IJEEP
INTERNATIONAL JOURNAL OF ENERGY ECONOMICS AND POLICY
EconJournals
ISSN: 2146-4553

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2018, 8(5), 300-305.

Competitiveness and Competitive Advantages of Enterprises in the Energy Sector

Ivan A. Kapitonov[1]*, Irina V. Zhukovskaya[2], Rustem R. Khusaenov[3], Valentin A. Monakhov[4]

[1]Graduate School of Corporate Management, Plekhanov Russian University of Economics, Moscow, Russian Federation, [2]Kazan National Research Technological University, Kazan, Russian Federation, [3]Kazan National Research Technological University, Kazan, Russian Federation, [4]CJSC Experimental Machine-building Plant of S.P. Korolev Rocket and Space Corporation Energia, Korolev, Moscow region, Russian Federation. *Email: kapitonov_ivan@mail.ru

ABSTRACT

Traditional energy sources form the basis of the energy complex. But the use of renewable energy sources is more acceptable from the ecological point of view and contributes to the saving of oil and gas resources. Therefore, the authors analyzed the competitiveness of the use of alternative energy sources. To study the issue, the study used econometric, theoretical methods. It was found that most of the energy resources in the world and in the Russian Federation is covered by gas and oil, but alternative energy sources are gaining momentum. It is determined that in Russia the greatest percentage is occupied by bio-heat power stations, while in the world the main part is given to wind energy.

Keywords: Power Complex, Wind Power, Competition, Renewable Energy, Large Business
JEL Classifications: P18, P28

1. INTRODUCTION

Enterprises can be classified on various grounds, the first and most visible among which are, firstly, their industry affiliation, and, secondly, their scale. The first criterion distinguishes enterprises: Industrial (plants, factories, mines, etc.); agricultural (cooperatives, state farms, etc.); construction (construction and installation management, etc.); transport (railways, shipping companies, ports, airports, etc.); communication (communication nodes, post offices, etc.); shopping (department stores, gastronomes, various specialized stores); housing and utility (operational offices, repair and maintenance management, heat capacity, power grid, etc.). According to the second parameter, enterprises are traditionally divided into large, medium and small (Bohl et al., 2015). Criteria for classifying business entities into different size groups are constantly changing, but currently the main focus is on: The volume of annual turnover (gross revenue); the number of employees (Coram and Katzner, 2018). At the same time, these parameters are mainly determined for the subjects of micro-, small- and medium-sized businesses, as a result of which large scale enterprises are defined "on a residual principle," i.e., on them exceeding the bar established for the above-mentioned subjects. Thus, for today in Russia economic entities with an annual revenue of more than 2 billion rubles are considered as large business' enterprises.

As for the number of employees, the Government of the Russian Federation set a bar for medium-sized enterprises at a level of no more than 250 people. Consequently, exceeding the value by this parameter means that the corresponding enterprise is included in the category of large ones. Large enterprises as the leading sector of the domestic economy can be explored in various aspects: Organizational, legal, economic, system and analytical, etc. Energy plays an important role in the economy of any country (Lukiyanova et al., 2017; Kapitonov and Voloshin, 2017; Resener et al., 2018; Samarina et al., 2018). The fuel and energy complex (FEC) in the modern economy is a combination of production, economic and social processes arising from the extraction, transformation, transportation, distribution and consumption of primary fuel and energy resources and converted types of energy carriers. Figure 1 presents an analysis of the distribution of energy resources (Cheung et al., 2016).

Studies of the modern specifics of processes occurring in the FEC reveal the reasons for the underdevelopment of competition instruments at many stages of the technological process of energy

supply. The main reasons for the emergence of such a situation in the fuel and energy sector can be considered the enlargement of industrial enterprises, which, through the use of economies of scale, can reduce costs per unit of output, become a cost leader, finance large research projects, introduce new technologies, and therefore prepare an energy basis for structural changes in the economy (Gao et al., 2018). An important reason for the underdevelopment of competition instruments is also the state participation in the capital of energy companies, the state regulation of this strategically important for the Russian economy. Separation of the energy market by several major participants in economic activity and the formation of unfree competition leads to a decrease in the efficiency of enterprises in all sectors of the national economy.

