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RESEARCH NOTES

Development of Key Indicators for Power Supply Companies

Desarrollo de indicadores clave para empresas de suministro de energía

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Abstract

This article is devoted to the synthesis and analysis of a set of key performance indicators (KPI) for energy companies. The authors look at several large enterprises operating in the energy sector of Russia to answer the question: what factors play a critical role in the development of KPI for the power supply companies?

Keywords: power supply, KPI, economic analysis, steady development, debtor's management, tariff policy, regional energy commissions.

Resumen

Este artículo está dedicado a la síntesis y análisis de un conjunto de indicadores clave de desempeño (KPI) para empresas energéticas. Los autores analizan varias grandes empresas que operan en el sector energético de Rusia para responder a la pregunta: ¿qué factores juegan un papel crítico en el desarrollo de KPI para las empresas de suministro de energía?

Palabras clave: suministro eléctrico, KPI, análisis económico, desarrollo constante, gestión deudora, política tarifaria, comisiones regionales de energía.

Introduction

The performance of any commercial organization is measured using fairly simple indicators that are known to almost everyone with experience in company management. However, in practice, it turns out that the features of the functioning of sectors of the national economy, which can be attributed to the systemic (e.g., energy, transport, mining, and others) leave their mark on the formation of performance indicators of the enterprise and their use to analyze this activity.

The Russian energy industry is one of the sectors of the national economy where the traditional approach to the formation of KPIs requires an expert approach based, on the one hand, on the specifics of the region of operation, and on the other, on state regulation of electricity tariffs.

Methodology

In the framework of the presented work, the authors used the following research methods:

- *at the theoretical level*: study and generalization, formalization, analysis and synthesis, induction and deduction, axiomatics;
- *at the experimental-theoretical level*: experiment, analysis, modeling, synthesis;
- *at an empirical level*: observation, measurement, comparison.

Analysis

Power supply companies (PSC) are a guarantor of the stable functioning of the heat and electrical energy industry and the supply of heat and electrical energy to the economy and the population (Karyakin et al., 2005; Karyakin et al., 2007; Baitov et al., 2012). Power supply companies on the electrical energy market are the intermediaries who buy electrical energy on the wholesale market and sell it to the final consumer in the retail market. Controlling cash flow throughout the production chain, distribution is calculated with generators for electrical energy production, with the network companies - for the delivery of electrical energy (figure 1).

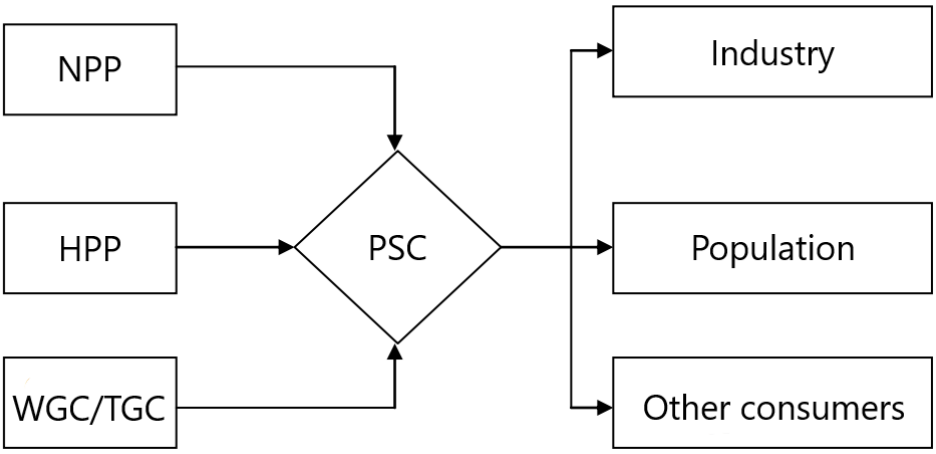

Figure 1. Power supply companies in the electrical energy market.

Power supply organizations providing the population with power can obtain the status of a guaranteed supplier. The main goal of creating the institute of guaranteeing suppliers is to develop a system of reliable supply of electrical energy to consumers. One of the special conditions for the implementation of activities by the guaranteeing supplier is the obligation to serve each consumer who turns to him. This is indicated by the public nature of the contracts concluded between the supplier and the consumer of electrical energy. Power supply companies are the connecting link in the movement of financial flows between the subjects of the electric power system, which is based on the electricity tariff distribution between them for the final consumer.

