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ORGANIZATIONAL AND ECONOMIC MECHANISM OF OIL AND GAS PROJECTS IN THE RUSSIAN ARCTIC SHELF

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Abstract

Authors of the paper prove the need of development of the organizational and economic mechanism of development of oil and gas fields in the Arctic shelf of the Russian Federation. The organizational and economic mechanism of oil and gas projects in the Russian Arctic should take into account strategic issues of oil and gas sector of Russia. It must be a universal algorithm of the choice of the investment scheme for development of oil and gas fields in the Arctic shelf. This mechanism should also estimate efficiency of participation for all concerned parties. The mechanism provided by authors includes evaluation of public, commercial and budget effectiveness, evaluation of social, economic, political and innovative effects, quality evaluation of the offered investment

schemes and also evaluation of impact of oil and gas projects on the main involved participants – stakeholders.

Keywords: Arctic, Gas, Oil, Shelf, Field, Organizational and Economic Mechanism

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INTRODUCTION

The current state of the oil and gas industry in Russia is characterized by gradual exhaustion of conventional reserves in Western Siberia. That is why the exploration and the development of the Arctic shelf fields is a promising project [1]. Total initial recoverable resources of hydrocarbons in the Russian continental shelf are distributed across 16 large marine oil and gas province and basins. They contain 90.3 billion tons of standard fuel. The most promising fields are in the Western Arctic shelf: Barents, Pechora and Kara seas. They represent more than 70% of the resources (Figure 1). Western Arctic contains unique fields such as Shtokman, Leningrad, Rusanov. In 2013 ARCO oil production began in Prirazlomnoye field in the Pechora Sea [2,3].

Figure 1: Resources of Russian Seas.



However, the development of the West-Arctic shelf is hampered by several factors: the climate and geography (distance from the coast, difficult ice conditions, large depth of the sea); technical and technological (lack of the necessary experience and technology); economic (high cost of capital expenditures and operating costs). Figure 2 shows capital expenditures for the development of the fields in Barents, Pechora and Kara Seas in comparison with the largest deposits of the Arctic Norway. Evaluation is made by experts.

The exhaustion of reserves in Western Siberia and the growth of world consumption prove the necessity of development of such deposits. Western Arctic field projects can be a powerful impetus for the development of the region, the industry and the national economy. The scale of the project, involving a large number of participants proves it. Therefore, it is necessary to develop a universal organizational and economic mechanism for oil and gas fields in the Arctic, which considers the impact of all factors [4,5].



Figure 2: Capital expenditures for biggest Russian and Norwegian fields.

METHODOLOGY

In this paper economical methods are applied: logical, economic and mathematical methods, methods of strategic analysis, project planning, methods of evaluation of the investment project, methods of financing of investment projects. Different theoretical approaches are applied as well: theory of system [6], cybernetic [7] and behavioral [8].

The proposed scheme of the organizational and economic mechanism involves the following steps:

- 1. Assessment of the public importance.
- 2. Evaluation of the commercial efficiency.
- 3. Search for investment and construction of the organizational and economic mechanism
- 4. Evaluation of efficiency of the project for each of the participants (including the basic provisions of the theory of contracts)
- 5. Multilateral evaluation of efficiency
- 6. Qualitative assessment of the proposed schemes

The significance of the offshore development projects for the Russian economy justifies the need for a multilateral assessment of their quantitative and qualitative indicators, including the possibility of achieving economic, social, political and innovative effects [9,10].

Given the complexity of the mechanisms of interaction of participants of the project, as well as to make informed choices of organizational and economic mechanism, it is recommended to evaluate quality parameters of the proposed schemes, based on the following indicators: independence from government agencies; independence from the partners; the level of transparency or the possibility of corruption schemes [11]; flexibility (the ability to make changes); quality of management.

RESULTS

As a result of the research, authors propose the conceptual scheme of organizational and economic mechanism of oil and gas projects in Arctic which is represented on Figure 3 [12-14].



Figure 3: Concept of organizational and economic mechanism [15].

The 6th stage of the organizational and economic mechanism (Figure 3) is the evaluation of social, regional, political and innovational effects is précised in Table 1 [16].

Table 1: Multilateral evaluation of effectiveness of the project.

Indices	Includes		
	On the federal level: revenues to the federal budget; multiplicative effects.		
	On the regional level: admission to the regional budget;		
	On the sectorial level: the impact of the project on the		
	work of other organizations: the share of Russian		
	suppliers.		
	The level of social protection: improving quality of life; reduction of the emigration flow.		
Social effect	The level of the labor market: an increase in demand for		
	oil and gas specialists; increasing jobs for the		
	maintenance of the project; increase in the requirements		
	to stall.		
	of hydrocarbons: increase the diversification of supplies		
	by countries: cooperation with the world's largest oil and		
	gas companies; ensuring uninterrupted supply		
Political effect	contracts.		
	Internal level: the development of special legislation;		
	promotion of works on the shelf (creation of special		
	economic zones, providing tax breaks/holidays).		
	The technical and technological level: machinery and		
Innovation effect	technology, first used in the Russian practice/first used		
	In International practice.		
	specialties the development of programs; increases in P		
	& D for oil and das complex		
Innovation effect	in international practice. Scientific and educational level: the creation of new specialties, the development of programs; increase in R & D for oil and gas complex.		