2. LITERATURE REVIEW

Before analyzing the competitiveness of high-tech transnational corporations, we will consider methodological approaches to such analysis. After all, in the literature and business practice, there are many methods for assessing the competitiveness of enterprises that can contradict each other. As Cho and Shim rightly note: "The number of methods and methodologies for assessing the competitiveness of various objects from the enterprise to global entities is so significant that a very complex problem of choosing the optimal one arises before researchers and practicing managers" (Cho and Shim, 2011). Evaluation of the enterprise's competitiveness is the definition of its level, which gives some relative characteristic of the enterprise's ability to compete in a certain market.

In general, the process of assessing the competitiveness of an enterprise's potential consists of the following stages: Definition of the purpose of the competitiveness' assessment; selection of a group of competing enterprises, taking into account the possibility of obtaining the necessary primary information for the purpose of assessing competitiveness; definition of groups of competitiveness' key indicators, which are subject to evaluation; calculation of single, group, integral indicators of competitiveness for each enterprise; substantiation of the conclusion about the competitiveness' level of the evaluation object and development of measures aimed at improving or retaining competitive positions. As indicators for determining the competitiveness of an enterprise, indicators and characteristics such as product competitiveness, quality and reliability of products, the distinctive properties of goods, the image of the enterprise usually appear (Bergsteiner and Avery, 2012), the sales profitability, the rate of revenue growth, financial ratios (Pearce, 1997), the effectiveness of advertising and sales promotion methods, the competence and experience of personnel, environmental performance indicators, service efficiency. Most of the methods for assessing the company's competitiveness are based on applying different coefficients to analyze production activity, financial position, investment efficiency, and the like (Davis, 2016; Kryukova et al., 2016). The essence of matrix methods is to determine the quantitative value of the integral rating indicator of the competitiveness of an individual enterprise or to graphically determine its competitive positions in the competitiveness matrix by certain parameters (Deavers, 1997). Index methods are the most common in a market economy. The system of indicators that underlies any index method is based on the directions of analysis (indicator of the use of resources, labor, market capacity). Taking into account the peculiarities and spheres of use of each of the above methods, the study uses a graphical method for constructing a competitiveness polygon and an analytical method for calculating the integral indicator of the level of competitiveness of high technology technologies of different industries.

3. RESULTS AND DISCUSSION

Despite the fact that today all economic entities in high-tech industries, including power engineering, face some common problems typical for these spheres of the economy, in particular rapid environmental variability, uncertainty in the prospects for market and industry development, rapid technological aging of products and the emergence of new technologies in the market, the importance of assessing the level of competitiveness in order to identify and implement the best methods of business organization is undeniable (Asensio et al., 2017). With the use of energy resources, more and more often attention is paid to non-traditional sources of energy. The authors carried out a comparative analysis of the use of traditional and non-traditional energy sources. Figure 2 presents a comparative analysis of the use of energy resources in the world and in Russia.

However, non-traditional sources in the world are finding increasing use. Figure 3 shows the distribution of wind power.

