least 44, 5 thousand units per year, and the cost of such modernization will be about 180 billion rubles. The assessment was carried out taking into account moral and physical wear of the equipment (the proportion of tractors older than 10 years in the Park of agricultural producers in 2018 amounted to 73,1%, combine harvesters – 64%, forage harvesters – 66,4%, and this percentage is growing every year [4]. In fact, for the period from 2015 to 2018, taking into account state support, about 11 thousand units were purchased annually. new tractors, which of course is extremely insufficient for the comprehensive modernization of the power Park and speaks about the imbalance in the market of equipment in terms of demand and real solvent demand of agricultural producers. A number of authors reveal the role of the market approach in ensuring food security in Russia in an innovative economy. [6] as combine

C. Result Analysis

The market of power capacities for crop production is estimated by demand and supply for self-propelled machines (self - propelled harvesting equipment-combines, tractors of various traction classes, and other self-propelled equipment for performance of technological operations). We note that the target indicators of the state Program 2013-2020 and other strategic carriers are monitored from energy capacity as of agriculture in General and crop production in particular only tractors, combine and forage harvesters, which of course does not fully reflect the energy security of the industry. A number of authors abroad pay special attention to the energy characteristics of technical resources for agriculture [3], [14]. the Provision of agricultural technical resources is one of the key elements of food security.[8] table 1 presents data on the availability of agricultural producers of the main types of equipment for crop production and indicates the share of foreign equipment.

harvesters annual assessment need to be updated is in the order of 12,5 thousand units, the actual annual volume of purchase kolebletsja at the level of 5.2 to 6.2 thousand units'.

Subject to the additional requirements in the annual update, according to experts of the Ministry of agriculture of Russia at the end of 2018, the General lack of tractors of different tractive class is 86653 units, which is about 20% of the availability of tractors, the shortage of combine harvesters – 42140 units (33%), shortage of forage harvesters – 5603 units (35%) [15].

It is important to assess the market of agricultural machinery not so much from the standpoint of quantitative as from the standpoint of qualitative characteristics [16] the use of innovative technology is the material basis of economic stability of agricultural producers [5].

Another important indicator that forms the energy supply for crop production is the structure of the tractor fleet by traction classes. Table 2 presents an analysis of market niches in the tractor segment by traction classes.

Table 2: Economic analysis of market niches in the tractor segment by traction classes [15]

Traction class tractors	Actual availability	Deficit, units	Deficit in% of actual availability,%
Traction class0,6-0,9	28403	4498	15,84
Traction class1,4	180595	23782	13,17
Traction class2-3	131934	26678	20,22
Traction class4-5	75598	20420	27,01
Traction class6-7	28504	9702	34,04
Traction class 8 and above	3302	1573	47,64

According to the data presented in table 2, it is clear that the largest deficit is observed in the segment of high-power tractors, and one can note sufficient potential for growth in production volumes of Russian-made tractors in this particular segment. However, in quantitative terms, the capacity of the market for medium tractors allows you to

increase production and carry out targeted work to conquer the market in this particular segment.

At the same time, it is important to assess the dynamics of development and the potential of agricultural engineering within the country, which is especially important when

implementing the import substitution policy in resource markets. Table 3 presents data on the production volumes of the main types of agricultural machinery of the Russian models.

Table 3: Dynamics of production volumes of the main types of agricultural machinery of Russian models, units According to the Ministry of Industry and Trade

Type of equipment, brand	Years					Total production
	2013	2014	2015	2016	2017	
Tractors, total units	7641	6394	5226	6623	7063	32947
Russian models, total units.	924	1457	1840	2548	2775	9544
Kirovets stamps	327	653	1337	2187	1862	6366
Stamps "AGROMASH"	354	414	160	110	102	1140
Stamps "Terrion"	83	147	96	68	40	434
Combine harvesters, total	6008	5652	4583	6431	7273	29947
Russian models, total units	3315	3642	3758	5063	5507	21285
Stamps "RSM"	2960	3535	3706	5002	5447	20650
Stamps "AGROMASH"	181	50	52	61	27	371
Forage harvesters, total units	642	522	619	988	689	3460
Russian models, total units	402	390	509	805	530	1831
Rostselmash	190	107	261	313	286	844
Clever	194	246	229	383	232	1284

According to the data presented in table 3, it is clear that only 29% of tractors produced in Russia are Russian models, and 2/3 of them are Kirovets brands. In this regard, the issue of expanding the brand composition of Russian tractors produced and occupying new market niches is of particular relevance. 71% of Russian-made grain harvesters and 53% of

Russian-made forage harvesters. The leader in the combine market is the Rosselmash plant. Table 4 presents data on production volumes of the main types of agricultural machinery of Belarusian and foreign models.

