

ENHANCING THE ENERGY EFFICIENCY OF OIL AND GAS COMPANIES AS A FACTOR OF THEIR SUSTAINABLE DEVELOPMENT

^aTATIANA KREYDENKO, ^bMAXIM CHERNYAEV, ^cELENA GRIGORIEVA, ^dMANNA KORENEVSKAYA

^{a-d}Federal State Independent Educational Institution of Higher Education "Peoples' Friendship University of Russia" (RUDN University), Miklukho-Maklaya Street 6, 117198, Moscow, Russian Federation

email: ^atkreydenko@mail.ru, ^bm.chernyaev@mail.ru, ^cegrigorieva@mail.ru, ^dm.korenevskaya@mail.ru

Abstract: The article is devoted to the analysis of the problem of assessing the sustainability of enterprises in the oil and gas sector, taking into account the nature of the processes of improving the energy efficiency of a company. Modern requirements for business on the part of the state, the consumer, and other members of the business community pose many different kinds of challenges to companies. The effectiveness of decisions depends on the quality of management of enterprises and companies. Under these conditions, the basic processes for the efficient management of enterprises can be the formation of estimate indicators of the level of sustainability achieved and their monitoring. The assessment of the sustainable development of an oil and gas company under these conditions should cover all aspects of sustainable development. The article proposes and approves the author's methodology for assessing the energy efficiency of all aspects of the sustainable development of oil and gas enterprises based on the statistical data of companies and calculated integral indices.

Keywords: energy efficiency, oil and gas sector, sustainable development of an enterprise, sustainable development standards.

1 Introduction

The formation of the sustainable development of the national economy at the macro level is largely due to the sustainability of the micro level, and, therefore, due to the sustainable development of organizations and production units. The highly variable external environment of the economy causes unpredictability and a difficult predictability of changes in the economy, which is the cause of a large number of complex multidimensional risks that have a significant impact on the sustainable development of an enterprise. Under the influence of complex multidimensional risk factors, production units are doomed to search for tools and methods to increase the effectiveness of managing the sustainable development of their activities. In this regard, it is very important to solve the problem of ensuring the internal management of complex risk factors for sustainable development. The formation of estimate indicators of the achieved level of sustainability, their monitoring and the decision-making based on the data obtained are fundamental things for solving this problem. Fundamental changes in industrial production caused by both scientific and technological progress and systemic changes occurring in the process of globalization and business consolidation efforts, undertaken by the world community to overcome the protracted financial crisis, form many challenges for modern industrial production, the most important of which is restructuring and adaptation of the management system.

The oil and gas sector is the leading sector of the economy of the Russian Federation. 27 of the 600 largest companies in the Russian Federation in 2018 (according to the results of 2017) represent the oil and gas sector. They account for more than 28% of the total sales of products. The sustainable development of the oil and gas sector of Russia is one of the main conditions for ensuring the sustainable development of the country as a whole and involves the implementation of two main activities: firstly, the improvement of environmental, economic and social indicators of the development of the sector, and secondly, the consideration of the consequences of the current activities of oil and gas enterprises for the possibility of realizing the needs of future generations. In this regard, there is a need to analyze and assess the level of sustainability of the development of an oil and gas producing enterprise, which will be used to determine the influence of internal factors of the organization's development on its position in the environment (competitiveness), as well as

to make a decision on the timely reorientation of the enterprise management mechanism.

These activities are predetermined by the concept of sustainable development, which, as defined by the World Commission on Environment and Development (Brundtland Commission, 1987), is a development that meets current needs but does not jeopardize the ability of future generations to meet their needs. In the corporate practice, there is no generally accepted definition of the term "sustainable development." This is due to the difference in the conditions in which companies operate at the macro and micro levels. As a rule, it is associated with the achievement of such a level of production efficiency, which, with proper technological support in the long term, would reduce the negative impact on the environment and optimize the environmental and social trends of the company.