Figure 1: Percentage of use of energy resources in the world, 2016

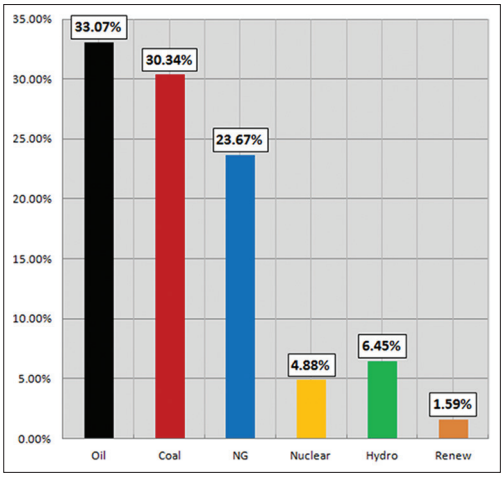


Figure 2: Structure of consumption of energy resources, 2016

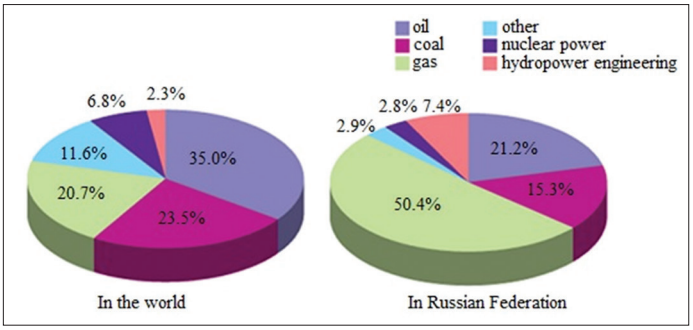
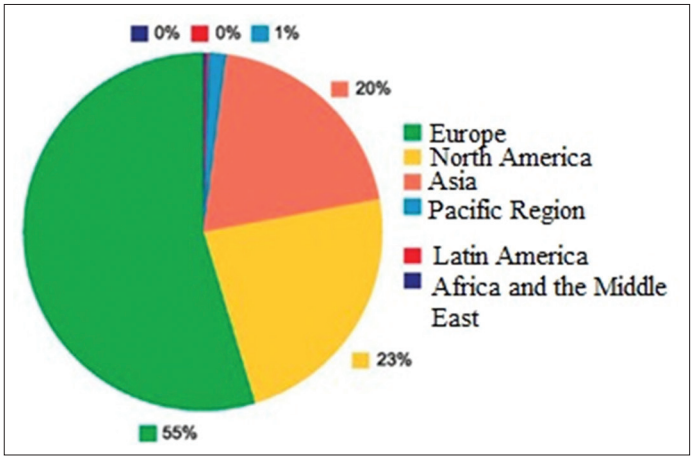


Figure 3: Continental distribution of installed wind power capacity, %



The 2016 BP statistical review, covering 2015 world energy data, has been released. With global oil production roughly flat for a 7th year, coal once again gained global share of total primary energy consumption. World consumption of coal rose 5.4% in 2011, as oil consumption eked out a very small, 0.7% gain. As for other sources, nuclear use fell notably by -4.3%. And world natural gas consumption was restrained to a 2.2% advance, owing to a large retreat in European demand (Simoes et al., 2015). Finally, while starting from a small position, both hydropower and renewables (biofuels, solar, wind) once again made very strong gains. As a result, coal's share of primary energy consumption has now risen above 30%, as coal continues its relentless attack on oil's market share. Nuclear's share falls below 5%, while natural gas and hydropower maintained their positions compared to 2015.

Since the conditions in the market have changed and the rate of change has increased, entrepreneurial situational approaches are now more important than in the past. Jack Welch, the former CEO of general electric, was an early supporter of this approach. He used an entrepreneurial approach (creating a crisis to create opportunities) to restore General Electric, which is now one of the largest and most recognized companies in the world (Lisin et al., 2015; Lisin et al., 2017). "What we were always trying to build is a company that would combine the enterprise with the influence and resources of a large company – in the structure of our big company, but with a thirst for knowledge, an irresistible desire to share our own experience and passion for ongoing action – in the shower small company." The authors analyzed the capacity of renewable energy sources (RES) for 16 years. The results are shown in Figure 4.

Based on the established data, the authors concluded that the use of renewable energy sources is quite effective. This is due to the fact that in the 1970s, political factors played a role for Western countries – the oil crisis of the early 1970s. The incentive for the development of renewable energy was the declared desire to reduce dependence on energy supplies from the Middle East and the USSR, and later to Russia. Finally, the development of energy for renewable energy would be impossible without the actual technical progress, first of all, the improvement of electricity generation technologies due to wind and sun. In recent years, in the mass consciousness, "renewable energy" is most often associated, first of all, with wind and solar energy. Since the 1980s, renewable energy in the world has developed at a very high rate, but with an important caveat – except for hydro power. In particular, the electric power production capacity for renewable energy (excluding hydropower plants) increased from 2000 to 2013, according to the International Renewable Energy Agency (International Renewable…, 2018), in 9.5 times – from 57 to 543 GW. For comparison, all of Russia's power generation capacity is about 230 GW.

