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Article

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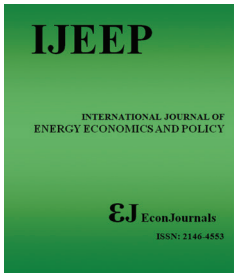

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Energy Sector of the Russian Federation in the Context of Macroeconomic Instability

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ABSTRACT

Electric power is one of the leading industries in the modern economy: It has a direct impact on all vital systems of the society, as well as on the formation of the social climate and on the economic development of any state. The current economic crisis and sanctions on behalf the US and the EU have significantly complicated the activities of Russian energy enterprises, thus, the government plays a key role in combating the crisis in this industry. Based on official statistical data, the article presents the results of complex analysis of the industry and defines the basic tendencies of its development. According to the results of the conducted research, it is revealed that in the past 3 years the performance indicators for electricity and heat production have deteriorated, the manageability of the functioning of energy systems has decreased, and the need for new technologies has increased.

Keywords: State Regulation, Market Failure, Macroeconomic Indicators, Energy, Sanctions, Crisis, Electricity, State Support
JEL Classifications: O25, Q43, Q48

1. INTRODUCTION

At present, much attention is being paid to small-scale energy, but despite the use of progressive energy-saving technologies, energy consumption in the world is increasing. The expansion of world production and consumption increases the need for energy, especially in developing countries (Al-Mulali and Mohammed, 2015; Apergis and Payne, 2009; Narayan and Popp, 2012; Shang, 2014). The annual requirement of the world economy for energy is estimated at 11.7 billion tons of oil equivalent (Bambulyak et al., 2015). At the current development stage of the national economy, Russia sets itself very high but achievable goals of long-term development - ensuring a high level of the well-being of the population, consolidating the geopolitical role of the country as one of the global leaders that determine the world political agenda. With that, the processes that occurred in 2014-2015, related to the events in Ukraine, the sharp deterioration of relations with the countries of the West, primarily the United States, the imposition of sanctions against Russia, the occurrence of serious difficulties in the economic development of the country, the deterioration of any prospects, as well as a strong decrease in the ruble exchange rate and the prices of oil and oil products on the world market - the main sources of foreign currency for the Russian Federation - fundamentally changed the development picture (Voropay et al., 2001).

Theoretical and practical aspects of the production and consumption of energy, in particular electric power, are considered by a wide range of authors. A recent study of Bambulyak et al. (2015) focused on analyses of the state of the oil industry in the event of the price instability and growing competition for the consumer. Within the framework of the study, various options for optimizing the performance of companies in different areas are evaluated.

Gazizov and Galiev (2015) assessed the vulnerability of the Russian economy, including its industries, to the sanctions imposed. The authors note that the current situation is a lesson for the country, in which it is able to see its shortcomings beforehand and find competent solutions. Research of Zavalny et al. (2015) is devoted to the analysis of the state of the Russian gas industry. In particular, the author notes the country's optimistic prospects on the world market due to competitive advantages in terms of price conditions, reliability and delivery volumes. Tunc (2016) analyzes the rationality of using energy by studying the example of the functions of marginal energy expenditure and analysis of the accumulated global energy. Piechota (2013) considers the situation with an uninterrupted increase in demand for energy with limited opportunities to increase its supply, that is, assesses the likelihood of an energy crisis. Yang et al. (2016) analyze the 3 year cooperation of nuclear energy of Russia with a number of countries on the basis of data of exports, imports and government regulations and agreements.

In the Russian Federation, the main role in the governance, development and improvement of the energy sector is given to the state, since the market, like any other element in economic activity, has its drawbacks - market failures. One of the determinant factors that require government regulation is the monopoly structure of the energy sector. In the sphere of gas supply and oil there are Gazprom and Transneft, respectively, which are, in fact, the largest participants creating barriers to the development of competition, by blocking access to certain pipelines. It can also be noted that the energy infrastructure is capital-intensive (construction of nuclear power plants, hydroelectric power stations) and long-term, so there is not enough private investment in the industry. In addition, there are social effects - social justice (all need electricity, gas) and ecological effects. Thus, state regulation is unavoidable.