Sustainable business development is a natural continuation of complex organizational changes. A sustainable business is an economic process that can survive in the long term. The problems of affordability and volatility in resource prices, consumer demand, investor pressure, the attraction of gifted persons, the emergence of new markets, the disappearance of old ones, and changes in financial transactions are an incomplete list of what influences the problem of sustainability. If the problem of sustainability is embedded in the company's approach to doing business, this leads, in a strategic sense, to a reduction in costs, the formation of a new consumer base, the selection and development of gifted persons in an organization. (1-2) A company involved in sustainable development receives a long-term goal that will be consistent with its core business and strengths; it will motivate employees and counterparties, and to give them optimism. The concept of sustainable development combines 3 main aspects, i.e. economic, social and environmental ones. The harmonization of these elements is a complex task, as they must be considered as a whole. (3)

The economic sustainability of an enterprise is the ability of an enterprise to maintain a certain level of values of economic parameters, which ensures its profitable functioning and stable development. The main components of economic sustainability are financial, market, organizational, production, investment, and technological sustain abilities. (4-5) It should be noted that the economic approach is the core of the concept of sustainable development. The concept of sustainable development is socially oriented and aimed at preserving social and cultural stability. In order to achieve sustainable development, modern society needs to create a more efficient decision-making system that takes into account historical experience. Regarding an enterprise, its social sustainability shows the degree of social security of its personnel. The environmental aspect of sustainable development involves the relationship of an enterprise's economy with its environmental safety, minimizing the harmful effects of production and business activities on the environment. The focus should be on preserving the abilities of natural systems to change and not on preserving them in a certain "ideal" static state.

The stability of oil and gas enterprises cannot be considered without analyzing the interest of all participants in the process in the nature and dynamics of the sustainable development of oil and gas enterprises.

In this regard, the authors propose to consider the sustainable development of oil and gas enterprises from three basic points of view: (6)

1. sustainable development of an energy enterprise;
2. sustainable development of the energy industry as a whole;
3. sustainable development of the territory as a reflection of the sustainable development of the industry.

Thus, the sustainable development of the energy industries can be considered via the socio-economic status of the enterprises of

the sector as well as via an assessment of the nature of the impact of the energy industry on the sustainable development of the regional economy and the country as a whole. At the same time, the scientific literature has not yet developed an unambiguous approach to the concept of "sustainable development of the State energy industry." In the works of David L. Green, the stability of the energy industry of a territory is defined as guarantees that future generations have energy resources that would allow at least the same level of well-being as the current generation, which is consistent with the generally accepted definition of sustainable development. (7)

N. A. Shevchenko (8), in "The scientific and innovative potential of the modern energy sector of the world economy," considers the sustainable development of the State energy industry, primarily from the point of view of social and environmental aspects and relates it to the tasks of ensuring access to energy sources and modern technologies for energy production, eliminating inequalities in this area, protecting environment, financial resource mobilization, institutional and human capacity building.

A number of experts consider sustainable energy development via the development process of a system capable of self-regulation with a view to achieving regional energy security with the rational use of energy resources, ensuring social equality in access to energy services and preserving the environment in the face of uncertainty. (9) From this point of view, it is advisable to consider the sustainable development of energy industries as a process of their technological and economic development in the face of uncertainty. This process is aimed at the reliable and uninterrupted power supply to consumers with the rational use of resources and minimal environmental impact in order to improve the functioning of the region. Y. S. Mozgovaya (10) investigates the mechanisms of sustainable development of the sector from the point of view of organizing the process of constant search and implementation of solutions to achieve a new equilibrium state between the changed environmental conditions and the capabilities of the economic entities of the energy industry to realize their national economic mission new conditions.

L.R. Abzalilova (11) provides a definition of the socio-economic sustainability of the industry as an area of its optimal functioning expressed by existing and potential opportunities to confront, in a certain period of time, the destabilizing external and internal factors, while maintaining and increasing at the same time its potential and positive direction of development.

R. Chegis and R. Pusinaite (12) believe that the main goal of the sustainable development of the energy sector is to create a situation in which the production and use of electricity will ensure the long-term development of mankind, economic growth, and environmental sustainability.