The volume of electricity production due to renewable sources (except for hydro power plants), according to US Energy Information Administration (EIA) (Direct Federal Financial…, 2016), increased from 1980 to 2012 with 31 TWh/year to 1069, or 35 times, and the share of RES in the world's electricity generation increased from 0.4 to 5%. Since 2000, the production of electricity for renewable energy has increased from 249 TW or more than four times, and the share in world electricity production – from 1.7%. In other words, on renewable sources in the world now about the same amount of energy is being produced as by all power plants in Russia. Figure 5 presents a comparative analysis of the distribution of renewable energy resources in Russia and the world. Electric power production capacities for renewable energy (excluding hydropower plants) increased from 9.5 times from 57 to 543 GW from 2000 to 2013, according to IRENA. For comparison, all of Russia's power generation capacity is about 230 GW. Until 2000, the main factor in the growth of energy based on RES was bioenergy and geothermal energy. In the 2000s, wind energy was developing at an accelerated pace, and now it is more than half of all RES capacity and almost half of production. Starting from 2007 to 2008, solar energy comes first in terms of growth rates. During the period under review, the share of fossil energy resources in the world energy supply decreased from 86.7 to 81.7%, and in the world production of electric energy – from 70 to 67%. However, this happened to the greatest extent precisely at the expense of nuclear energy. The above analysis allows us to conclude that alternative energy sources are competitive in comparison with traditional ones. Renewable energy production is one of the fastest growing sectors of the global economy. In 2013, alternative energy provided 56% of the increase in world capacity in electricity generation. The construction of power plants on renewable energy sources (HPP, solar, wind, biomass, biogas) is the direction of the development of the energy of such hydrocarbon rich countries as the USA, China, Norway, Saudi Arabia, etc. Will Russia take this route? How necessary are renewable sources for Russia? Can alternative energy and industry be economically profitable? Russia has enormous resources for the development of alternative energy. However, despite all the possibilities, traditional hydrocarbons still form the basis of the energy system of our country. Renewable sources of energy are in demand in the North and Far East of Russia. Also in Russia promising small hydropower (the south of Siberia and the North Caucasus), solar energy. The used alternative energy capacities in Russia are shown in Table 1.

Another of the characteristic indicators for a high-tech company, which we believe was appropriate to analyze, is the patent potential. Indeed, the efficiency of the development of high-tech

Figure 4: Installed capacity of RES in the world 200-2016 g (thousand mW)

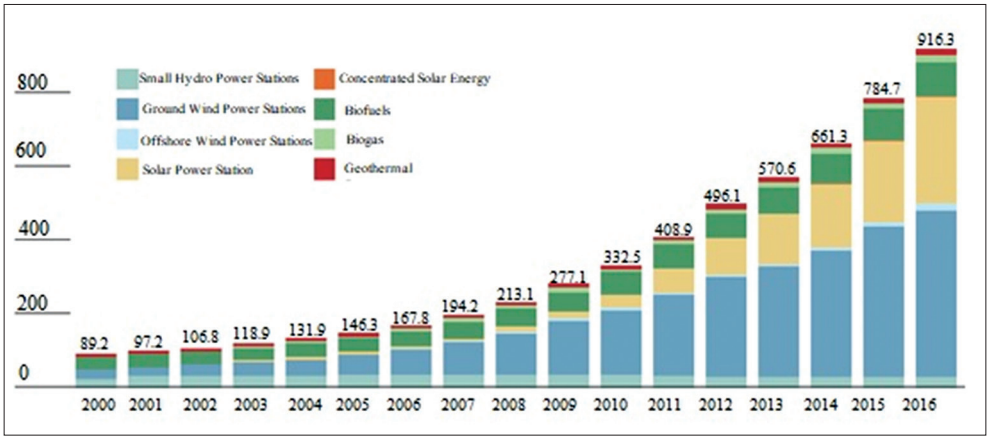


Figure 5: Comparative analysis of RES distribution in the world and Russian energy complex

