

REICE

Revista Electrónica de Investigación en Ciencias Económicas  
Abriendo Camino al Conocimiento

Facultad de Ciencias Económicas, UNAN-Managua

Vol. 8, No. 16, Julio – Diciembre 2020

REICE

ISSN: 2308-782X

REICE | 490

<http://revistacienciaseconomicas.unan.edu.ni/index.php/REICE>

[revistacienciaseconomicas@gmail.com](mailto:revistacienciaseconomicas@gmail.com)

## Diagnostic Analysis of Factors for the Financial Stability of a Power Supply Company

Análisis de diagnóstico de factores para la estabilidad financiera de una empresa de suministro de energía

Fecha recepción: julio 02 del 2020

Fecha aceptación: septiembre 29 del 2020

Lyubov V. Salova

Associate Professor, Department of Economics and Management, Vladivostok State University of Economics and Service

Email: [Lsalova@gmail.com](mailto:Lsalova@gmail.com)

ORCID: <https://orcid.org/0000-0002-5068-4522>

[DOI 10.5377/reice.v8i16.10712](https://doi.org/10.5377/reice.v8i16.10712)



Derechos de autor 2020 REICE: Revista Electrónica de Investigación en Ciencias Económicas. Esta obra está bajo licencia internacional [Creative Commons Reconocimiento-NoComercial-CompartirIgual 4.0](https://creativecommons.org/licenses/by-nc-sa/4.0/). Copyright (c) Revista Electrónica de Investigación en Ciencias Económicas de la Unan- Managua

## **Abstract.**

The paper discloses the approach and results of the study of the electric power market (electricity market) related to the II non-price zone on the basis of the formulation of indicators that make it possible to highlight its specificity. The results of a study devoted to the solvency of electricity consumers - individuals are revealed by comparing the level of average income in the regions of the Russian Federation and the conditional maximum amount of electricity that can be paid for from these incomes. It has been established that despite the opportunities for timely payment, there remains a low payment discipline for a number of consumers, which is reflected in the growth of receivables and, as a result, leads to cash gaps. During the review of the dynamics of debt, the scope of cash gaps was determined, which in 2018 amounted to more than 169 billion rubles. Power supply companies attract loans for timely settlements, what entails additional costs and worsens financial results. The impact of the identified factors on the main indicators of power supply companies being last resort providers of electricity in Russia, including the power supply company under study, was assessed. The results obtained will be further used to develop methods for the diagnostic analysis of critical risk zones, which determine the financial stability of the power supply company being a single purchaser and last resort provider of the 2nd non-price zone.

**Keywords:** economy, energy, electricity, power supply company, single purchaser,

## **Resumen**

El documento revela el enfoque y los resultados del estudio del mercado de la energía eléctrica (mercado de la electricidad) relacionado con la II zona no sujeta a precios sobre la base de la formulación de indicadores que permiten resaltar su especificidad. Los resultados de un estudio dedicado a la solvencia de los consumidores de electricidad: los individuos se revelan al comparar el nivel de ingreso promedio en las regiones de la Federación de Rusia y la cantidad máxima condicional de electricidad que se puede pagar con estos ingresos. Se ha establecido que, a pesar de las oportunidades de pago oportuno, sigue habiendo una baja disciplina de pago para varios consumidores, que se refleja en el crecimiento de las cuentas por cobrar y, como resultado, genera brechas de efectivo. Durante la revisión de la dinámica de la deuda, se determinó el alcance de las brechas de efectivo, que en 2018 ascendieron a más de 169 mil millones de rublos. Las compañías de suministro de energía atraen préstamos para liquidaciones oportunas, lo que implica costos adicionales y empeora los resultados financieros. Se evaluó el impacto de los factores identificados en los principales indicadores de las compañías de suministro de energía como proveedores de último recurso de electricidad en Rusia, incluida la compañía de suministro de energía en estudio. Los resultados obtenidos se utilizarán para desarrollar métodos para el análisis de diagnóstico de zonas críticas de riesgo, que determinan la estabilidad financiera de la compañía de suministro de energía como un comprador único y proveedor de último recurso de la segunda zona sin precio.