The above points determine the need for an analysis of the energy industry in conjunction with the economy of the Russian Federation as a whole. In this respect, the authors consider the main macroeconomic indicators of the country: The growth rate of the gross domestic product, industrial production index, inflation, and investment in fixed assets. According to these criteria, it is possible to evaluate the preconditions for the development of the energy sector.

2. OVERVIEW OF THE STATE OF THE RUSSIAN ECONOMY

The Government of the Russian Federation has proclaimed a course towards modernization as the main direction of the country's economic development for a further period of at least 10-15 years. However, this does not imply a denial of the general strategic goals of the country's socio-economic development for an indefinite period, which are transition to a higher scientific and technical level of the national economy, a radical change in the structure of the economy and foreign trade, and a significant increase in the standard of living of the population.

As can be seen from Table 1, there is a reduction in the rate of growth, which is an expected result of the ongoing process of economic degradation, and not a short-term deviation, as it was in 2009. It is a consequence of the accumulated problems in the economy. The same applies to the index of industrial production, which has a negative trend, which in turn can be concluded: No signs of recovery in the national economy are observed. This type of development can be associated with such factors as: Rising costs due to the rise in price of loans and low effective demand due to job cuts and wages. In addition, there is a systemic domestic crisis in the Russian Federation, low volumes of government procurement, which could provide demand for domestic production and equipment wear.

The acute problem remains to be inflation. This indicator is the main destabilizing factor of the market economy, which is why it is proclaimed as the main goal of the national economic policy. Curbing strong inflation is an indispensable condition for successful economic development and solving social problems. The positive results achieved so far are not strong, as the events of the second half of 2014 and early 2015 showed that a sharp fall in world oil prices, a strong devaluation of the ruble and sanctions imposed by Western countries in relations with Russia provoked a significant acceleration of inflation in the country. The fall in investment is a long-term phenomenon that has been going on since 2013. Reduction of investments is associated with a decrease in the volume of state support and the volume of raised funds as a result of a decrease in business profitability. In addition, the decline in investment explains the slowdown in production growth.

Considering the country's economy, one cannot keep aside the exchange rate volatility of the ruble. The turn of the conjuncture for the worst in Russia occurred in 2014 under the influence of the general weakening of growth in the world economy and political crisis due to the events in Ukraine. Economic growth in Russia has stopped. The exchange rate of the ruble against the US dollar and the euro fell almost twofold. The reasons are the three important factors of the country's external environment, such as: Sanctions from the European Union and the United States of America, the world prices for energy resources and the military and political situation in the eastern regions of Ukraine. Oil in world markets has fallen in price by 40-50% (depending on the period measured), respectively, decreased Russia's currency incomes, unemployment and inflation have become the most painful factors for the population.

Assessing the overall results of socio-economic development over the past two or more decades, we must admit that they are very contradictory, especially from the point of view of the social costs of market reforms. According to the basic results of development over the past two decades, Russia is somewhere in the third dozen of the former socialist countries that began the transition to a market economy. At the same time, Russia was able to achieve the main goal of transformation: The country has formed a market socio-economic system that has replaced the previous directive planned economy. The new mechanism is put into operation, and, despite a number of unresolved problems, the economy is already functioning on a new basis, although not without a "squeak."

3. ANALYSIS OF THE ENERGY INDUSTRY OF THE RUSSIAN FEDERATION

At present, a special role in the development of the Russian economy belongs to the fuel and energy complex. As for the

energy sector itself, it is a combination of several industries. These include the production of electricity, the coal industry, oil and gas production. Electric power industry is known to be one of the leading industries in the modern economy: It directly affects all the most important life support systems of the society itself, as well as the formation of the social climate and the economic development of any state.

