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Trends and Prospects in Development of the Russian Energy Organisations Selling Electrical Energy

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Abstract

The paper contains the objectives, tasks, and directions for the reform of the electrical energy industry in the Russian Federation as well as the negative aspects of the reform. The authors underline the relevance of the development of the methodological, economic-mathematical and information tools for assessment and an increase in the efficiency of the energy organisations selling electrical energy. They suggest using the statistical and rank analysis for the assessment of the performance indicators of the last resort energy suppliers, including the profit margin. Based on the obtained results of the analysis, the authors described the trends of the last resort suppliers' functioning that take an adverse effect on market relations in the electrical energy industry. They recommend the approaches that allow changing the established work system of the organisations selling electrical energy through the activation of the state regulation and the change in the approaches towards the formation of the range of additional services aimed at the support and development of the activities for the increase in the energy efficiency.

Keywords: Rank Analysis, Net Profit Margin, Last Resort Supplier, Cenosis, Closed System, Energy Efficiency.

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Introduction

The increase in performance of the electrical energy industry is one of the main tasks of the Russian economy (Government of Russian Federation, 2009) and the international community (Arkhipova, 2011). The dynamics of this industry development directly affects the economic growth rate and consequently requires the deliberate attention to the management, control, and analysis of the energy organisations' performance, as well as to the applied principles and methods for its growth. The activation of the competitiveness in order to increase the performance of the industry was the basic idea of the reform of the electrical energy industry in Russia and abroad implemented since the 1990s. The reform of the electrical energy industry abroad was based on various scenarios implementing both the vertical disintegration of the energy companies and the operation of the energy companies with the mandatory introduction of the separate financial accounting (Kostitsyna and Kostitsyna, 2012).

RF Government Regulation "Concerning the Reform of the Electrical Energy Industry of the Russian Federation" stipulated that "the goals of the reform of the electrical energy industry of the Russian Federation are ensuring sustainable operation and development of the economy and social sphere, increase in the industrial performance and consumption of the electrical energy, ensuring reliable and uninterruptible electrical power supply to the consumers"(p.1). The RF Government also defined the strategic task of the reform: "transfer of the electrical energy industry into the sustainable development model based on the application of progressive technologies and market principles of the operation, and on the basis of it ensuring reliable, economically viable satisfaction of effective demand for electricity and heat in the short-term and the long-term perspective"(p.1) and chose the reform based on vertical disintegration (Government of Russian Federation, 2001).

Literature Review

The established approach to the reform of the industry has for many times provoked negative evaluation by the energy scientists (Delyagin, 2003; Kutovoy, 2016; Platonov, 2009; Platonov, 2010; De Boni, 2017). They underline the groundless cost escalation in the operation of both the entire Unified Energy System, and its structural elements, a decrease in the reliability of the energy system, lack of financial transparency, and other destructive aspects of the reform.

The completion of the reform period in the electrical energy industry of Russia in 2012 (Government of Russian Federation, 2012) became the edge of the formation of competitive relations on the wholesale and retail markets of electrical energy. The market relations during five years of the post-reform period were supposed to affect the arrangements for pricing electrical energy towards its growth rates reduction or stabilising, which was not reflected in the reality (Russian Federal Tariff Service, 2011; Russian Federal Tariff Service, 2012; Russian Federal Tariff Service, 2013; Russian Federal Tariff Service, 2014; Federal Antimonopoly Service of Russian Federation, 2015; Federal Antimonopoly Service of Russian Federation, 2016; Federal Antimonopoly Service of Russian Federation, 2017) (Figure 1).

The reform of the electrical energy industry based on vertical disintegration caused the change in the industry structure: the organisations with new 'functions' appeared: Last Resort Suppliers (LRS), the status of which is legally determined (State Duma of Russian Federation, 2003). The Federal Antimonopoly Service of the Russian Federation (2018) keeps the Federal Information Register of the Last Resort Suppliers.

