

Risk Assessment in Global Energy

M. I. Kudusova

Chechen State University, Grozny, Russia

Keywords: International energy security, energy, risk, global risk, risk map, commodity risks, investment risks, nuclear energy technologies.

Abstract: The article is devoted to the problems of risk assessment in the global energy sector in the world and in Russia. A register of risks in this energy sector has been compiled, which shows internal and external risks. A risk map is provided.

1 INTRODUCTION

The new financial chronicle showed that, despite the importance of the energy market, for the world economy, it is quite receptive to a single set of interrelated factors, the range of which is quite extensive - from scientific and technical to geopolitical.

As a result, the problem of energy security (ES) is becoming more and more acute, providing a successful distribution of completed energy resources among consumers.

Undoubtedly, the result of the global ES is impossible without considering the functioning, as well as possible dangers that hinder the establishment of a balance in the energy market.

This, in turn, means identifying internal and external aspects of influence, modernizing scenarios for the future development of incidents, assessing the randomness of the occurrence of incidents and potential damage.

As a result of the above analysis, the main postulates of risk minimization tactics and their impact on the global energy market will be outlined. Thus, the understanding of possible dangers and the formation of a proper risk management system can be considered as one of the significant elements of the supply of international energy security (Egorova, 2013).

2 MATERIALS AND METHODS

International energy security has usually been viewed primarily from the point of view of buyers, the leading energy importing countries, from the standpoint of providing them with energy resources on a stable concept and at fairly reasonable prices.

At the same time, net exporting countries (producers) were required to maintain a significant level of reserve capacities, which, among other things, would allow them to compensate for the time from time to time emerging in the market shortage of energy resources.

Meanwhile, the energy industry itself, like other industries of the economy, is subject to a list of risks arising in the process of manufacturing and exporting products. In addition, energy production has a number of typical features.

First of all, this is the use of the final product (energy) by all segments of the national economy, which emphasizes the importance of the energy industry in the formation of a general trend of economic development.

The risks of the primary energy markets create uncertainty in the pricing of final products. And finally, the basic type of raw material for energy today is non-renewable hydrocarbon resources, of course, over time, the risk of their depletion and the emergence of an energy shortage increases. Some of the risks can be mitigated by redistributing investment flows in certain areas of development of the energy industry (Ralph, 2011; Egorova, 2015).

However, at present, in the context of high uncertainty in the prospects for economic development and the situation in energy markets, the