Summarizing the existing approaches to assessing the sustainability of the energy sector in the context of the concept of sustainable development, one should consider the sustainable

development of energy enterprises as an opportunity for changes in all structural units of enterprises as a response to changing external and internal factors of the development of the energy industry in conjunction with the nature of the manifestation of economic, social and environmental problems of the territory. (13-14)

In this regard, the authors interpret the problem of the sustainable development of the oil and gas sector of Russia as a subsystem of the economy that has a significant impact on the economic development of society and the quality of the environment, both in the present and in a strategic perspective. Thus, almost all stages of the oil and gas production cycle are characterized by various types of negative environmental impact and economic consequences, which can be summarized and grouped into four main blocks: emission of pollutants into the environment and its components (water bodies, atmosphere, and soil); structural transformation of subterranean depths and landscape change; reduction of strategic reserves of raw energy resources extracted from subterranean depths; formation of territories and objects of accumulated environmental damage. (15)

2 Materials and Methods

At present, the practice of managing the sustainable development of enterprises both in Russia and abroad is increasingly based on numerous standards acceptable in the field of social, ecological and economic activities. (1,16) Such standards, on the one hand, provide guidelines for the sustainable development of the enterprise; on the other hand, they link the interests of many stakeholders in achieving specific results of the company's activities and development.

To date, there are more than a hundred rating systems in the field of sustainable development of companies. (1) The prerequisites for the use of indices and the increase in their number are

- increase in the number of companies for which issues of sustainable development of the company are relevant and strategically significant;
- emergence of new regulatory bodies such as the European Commission and stock exchanges interested in collecting information on the sustainable development of companies;
- change in the regulatory framework of organizations.

In this regard, in the face of tighter competition, the struggle for access to capital markets, as well as the growing attention of investors and the general public to the final results of work and processes occurring within the enterprise, management practices based on standards, mostly foreign, are expanding since Russian standards based on foreign ones are being created. (17) According to the United Nations approach, these standards regulate the social, ecological and economic activities of an enterprise, which form the basis of its sustainable development (Table 1).

Table 1. Existing Indexing Systems in the Field of Non-financial Reporting and Sustainable Development of Global Energy Companies

	Aspects		
	Ecological	Social	Economic
International treaties and charters	United Nations Global Compact		
International standards	ISO 20121:2012. ISO 26000:2010		
	The Global Reporting Initiative		
		Social Accountability 8000:2008	Account Ability 1000 Assurance Standard
		Ethics Compliance Management System Standard 2000	
		IC CSR-08260008000	

National treaties and charters	Social Charter of Russian Business	
National standards	National standard of the RF GOST R 54598.1-2015	
National indices	Responsibility and openness	
	Sustainable development vector	

Source: compiled by the authors.

It should be noted that the available indicators and indices are not always able to objectively assess the real state of affairs: concepts evolve and business priorities change. Accordingly, there is a need for the constant creation of new assessment systems, universal approaches to assessing the quality of management of the sustainable development of companies.

In these standards, in addition to the mandatory disclosure of financial (accounting) statements, annual and quarterly reports of enterprises, non-financial information is also used (quality of management, ethics of business behavior, structure and performance of social investments related to personnel

development, maintaining workplace health, creating an enabling environment in the areas of presence). At the same time, in international practice, there is a tendency of convergence between the content of the regulatory framework for both financial and non-financial reporting. International business practice implies that the use of non-financial reporting will allow the company to solve the most likely problems in the field of sustainable development due to the presence of typical practices of their operation. (18)

In world practice, there is still no generally accepted methodology for assessing the sustainability of companies, which would cover all the modern features of the development of individual enterprises and the industry as a whole.