The economic features of power supply companies are manifested in the fact that they are characterized, first of all, by the practical absence of non-current assets in the balance due to the type of activity, and the main part of current assets is occupied by accounts receivable from electricity consumers (Karyakin et al., 2007; Tarasova, 2015; Meltenisova, 2013).

Equally important is the fact that supply companies do not need large investments and expenditures for modernization, compared to generating and grid companies, by virtue of which they can provide good dividend yield to their shareholders.

One of the main negative factors that have a direct impact on the successful activity of energy sales companies is the regulation of their tariff policy. Regional energy commissions in each region of Russian Federation carry out state regulation of prices (tariffs) and control their application in accordance with federal legislation. This leads to a strong dependence of energy sales companies on the tariff decisions made by these regional energy commissions, which, in turn, has a direct impact on the level of companies' profits and their ability to actualize the planned investment programs.

It should be noted that due to the large territory of the country, specific aspects of the work of energy sales companies in each separate region are emerging. To determine the turnover ratios of payable and receivable, it is necessary to analyze the financial statements of power supply companies.

To determine the reference values of accounts receivable turn-round based on the analysis of several energy sales companies operating in the energy market (Velikorosov ert al., 2019; Tarasova, 2015; Tarasova & Kolibaba, 2010; Okorokov & Lemekha, 2007; Tarasova, 2012; The Return of Depression Economics and the Crisis of 2008), we will analyze the calculated indicators of business activity presented in table 1:

Table 1. Indicators of business activity of receivables and payables of energy companies in 2018.

Index	Company									
	"ESK Garant"		PermES		KrasnoyarskES		TNS Energo NN		ChelyabES	
	2018	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**
Accounts receivable turnover ratio (ART ratio), rev.	8,734	7,418	11,97	11,72	9,092	9,342	3,276	3,452	2,686	4,78
Repayment period of receivables (T_{ART}), days	41,214	48,53	30,08	30,72	39,595	38,536	110,01	105,1	134,3	75,21
The share of receivables in the total amount of current assets (S_{ART}), %	91,776	77,16	69,34	80,26	95,23	96,29	94,99	92,74	91,68	89,26
Average receivables to revenue ratio, %	11,448	13,48	8,354	8,534	10,999	10,704	30,52	28,97	37,23	20,93
Accounts payable turnover ratio (APT ratio), rev.	12,84	13,49	10,49	11,06	11,692	10,245	4,71	4,79	2,8	7,84
Repayment period of payables (T_{APT}), days	28,11	27,05	34,33	32,55	30,79	35,14	77,07	75,22	127,2	44,23

The reference values of the turn-round of accounts receivable and payable, as well as the period of repayment of accounts receivable and the duration of the turn-round of accounts payable are given in table 2.

Table 2. The reference values of payables and receivables of business activity.

Index	Reference value
Accounts payable turnover ratio (APT ratio), rev.	8
Repayment period of payables (T_{APT}), days	30
Accounts receivable turnover ratio (ART ratio), rev.	8,5
Repayment period of receivables (T_{ART}), days	30

Despite the efforts being made to fight debtors, energy companies are unable to obtain the required gross revenues included in tariffs, which results in a shortage of investment funds. One of the possible methods for assessing the risks of non-payment can be the use of probabilistic methods and statistical tools, such as those described in (Maksim et al., 2017; Salnikova et al., 2017;

Chernoyarov et al., 2019). As a result, non-payments for used energy resources lead to higher prices for responsible payers, what generally causes a slowdown in economic growth in all regions of Russian Federation.

Table 3. Profitability of sales of power supply companies (thousand rubles).

Company	Index					
	Proceeds		Deviation	Net profit		Deviation
	2018	2017		2018	2017	
"ESK Garant"	8380755	7967329	413426	69856	13364	56492
TNS Energo NN	45238697	43057494	2181203	200871	205431	(4560)
ChelyabES	20742866	38925326	(18182460)	966907	152368	814539
PermES	37965717	37786343	179374	650596	471715	178881
KrasnoyarskES	36485696	34772241	1713455	348092	407404	(59312)

Analyzing the profitability of sales, it should be noted that companies, except for Chelyabenergosbyt, have a positive trend in revenue growth. Chelyabenergosbyt has a halving revenue in 2018, while there is a large increase in the company's net profit. LLC "ESK Garant" has an increase in revenue and net profit in 2018 relative to 2017.