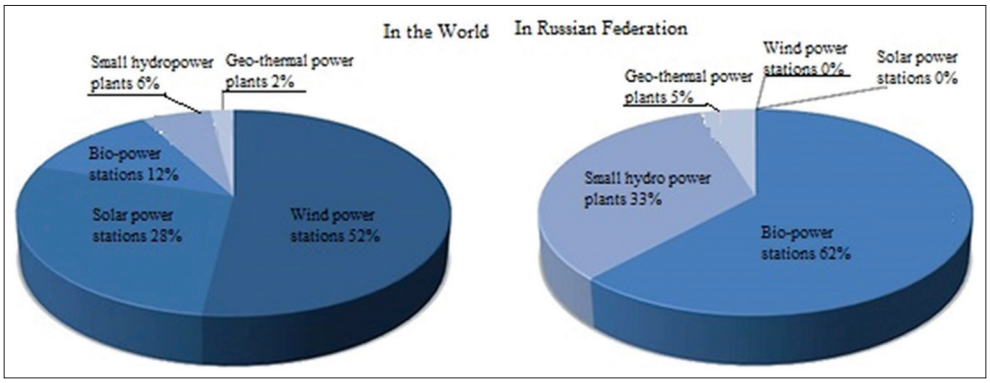


Table 1: Installed capacity of generating objects of renewable energy sources for 2014-2020 in Russian Federation

Type of RES/MW	2014	2015	2016	2017	2018	2019	2020	Total
Wind power stations	100	250	250	500	750	750	1000	3600
Solar power stations	120	140	200	250	270	270	270	1520
Small hydro power plants	18	26	124	124	141	159	159	751
Total	238	416	574	874	1161	1179	1429	5871

industries is increasingly dependent on its intangible assets, which play an incredibly significant role. It is from the effectiveness of the intellectual property use of companies that its level of innovation depends and, as a result, the efficiency of the activity. The number of patents in the company and the ability to commercialize them can act as an indicator of such activity (Litvinenko et al., 2016). It is as a result of the technologies commercialization that innovation takes on a reality – when protected intellectual property commences to work commercially. To a large extent, it is the number of patents and the effectiveness of their commercialization that determine the innovativeness of the company and is the measure of the company's development as a whole. Effective management of the competitiveness of high-tech companies in such a dynamic environment requires the construction of a system that will allow companies to take into account all important elements of ensuring competitiveness and build effective business processes in the company (Deavers, 1997).

According to the authors, the central element in the activity of a high-tech company is the presence of a developed innovative culture. Innovative culture should be the central part of the high-tech company's. Continuous work in the direction of changes, the receptivity of company employees to new ideas, the willingness and opportunity to implement them, and thereby ensure a qualitative growth in the company's performance – all this forms a positive innovative culture of the company and must be developed in companies that aspire to leadership. If the corporation is striving for the factor of global corporate leadership, it must first of all measure on the innovation imperative by justifying and implementing key innovative priorities. That is why, to achieve global leadership, leading corporations focus on innovative development, which not only requires large investments, but also involves high risks. On the other hand, corporations do not pay enough attention to innovations, they quickly lose their positions. This is convincingly evidenced by numerous studies by consulting and auditing companies of the relation of transnational corporations to innovation. The distribution of investments by year is shown in the Figure 6.

An integral part of the system for managing the competitiveness of high-tech businesses is also, in our opinion, the motivation of companies. Undoubtedly, the introduction of new technologies in

alternative energy, contributes to its competitiveness (Gao et al., 2018). In the opinion of the authors, financial mechanisms are an important element of the competitiveness management system for high-tech companies, primarily for making significant investments in research and development, the costs of raising the level of qualification of the company's employees, and also increasing involvement and ensuring the dominance of technologically oriented specialists in the employment structure, which are able to generate new knowledge, produce, adapt and use the latest technology. Financial management permeates all links of the financial system and is an important part of the management structure in the market. The basis of financial management is a financial policy based on the analysis of factors for the effective use of financial resources in the short and long term and determines the direction of the financial services.