Table 2. Existing Indexing Systems in the Field of Non-financial Reporting and Sustainable Development of Global Energy Companies

Designation of index	Developer (country)	Year of creation	Number of indexed companies	Selection criteria (selection categories)
Dow Jones Sustainability Indexes (DJSI)	USA and Switzerland	1999	2500	criteria for each industry: economy, ecology, society, quality of corporate governance, risk management, climate change mitigation
FTSE KLD GLOBAL SUSTAINABILITY INDEX (GSIN)	UK	2007	146	participation in the policy of supporting the environment and society
NYSE Energy Index	USA	2002	172	number of shares, share price (for the base and reporting periods), market capitalization
Wilderhill new energy global innovation index (NEX)	USA	2006	650	use of clean and renewable energy sources, technologies that reduce the amount of hydrocarbon emissions
FTSE4Good	UK	2001	2400	human rights support; countering bribery; occupational safety and health; climate change policy
FTSE Environmental Markets Index Series	UK	2009	590	energy efficiency, the nexus of the main activity with the development and introduction of environmental technologies, including the use of renewable, alternative energy sources, and hydraulic engineering
Rts+Skolkovo index of sustainable development	Russia	2011	50	level of environmental impact
Joint index of Interfax and Russian Federal Service for Supervision of Natural Resources (Interfax-ERA, Ecological, and Energy Rating Agency)	Russia	2011	3850	Ecological and energy efficiency of industrial production, the technological efficiency of the equipment used, dynamics of efficiency, transparency
Energy Strategy Institute	Russia	2011	52	Indicators for assessing economic, environmental and social responsibility, innovation activity and the effectiveness of public-private partnerships

Source: Tumin, Koryakov, & Kostromin, 2016

Thus, the methodological tools for studying the level of sustainable development of an enterprise in the oil and gas industry from the point of view of achieving energy efficiency include an analysis of indicators for all types of sustainability. At the same time, the analysis should take into account not only the indicators that the company independently develops and includes in the corporate sustainability report, but also integral indices that evaluate the relationship between individual parameters of all types of sustainable enterprise development: economic,

social, environmental, technological, financial, managerial ones etc. An effective tool for managing the sustainable development of an enterprise in such an analysis is the monitoring of both negative and favorable factors affecting the dynamics of indicators of sustainable development proposed for calculation. The result of the monitoring should be a program of measures aimed at preventing the factors hampering the sustainable development of the enterprise. (19)

At the same time, while considering the problem of assessing the sustainability of an extractive company in modern conditions, the authors propose to consider more deeply the process of assessing the energy efficiency of a company's activities, taking into account the relationship with both its own development strategy and the socio-economic development of the territory where the company operates.

3 Results and Discussion

The troubleshooting of the assessment of the role of energy efficiency in the sustainable development of an oil and gas producing company is proposed by the authors on the basis of the analysis of 7 integral indices built on statistical indicators included in the company's sustainable development reports. These indices take into account both the parameters of energy efficiency and the context of the very energy efficiency of the sustainability of extractive companies. (6)

To select the indicators used for the calculation within each index, a multilateral monitoring of the indicators included in the reports of companies on sustainable development was carried out

in order to determine the most appropriate, taking into account the following criteria:

- Correspondence of ideology for each block (index);
- Equilibrium (equivalence) of indicators within a single block;
- No correlation between indicators inside the index;
- Availability of an indicator or its parameters (sufficiency of indicators, transparency of calculations, and the possibility to make them).

In addition, the principles of selecting indicators were followed, including the following criteria: objectivity, adequacy, concreteness (unambiguity), and comparability. In the selection process, possible indicators are determined in such a way as to exclude a high degree of correlation between them.

The research selected several indicators in each of the blocks, reflecting the nature of each of the main and intermediate directions of sustainable development, as well as on the basis of a balanced scorecard reflecting the basic parameters of socio-economic development (Table 3).