During development a bonus system for the personnel of energy companies, it is proposed to use key indicators (at the level of a power supply company, indicators P1, P2, P3 are the basis for the payment (reduction) of bonus remuneration).

Table 4. Main indicators of power supply companies.

Index	Calculation formula
Return on sales indicator P1	Revenue from sales/Sales revenue
The indicator of the financial safety margin for receivables P2	$P2 = ПО_{ДЗ} – ПО_{КЗ}$
The indicator of input intensity of EBITDA P3	EBITDA/Cost of sales

The calculation of indicators for power supply companies is presented in table 5.

Table 5. Grading indicators for power supply companies.

Company	P1, %		P2, days		P3, rel. un.	
	2018	2017	2018	2017	2018	2017
"ESK Garant"	3,512	2,82	3,701	24,222	0,029	0,021
TNS Energo NN	1,997	0,574	32,79	36,812	0,075	0,034
Chelyabenergosbyt	1,81	2,675	-66,48	42,844	0,072	0,022
Permenergosbyt	2,81	3,251	-6,48	-3,749	0,023	0,021
Krasnoyarskenergosbyt	2,49	3,704	8,97	9,326	0,017	0,020

It is proposed to introduce the reference values of the key performance indicators P1, P2 and P3 for the subsequent analysis of the research object indicators (table 6).

Table 6. Reference values of key performance indicators P1, P2 and P3.

Index	Calculation formula	Reference value
Return on sales indicator P1	Revenue from sales/Sales revenue	5-10 %
The indicator of the financial safety margin for accounts receivable P2	$P2 = ПО_{ДЗ} – ПО_{КЗ}$	0 ±5 day
The indicator of input intensity of EBITDA P3	EBITDA/Cost of sales	7-8 %

Main conclusions

1) The indicator of profitability of sales P1 in conditions of economic stability aim at the interval of 5-10%. P1 has a maximum value in LLC "ESK Garant" and is 3.512%. This is sufficient value in a crisis economy. This indicator characterizes how profitable the enterprise is. This is the most important indicator of the financial well-being of an energy company. The higher the profitability of sales compared to the previous period (the value of this indicator of a competing energy company, the average value in the industry), the less sales revenue is absorbed by expenses. This differential is one of the main criteria for assessing the efficiency of energy sales companies in a competitive market. This information is used in fundamental analysis of the stock market, which directly affects the company's capitalization. As a result, the companies' top management should strive to increase the profitability of sales, which ultimately affects the growth of the company's value in the market.

2) The indicator of the margin of financial strength for accounts receivable P2. The P2 indicator should tend to or be greater than 0 – this is the threshold level. The positive value of the financial cycle's duration indicates that the power supply company has financial resources to pay all obligations on time, there are no cash gaps. As a result, the company may not resort to aggressive borrowing policy, which significantly reduces financial risks. A negative value of the indicator that the company receives funds from debtors faster, which indicates that there is a liquidity reserve. This indicator stimulates the payment discipline of the company and motivates the company's management to reduce short-term accounts payable, which, in turn, reduces interest payments and increases the profitability of the power supply company as a whole. In these conditions, the guarantee supplier need to establish long-term contractual relations with consumers with a positive credit history who have sufficient liquid assets on their balance sheet to ensure the fulfillment of obligations under the energy supply contract. The contract must include conditions aimed at the consumer's interest in long-term cooperation with the guaranteeing supplier, including economic. These conditions include the settlement system improvement, and a more transparent pricing scheme, and conducting energy surveys, and providing various services: replacing measuring instruments, advising on more rational use of energy and capacity, reducing the sales markup during using prepayment, assisting in the conclusion of contracts for technological connection of power receivers to power grids.

3) The indicator of input intensity of EBITDA – P3. Shows profit in relation to costs per ruble. The reference value is taken as 7-8%. The coefficient values in the power supply sector are not high. The indicator is the better, the higher its value. After definition the benchmark values of key performance indicators (KPI), it is possible to propose incentive coefficients for employees for individual divisions of the company, according to the organizational structure of the company.

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