"Last resort supplier of electrical energy (hereinafter – last resort supplier or LRS) is a commercial organization, which is, according to the legislation of the Russian Federation, assigned the status of last resort supplier, implementing power supply and obliged, in compliance with the applicable Federal Law, to

conclude the agreement for energy supply, for sale and purchase (supply) of the electrical energy (power) with any resorted consumer of electrical energy or with a person acting on one's own behalf or on behalf of the consumer of electrical energy and willing to acquire the electrical energy" (State Duma of Russian Federation, 2003: p.2).

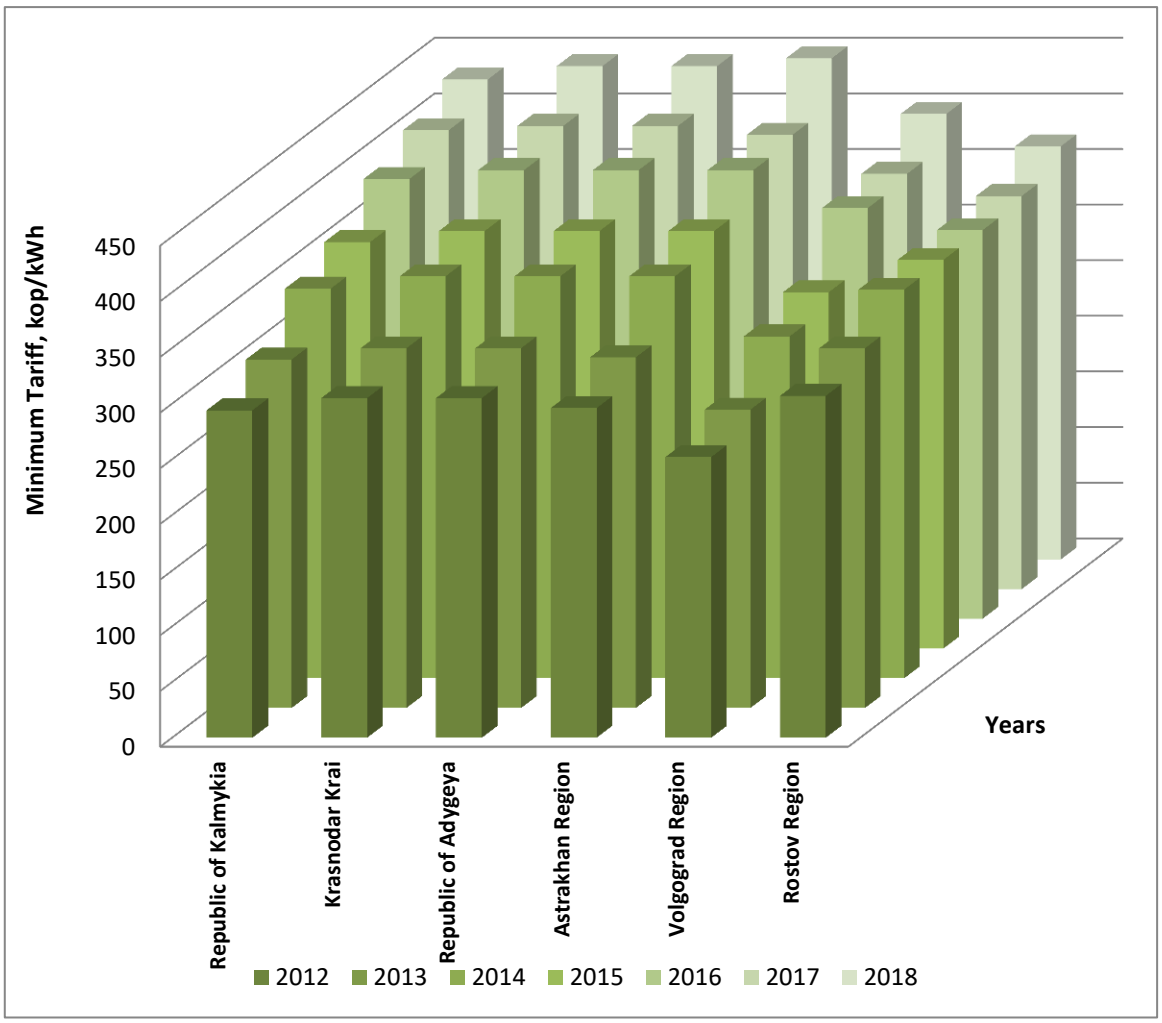

Figure 1: Minimum Electricity Tariffs (as of January 1) for the Population in the Southern Federal District of the RF in the Post-Reform Period (without the price indexation)
Source: Russian Federal Tariff Service, 2012; Russian Federal Tariff Service, 2013; Russian Federal Tariff Service, 2014; Government of Russian Federation, 2018

Methodology

The energy supply is "the activities on the sales of the generated and (or) acquired electrical energy, implemented on the retail markets within the Unified Energy System of Russia and in the territories lacking the technological connection with the Unified Energy System of Russia" (State Duma of Russian Federation, 2003: page 1).

The analysis of the LRS performance in the post-reform period (since 2012 inclusive), as a basic component of the wholesale and retail market, will allow making an objective assessment of the established market mechanisms of the electrical energy industry in Russia. The formation of the analysis methodology for the LRS activities considering the operation of the similar energy organisations may be conducted based on the statistical and rank analysis (Nadtoka and Kravchenko, 2017; Kravchenko, 2017a; Kravchenko, 2017b). To assess the LRS performance, one may use the indicators of profit margin, operating profit margin, and net profit margin.

Results and Discussion

