

Tryndina, Nikol; Moiseev, Nikita; Lopatin, Evgeniy et al.

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Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/>

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Trends in Corporate Energy Strategy of Russian Companies

Nicole Tryndina^{1*}, Nikita Moiseev², Evgeniy Lopatin³, Sergey Prosekov⁴, Jiang Kejun⁵

¹Faculty of Management, Financial University under the Government of the Russian Federation, Moscow, Russia, ²Department of Mathematical Methods in Economics, Plekhanov Russian University of Economics, Moscow, Russia, ³Department of Financial Markets and Banks, Financial University under the Government of the Russian Federation, Moscow, Russia, ⁴Department of Sociology and Politology, Financial University under the Government of the Russian Federation, Moscow, Russia, ⁵Energy Research Institute, National Development and Reform Commission, Beijing, China. *Email: nicoletryndina@yandex.ru

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ABSTRACT

This paper proposes to the analysis of Russia's energy strategy, with respect to the interconnection of governmental strategy concerning energy extraction, reproduction and distribution and corporate energy strategies. The current trends in Russian energy strategy have been studied on the back ongoing processes in Russian corporate energy strategy formulation, with the use of statistical analysis of total volume of energy generated over the period from each source. The conclusions on areas for development and key drivers of corporate energy strategy have been made.

Keywords: Energy, Russian Energy Strategy, Corporate Energy Strategy, Energy Efficiency

JEL Classifications: C30, D12, Q41, Q48

1. INTRODUCTION

Nowadays, the increasing importance of environmental issues is the trend for building corporate and governmental policies. Among other aspects of sustainable growth, the use of energy resources is deemed to be critical. One of the ways to solve these issues is defining the proper long-term sustainable development strategies with respect to the energy use.

The concept of energy policies has been considered already in the twentieth century. The following definition of energy policy: Energy policy is normally considered an economic issue, a matter of ensuring that safe and secure energy services are available at reasonable cost (Christoffersen, 2012).

This approach emphasizes the economic or monetary aspect of the concept; it does not consider sustainability and ecology factors due to these issues being relatively young. The modernized approach comprises not only the financial aspect of

acquiring and distribution of energy but also social, political and environmental effects. Energy policy comprises rules concerning energy sources; energy efficiency; energy prices; energy from abroad; energy infrastructure; and climate and environmental aspects of energy production, utilization, and transit (Downs, 2010; Grama, 2012).

This definition brings us to understanding the importance of sustainability issues consideration in the process of energy production, distribution and consumption. Obviously, in these years between publications, mentioned above much has changed.

Lately, global warming, climate change, water and air pollution are on the global agenda. While policy is a set of rules, strategy is a set of actions, which are critical for achieving the goal, so, these two concepts are interrelated and interconnected. In this paper, energy strategy of Russia as one of the main energy producers in the world will be analyzed.

2. LITERATURE REVIEW

The energy is critical to economic development and poverty reduction, thus, finding an optimal solution for balancing energy supply and demand in the world is an important issue for government to consider.

As for Russia, which is one of the most important players in the global energy system and one of the world's largest producers and exporters of energy. The energy is essential to the security, stability and development of the Russian Federation, as its economy heavily depends on energy exports. As such, the energy security is a priority (Nyangarika et al., 2019a; Nyangarika et al., 2019b).

Therefore, Russia needs to improve its energy strategy and energy policy to adapt to the current trends on the global market for energy. Moreover, there should be not only governmental policy or strategy, concerning energy safety and security but corporate one as well. A clean energy strategy can help understand energy profile, identify where energy costs come from, and develop a roadmap to improve competitiveness, reduce costs and build business brand reputation.

For now, Russian energy sector has a well-developed energy strategy up to the year 2030, but on the corporate level there is lack of responsible approach, so, this is the area for the future development. However, this applies not only to Russian economy but it is the global trend, as "Most firms can't easily say how much energy they use". So, this is important to find the connection between governmental and corporate levels of energy strategy and to balance the interests of stakeholders.

Furthermore, Guizhou et al. (2015) categorized issues that might be faced by resource-rich countries. In the prospect of China's growing energy demand, Gulick (2007) focused on energy cooperation between Russia and China and also examined the importance of energy.

According to Christoffersen (2012), energy cooperation between two countries requires constant interconnected policy decisions from both sides.