In the Russian Federation, the largest share of production falls on natural fuels, which consist of coal, natural gas and oil, including gas condensate, as the country has a high natural potential (Figure 1). It should be noted that in the period from 2007 to 2015, positive dynamics of production growth is observed for all types of hydrocarbons, excluding the negative trend during the periods of economic crises (2009 and 2013). The largest share belongs to natural gas, according to which, starting from 2006, the Russian Federation is the world leader (the main place in production belongs to PJSC Gazprom -20% of global production and 35% of world gas trade).

Not all of the natural gas produced in Russia is consumed. This is due to the fact that it is exported, but predominantly sent for processing to other types of fuel. At the same time, some part is still sent directly to meet the needs of the country's population - in the form of gasification of apartments, houses, businesses and the like. The dynamics of the distribution of natural and associated gas in the Russian Federation in the period from 2007 to 2015 is presented in Figure 2. It can be concluded that there are no significant fluctuations for either population, consumption, or exports. The level of gasification of the country is growing at an insignificant rate. At the same time, despite the fact that exports remain at about the same level, revenues from it are declining due to changes (i.e., fluctuations) in exchange rates (Zavalny et al., 2015). However, these trends also have negative consequences. For example, the burning of a huge number of different types of fuels, including natural gas, by mankind over the past half-century has led to an increase in the carbon dioxide content of the atmosphere, which, in turn, causes a greenhouse effect (Brown, 2014; Levi, 2013; Mackey and Lindenmayer, 2014; Tjandranegara et al., 2016).

As in the case of Russia's natural gas, it is the world's largest producer of cumulative production of mineral oil. Oil reserves are located on the territory of 40 administrative regions of the Russian Federation with at least seven major oil companies, such as: PJSC NK Rosneft, PJSC Lukoil, PJSC Gazprom, PJSC ANC Bashneft, JSC Surgutneftegaz, PJSC Transneft, PJSC Tatneft.

Analyzing the dynamics of the distribution of oil produced, it should be noted that unlike other energy resources, the population does not directly consume oil, thus, population consumption is excluded from the study. According to Figure 3, since 2009, there has been a decline in the share of exports and growth in oil consumption, as oil prices within the country have become competitive with respect to international markets. Thus, the domestic market was more than $30 per ton more attractive than external (Ministry of Energy of the Russian Federation). For this reason, some companies have redirected their export shipments to the domestic market. In recent years, one of the main features of the export policy of the Russian Federation in the field of oil supplies has been the reduction of transit through neighboring countries (Vatansever, 2017; Zhiltsov, 2016; Zonn, 2016).

The third, and the final element in natural fuel is coal - the world's most widespread energy resource, which became the first type of fossil fuel used by man. To date, this market can be viewed as a monopolistic competition, where demand for some types is significantly ahead of the offer.

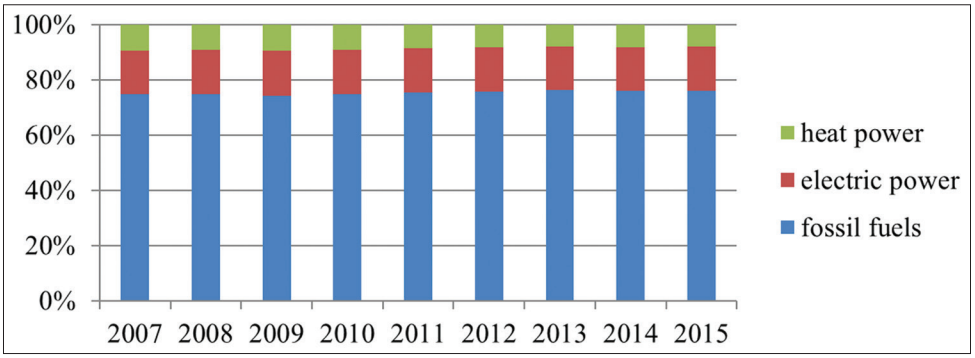
In the Russian Federation, there has been a reduction in consumption and an increase in coal exports (Figure 4). However, Russia already occupies a leading place in the export of coal, but, unfortunately, it is not a worthy competitor in the world market