As stated by Kravchenko (2017b), based on the analysis of financial indicators of 102 energy

organisations registered as LRS in the Federal Information Register of the Last Resort Suppliers (Federal Antimonopoly Service of Russian Federation, 2018), operating in 85 RF entities, the profit margin indicators since 2012 through 2016 (post-reform period) have been calculated (Kravchenko, 2017b). When conducting the statistical analysis of the profit margin indicators' values, the authors excluded the organisations lacking the necessary information on their operation within the considered period 2012-2016, as well as the organisations systematically experiencing losses, the causes of which are not directly connected with their operation in the sphere of energy supply activities, but caused by the natural, geopolitical factors. The values of the statistical points of the LRS profitability for each year within 2012-2016 are presented in Table 1.

Table 1: Statistical Points of the LRS Profit Margin

Statistical Points	Profit Margin	Years				
		2012	2013	2014	2015	2016
Expected Value	Profit Margin, %	2.57	1.76	2.45	2.79	2.71
	Operating Profit Margin, %	1.75	1.16	1.04	1.14	1.04
	Net Profit Margin, %	1.26	0.84	0.73	0.72	0.68
EMS	Profit Margin, %^{2}	11.83	6.00	7.94	8.16	6.88
	Operating Profit Margin, %^{2}	9.34	4.52	2.93	4.53	4.58
	Net Profit Margin, %^{2}	6.18	2.99	2.07	3.73	3.21
RMSD	Profit Margin, %	3.44	2.45	2.82	2.86	2.62
	Operating Profit Margin, %	3.06	2.12	1.71	2.13	2.14
	Net Profit Margin, %	2.49	1.73	1.44	1.93	1.79

Source: Kutovoy, 2016

The expected value of the net profit margin decreased from 1.26 % in 2012 to 0.68 % in 2016. The dispersion decreased approximately two times from 6.18%2 in 2012 to 3.21%2 in 2016 (Kravchenko, 2017b). "The change in the expected value of profit margin in 2012-2016 is insignificant compared to the decrease in the net profit margin. The growth of the organization's expenses: 'interest expenses', 'miscellaneous expenses', 'current income tax' affects the decrease in the LRS net profit margin" (Kravchenko, 2017b: 956).