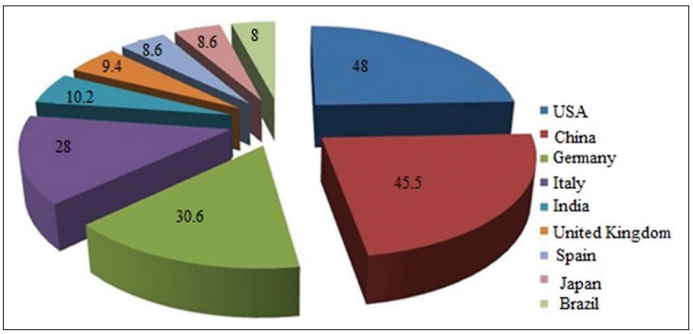
Today, all companies use technology in the course of their activities. Therefore, to a certain extent, each company is technological. However, only some companies create technological products, processes and services. For them, technology is the key, and often the key is a competitive tool. Managers in such companies face challenges and opportunities, which are usually the result of technology dependence. Leading global corporations have accumulated vast experience in strengthening their competitive positions in the world high-tech markets by not only creating and manufacturing these products, but also exporting them to various countries. However, this experience is known only to an extremely narrow circle of specialists, mostly foreign. At present, in Russia, the state has practically withdrawn from solving the problems of science and high-tech industries, as well as exporting their products and services, giving everything to the market, and extremely weakly supports knowledge-intensive industries.

It should be noted that a significant barrier to building a complete model of competitiveness management of high-tech companies is a serious divergence of views of specialists on methodological approaches to constructing such a model. Foreign specialists focus on applied aspects and specific tools for managing the competitiveness of TNCs. As for domestic researchers, they focus only on one instrument – mergers and acquisitions. The globalization of the world economy has created an extremely competitive environment in which most TNCs consider it a decisive condition for the growth of their economic power and victory in today's competitive struggle in the process of transnational mergers and acquisitions. An important place is occupied by financing the industry (Gupta, 2017). Investments in alternative energy contribute to its development (Figure 7). Of course, mergers and acquisitions are an extremely important area for increasing competitiveness in the energy sector. A significant number of researchers are following the way of using different indices of the functioning of the industry, which are compiled by various organizations and published by the mass media.

The most constructive in this regard is the structurally functional matrix approach, which is based on the model of global competitiveness management of high-tech transnational corporations with the identification of key management tools to strengthen the competitive positions of companies that allow

Figure 6: Distribution of investments

Figure 7: Investments in alternative energy in billions of dollars, 2016



to specify the use of basic management functions (strategic forecasting and dominance, organization, processes, metrics, remuneration, training, staff) in the context of achieving priority (strong leadership positions in the relevant sectors, mental-business integration, strategic coherence, creative values, neutralization of organizational antibodies, network activity, competitive-value parametrization). Mental-business integration consists of two processes: Technological (research, creation or development of a new product) and strategic (definition of a business model). In doing so, we must weigh on internal factors (technical capabilities, organizational capabilities, the success of the current business model, financing, preferences of top management) and external factors (opportunities in the environment, industry structure, competition, technological change).

4. CONCLUSION

The elimination of organizational barriers to the strengthening of the company's competitive position is carried out mainly through the creation of a culture that promotes innovation. Distributed energy is a set of solutions that ensure the generation of electricity directly at the place of its consumption. This is the type of power generating objects that is characterized by a relatively low power, therefore, the term "distributed energy" is often supplemented with the specification "small." In the FEC of Russia, the category of small and distributed energy includes power generating facilities with a capacity of <25 MW. The opinions of foreign experts on this issue have differed. Most of them draw a border at the level of 10 MW, and some raise the bar to 50 MW. At present, distributed generation in the Russian energy market is already playing a significant role. According to experts, it accounts for about 5-10% of the total power generation in Russia. The total installed capacity of small power plants is estimated at 12-17 GW.

In addition, many large industrial enterprises own generators with a capacity above 25 MW. It is important to weigh on the fact that external compensation negatively affects the internal motivation. Finally, a specific system for managing global competitiveness emerged. The article also estimated financial investments in the energy complex. Thus, the reflection of energy policy in accounting and reporting should be transformed in accordance with the changes that occur in the modern world of generalized informatization. It is necessary to take into account the environmental friendliness of alternative energy sources. Therefore, unconventional energy sources can compete with other sectors of the economy.

REFERENCES

Asensio, M., Munoz-Delgado, G., Contreras, J. (2017), Bi-level approach to distribution network and renewable energy expansion planning considering demand response. IEEE Transactions Power System, 32(6), 4298-4309.