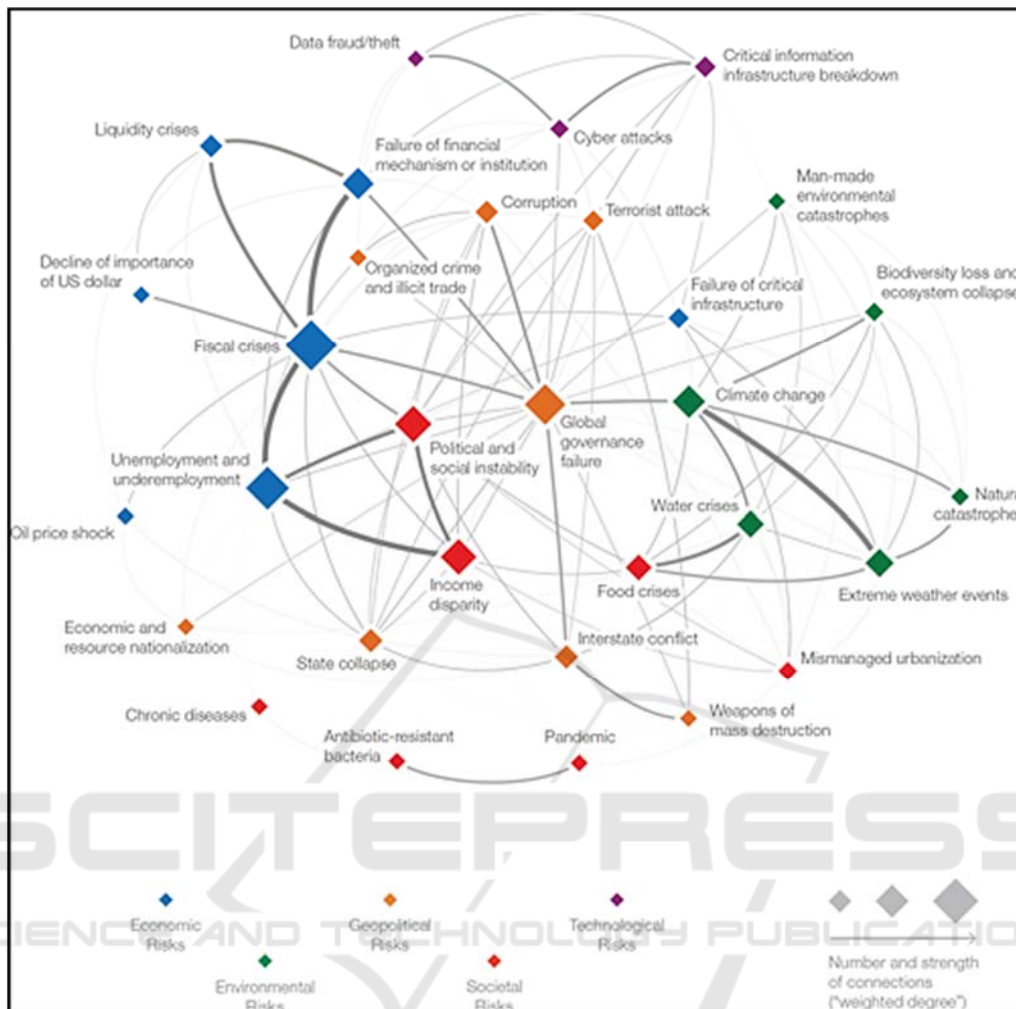


Figure 1: Map of global risks.

risks associated with investing in long-term energy projects are also on the rise. And the transition to new technologies is complicated uncertainty of possible outcomes of innovations.

In addition to economic risks, the importance of political risks is increasing, including transit. In the absence of an alternative replacement for hydrocarbons, the risks of conflicts over the possession of raw materials will only increase with growing shortage of traditional types of energy resources.

Thus, even a brief overview of potential threats in the energy market shows that risks are of a different nature: from negative trends in the global economy to technological accidents in individual industries.

A more detailed analysis of the main risk groups in the energy market allows us to assess the degree of influence of one or another unfavorable scenario and identify ways to reduce the negative consequences in

as a result of potential threats. Below is the classification risk matrix (see Table 1) and ranking of the main risk groups according to the degree of their influence to the energy market (see Figure 2).

The rise in oil prices revived investment processes in the global energy sector. The rise in hydrocarbon prices reflects the interests not only of oil and raw material producers, but also of the global financial community, which was hardly interested in maintaining the situation, which threatened, among other things, with large expenses to stop the consequences of bankruptcies of shale companies.

This is a fundamental difference between the current situation and the 1980s: at that time, the world capitalist system was strong enough to withstand two decades of low oil prices and, accordingly, a meager flow of petrodollars.

The modern global financial system, despite the huge difference in the formal volumes of financial resources, began to experience difficulties after 2 years, when the first talk began about the return of prices to the “average global profitability horizon”.

3 RESULTS AND DISCUSSION

The modern economy has become clearly more capital-dependent while maintaining the same sources of rent (Ivonin, 2009).

Expert assessments made on the eve of the World Economic Forum in Davos testify to the preparation

Table 1: Classification matrix of energy market risks.

Risks		Manufacturer	Consumer
Market	Macro	<ul style="list-style-type: none"> • a price shock (a sharp drop in income), • Uncertainty in demand level forecasts (unforeseen decrease in sales volumes), • uncertainty in the level of energy resources reserves (unforeseen decline in production), • credit risk (lack of investment funds), • currency risk (lack of investment funds), • interest rate risk (lack of investment funds) 	<ul style="list-style-type: none"> • price shock (a sharp increase in income), • uncertainty in estimates of the level of energy resources reserves (energy resource shortage), • uncertainty of the level of supply (growth of price volatility), • credit risk (unforeseen increase in expenses), • currency risk (unforeseen increase in expenses), • interest rate risk (unforeseen increase in costs)
	Micro	<ul style="list-style-type: none"> • aggravation of competition, mergers, acquisitions (greater competitive power, market monopolization), • technological breakthrough in the field of alternative energy (decrease in demand for traditional energy sources), • production risks, labor conflicts (suspension of production, decrease in income, additional costs) 	<ul style="list-style-type: none"> • mergers, acquisitions (monopolization of the market, inefficient pricing), • production risks of energy companies, labor conflicts, risk of disruption of supplies (unforeseen decrease in the level of supplies), • man-made accidents of energy companies (environmental pollution, additional costs, health hazard)
Political		<ul style="list-style-type: none"> • opaque energy-exporting economies (uncertainty in the level of stocks), • political conflicts (rupture of the production chain), • terrorist acts (rupture of the production chain) 	<ul style="list-style-type: none"> • non-transparent energy exporting economies (uncertainty in the level of supply), • political conflicts (breakdown of energy supplies), • acts of terrorism (disruption of energy supplies)
Global		<ul style="list-style-type: none"> • climate change (hard-to-reach deposits, increased costs) 	<ul style="list-style-type: none"> • climate change (energy reduction)