Over the five years, the dispersion decreased almost two times: profit margin – from 11.83 % to 6.88%, operating profit margin – from 9.34% to 4.58%, net profit margin – from 6.18% to 3.21%. As the profit tax interest from 2012 to 2016 did not change (State Duma of Russian Federation, 2000), and the bank credit interest increased insignificantly, then the LRS 'miscellaneous expenses' increased (Figure 2).

The statistical analysis of profit margin showed some commonality in the LRS corporate policy, which may be elaborated during the rank analysis allowing estimating the structural stability of the last resort suppliers' system.

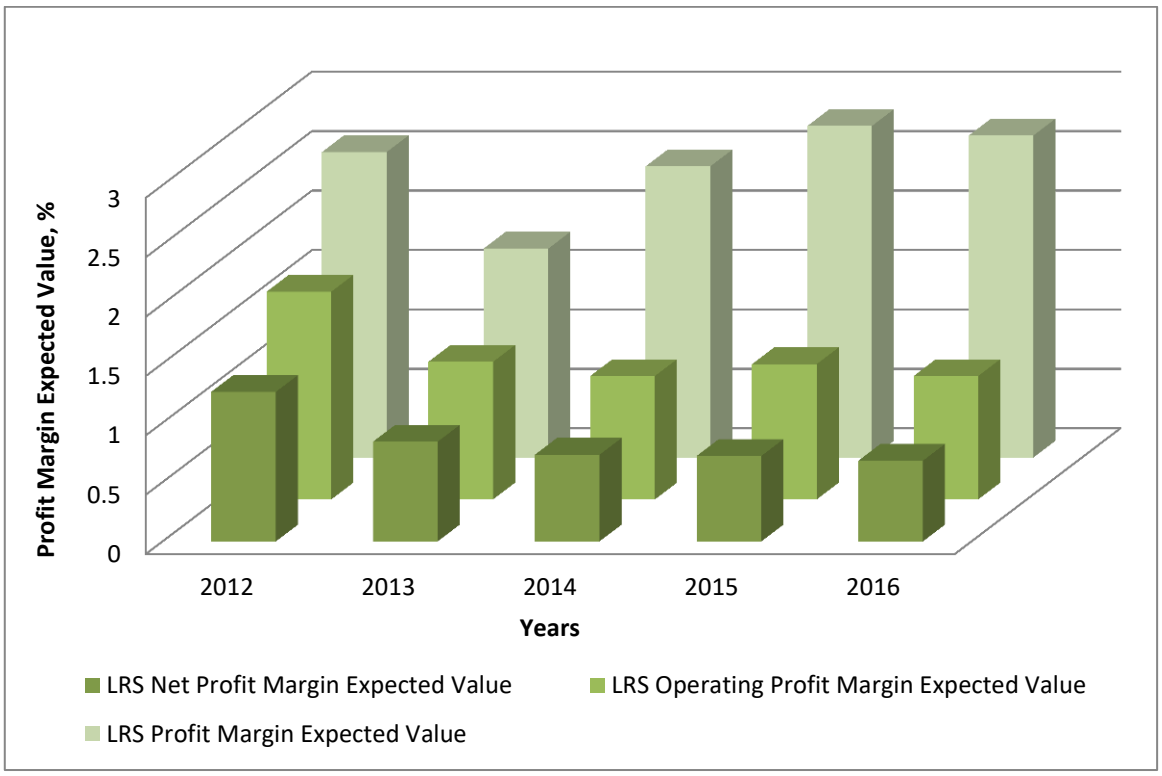

Figure 2: Dynamics of the LRS Profit Margin's Expected Value

Source: Kapitonov and Voloshin, 2017

Rank analysis as a component of the theory of stable distributions formed by the French mathematician Paul Levy and developed by the Soviet mathematicians A.N. Kolmogorov, A.Ya. Khinchin, B.V. Gnedenko, V.M. Zolotarev (Petrov and Yablonsky, 2013; Yablonsky, 2001; Zolotarev, 1983), started to be actively applied by the scientists of various scientific branches, including science studies, astronomy, economics, energetics (Kudrin, 1993; Kudrin et al., 2008) and others over the recent five years. The rank distribution looks as follows:

$$H(r) = A_1/r^{\propto}, \quad (1)$$

Where *r* – 1,2, …– rank; for *r*=1 first point

A_1 – element with the maximum value of the parameter;

α – rank ratio is characterising the rate of rising of the distribution curve (usually 0.5 ≤ α≤ 1.5 (Gnatyuk, 2005).