**Palabras clave:** economía, energía, electricidad, compañía de suministro de energía, comprador único,

## **Introduction**

At present, the most urgent issues are the dual nature of the development of energy sales activities determined by today's technological, industrial and commercial relations, and the legal field. On the one hand, energy sales activities are managerial activities to develop and make decisions that ensure efficient sales of energy by power supplying companies to consumers (subscribers) in each municipality, region and country as a whole. At the same time, consumers are interested in minimizing the cost of basic services under supply contracts, as such a service, and also in the possibility of obtaining additional services. On the other hand, this is a sphere of independent business, often with signs of monopoly activity, in which the desire of business entities to ensure their financial stability is an objective law of a market economy.

It is precisely due to the conflict of interests of consumers and industry participants that the role of state participation in ensuring a balance of economic interests of the parties is decisive. This problem is always dynamic based on time-varying factors, fair prices for products and services of industry participants will remain the subject of regulators, and ways and methods of ensuring financial stability in changing conditions will be in demand by business entities.

Attention in publications on the problems of research and analysis of the electricity (power) market is mainly paid to such issues as:

- Consideration of forecasting and demand management tools for electricity consumption within the framework of the wholesale and retail electricity markets of Russia, analysis of their advantages and disadvantages (Dzyuba, Solovyova, 2016, p.147-162);
- Reforming and evolution of the functioning model of the wholesale market in the Russian Federation (Smagina & Nestupaeva, 2015);
- Analysis of financial and economic indicators of electric energy generation in the Russian Federation to identify the strengths and weaknesses of the largest holdings of energy generation (Petyukov, 2019).

- Elaboration of scenarios and forecasting the development of the energy market (Maslova, Daneev, 2019).
- Development of models for managing the power and energy market (Myznikova, 2015).
- Regulation of the market mechanism; the development of the market infrastructure (Vasin & Gusev, 2012; Emam, & Shajari, 2013).

At the same time, the development of indicators to identify the specifics of the functioning of the electricity market in non-price zones of the wholesale market has not been sufficiently disclosed, which focuses us on continued research in this area.

In the publications devoted to the problems of settlements between the subjects of the energy (power) market and the payment discipline of electricity consumers, they mainly deal with:

- Methods for assessing the impact of the wholesale market model on the economy of the region (Dronova & Krasnova, 2017; Lobão, & Pereira, 2016).
- Problems of payments for electricity (Rodin, 2015; Jaramillo, 2018).
- Complex problems and issues of improving the business processes of the energy sales company, including analysis and management of receivables (Salov & Maslov, 2014).

At the same time, the problems of settlements between wholesale market entities and consumer payment discipline in the retail electricity market, and the impact of these factors on the financial stability of the power supply company have not been adequately disclosed.

The aim of the study is to perform a diagnostic analysis of the factors that determine the financial stability of a power supply company.

The objectives of the study are:

- 1) To disclose the approach to the study of the electricity (power) market model for the II non-price zone and the specifics of its functioning through the analysis of electricity generation in comparison with the macro-region with industry average values;
- 2) To study the factors that determine the ability of electricity consumers-individuals to observe payment discipline for the payment of electricity consumed in the process of

comparing data on price and non-price zones of the Russian Federation, as well as to study the state of payments for electricity of consumers - legal entities.

## **Materials and methods**

The study of the electricity (power) market of the II non-price zone was carried out on the basis of open data from the Ministry of Energy of the Russian Federation, JSC "CFS", NP "Sovet Rynka", and data from annual reports of market business entities indicated in the paper. To study the functioning model of the electricity (power) market of the II non-price zone, a systematic approach, logical methods, and observation were applied. To study the specifics of the electricity (power) market of the II non-price zone, analytical research methods were applied.