Table 1: Macroeconomic indicators of the Russian Federation

Indicator	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
GDP growth rate	123.5	124.2	94.0	119.3	128.9	112.1	106.1	109.8	103.6	106.4
Industrial production index growth to previous year	106.8	100.6	89.3	107.3	105.0	103.4	100.4	101.7	96.6	100.8
Inflation	11.8	13.2	8.8	8.8	6.1	6.6	6.5	11.4	12.9	5.4
Growth rate of investments in fixed assets	142.0	130.8	90.8	114.7	120.6	114.0	106.9	103.4	104.7	103.2

Source: Compiled by the authors according to the federal service of state statistics www.gks.ru. GDP: Gross domestic product

Figure 1: Distribution of natural and associated gas of the Russian Federation, in percentage



Source: Compiled by the authors according to the federal service of state statistics www.gks.ru

due to the large distance between the place of extraction of this resource and the main export terminals.

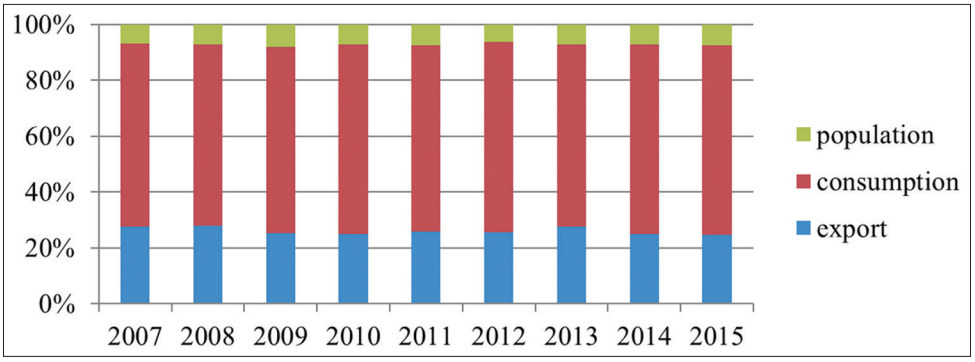
Thus, based on the results of the analysis of the state of the fuel and energy complex of the Russian Federation, the following main trends can be identified: Firstly, a significant growth in oil and gas production; secondly, coal as the main source of energy loses its former role; thirdly, the share of non-traditional energy sources (e.g., solar) is increasing.

From an estimation of mineral resources we shall turn to the analysis of electric power generation. In the period from 2007 to 2015 the consumption of electricity in Russia increases at a significant pace. This is due to the innovative nature of economic development and the growth of the processing industry (Figure 5). It should be noted that the recession of 2009 coincides with the period of the economic crisis, the same is due to the decline in the growth rates of consumption in 2013-2015.

We will analyze the main dynamic indicators for the period under review, in particular, among which: Absolute growth, growth rate, growth rate, annual increase and the rate of acceleration. For the last two mentioned indicators, both the basic and the chain approaches are applied (Table 2).