Current Ukrainian crises has not only brought together two countries but has led to the new energy policy proposals, Henderson and Mitrova (2016).

The global natural gas trade has dominated and largely based on pipeline net that connects countries. In this context, several important issues should be reconsidered: various conflicts between countries, constant growing energy demand and the future of gas pipelines (Mikhaylov, 2019; Hu and Ge, 2014).

The future role of natural gas written by Røseth (2017) argues that a lack of sufficient facilities hinders development of gas market.

Diversification as a strategy has occurred right after the realization of growing energy interdependence between countries (Mikhaylov, 2018a).

However, to put it into a simple definition, diversification is a process of creating a balanced portfolio of procurement resources and supply routes (Bansal et al., 2013; Mikhaylov, 2018b; Denisova et al., 2019).

3. METHODS

Energy policy is strongly associated with the measures taken by governments to ensure safe energy supply with consideration of environmental issues. Government's energy policy is decrees and legal acts, while energy strategy is an overall view on how energy issues are managed.

The main law, regulating energy issue in Russia is the Federal Law №35-FZ "on electroenergetics," which defines the aspects of energy emission, distribution and reproduction. It considers the authorities, ensuring legal bodies comply with the law and responsibilities of the bodies, involved into the process. Energy strategy is a long-term plan of how energy issues are addressed in the country. Numerous legal bodies and experts are involved into the process of strategy formulation and implementation. While government's strategy represents the upper level of energy policy, there is also corporate level and we believe, that there should also emerge household or domestic level.

We created a data set using several criteria like it was done in research (Mikhaylov et al., 2019). We use statistic tests standard weighted-means analysis ANOVA including F-test.

$$F = \frac{MS_{Treatments}}{MS_{Error}} = \frac{SS_{Treatment} / (I - 1)}{SS_{Error} / nt - I} \quad (1)$$

Where MS is mean square, I is number of treatments and nt is total number of cases to the F-distribution with I-1, T-I degrees of freedom. Using the F-distribution is a natural candidate because the test statistic is the ratio of two scaled sums of squares each of which follows a scaled chi-squared distribution. The expected value of F is 1 for no treatment effect. As values of F increase above 1, the evidence is increasingly inconsistent with the null hypothesis. Two apparent experimental methods of increasing F are increasing the sample size and reducing the error variance by tight experimental controls.

$$U_1 = R_1 - \frac{n_1(n_1 + 1)}{2} \quad (2)$$

where n_1 is the sample size for sample 1, and R_1 is the sum of the ranks in sample 1.

Russia is one of the main producers and consumers of energy resources and its current energy strategy was chosen as an example for the analysis. Main components of any energy strategy include: (1) current results of energy strategy, being undertaken during this period and analysis of its implementation; (2) consideration of main socio-economic trends and further forecasting of interaction between energy and economy; (3) prediction of demand for energy in the country; (4) defining of the key aspects of the state energy policy; (5) prospects of fuel and energy complex of the country; (6) formulation of expected results of strategy's implementation.

While defining energy strategy, clear objectives must be stated. Usually, the objectives are identified by external and internal challenges in foreseeable future. According to the Energy strategy of Russia for the Period up to 2035 “As for Russian Federation, crucial internal challenge lies in the necessity for the energy sector to fulfill its vital role in the transition to an innovative path of economic development.”

For Russia the following requirements must be met to ensure the objectives completion:

1. living standards level corresponding with ones represented in developed countries;
2. Technological and scientific progress should guarantee competitive advantage and energy security;
3. Economic structure of the country should shift into less energy-intensive sectors;
4. Economy should become oriented on innovative approaches of renewable energy, not export of raw materials;
5. The share of investments in fuel and energy complex should decrease, while the absolute value of investments in energy sector necessary for modernization and development
6. There must be a trend for shifting from energy-intensity to energy-efficiency;
7. Steps to limit the impact of energy and fuel complex on the environment, including greenhouse effect, air pollution and gas emission.

To overcome external challenges the following must be provided:

1. Achievement of sustainable results in the area of foreign economic activities in energy sector;

2. Global economic crisis impact minimization and further modernization of economy, caused by changes, which took place as the result of remission after the crisis;
3. Increase of Russia’s present in high-tech and intellectual services markets;
4. Diversification of Russian export in the global energy market;
5. Switching from selling abroad raw materials to selling highly-processed oil;
6. Development and promotion of energy infrastructure hubs for new technologies in Russia.