## **Analysis and Results**

At the moment, the energy system of the Russian Federation involves:

1) The Unified Energy System (UES of Russia"), which includes 7 combined energy systems (CES) - Tsentr, Severo-Vostok, Sredniaya Volga, Yug, Ural, Sibir, and Vostok (Centre, North-West, Middle Volga, South, Urals, Siberia, and East).

2) Geographically isolated power systems (power systems of the northern part of the Republic of Sakha (Yakutia), Chukotka Autonomous Okrug, Kamchatka Territory, Sakhalin Oblast, Magadan Oblast, Norilsk-Taimyr and Nikolaev energy districts).

In 2018, the generation of electricity by power plants, including the production of electricity at power plants of industrial enterprises, amounted to 1,091.7 billion kWh (in the UES of Russia - 1,070.9 billion kWh), including for the CES Vostok (3.44% of the total amount for the structure) - 37.6 billion kWh (Ministry of Energy, 2019).

For technological reasons, the wholesale market for electricity and power (WMEP) is divided into several independent geographical zones: I price zone (zone of the European part of Russia and the Urals), II price zone (zone of Siberia), I and II non-price zones. The I non-price zone includes: Arkhangelsk region of the Komi Republic, Kaliningrad region;

the second non-price zone includes the territory of the Far East, which combines the territory of the South Yakutsk region in the Republic of Sakha (Yakutia), Primorsky Territory, Khabarovsk Territory, Amur Region, and the Jewish Autonomous Region (according to the Ministry of Energy, 2018).

Today, I and II price zones operate under terms of competitive markets, what is characterized by a large number of consumers and a developed network infrastructure, despite the fact that the I and II non-price zones are characterized by a limited structure of electricity generation, as well as the fact that their network infrastructure (including due to geographical conditions) does not have access to other CESs, which does not allow fully realizing market relations. Also, the specific of non-price zone markets consists in that due to the absence of power exchange, it is necessary to maintain equilibrium at every moment between its production and consumption.

The principles of the functioning of the wholesale market are determined by the Rules of the wholesale market for electricity and power, according to which several market sectors work in WMEP: wholesale market for regulated contracts; day ahead market; sector of free contracts; balancing market. In addition to electric energy, power is traded in the wholesale market as a separate commodity. A special model of the functioning of the wholesale market was developed for the Far East: the Single Purchaser model, which involves the acquisition of the entire amount of energy and power, which is subsequently sold to all participants in the wholesale market and to retail resellers and consumers.

A feature of this market model and the corresponding technological process is that the Single Purchaser sets for heat generation uniform prices for settlements in the wholesale market for electricity and power. In turn, the generating company in the course of interaction with the system operator has the opportunity to establish the priority and sequence of attracting objects to the planned hourly schedule.

The share of electricity generation by hydropower plants in the Far East region is quite high, but may vary depending on the water content of rivers, as well as on technological

factors, including emergency events. The risk factor expressed in the possibility of a significant financial gap due to deviations of the average weighted price of electricity and the price of its generation, which is set in retail tariffs is reduced through the distribution of this risk between the Single purchaser and hydroelectric stations in case of discrepancy between the load volumes of hydroelectric stations and the volumes fixed in the forecast balance.

In this regard, it is envisaged to use a special order of pricing for volumes that are produced above or below the volumes fixed in the forecast balance sheet. With an increase in the share of energy production by hydropower plants compared to the balance volumes, these volumes are paid at a higher price, which is beneficial both to hydropower plants (despite the redistribution of risk), and to consumers, because the cost of electricity is cheaper compared to thermal generation. With a decrease in energy production by hydroelectric power plants relative to fixed volumes in the forecast balance, the price of electricity increases, since the deficiency is compensated by thermal generation.

In order to highlight the specifics of the market of the second non-price zone, the analysis of the main indicators for the CES Vostok is carried out in comparison with the data for the UES of Russia (Table 1).

