Sustainable energy development issues in the context of world economy deglobalization

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Abstract. The need for sustainable development of regional economies and the energy sector in the context of world economy deglobalization is highlighted. The role of energy companies as the key economic entities in providing the resilient development of regional socio-economic systems is substantiated. A number of Russian energy companies are correlated to the regions within the federal districts. Based on the review of the sustainable development concept, the gaps in the theory of regional economic resilience and in the methodology of qualitative evaluation of the energy sector's participation are stated. A comprehensive approach combining the debt limitation methodology with the conceptual model by C. Walsh is suggested for the estimation of sustainable development in the energy sector. The application of the approach using the example of Russian energy companies revealed the key factors of imbalance in operating and investment efficiency management.

1 Introduction

The deglobalization factors that can be observed in the world economy today enhance the importance of regional economies for providing Russia's economic sustainability.

Regional economy as a component of mesoeconomy includes regions as well as other territorially separate groups of enterprises and other institutions. A region is generally understood as a large, organizationally separate territory within a country, which is characterized by relatively homogeneous natural conditions, established material and technical base, industrial and social infrastructure [1]. The recent academic literature treats regions not only as administrative units, but also as socio-economic systems (SES's) [2].

A regional SES contains a number of major functional subsystems that largely determine the sustainability of economic development. The entities of sustainable development are involved in goal-setting within these subsystems (Table 1).

Energy companies are the key economic entities of sustainable development in the regional economic growth. They are major consumers of specialized engineering equipment, comprehensive servicing, skilled personnel, scientific research results, and IT, and therefore they stimulate the sustainable development of the core industries. The energy infrastructure provides interrelations between the major industrial enterprises that are the key energy consumers, and contributes to the improvement of their performance efficiency due to the

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quality and uninterrupted energy supply that accounts for the reduction of energy per unit cost in the net cost of themanufacturers’ final product [3].

Table 1. Regional SES structuring by function and by target [4].

Functional subsystems	Target structure
- investment support - social security - utilities and services sector - production and technology sector - systems of governance - innovation generation and implementation - market infrastructure - education and culture - fundamental and applied science - environment management and protection	- resources potential development - natural and environmental potential for future development - efficient entrepreneurship development - educational and cultural development - market infrastructure development - innovative development - efficient governance - productioncapacity and technological potential - health care - social security

A number of Russian energy companies are correlated to the regions within the federal districts in Table 2.

Table 2. Correlation between the energy companies and the regions of the Russian Federation

Region	GK “ Rosatom”	PAO “ OGK-2”	PAO “ Mosenergo”	PAO “ MRSK TsentralPrivolzhya” П ривольжъя»	PAO “ TKG-2”	PAO “ Fortum”
Central federal district	+	+	+	+	+	
Northwestern federal district	+	+			+	+
Southern federal district		+				
Volga federal district	+			+		+
Urals federal district	+	+				+
Siberian federal district	+	+				
Far Eastern federal district	+	+				

The issues of sustainable development and the possibilities of its quantitative assessment are covered in the works by such authors as H. Bossel, A.G. Granberg, N.P. Vashchekin, M.Ch. Zalikhanov, V.A.Koptug, O.V. Mikhalev, N.N. Moiseev, S.I. Mutovin, A.D. Ursul, K.N. Sud’in, A.A. Chub, A.M. Shelekhov and others [5].

Defining sustainability as the system’s ability to continually perform its functionsunder the influence of various negative external factors, it should be noted that the modern trends in the economic sustainability theory are grounded on neo-institutionalism. In this context, the role of the institutions is connected with reducing the uncertainty by means of establishing a more sustainable structure of interactions between the economic entities [6].

The notion of economic sustainability widely accepted in the economic science as a balance between resource exploitation and human development stems from the widely applied concept of sustainable development [2]. It should be noted that the sustainable development concept is the only widespread conceptof SES management, the main focus of which ignores the attention to economic performance [7].

According to the most common out of more than 60 existing approaches, sustainable development is defined as the kind of development that meets the present needs without putting under threat the ability of future generations to meet their own needs [6].