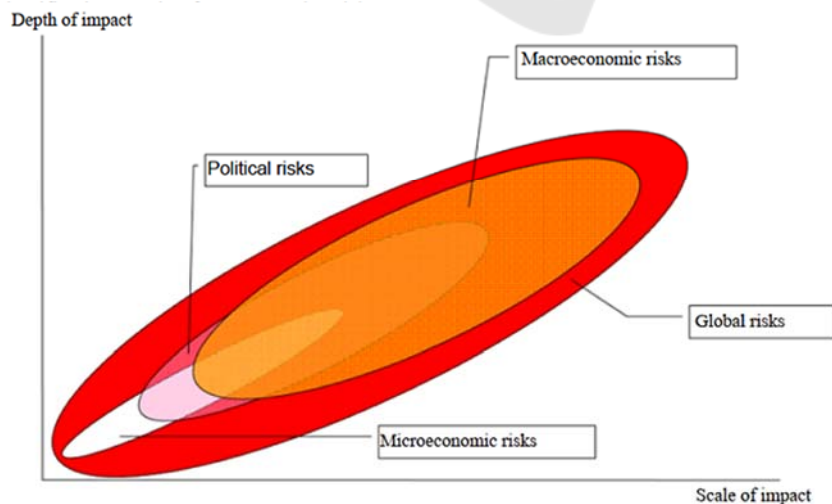


Figure 2. The degree of impact of the main risk groups on the energy market.

of the investment community for a new cycle of investing petrodollars in global energy.

None of the major world players in the modern world economy is interested in the implementation of reindustrialization projects announced in oil-producing countries (in Saudi Arabia, Iran, and partly in Russia), which can at least make it difficult to collect traditional raw material rent. The surplus of petrodollars formed as a result of rising prices should either be "eaten away" (within the framework of "social programs", for example) or spent on various large investment projects, some of them fictitious. At the same time, it is impossible to allow the strengthening of the influence of new players in the global "digital economy", where a difficult competitive situation is already developing.

It is fundamentally important for Russia to ensure, at the present stage of development of the world economy, if not dominant, then at least a leading position precisely in the energy sector. And for this it would be extremely expedient to lead, at least at the level of conceptual understanding and comprehension of the problem, a new investment cycle in the global energy sector, avoiding both the "eating up" of additional funds received, and their "dispersed", "portfolio" investment (Polyakova, 2011).

If we consider potential investment "vectors" in the global energy sector, the picture for Russia is not very favorable:

The topic of biofuels, which was the most important investment vector at the beginning of the 2000s, can be considered almost completely "burnt out". It is unlikely that investment interest in it will resume in the near future, although "laboratory" research will continue.

Renewable energy sources and in general, i.e. "alternative energy" as an object of investment are contradictory: these technologies have already been practically tested and "promoted". But this type of energy has turned out to be economically discredited to the greatest extent.

Nuclear energy technologies remain investment attractive. But it is premature to talk about the existence of any fundamentally new technological platform for the development of nuclear energy. However, the development of investment processes in this area may also have the character of competitive pressure on Russia in the promising nuclear energy markets.

Energy-saving technologies will remain a significant investment vector. But it carries significant risks for Russia associated with a decrease in energy consumption in developed countries.

Serious contradictions of a social nature are also emerging within Russia, where energy consumers are interested in reducing consumption, and energy companies in increasing sales.

Risky projects in the field of classical hydrocarbons. As a principle direction of investment in the energy sector, they are acceptable for Russia, although earlier investments have largely depreciated due to falling hydrocarbon prices. And most importantly, their volume cannot be restored, even in a minimal form, given the current and prospective level of oil prices in the coming years.