The law of frequency inversely proportional to rank, formulated by the American scientist G. Zipf, evidence that many forms of human behaviour obey the 'least effort principle' (Petrov and Yablonsky, 2013: 34). The steady equitable nature of the law, according to G. Zipf, is originated from the compromise between the opposite trends during the interaction between a specific individual and society in general as the individual wishes to spend as little as possible efforts to achieve a goal, while the society aspires to the activation of the individual's activities for the implementation of its purposes. Based on the rank analysis of 59 last resort suppliers in 2012-2016 by the indicator of net profit margin (Kravchenko, 2017a), the authors obtained the parameters of the rank distribution presented in Table 2.

Table 2: Parameters of Rank Distribution of LRS by the LRS Net Profit Margin

Years	Rank Indicators	
	Maximum Value of Net Profit Margin (A_1), %	Rank Ratio (α)
2012	10.88	0.62
2013	8.54	0.76
2014	5.68	0.60
2015	7.27	0.65
2016	7.72	0.76

Source: Kravchenko, 2016

As seen in Table 2, ratio values (α) of the profit margin rank distribution are less than 0.6 and do not exceed 0.76, i.e. $0.5 \leq \alpha \leq 1.5$, which means the stability of the LRS lossless operation cenosis structure in the post-reform period (Kravchenko, 2017a).

Efficient operation of the LRS, assessed through the analysis of the targets they achieve formed with the consideration of the Stakeholder theory (Korchagina, 2009) based on the target structure, imply the observance of the interests of the three most concerned parties: owners, electrical energy consumers, and executives (Kravchenko, 2016). The dynamics of this process indicators point at the trends of the market relations development in the post-reform period. The electrical energy consumers' interests are currently considered insignificantly because there is a systematic and significant growth of the electricity prices (Figure 1). The owners' interests are considered to a minor extent, as there is a decrease in the net profit margin. The growth of the 'miscellaneous expenses' value in the LRS activities evidences the enhancement of the influence of these organizations' executives, directing the funds to the budget items not directly connected with the power supply activities. The problem of the executives' influence enhancement over the power of owners was underlined in the works by J. Galbraith (2004).

Ratio values (α) of the LRS distribution by the net profit margin indicator ($0.62 \leq \alpha \leq 0.76$) point at the fact that the executives' position is rather stable, and, consequently, the LRS net profit margin will further tend to 0, and the 'miscellaneous expenses' will rise. The electricity prices will also increase not resulted from the inflation, but due to the chosen corporate policy of the energy organisations. In the case of the positive scenario of the market relations development in the electrical energy industry, the concerned parties' interests were supposed to be satisfied, i.e. the increase in the electricity prices was supposed to be stopped, the process of the prices stabilization started, the owners were supposed to gain the revenue, the increase in the net profit margin, the energy companies as part of the competitive struggle were supposed to occupy their niche on the market. In other words, the results of the rank and statistical analysis by the net profit margin indicator should be characterised by the fact that the expected value of net profit margin should steadily grow, while dispersion – not decrease, which is not observed.

Thus, at the ratio value (α), the LRS distribution by the net profit margin indicator $0.62 \leq \alpha \leq 0.76$ over five years, the LRS system is a closed system (the decrease of the dispersion almost two times, i.e. all the LRS (major part) aspire to decrease the indicator). It steadily decreases net profit margin (expected value decreased almost two times). Consequently, we can observe the market system in the electrical energy industry, tending to 'downfall'.