The development of the conceptual approach to sustainable development can be divided into the following stages.

1. The concept of global threats to the future of humankind (the Club of Rome, “The Limits to Growth” report – D.H. Meadows, D.L. Meadows, J. Randers et al, 1972).
2. “The worldview revolution” in the attitude to the environment: the realization of contradictions between the traditional economic growth and environmental care (the UNO Conference, Stockholm, 1972).
3. The concept of sustainable socio-economic development in balance with the environment (the Brundtland Commission report “Our Common Future”, 1987).
4. The program of action for prosperity by harmonizing human activity with the laws of nature (“Agenda 21”, Rio de Janeiro, 1992).
5. The concept of sustainable development and the innovative strategy for the survival of the humankind.
6. The concept of managing the innovative potential of sustainable development based on the harmonization of the needs and limitations stemming from the condition of technology and social organization [8].

In spite of the fact that academics and research group often address the issues of sustainable development in their works, an insufficient development of the existing concepts can be noted, including the gaps in the theory of regional economic resilience and in the methodology of qualitative evaluation of the energy sector’s participation, which make this research relevant. A number of Russian economic entities of the energy sector are the objects of research. The sustainable development indicators for these companies were considered as the subject of research.

2 Methods of evaluating sustainable development in energy companies

For the evaluation of sustainable development, energy companies apply a variety of financial analysis tools, among which the authors emphasize the methodology for calculating the debt limitations, and the EBITDA profit.

According to the methodology for calculating the debt limitations, four kinds of limitations are estimated: the current liquidity limitation (CLL), the financial leverage limitation (FLL), the debt coverage limitation (DCL), and the debt service coverage limitation (DSCL). The resulting index of the methodology is the financial sustainability reserve (FSR); it is calculated as a ratio of the difference between earnings before interest, taxes, depreciation and amortization (EBITDA) and retained profit of the reporting period to the net earnings [9].

The authors extend the methodology of evaluating the economic sustainability of energy companies by adding to it the conceptual model by C. Walsh. Focusing on the dynamics of a limited number of financial ratios (the “Retained Profit to Net Earnings” ratio, the Net Earnings growth rate, the “Current Assets to Net Earnings” ratio) the model checks whether there is a balance among the key parameters that generate the cash flow: Net Earnings, Profit, and Assets. The rate of cash flow growth and, therefore, the growth in the company value is reflected in the integral index E ; at $E = 1$ the cash flow is neutral, at $E > 1$ it is positive, at $E < 1$ it is negative [10].

The input data for calculating the Russian energy companies’ sustainable development indicators are presented in Table 3.

Table 3. Input data for calculating the Russian energy companies' sustainable development indicators in 2015-2019, bln rubles

Indicator	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015
	GK "Rosatom"					PAO "OGK-2"				
Current Assets	311.8	221.6	185.1	141.2	122.4	38.0	36.6	31.9	31.3	37.5
Net Earnings	456.7	389.1	360.4	282.0	263.8	134.2	140.9	139.6	134.3	112.1
EBITDA	207.4	117.8	119.7	56.8	59.0	29.3	26.2	21.5	15.2	8.7
Total Assets	1,971.2	1,841.8	1,741.7	1,614.1	1,470.7	215.7	202.7	200.0	201.6	195.3
Retained Profit	140.3	109.7	119.4	75.1	45.8	7.8	9.1	5.6	2.7	1.9
	PAO "Mosenergo"					PAO "MRSK TsentraiPrivolzhya"				
Current Assets	96.5	88.9	88.5	88.7	69.8	28.6	30.7	23.8	16.7	17.5
Net Earnings	189.8	199.0	196.8	190.3	164.5	96.3	93.9	90.8	78.5	68.9
EBITDA	37.5	44.6	46.1	34.0	24.3	17.8	21.4	23.2	13.5	10.2
Total Assets	321.5	292.8	279.7	285.0	275.5	118.3	114.7	101.5	92.0	91.3
Retained Profit	8.8	18.1	22.1	9.1	8.2	3.3	9.3	11.0	3.1	0.9
	PAO "TGK-2"					PAO "Fortum"				
Current Assets	22.5	17.5	22.4	18.8	17.5	30.8	40.1	37.7	27.2	20.7
Net Earnings	37.6	36.4	36.4	33.7	31.0	76.8	73.8	65.3	60.5	54.1
EBITDA	3.6	3.5	3.4	3.8	4.1	32.0	29.0	12.0	11.7	9.6
Total Assets	60.2	55.1	59.4	54.5	47.4	184.9	196.9	190.0	175.6	164.4
Retained Profit	1.9	(0.4)	2.8	(2.1)	(1.4)	(12.2)	2.1	12.2	9.1	6.9