Thus, none of the conditional vectors in the world energy industry that existed before the collapse of oil prices can now be the basis for an economically meaningful investment cycle. For Russia, in the current investment cycle in the energy sector, if it really becomes a reality, there are practically no risk-free vectors.

It is possible that we will face the next edition of the "green revolution", i.e. with some kind of propaganda campaign, within the framework of which investment will be carried out in too wide a range of energy technologies, moreover, on the basis of some "ideological" considerations in essence and without a clearly defined prospect of further monetization. There is a risk of "chaotization" of investment processes in the energy sector and manipulation of investment projects.

There is a danger of a global fictitious investment process emerging in the world energy industry, probably based on the topic of "alternative" energy sources. It is important for Russia to avoid being drawn into such fictitious investment processes both at the state level and at the level of companies, while at the same time increasing the level of "greening" of the economy and reducing its energy intensity.

There is a need to form some kind of joint system of expert evaluation and organization of investment processes in the energy sector. Which should - to a certain extent - guarantee Russia both at the level of state interests and at the level of interests of corporate structures from serious financial losses during the current investment cycle in global energy. Investments in the "new energy" cannot stand out from the competition between the largest Russian fuel companies. But the situation on the market dictates the need for centralization of efforts.

It is important that such centralization is not used for cartelization in the domestic market. But Russian companies, not only hydrocarbons, but also energy and investment companies, would do well to cartelize on external energy markets, given the very likely increase in competition.

We can name the following areas in which it is already necessary to strengthen interaction between Russian companies and the state:

Research and forecasting of processes, identification of fake (in fact, misinformation) investment areas in the energy sector.

Examination of new foreign energy investment projects on a cooperative basis and on the basis of a unified methodology and risk assessment system.

Organization of "investment pools" for energy projects, including research projects (R&D), formation of mechanisms for managing such "portfolio" investments (Porfiriev, 2010). For example, the problem of organizing portfolio investment in the development of nuclear energy and nuclear energy technologies needs serious study. Despite all attempts to advance in this direction, which is natural for a modern market economy, fundamental "model" solutions have not yet been developed.

Organization of joint research and investment projects in the field of energy saving, small and non-traditional energy.

Organization of a Russian investment fund for investments in the "new energy" within the country on the basis of a "competition of regions" for the most attractive conditions.

Creation of an "insurance" pool in the field of new investments in the energy sector for at least partial hedging of investment risks, including risks of joint and several environmental liability (Nikoláeva, 2018).

In fact, without reducing the "competition field" for Russian companies in traditional energy sectors, as well as maintaining the level of antimonopoly competition within the country, such measures make it possible to be more systematically prepared for a new investment cycle on a global scale

4 CONCLUSIONS

The designation of tasks and mechanisms for achieving global energy security is largely determined by monitoring existing and hypothetical risks in the energy market.

In this regard, it is important to come to a common understanding of threats in the energy field, which can be achieved through the detection of probable adverse events and the assessment of their consequences.

Systematization of risks according to their importance for the energy market makes it possible to

form a sane and effective program of actions aimed at reducing these risks.

In addition, an analysis of the mechanisms of the impact of negative events on the energy market and, as a result, on the economy as a whole, gives the prospect of interpreting the final indicators of the realization of risks under certain scenarios for the development of the world energy market.

REFERENCES

- Egorova, M. S., 2013. Russian strategy for the development of ecological construction. *Megapolis management: Scientific-theoretical and analytical journal*. №6(36). Moscow: Publishing house of the NICKNAME "Content – Press". 2013.
- Ralph, F., 2011. *The Green Revolution*. Economic growth without damage to the environment: Alpina Non-fiction Publishing House. 2011.
- Egorova, M. S., Tsubrovich, Ya. A., 2015. Analysis of the demand for "green" technologies in Russia. *Economic Sciences*.
- Ivonin, V. M., 2009. *Adaptive forest reclamation of steppe agricultural landscapes*.
- Polyakova, G. A., Melancholin, P. N., Lysikov, A. B., 2011. Dynamics of the composition and structure of complex forests of the Moscow regionю *Lesovedenie. Ecosystem services // Forestry and hunting*.
- Porfiriev, B., 2010. *Climate change: risks or development factors Russia in global politics*. <http://www.globalaffairs.ru/number/Atmosfera-i-ekonomika-14886>.
- Nikoláeva, L. B., 2018. Latin American economy in the face of climate changes. *New priorities*.