Table 3. The Developed System of Indicators for Assessing the Energy Efficiency of Sustainable Development of Oil and Gas Companies

Integral indices	Statistical data of the company's corporate sustainability report taken into account in the calculation of the indicator
Managing sustainable development of extractive companies based on energy efficiency assessment	
Elasticity of the basic integral indices of energy efficiency of the company	
Energy efficiency of the company's economic sustainability	
Energy intensity of production activities	Fixed assets
	Consumed electric energy for own needs
	Consumed thermal energy for own needs
Energy efficiency of the socio-economic sustainability of the company	
Energy intensity of human labor productivity	Consumed electric energy for own needs
	Consumed thermal energy for own needs
	Labor productivity - specific revenue, million rubles/person.
Energy efficiency of the social sustainability of the company	
Energy intensity of human labor	Average number of employees, people
	Consumed electric energy for own needs
	Consumed thermal energy for own needs
Energy efficiency of the ecological and social sustainability of the company	
Energy efficiency index of environmental and social sustainability of the extractive company	Emissions into the atmosphere, thousand tons
	The ratio of annually recycled waste to newly generated waste (correction factor)
	Environmental costs
Energy efficiency of the environmental sustainability of the company	
Energy efficiency index of the environmental sustainability of the extractive company (air emissions per unit of extracted fuel (raw materials))	Emissions into the atmosphere, thousand tons
	The ratio of annually recycled waste to newly generated waste (correction factor)
	Hydrocarbon production (oil equivalent)
Energy efficiency of the ecological and economic sustainability of the company	
Energy efficiency index of environmental sustainability of the extractive company	Emissions into the atmosphere, thousand tons
	The ratio of annually recycled waste to newly generated waste (correction factor)
	Fixed assets

Source: developed by the authors

The energy efficiency of the company's economic sustainability is assessed on the basis of the energy intensity of its production activities. The proposed index reflects the nature of the relationship between the cost of electrical and thermal energies consumed for own needs and the average annual value of fixed assets (based on consolidated financial statements made according to IFRS) and is calculated as the ratio of the amount of energy consumed for own needs to a unit of fixed assets:

$$Epa = (Cee + Cte) / ((FAe - FAb)/2), \text{ where}$$

Epa is the energy intensity of production activities.

Cee is consumed electric energy for own needs.

Cte is consumed thermal energy for own needs.

FAe is the value of fixed assets at the end of the fiscal year.

FAb is the value of fixed assets at the beginning of the fiscal year.

The energy efficiency of the company's socio-economic sustainability is assessed on the basis of the energy intensity of human labor productivity and is calculated as the ratio of the amount of electric and thermal energies consumed for own needs to the average labor productivity in the company.

The energy efficiency of social sustainability is estimated on the basis of the energy intensity of human labor and is calculated as the ratio of the annual amount of electric and thermal energies consumed for own needs to the average number of employees.

The energy efficiency of the company's environmental sustainability takes into account the nature of the environmental aspects of its production activities and is calculated as the amount of air emissions per unit of output (unit of fuel produced). The amount of air emissions is adjusted for the factor characterizing the intensity of the environmental activities of the company:

$$I_{ees} = (Ae/Fie) / O, \text{ where}$$

I_{ees} is the index of energy efficiency of the environmental sustainability of the company.

Ae is air emissions, thous. t.

Fie is the factor of the intensity of environmental activities (as the ratio of annually recycled waste to newly generated waste, which is calculated by the company and included in the report on corporate sustainability).

O is the output (total annual hydrocarbon production in oil equivalent).

Energy efficiency of environmental and economic sustainability is based on the analysis of indicators reflecting the relationship of environmental, financial, and economic aspects of the nature of the company's production activities:

$$I_{ees} = (Ae/Fie) / ((FAe - FAb)/2)$$

I_{ees} is the index of energy efficiency of the environmental sustainability of the company.

Ae is air emissions, thous. t.

Fie is the factor of the intensity of environmental activities (as the ratio of annually recycled waste to newly generated waste, which is calculated by the company and included in the report on corporate sustainability).

FAe is the value of fixed assets at the end of the fiscal year.

FAb is the value of fixed assets at the beginning of the fiscal year.