As can be seen internal and external objectives are interrelated. Based on the objectives, the following goals are formulated:

1. Enhancing the efficiency of energy reproduction, extraction, processing and distribution;
2. Modernization of energy infrastructure and updating the sector practices and technologies;
3. Institutional framework establishment in energy sector;
4. Efficiency improvement of the sector;
5. Integration of country’s energy sector into global energy system.

4. RESULTS

Regarding current trends in Russia’s total primary energy supply for the period 1990 to 2016, shown in the Table 1, the following observations can be discussed: natural gas still represents the largest share of all energy supplied, 373 391 ktce in the beginning of the period and 364 253 ktce in the year 2016.

Table 1: Data summary

Company name	Emissions score	Policy emissions	Energy use total, Giga Joules	Total energy use to revenues, Giga Joules/USD
Gazprom PAO	64.57	Yes	1784370000.00	0.0157
Tatneft’ PAO	56.07	Yes	35654912.22	0.0029
Sberbank Rossii PAO	25.20	No	6273125.00	0.0002
Rostelekom PAO	24.06	Yes	13403241.77	0.0029
Surgutneftegaz PAO	67.41	Yes	173173575.03	0.0085
Severstal’ PAO	84.22	Yes	119559024.00	0.0152
Uralkaliy PAO	26.80	No	26886032.00	0.0118
Vozrozhdenie Bank	45.33	No	29405.59	0.0001
Gazprom Neft’ PAO	56.48	Yes	50139171.80	0.0015
GMK Noril’skiy Nikel’ PAO	67.03	Yes	238401000.00	0.0256
Transneft’ PAO	97.97	Yes	51435071.60	0.0034
Mobil’nye Telesistemy PAO	42.02	No	5497200.00	0.0007
Novolipetsk Steel PAO	57.66	Yes	373734702.00	0.0371
Mechel PAO	17.38	Yes	186510413.00	0.0416
MMK PAO	72.46	Yes	775529702.81	0.0944
Novatek PAO	67.81	Yes	88595480.18	0.0088
AFK Sistema PAO	57.27	Yes	156468588.00	0.0130
TMK PAO	51.41	Yes	44650547.02	0.0102
Polyus PAO	44.22	Yes	28460732.96	0.0103
NK Rosneft’ PAO	96.09	Yes	598000000.00	0.0051
Bank VTB PAO	69.16	No	1231246.80	0.0001
Gruppa LSR PAO	83.70	Yes	1966000.00	0.0008
RusHydro PAO	41.82	Yes	443680499.12	0.0727
FSK YeES PAO	60.54	Yes	91680417.12	0.0218
PhosAgro PAO	5.22	Yes	48924084.01	0.0146
AK Alrosa PAO	59.22	Yes	7044200.00	0.0015
MegaFon PAO	1.53	No	3494949.46	0.0006
MMVB-RTS PAO	20.24	No	91940174.88	0.1606

Source: Thomson Reuters, Minenergo

The second place was represented by primary and secondary oil with 263 778 ktoe in 1990 and 173 263 ktoe in 2016 respectively. Coal is the third representing 191 114 ktoe in the year 1990 and 113 287 ktoe at the end of the period. Three main energy sources are shrinking in terms of total supply, while nuclear and hydro energy showed an increase in total supply with 31 294 ktoe and 14 266 ktoe in 1990 and 51 579 ktoe and 15 874 ktoe.

Geothermal and solar energy amount has also increased over the period from 24 ktoe to 165 ktoe, while the amount of energy generated from biofuels and waste fell from 12 182 ktoe to 8 122 ktoe (Figure 1).

The data (Table 1) corresponds to the long-term energy strategy of Russia. For example, total supply of energy over the period showed a down-ward sloping trend, traditional and non-renewable sources use decreased, while nuclear, solar, geothermal and hydro energy became more widely used. Overall, the trend for less energy-intensity, mentioned in the strategy, is being realized in Russia, as the total amount of energy supplied fell over 26 years significantly.

Moreover, Russian economy is moving towards modernization of energy and fuel industry and shifting to more sustainable and responsible ways of reproduction of energy.