Table 4: Dynamics of production volumes of the main types of agricultural machinery of Belarusian models and models of far-abroad countries, units

Type of equipment, brand	Years					Total production
	2013	2014	2015	2016	2017	
Tractors						
Joint production with the Republic of Belarus, total units	3914	2729	2330	2985	2546	14504
TD MTZ-ELAZ (Tatarstan)	2238	928	588	742	137	4633
Buzuluk Mechanical Plant (Orenburg Region)	177	436	214	383	167	1377
Cherepovets Foundry and Mechanical Plant (Vologda Oblast)	137	271	1253	1824	1546	5031
Foreign models, total units	2803	2208	1056	1090	1742	8899
"John Deere Rus" (Moscow region)	883	680	67	176	246	2052
Brands "Versatile" (Rostselmash)	236	262	88	74	648	1308
Klaas stamps (Krasnodar Territory)	289	238	228	414	192	1361
SIENEICH-KAMAZ-INDUSTRY (Republic of Tatarstan)	273	170	60	126	238	867
TD KhTZ (Belgorod Region)	942	858	535	123	418	2876
Combine harvesters						
Joint production with the Republic of Belarus, total units	1764	1255	711	1050	1101	5881
Bryanskselemash (Bryansk region)	1620	1117	550	975	1101	5363
Foreign models, total units	929	755	114	318	665	2781
"John Deere Russia" (Moscow region)	168	111	8	67	151	505
Klaas (Krasnodar Territory)	523	406	79	225	466	1699
SIENEICH-KAMAZ-INDUSTRIYA (Republic of Tatarstan)	221	229	27	26	48	551
Forage harvesters						
Joint production with the Republic of Belarus, total units	240	132	110	183	159	824
Bryanskselemash (Bryansk region)	240	132	110	183	159	824

According to the Ministry of Industry and Trade

The information presented in table 4 indicates the dominance of Belarusian brands of tractors in the Russian market. It should also be noted that the world leaders in agricultural engineering localize their production on the territory of Russia, which can significantly reduce the cost of equipment entering the market.

IV. DISCUSSION

An important factor in the development of agricultural engineering and the intensification of technical

modernization of agricultural sectors is government support. The most significant and effective measures of state support of the energy capacity market for the development of crop production are as follows:

Since the beginning of the implementation of the State Program 2013-2020, in the framework of the Decree of the Government of the Russian Federation dated December 29, 2012 No. 1432, over 46 thousand units were purchased by agricultural organizations. agricultural machines at a discount, which had a positive impact on updating the fleet of

this equipment. The implementation of the subsidy program allowed to increase the production of machinery at 70 agricultural engineering enterprises in 37 constituent entities of the Russian Federation. For example, in 2017 - 2018, 25.7 billion rubles were allocated for agribusiness entities in this area of state support, that is, ensuring the sale of agricultural machinery of Russian production with a significant discount.

Starting from 2018, the state has provided a federal subsidy (Decree of the Government of the Russian Federation No. 145 dated February 10, 2018) to compensate for part of the costs associated with the issue and support of warranty obligations for high-performance agricultural self-propelled and trailed equipment in the amount of 9 billion rubles, which also allowed to stimulate the development of agricultural engineering in the segments of high-performance equipment.

Modernization of the equipment fleet for agricultural producers is a high-cost event, and in this regard, the availability of borrowed funds is an important aspect. State support is also being provided in this area, for example, in the framework of Decree of the Government of the Russian Federation No. 163 dated February 17, 2018, it was realized using the preferential interest rate on loans for the purchase of agricultural machinery (about 5%) in the amount of more than 2 billion rubles. [7], [15]

At the same time, according to the Ministry of Industry and Trade of Russia, foreign agricultural machinery is purchased by farmers through subsidies from regional budgets in more than 50 constituent entities of the Russian Federation, up to 8 billion rubles are provided annually for these purposes.

V. CONCLUSION

Foreign experience of state support for agricultural machinery manufacturers shows that in most countries of the world the targeted mechanism for supporting the agricultural engineering industry is not applied, but is part of a comprehensive mechanism for supporting the engineering sector. In Russia, the comprehensiveness of the measures taken to support domestic producers of agricultural machinery has allowed agricultural machinery to be overcome from the crisis, but the lack of support for agricultural producers has an impact on the slowdown in the renewal of the agricultural machinery fleet. It is also necessary to more intensively financially support manufacturers of energy-intensive and energy-efficient equipment using precision farming systems and digital technologies.

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