The energy efficiency of environmental and social sustainability is assessed on the basis of the ratio of the cost of environmental protection to a unit of emissions into the atmosphere as a result of the company's activities. The amount of air emissions is adjusted for the factor characterizing the intensity of environmental activities of the company similarly to the company's index of energy efficiency of environmental sustainability:

The efficiency of managing sustainable development of extractive companies is based on the assessment of energy efficiency. The authors also propose to assess it on the basis of a total indicator of the dynamics of the basic integral energy efficiency indices of the company's activities:

$$Em = 1/3 ((E_{pae} / E_{pab}) / (FAe / FAb)) + 1/3 ((E_{sie} / E_{sib}) / (A_{ee} / A_{eb})) + 1/3 ((E_{le} - E_{lb}) / (N_e - N_b)), \text{ where}$$

Em is the index of the efficiency of sustainable development management of the extractive company.

E_{pae} is the energy intensity of production activities at the end of the year.

E_{pab} is the energy intensity of production activities at the beginning of the year.

FAe is the value of fixed assets at the end of the fiscal year.

FAb is the value of fixed assets at the beginning of the fiscal year.

E_{sie} is the ecological sustainability index at the end of the year.

E_{sib} is the ecological sustainability index at the beginning of the year.

A_{ee} is air emissions at the end of the year.

A_{eb} is air emissions at the beginning of the year.

E_{le} is the energy intensity of human labor at the end of the year.

E_{lb} is the energy intensity of human labor at the beginning of the year.

N_e is the average number of employees at the end of the year.

N_b is the average number of employees at the beginning of the year.

4 Conclusion

In order to test the authors' methodology for assessing the sustainability of an oil and gas company in the context of the nature of the impact of energy efficiency on its development, the authors analyzed data from Lukoil, one of the largest public vertically integrated oil and gas companies in the world, which accounts for more than 2% of world oil production and about 1% of proven hydrocarbon reserves. In 2018, the company ranked second in the top 250 largest energy companies in the world according to S & P Global Platts.

The first report on the company's activities in the field of sustainable development was published in 2005. When preparing reports, the company's specialists are guided by the following documents: AA1000 standard (1999), the Global Reporting Initiative (GRI) Sustainability Reporting Guidelines, the UN Global Compact, and the Social Charter of Russian Business. The company's reports are placed in the GRI database, and also included in the National Register of Corporate Non-Financial Reports, which is administered by the Russian Union of Industrialists and Entrepreneurs. (20)

An analysis of the dynamics of corporate sustainability indicators laid down in the company's report demonstrates the overall high level of corporate responsibility in matters of the sustainable development of enterprises of the company and their contribution to the sustainable development of the industry and the economy as a whole. The following areas are announced as priority directions for the implementation of the company's sustainable development strategy: integration of risk management and sustainable development aspects into the company's business model and strategy; ethics and compliance with legal requirements; climate strategy and climate risk management; major environmental impacts, rational use of natural resources and biodiversity conservation; process safety; energy consumption and energy efficiency; human capital management; impact on the socio-economic development of local communities, including human rights, the supply chain, safety and product quality.

Thus, the growth of emissions into the atmosphere as a result of the activities of the company's enterprises in 2016 was offset by growth in environmental protection costs.

Table 4. Dynamics of Indicators of Sustainability of Lukoil Enterprises in the Context of Improving the Energy Efficiency of Their Activities (2015 - 2017)

reporting indicators / integral indices	2015	2016	2017
hydrocarbon production, million barrels	890	833	828
air emissions, thousand tons	540	628	503
ratio of annually recycled waste to newly generated waste	0,930	1,070	0,960
average number of employees, thousand people	107,040	105,539	103,647
environmental protection costs, mln. RUB	48 161	53 286	42 413
labor productivity, million rubles / person	53,7	49,5	57,3
consumed electric energy for own needs, mln. RUB	87,9	90,4	94,3
consumed thermal energy for own needs, mln. RUB	24,8	28,1	25,3
fixed assets (mln. RUB)	3 411	3 391	3 575
energy intensity of production activities (of fixed assets)	33,13	34,02	66,91
energy intensity of human labor productivity	2,10	2,39	2,09
energy intensity of human labor	1,05	1,12	1,15
energy efficiency index of environmental and social sustainability of the extractive company	82,94	90,79	80,95
energy efficiency index of environmental sustainability of the extractive company	0,65	0,70	0,63
energy efficiency index of environmental and economic sustainability of the extractive company	0,18	0,17	0,15
index of the efficiency of sustainable development management of the extractive company		1,01	1,34