If we look at the trend of the study period, it can be noted that a growing trend prevailed in the operating activity as reflected by the Net Earnings value. In the potential of investment activity, measured by the EBITDA profit, an upward trend can also be observed.

3 Analysis and evaluation of the Russian energy companies' sustainable development indicators

The sustainable development indicators for a number of Russian energy companies are presented in Table 4. The comparative dynamics of the key indicators is shown in Fig. 1-2.

Table 4. Sustainable development indicators for Russian energy companies in 2015-2019

Indicator	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015
	GK "Rosatom"					PAO "OGK-2"				
FSR, %	14.7	2.1	0.1	(6.5)	5.0	16.0	12.2	11.4	9.3	6.1
E	>1	>1	<1	>1	>1	<1	>1	<1	<1	<1
	PAO "Mosenergo"					PAO "MRSK Tsentrai Privolzhya"				
FSR, %	15.1	13.3	12.2	13.1	9.8	15.1	12.9	13.5	13.2	13.4
E	<1	>1	>1	<1	<1	<1	=1	<1	<1	<1
	PAO "TGK-2"					PAO "Fortum"				
FSR, %	10.1	19.2	10.0	10.6	13.3	57.6	36.4	18.3	19.1	17.7
E	<1	>1	<1	<1	<1	<1	<1	>1	<1	<1

It should be noted that the correlation between the dynamics of the FSR and E values over the study period is inverse for most companies. It means that the comprehensive management of operating efficiency and investment potential of the companies is differently directed.

The FSR value predominantly varies within the range of 10-20%.

For all the companies under study, with the exception of GK “Rosatom”, negative values of C. Walsh indicator prevail, which indicates the imbalance in the growth of Net Earnings, Profit, and Assets. The main imbalance factors were low or negative values of retained profit of the reporting period, and the decrease in Net Earnings in some years. Also, for most of the companies there is a discernible upward trend of the indicator over the years 2017-2018 and its decline in 2019.

Fig. 1. Dynamics of Financial Sustainability Reserve for Russian energy companies in 2015-2019

Fig. 2. Dynamics of C. Walsh indicator for Russian energy companies in 2015-2019

Considering the dynamics of C. Walsh indicator value within the study period in comparison with the dynamics of the FSR value and the EBITDA profit, it may be concluded that the investment program implementation in the companies lacked efficiency in a number of periods. For example, PAO “OGK-2” and PAO “Fortum” in 2019 were characterized by the negative E values of 0.1650 and 1.5769, respectively, with the growth of FSR and EBITDA.

4 Conclusions

1. The deglobalization processes that can be observed in the world economy today determine the need for regional studies, including those investigating the relation between the energy sector and the economic sustainability of regional SES's.
2. This paper is aimed at improving the methodology of evaluating the sustainable development of Russian energy companies in providing the sustainable development of regional SES's.
3. For the evaluation of sustainable development in energy companies, the authors suggest a comprehensive approach that combines the debt limitations methodology with the conceptual model by C. Walsh. The methodology allows to reveal the key imbalance factors in the management of operating and investment efficiency in energy companies.
4. The methodology suggested allows solving the problem of controlling the company value growth on the basis of the interrelation of the sustainable economic development indicators.

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