Table 1. Indicators of the II non-price zone as of 01.01.2019

Name	Absolute indicators			Specific indicators		
	Power generation	Population	Territory	Electricity generation per 1 person	Electricity generation per square meter km	Population density
	Billion kWh	Thousand people	Thousand square km	kWh / person	kWh / sq. Km	people / sq. km
UES of Russia	1 091,7	146 781,1	17 125,2	7 437,6	63 748,2	8,6

CES Vostok	37,6	4 290,8	1 600,3	8 763,0	23 495,6	2,7
CES / UES, in %	3,44	2,92	9,34	117,82	36,86	31,28

All participants in the energy (power) market are interconnected by complex technological and commercial ties. The study found that the financial stability of electricity market participants, in particular power supply companies, is directly related to timely settlements between market entities. On the one hand, all buyers of energy (power) must pay for the electricity produced by generating companies and for its transportation to consumers. On the other hand, power supply companies must ensure its sales in the retail market and receive payment from electricity consumers.

In ideal conditions, all payments between market participants should be balanced at all stages of the production and commercial cycle. But the existing reality shows that the untimely calculations of consumers in the retail market directly affects the ability of power supply companies to fulfil their obligations in the wholesale energy (power) market; violation of settlement schedules entails significant penalties and additional costs. As a rule, there are so-called “check dates” within a month at which power supply companies must make settlements to receive payments for energy (power) supplied to retail consumers of the wholesale market.

On the other hand, the payment discipline of electricity consumers in the retail market is far from ideal conditions, which is reflected in the growth of overdue receivables. Therefore, having a clear schedule for settlements in the wholesale market, a power supply company should solve the problem of cash gaps in the absence of payment from its consumers with a further collection of this debt, including with the application of penalties for late payment terms.

Since the payment discipline of consumers is a critical factor for a last resort provider power supply company, we will consider how this solvency is formed in comparison with the average level of wages and their sufficiency for paying electricity.

The range of the ability to pay for electricity for account of the average wage in 2018 ranged from 23 to 41 standard amounts (350 kWh per month per person in the absence of metering devices). Given that in the Russian Federation a substantial majority of subscribers still have metering devices, and also that the energy consumption per person is usually lower than the standard amount, we estimate that the share of payment for electricity consumed per person for account of the average wage is within the range of 2-4%.

Although the average wage figures indicate that it is possible to pay for electricity consumed, in Russia there are a significant number of citizens - consumers of electricity with lower incomes being at the cost of living or a little higher. Already here, the share of the electricity cost may exceed 10% of revenues. In this situation, taking into account the total amount of expenses for the payment of communal services, their consumers may have reasons to apply for a subsidy to pay for the utilities.

Insufficient payment discipline of retail consumers leads to cash gaps in last resort providers. As of January 1, 2019, the total cash gap amounted to 169.0 billion roubles. Moreover, the dynamics of debt tends to worsen, i.e. to increase cash gaps. Consequently, power supply companies must cover this cash gap at the expense of borrowed funds and bear additional expenses for paying interest on their use, which worsens the balance sheet structure and financial results.

An interesting fact is that the debt of last resort provider power supply companies, which are Single purchasers of energy (power) in the wholesale market of non-price zones, tends to decrease, and as of 01.01.2019 is practically absent. First of all, this characterizes the high share of responsibility of such last resort provider power supply companies for the state of settlements between wholesale market entities, and the reliability of energy supply. At that time, debt of last resort provider power supply companies in price zones is growing steadily.

In fact, last resort provider power supply companies of non-price zones accept the risks of payment discipline of consumers on their financial result to a greater extent. Since the last resort provider power supply companies of non-price zones has a larger share of responsibility for settlements in the wholesale market as a single purchaser, this also contributes to their greater activity in the development of adaptive policy for managing financial stability to ensure timely settlements with generation and network companies.