The figures are calculated by the authors on the basis of the data of the Sustainable Development Reports of the Russian company Lukoil. Date of access: 23.10.2018. Electronic source: <http://www.lukoil.ru>

At the same time, the analysis of integral indicators shows ambiguous trends in assessing the sustainable development of the company. So, in the period 2015-2017 own energy costs per unit of fuel produced were increased: 0,127 in 2015; 0,142 in 2016 and 0,144 in 2017. The energy intensity indicators of labor increased by almost 10%, the energy intensity of industrial activity increased 2 times (according to the value of fixed assets). At the same time, the values of the indices characterizing different sides of the environmental aspects of the company's sustainable development have decreased.

Research into the implementation of the strategy for the sustainable development of an oil and gas producing company (by the example of Lukoil) shows that the extractive company manages its sustainable development, makes decisions based on indicators, which were independently developed taking into account recommendations, international and Russian standards, internal documents, etc. Each company independently determines the direction of its sustainable development depending on its business model, positioning, market position, etc. A necessary and sufficient condition for the implementation of a strategy for the sustainable development of energy companies is the formation and evaluation of a group of indicators illustrating its further sustainable development taking into account industry specialization. The company's industry specialization is a challenge in the effective management of sustainable development.

Assessment of the nature of the sustainable development of oil and gas companies is impossible without taking into account the indicators characterizing the processes of energy efficiency of companies. In modern conditions of interaction between business, society and the state, energy companies are forced to take into account in their activities not only their own economic interests, but also environmental, social and innovation benchmarks, including those reflecting the issues of energy supply, energy security and energy efficiency of the country's economy as a whole. (3, 21)

In this regard, it is necessary to form a universal system of indicators, a number of indices, as well as mechanisms for their effective implementation, which fully and objectively could reflect the internal and external aspects of companies in the impact of energy efficiency indicators on all sides of a company's sustainable development. In general, this should

provide an opportunity for an effective comparison of companies at the global and national levels and the characterization of the strategies of the most successful companies based on a comprehensive benchmarking and reviewed global experience. The world practice of evaluating the effectiveness of fuel and energy companies has not yet worked out the system and culture of building universal tools for analyzing, optimizing and evaluating activities that cover all the fundamental modern issues of the development of companies and industries in general. Existing assessment systems do not allow to cover all the issues and directions of the enterprise's sustainable development; in some cases, when compiling them, it is necessary to use the company's closed information or expert assessments, which can be very subjective.

At the same time, the category "sustainable enterprise development" itself does not have an established definition; its interpretation implies a combination of a set of characteristics, whose direction and content differ. Sustainable development of enterprises is a multidimensional concept, which combines production, financial, investment, social and other aspects of the enterprise and determines the relationship with both internal (organization of economic activity of the enterprise) and external (market environment) factors. (10)

When forming approaches to assessing the role of energy efficiency in the sustainable development of an energy enterprise, it is necessary to consider all aspects of this process: economic, social, environmental, and economic, as well as the effectiveness of sustainability management. The authors' assessment method allows not only to evaluate these aspects in statics but also to analyze the dynamics of processes by calculating integral indices.

Acknowledgments

This paper was financially supported by the Ministry of Education and Science of the Russian Federation, which ensures the Peoples' Friendship University (RUDN University) the provision of budget funds for financial support for the implementation of project "Support Tools for Fuel & Energy Complex as a Condition for Achieving Energy Efficiency and Energy Independence of the Region" (Task No. 26.4089.2017/4.6) in 2017-2019.

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