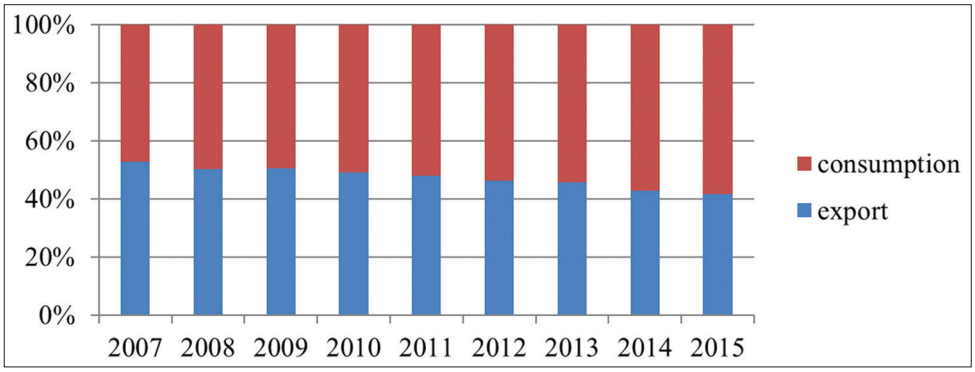
According to Table 2, the average annual growth rate is 1036.5 terawatt hours, with an average consumption growth rate of -103.8%. A significant decline in consumption (95.5%) from

Figure 2: Distribution of natural and associated gas in the Russian Federation, percentage



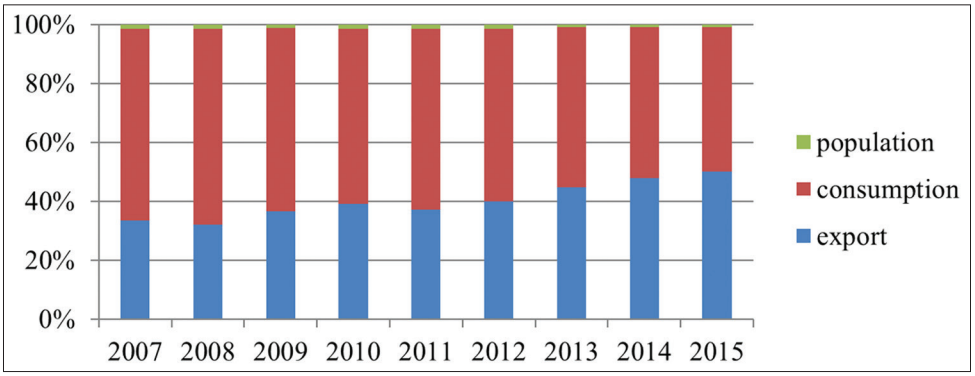
Source: Compiled by the authors according to the federal service of state statistics www.gks.ru

Figure 3: Distribution of oil, including gas condensate in the Russian Federation, percentage



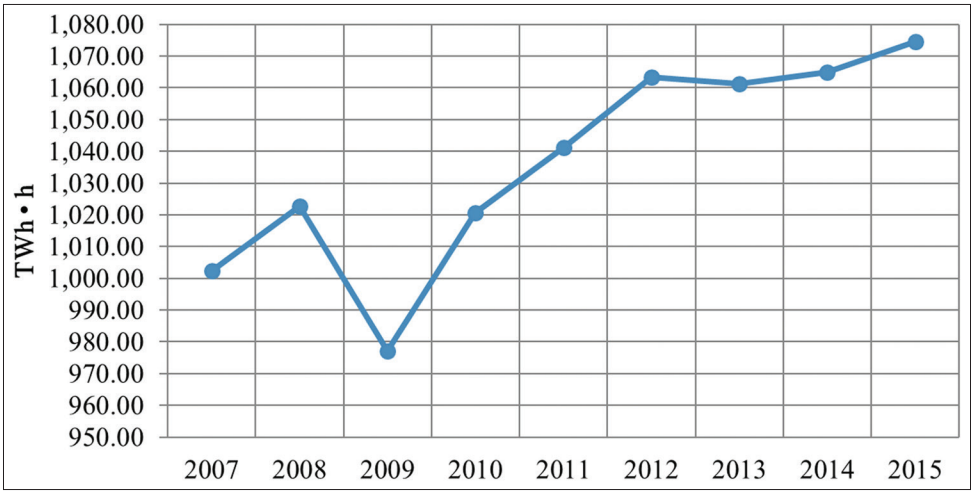
Source: Compiled by the authors according to the federal service of state statistics www.gks.ru