Bergsteiner, H., Avery, G.C. (2012), When ethics are compromised by ideology: The global competitiveness report. Journal of Business Ethics, 109(4), 391-410.

Bohl, M.T., Kaufmann, P., Siklos, P.L. (2015), What drove the mid-2000s explosiveness in alternative energy stock prices? Evidence from US, European and global indices. International Review of Financial Analysis, 40, 194-206.

Cheung, G., Davies, P.J., Trück, S. (2016), Financing alternative energy projects: An examination of challenges and opportunities for local government. Energy Policy, 97, 354-364.

Cho, D.H., Shim, H.S. (2011), A Study on IT organization redesign with IT governance: Focusing on public corporation in Korea. Berlin: Springer Berlin Heidelberg.

Coram, A., Katzner, D.W. (2018), Reducing fossil-fuel emissions: Dynamic paths for alternative energy-producing technologies. Energy Economics, 70, 179-189.

Davis, S.T. (2016), From insularity to integration: The reformulation of socially responsible business in Japan. In: Key Initiatives in Corporate Social Responsibility: Global Dimension of CSR in Corporate Entities. Cham: Springer International Publishing.

Deavers, K.L. (1997), Outsourcing: A corporate competitiveness strategy, not a search for low wages. Journal of Labor Research, 18(4), 503–519.

Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2016. (2016), Available from: https://www.eia.gov/analysis/requests/subsidy/.

Gao, D., Li, Z., Liu, P., Zhao, J., Zhang, Y., Li, C. (2018), A coordinated energy security model taking strategic petroleum reserve and alternative fuels into consideration. Energy Journal, 145, 171-181.

Gupta, K. (2017), Do economic and societal factors influence the financial performance of alternative energy firms? Energy Economics, 65, 172-182.

International Renewable Energy Agency. (2018), Available from: http://www.irena.org/events/2018/Apr/Renewables-Readiness-Assessment-Pakistan-Report.

Kapitonov, I.A., Voloshin, V.I. (2017), Strategic directions for increasing the share of renewable energy sources in the structure of energy consumption. International Journal of Energy Economics and Policy, 7(4), 90-98.

Kryukova, E., Vetrova, E., Urzha, O., Alieva, Z., Konovalova, E., Bondaletova, N. (2016), Problems of attracting foreign investment in Russia. Journal of Applied Economic Sciences, 11(2), 239-346.

Lisin, E., Marishkina, Y., Strielkowski, W., Streimikiene, D. (2017), Analysis of competitiveness: Energy sector and the electricity market in Russia. Economic Research, 30(1), 1820-1828.

Lisin, E., Rogalev, A., Strielkowski, W., Komarov, I. (2015), Sustainable modernization of the Russian power utilities industry. Sustainability, 7(9), 11378-11400.

Litvinenko, I.L., Gurieva, L.K., Baburina, O.N., Ugryumova, M.A., Kataeva, V.I. (2016), Tendencies and features of innovation management in the activities of business. International Business Management, 10(22), 5397-5405.

Lukiyanova, M., Nikitskaya, E., Sedova, N. (2017), Concept and model of local self-government using organizational design and public communications. Journal of Advanced Research in Law and Economics, 8(3), 887-898.

Pearce, R. (1997), The Implications for Host-Country and Home-Country Competitiveness of the Internationalisation of R&D and Innovation in Multinationals Global Competition and Technology: Essays in the Creation and Application of Knowledge by Multinationals. London: Palgrave Macmillan UK.

Resener, M., Haffner, S., Pereira, L.A., Pardalos, P.M. (2018), Optimization techniques applied to planning of electric power distribution systems: A bibliographic survey. Energy Systems, 185, 1684-1693. Available from: https://www.link.springer.com/article/10.1007/s12667-018-0276-x.

Samarina, V., Skufina, T., Samarin, A., Ushakov, D. (2018), Alternative energy sources: Opportunities, experience and prospects of the Russian regions in the context of global trends. International Journal of Energy Economics and Policy, 8(2), 140-147.

Simoes, M.D., Klotzle, M.C., Pinto, A.C.F., Gomes, L.L. (2015), Nonlinear models and the load of an electricity distributor. International Journal of Energy Sector Management, 9(1), 38-56.