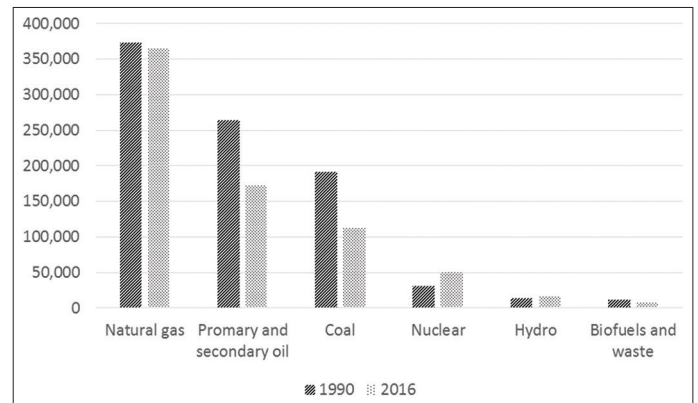
Concerning renewable sources of energy, which still does not show the level comparable with one, represented in developed countries, the following results in the year 2016 can be observed below (Figure 2).

As can be seen from the picture above, the hydro energy represents more than 95% of all renewables, generating energy in Russian energy and fuel industry. Solar and geothermal sources are one the second place, while wind energy remains not developed. This situation can be explained by already existing infrastructure in Russia, some geographical peculiarities of the area, the focus of government policies and scientific researches. Another reason for predominance of hydro energy over other renewables is the fact that development of geothermal sources has started to grow rapidly only in 2000s, solar and wind energy sources experienced growth only in 2013, while Hydro energy was well developed already in the beginning of 1990s.

It means, that this source of energy had more time, thus more monetary and administrative resources, more scientific and technological innovations and infrastructure capacity (Table 2).

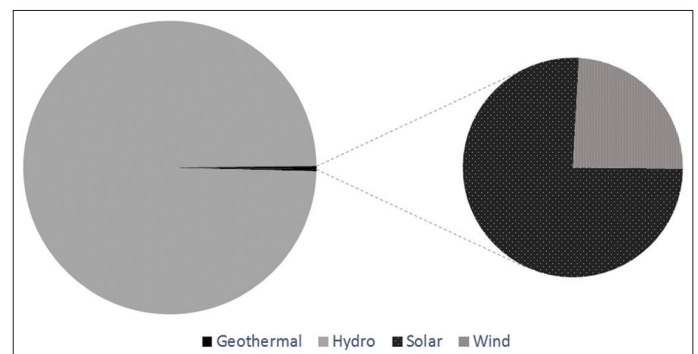
Finally, this trend observed in Russian energy sector corresponds to the world tendencies: hydro source represents much larger share of generated energy for the forecasts till year 2023, than wind and solar sources. However, in countries, which produce large portion of world energy, biomass is the trend which is being rapidly developed, unfortunately, in Russia this type of energy is not showing the same pattern. So, it can be viewed as an opportunity, which is described in Russian energy strategy as a shift from non-renewable energy, such as gas and oil to its renewable alternatives.

Figure 1: Russia's total primary energy supply (ktoe)



Source: Thomson Reuters, Minenergo

Figure 2: Electricity generation from renewables by source 2016



Source: Thomson Reuters, Minenergo

5. DISCUSSION

State energy strategy defines corporate strategies, i.e., strategies of firms, operating in the country. Thus, state energy policy shapes corporate energy policies. It means that strategies and policies formulated by firms should be in accordance with government's strategies and policies in a form of legal acts and federal laws. Today, no company can escape from following state recommendations and meeting standards of the industry. Moreover, being energy responsible and sustainable is not only a question of some legal aspects, it also affects brand equity, in other words, it is a crucial part of how company's brands are perceived, which directly affects the sales and profit figures (Mikhaylov et al., 2018).

On the other hand, some energy resources are extremely costly or unavailable for the region, or their use requires purchase of expensive equipment and staff extensive training. So, a firm should find a balance between legislation, sustainability and cost-efficiency.

As mentioned above, company's energy strategy depends on government policy in the field, this creates not only useful guidelines for the firms, but imposes some barriers as well. According to the research (Morris and Barlaz, 2011) the following principal barriers were identified: access to capital, time and expertise, risks, complexity, either lack of governmental policies or too strict regulations etc.