The market mechanisms in the electrical energy industry formed at the legislative level do not stimulate the development of the sector. Due to the increase in the electricity prices, decrease in the energy organisations' income and, consequently, the volume of the funds from the taxes in the treasury, the state will face the growth of the social disaffection and the decrease in the revenue. The formed

cenosis of the LRS in the post-reform period is a closed system (Kravchenko, 2017a; Kravchenko, 2017b; Petrov and Yablonsky, 2013, Ushakov et al., 2017), the operation of which in the long-term perspective without amending the corporate policy may lead to serious negative results both for the state and for the consumers of electrical energy. The formed trends of the LRS performance in the post-reform period evidence the necessity in the change of the system of their operation. Moreover, at real 'lack of the owners' governance' of these organisations and direct influence on the economy, it is necessary to consider the issue of the increase in the state's influence on the LRS operation based on the organisation and the state control over the energy organisations selling electrical energy.

The innovative approach towards the formation of the strategies of the organisations selling electrical energy based on the distributed energetics technologies is currently actively applied in many European states (Lapin, 2014). It provides an opportunity for increasing the cost of these organisations based on the suggestions on the increase in the energy efficiency raising the organisations' cost. The use of the distributed energetics technologies allows increasing the invariability of the electric energy supply source selection for the consumers, optimizing the consumers' expenses for the electric energy supply by applying the aggregate owning cost (Nadtoka and Kravchenko, 2010; Nadtoka and Kravchenko, 2013), based on the increased role of the competitive environment of the technological solutions in the electrical energy industry. The activation of the competitiveness in the sphere of technologies of the electrical energy generation allows the LRS, usually taking the monopoly position on the market of the energy supply services, to change their role on the retail market of electrical energy based the activation of the work on rendering the services that influence the growth of the consumers' costs, including through the optimization of the energy consumption (Kapitonov & Voloshin, 2017; Daus et al., 2018; Akhmetshin et al., 2018).

Thanks to LRS the consumer will select the type of energy, kind of equipment, reliability, maintainability of equipment, etc.

The design of the commercial proposals for the consumers regarding the complex solution of the electrical energy supply issues including the use of the distributed energetics technologies will become an innovative direction of the LRS development. The organisations rendering services on the optimisation of the energy supply costs are focused on the consumer's goal, create their value and ensure the increase in the cost based on the electricity consumers' interests support and support the growth of the energy efficiency both of the sector and of the Russian economy in general Government of Russian Federation, 2014; Government of Russian Federation, 2018).

The strategies of the organisations selling electrical energy should be based on the integration of the theoretical developments and the applied aspect in the sphere of the energy management, support a wide range of services aimed at the optimisation of the energy sector operation and the increase of its energy efficiency.

Conclusion

- The analysis of the energy companies' performance indicators has shown that the targeted LRS performance in the post-reform period is decreasing due to the manifestation of such trends as the growth of the electricity tariffs, decrease in the net profit margin, growth of the 'miscellaneous expenses', which leads to the degradation of the market relations in the electrical energy industry, escalation of social disaffection, and the decrease in the state's revenue.
- The rank analysis of the profit margin indicators showed that the LRS system in the post-reform period is structurally stable, which enhances the positions of these organisations in the framework of the selected direction of the corporate policy.

- The actual 'lack of the owners' governance' taking an adverse effect on the operation of the economy may be avoided based on the formation and management by the government of new energy organisations selling electrical energy and enhancement of the state influence in control over the electrical energy industry in general.
- The development of the distributed energy will allow increasing the invariability of the electric energy supply source selection for the consumers, optimising the consumers' expenses for the electric energy supply by applying the aggregate owning cost methods based on the increased role of the competitive environment of the technological solutions in the electrical energy industry.
- The energy organisations rendering services on the electrical energy supply costs optimisation will be focused on the consumers' goals, create their value and ensure the growth of the cost based on the support of the consumers' interests regarding the increase in the energy efficiency of both separate economic entities and the economy in general.

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