Figure 4: Distribution of Russian coal, percentage



Source: Compiled by the authors according to the federal service of state statistics www.gks.ru

Figure 5: Electricity consumption in Russia, TWh • h



Source: Compiled by the authors according to the federal service of state statistics www.gks.ru

Table 2: Dynamic indicators of electricity consumption in Russia

t	y	Absolute growth		Growth rate		Annual increase	
		Basic	Chain	Basic	Chain	Basic	Chain
2007	1002.5	-	-	-	-	-	-
2008	1022.7	20.2	20.2	102.0	102.0	2.0	2.0
2009	977.1	−25.4	−45.6	97.5	95.5	−2.5	−4.5
2010	1020.6	18.1	43.5	101.8	104.5	1.8	4.5
2011	1041.1	38.6	20.5	103.9	102.0	3.9	2.0
2012	1063.3	60.8	22.2	106.1	102.1	6.1	2.1
2013	1061.2	58.7	−2.1	105.9	99.8	5.9	−0.2
2014	1065	62.5	3.8	106.2	100.4	6.2	0.4
2015	1074.4	72.1	9.6	107.2	100.9	7.2	0.9
Average	1036.5	38.2		103.8		3.8	

Source: Compiled by the authors according to the federal service of state statistics www.gks.ru

the previous period is observed only in 2009, with a return to the previous level already observed in the next period.

Thus, the consumption of electricity will continue to grow (Piechota, 2013). However, in the past decade in the development of energy resources is invested 5-6 times less than necessary, leading to a decrease in the technological level of energy production and accelerated aging of fixed assets. In addition, the efficiency of electricity and heat production is deteriorating due to the growth in the needs of power plants and losses in electrical networks. The volatility of financial indicators of most enterprises is exacerbated by the high level of accumulated accounts receivable from consumers. The manageability of the functioning of power systems is reducing, while influenced by the crisis of the financial system of mutual settlements, increases the cost of dispatching the operating modes of the unified electricity networks of Russia (Voropay et al., 2001).

Taking into account the aforementioned facts, the state tries to maintain a stable situation in the energy sector, reduce the risks of worsening of crisis manifestations. The regulatory actions of the Government of the Russian Federation (2009) contain a wide range of actions: From the adjustment of existing contracts for improving the guarantee conditions for enterprises to the development of motivational activities for the creation of new projects. There are two main areas of the state policy to improve the investment climate in the energy sector: The development of the fiscal policy and the creation of new institutions for financing the energy complex. There is a change in the structure of production in favor of innovative energy-saving industries that reduce the consumption of energy and raw materials, and, in the future, drop the world prices for energy resources. In addition, the state assumes responsibility for the regulation of tariffs in the fuel and energy sector.

4. CONCLUSION

Despite the policy of replacing nonrenewable fuels by renewable energy resources being held by most countries, namely a strategy to reduce hydrocarbon consumption and increased consumption of renewable energy sources such as solar energy, wind energy and other alternative sources, industrial production is constantly increasing energy demand. This, in turn, contributes to the expansion of the energy market. In a crisis, the dynamics of energy growth is noted with a decrease in output. This is due to several reasons: A decrease in investment in fixed assets, as well as a decline in economic activity of industrial production as a whole.

In the Russian economy, the state's participation in the energy sector is extremely necessary. The macroeconomic indicators

of the Russian Federation reflect the events related to Ukraine, sanctions from the EU and the USA, a strong fall in the exchange rate of the national currency and the prices for oil and oil products on the world market. In addition, there are a number of national problems in the economy. Considerable attention at the present stage is given to small power engineering. Electricity consumption in Russia is of an industrial nature; therefore the dynamics of energy consumption depends mainly on the dynamics of industrial production.

5. ACKNOWLEDGMENT

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