Table 2: Analysis summary

Parameter	Emissions score	Energy use total, Gigajoules	Total energy use to revenues, GigaJoules/USD
Average	52.24681718	194526196.30	0.02
Standard error	4.782097771	69176812.15	0.01
Median	56.87523003	50787121.70	0.01
Standard deviation	25.30448289	366049282.87	0.04
The sample variance	640.3168544	133992077490893000.00	0.00
Excess	-0.410922219	13.51	9.24
Asymmetry	-0.248263741	3.43	2.91
Interval	96.43373734	1784340594.41	0.16
Minimum	1.533742331	29405.59	0.00
Maximum	97.96747967	1784370000.00	0.16
Amount	1462.910881	5446733496.36	0.58
Quantity	28	28.00	28.00
Largest	97.96747967	1784370000.00	0.16
Smallest	1.533742331	29405.59	0.00
Reliability level (95,0%)	9.812054138	141939094.20	0.01

Source: Authors calculation

As for Russia, there was not enough of research done concerning energy management and energy strategy of companies, while the overall strategy and policy is well defined and thoroughly prepared. After the analysis of several large energy and fuel companies, the following similarities of energy strategy have been found:

1. The main principles of corporate energy strategy building are the following: compliance with state regulations, rational use of energy, responsibility, limitation of negative environmental effect of energy use, staff training in the area of energy managements.
2. Key areas of corporate energy strategies: running and sponsoring of scientific researches in the area of energy and further implementation of recommendations and conclusions; formulation of corporate set of rules in the field of energy management; identification of basic energy efficiency requirements to the equipment; raising energy issues on the corporate level by organizing staff training;
3. The main actions being taken by companies: implementation and constant improvement of energy management practices to meet international standards ISO 50001:2011; equipment modernization with the aim of reduction of energy used; building an image of ecologically responsible company in the eyes of stakeholders; raising employees' awareness of energy issues and their responsibility for energy efficiency and energy safety; keeping statistical records of energy consumption and energy efficiency.

6. CONCLUSION

Unfortunately, in Russian practice energy issues are more addressed in large fuel or energy-intensive companies, while small firms or firms, whose operational activities are not concerned with energy, lack this responsible approach. Thus, this can become one of the future directions of Russian energy strategy, which means, more legal regulations and incentives should be addressed to non-fuel companies, as ones representing a large portion of energy consumers (Denisova, 2019; Nyangarika et al., 2018; Bove and Lunghi, 2006; Meynkhart, 2019).

Another driver for Russian energy strategy is sponsoring and offering financial support to the companies performing in full

accordance with best energy safety and energy efficiency practices. Major decision-makers in Russian business should be motivated to switch from traditional non-renewable energy use to clean and efficient alternatives. Finally, teaching and training employees to use energy responsible is a crucial step in enhancing Russian energy policy and energy strategy. Desirable results can be achieved through social programs, staff trainings, open discussions and public talks, concerning the topic.

In total, Russian energy strategy is oriented on moving from energy-intensive economy to energy efficient one, with development of renewable sources. Overall governmental trends in energy strategy formulation influence energy strategy and energy policy on the corporate level (Bolt and Cross, 2010).

So far, Russia has developed a competitive energy strategy which may guarantee energy security, but on the other hand, the level of corporate energy responsibility is the dimension for the future growth (An et al., 2019a; An et al., 2019b).

Prevailing tendencies of corporate energy strategies of large companies involved into the process of energy emission, production, distribution or massive consumption have been investigated. Principles for building a corporate view on energy issues, key areas for consideration by large Russian companies and the actions taken have been studied. Finally, some measures for enhancing corporate energy responsibility among Russian businesses have been proposed.

REFERENCES

- An, J., Mikhaylov, A., Lopatin, E., Moiseev, N., Richter, U.H., Varyash, I., Dooyum, Y.D., Oganov, A., Bertelsen, R.G. (2019a), Bioenergy potential of Russia: Method of evaluating costs. *International Journal of Energy Economics and Policy*, 9(5), 244-251.
- An, J., Mikhaylov, A., Moiseev, N. (2019b), Oil price predictors: Machine learning approach. *International Journal of Energy Economics and Policy*, 9(5), 1-6.
- Bansal, A., Illukpitiya, P., Singh, S.P., Tegegne, F. (2013), Economic competitiveness of ethanol production from cellulosic feedstock in Tennessee. *Renewable Energy*, 59, 53-57.