A study of publicly available scientific publications showed that the selected specific indicators proposed in the study to characterize the specifics of the electricity and power market of the second non-price zone and the approach to assessing payment discipline factors in electricity calculations were not previously disclosed.

## **Conclusions**

The obtained results and further work on detailing territorial planning for the regions, cities, municipalities, etc. included in the CES Vostok, will form an information base for the decision-making regarding the development of electric power generation capacities, grid facilities, energy supply and customer service organization (Kozlova et al., 2016; Levkina & Titova, 2019; Vasilenko & Titova, 2019). The proposed approach to data analysis and the results will be in demand in the formation of the information base for decision support on certain aspects [18] and the problems of sustainable development management of economic entities in the energy market.

## **References**

- Dronova, Yu.V., & Krasnova, A.O. (2017). Analysis of the consequences for the regional economy of the introduction of a new energy market model. *Business. Education. Law.* 3(40), 37-40.
- Dzyuba, A.P., & Soloviev, I.A. (2016). Study of tools for managing demand for electricity within the framework of the wholesale and retail electricity markets of Russia. *Economics, entrepreneurship and law*, 6(2), 147–162.

Kozlova, O.A., Terentyeva, T.V., Makarova, M.N., & Lan, D.H. (2016) Territorial factors of strategic development of the Far East regions. *Economy of Region*, 3, 765-775 (doi: 10.17059/2016-3-13).

Levkina, E.V., & Titova, N.Y. (2019). The analysis of the financial condition of small business and the ways of its development in the Primorsky Territory. *IOP Conference Series: Earth and Environmental Science*, 032185.

Maslova, P.A., & Daneev, O.V. (2019) An econometric study of the electricity market in Russia. *Chronoeconomics*, 3(16), 108-112.

Myznikova, M.A. (2015). The functioning of the electricity (power) market model: the development of market infrastructure, regulation of the market mechanism, and pricing problems. *Kazan Economic Bulletin*, 2(16), 46-51.

Petyukov, S.E. (2019). Electric power generation in the Russian Federation: analysis of financial and economic indicators. *Social policy and sociology*, 1(4), 74-86.

Rodin, E. (2015). Prevention of payment discipline in the retail electricity markets: a complete limitation of energy supply. *Energy and law*, 1, 19-24.

Salov, A.N., & Maslov, V.G. (2014). Re-engineering business process of managing debt liabilities of resource-supplying companies. *International Journal of Experimental Education*, 9, 25-27.

Smagina, M.N., & Nestupaeva, D.R. (2015) Study of the Russian electricity market. *Bulletin of Economics, Law and Sociology*, 3, 94-96.

*The official website of the Ministry of Energy of the Russian Federation.* URL: <https://minenergo.gov.ru/activity/statistic>

*The official website of the Ministry of Energy of the Russian Federation. URL:*  
<https://minenergo.gov.ru/node/532>

Vasilenko, M., & Titova, N. (2019). Accounting policy the system of enterprise economic security. *Amazonia Investiga*, 8(22), 254-260. REICE | 501

Vasin, A.A., & Gusev, A.G. (2012). Game theory models of power and electricity market management. Proceedings of the Russian Academy of Sciences. *Theory and control systems*, 6, 52-62.

Emam, S. S., & Shajari, H. (2013). RECOGNITION AND ANALYSIS OF EFFECTIVE FACTORS ON INVESTORS'DECISION MAKING IN STOCK EXCHANGE OF TEHRAN, *UCT Journal of Management and Accounting Studies*, 1(1): 14-21.

Lobão, J., & Pereira, C. (2016). Looking for Psychological Barriers in nine European Stock Market Indices. *Dutch Journal of Finance and Management*, 1(1), 39.

Jaramillo, L. E. S. (2018). Malware Detection and Mitigation Techniques: Lessons Learned from Mirai DDOS Attack. *Journal of Information Systems Engineering & Management*, 3(3), 19.