- Bolt, P.J., Cross, S.N. (2010), The contemporary Sino-Russian strategic partnership: Challenges and opportunities for the twenty-first century. *Asian Security*, 6(3), 191-213.
- Bove, R., Lunghi, P. (2006), Electric power generation from landfill gas using traditional and innovative technologies. *Energy Conversion and Policy*, 47(11-12), 1391-1401.
- Christoffersen, G. (2012), Multiple levels of Sino-Russian energy relations. In: *Eurasia's Ascent in Energy and Geopolitics: Rivalry or Partnership for China, Russia and Central Asia?* Routledge Contemporary Asia Series. Yangon: Central Statistical Organization, Routledge. p135-157.
- Denisova, V. (2019), Energy efficiency as a way to ecological safety: Evidence from Russia. *International Journal of Energy Economics and Policy*, 9(5), 32-37.
- Denisova, V., Mikhaylov, A., Lopatin, E. (2019), Blockchain infrastructure and growth of global power consumption. *International Journal of Energy Economics and Policy*, 9(4), 22-29.
- Downs, E.S. (2010), *Sino-Russian Energy Relations an Uncertain Courtship. The Future of China-Russia Relations*. Lexington, KY: University Press of Kentucky. p146-176.
- Grama, Y. (2012), Impetuses and problems of Sino-Russian energy cooperation. *Asian Social Science*, 8(7), 45-53.
- Guizhou, L., Jijun, Z., Yongqing, S. (2015), The game analysis of oil and gas cooperation between China and Russia. *International Journal of Earth Sciences and Engineering*, 8(5), 2301-2310.
- Gulick, J. (2007), Russo-Chinese energy cooperation: Stepping stone from strategic partnership to geo-economic integration? *International Journal of Comparative Sociology*, 48(2-3), 203-233.
- Henderson, J., Mitrova, T. (2016), *Energy relations between Russia and China: Playing chess with the dragon*. Tatiana Mitrova: Oxford Institute for Energy Studies.
- Hu, Z., Ge, Y. (2014), The geopolitical energy security evaluation method and a China case application based on politics of scale. *Sustainability (Switzerland)*, 6(9), 5682-5696.
- Meynkhard, A. (2019). Energy efficient development model for regions of the Russian federation: Evidence of crypto mining. *International Journal of Energy Economics and Policy*, 9(4), 16-21.
- Mikhaylov, A. (2018a), Pricing in oil market and using probit model for analysis of stock market effects. *International Journal of Energy Economics and Policy*, 2, 69-73.
- Mikhaylov, A. (2018b), Volatility spillover effect between stock and exchange rate in oil exporting countries. *International Journal of Energy Economics and Policy*, 8(3), 321-326.
- Mikhaylov, A. (2019). Oil and gas budget revenues in Russia after crisis in 2015. *International Journal of Energy Economics and Policy*, 9(2), 375-380.
- Mikhaylov, A., Sokolinskaya, N., Lopatin, E. (2019), Asset allocation in equity, fixed-income and cryptocurrency on the base of individual risk sentiment. *Investment Policy and Financial Innovations*, 16(2), 171-181.
- Mikhaylov, A., Sokolinskaya, N., Nyangarika, A. (2018), Optimal carry trade strategy based on currencies of energy and developed economies. *Journal of Reviews on Global Economics*, 7, 582-592.
- Morris, J.W., Barlaz, M.A. (2011), A performance-based system for the long-term policy of municipal waste landfills. *Waste Policy*, 31(4), 649-662.
- Nyangarika, A., Mikhaylov, A., Richter, U. (2019b), Oil price factors: Forecasting on the base of modified auto-regressive integrated moving average model. *International Journal of Energy Economics and Policy*, 1(6), 149-160.
- Nyangarika, A., Mikhaylov, A., Richter, U. (2019a), Influence oil price towards economic indicators in Russia. *International Journal of Energy Economics and Policy*, 1(6), 123-130.
- Nyangarika, A., Mikhaylov, A., Tang, B.J. (2018), Correlation of oil prices and gross domestic product in oil producing countries. *International Journal of Energy Economics and Policy*, 8(5), 42-48.
- Røseth, T. (2017), Russia's energy relations with China: Passing the strategic threshold? *Eurasian Geography and Economics*, 58(1), 23-55.