The analysis of quality characteristics of the offered schemes (Table 2) shows that the highest quality characteristics are provided in case of independent financing of projects. That is impossible in case of the set amounts of capital expenditures.

Under the conditions of unique projects in the Arctic one of the major conditions is availability of necessary experience and technologies which can be received by involvement of the companies in consortium.

That is why this scheme (own funds of the participants of consortium) can be considered as the optimal of the Arctic shelf [17,18].

Table 2: Comparative analysis of the schemes	5.
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Indices/Capital	Own funds of the company	Own funds of the participants of consortium	Own funds of the company + budget financing	Own funds of the company on the conditions of share production agreement	Loan	Emission of Ioan stock
Independence	+	+	-	-	+	+
from authorities	maximum	maximum	minimum	much less	maximum	maximum
Independence from other participants	+ maximum	- minimum	maximum (if there is no partners)	+ or – (in case of other partners)	- much less	+ maximum
Transparency	+ maximum	+ maximum, because project is verified by each of the partners	- corruption is possible	- corruption is possible while the licensing	+ maximum	maximum, because audit is necessary before emission
Flexibility	+ maximum	- much less	- minimum: strict control of budget funds	- minimum: review of all the conditions of the project requires adjustments	- much less	+ maximum
Quality of management	- much less: all decisions are made by the manageme nt of the company)	+ maximum: companies have a huge experience	- much less because of control from the state institutions	- much less because of the control from the state institutions	- much less	- much less

According to the stakeholder theory, in case of projects implementation it is necessary to consider interests of the involved groups which can have impact on the project. In case of development of fields of the Arctic shelf the most important participants are operator companies, the federal and regional government and local population [19,20]. For the purpose of creation of mutually advantageous schemes it is necessary to

consider interests and the purposes of each of the involved participants. The strategic map of purposes and criteria for evaluation of projects on development of fields in the Western Arctic by the main involved groups is presented in Table 3.

Step (aim)/Stakehol der	Federal Government	Regional Government	Oil and gas companies	Inhabitants of the Arctic region	
Stages of the project					
Field development	+ increase in revenues, appearance of the region-donor, positioning on the international energy market	+ gasification of the region ⇒ acceleration of the industrial growth ⇒ increased inflow into the regional budget ⇒ development of the region	+ profits	+ in case of gasification of the region	
Infrastructure development	+ at the expense of the companies - at the expense of the state	+ at the expense of the companies - negative at the expense of the	- additional expenses	+ if this creates additional jobs and/or if the infrastructure is used not only for the service of	
Processing	At the initial stage it is negative (increase of capital expenditures declines tax revenue) + then positive (due to the higher value added the revenue in budget increases)	At the initial stage it is negative (increase of capital expenditures declines tax revenue) + then positive (due to the higher value added the revenue in	- At the initial stage, it is negative, since increased capital expenditures ⇒ falling tax revenues + then positive: due to the higher value added profit increases	No direct impact	

Table 3: Evaluation of Arctic oil and gas project by stakeholders.

		increases)				
	Social and ecological aims of the project					
Creation of work places	+ reducing of social tension, the incomes in pension and other funds	+ reducing social tensions, increasing effective demand, the increase in payments to the budget	+ reduction of costs of relocation of employees and their placement	+ the opportunity for career growth and development, there is no need of immigration in other regions		
Compliance with the ecologic law	+ Absence of international claims (Norway, Finland)	+ preservation of the region as a recreational area - termination of revenues (fines	- high capital expenditures + Decline in fines	+ preservation of environment		
Global aim	The increase in revenues, a strong position on the world energy markets	and payments) The increase in revenues, infrastructure development, gasification, industrial production growth	The increase in revenues; gain experience; development of new technologies	The increase in income, employment growth, and improving quality of life, reducing the outflow of population		

DISCUSSION

The provided organizational and economic mechanism can be used in case of successful implementation of oil and gas projects in the Arctic.

However, it has a number of shortcomings which need some revisions. First, it is based on the existing techniques of development of organizational and economic mechanism and it is adapted only for conditions of the Arctic.

Second, the project evaluation issue from the point of view of the involved groups – stakeholders is insufficiently handled. In this paper, the main possible concerned parties are listed, main stakeholders of projects of development of oil and gas fields of the Western Arctic are chosen, according to the author. However, this choice is not

reasonable. Work can be enriched by more detailed study of the issue.

Third, in addition to justification of the choice of the optimum scheme for development of fields not only financial methods were used. Also, the author's technique of assessment of high-quality parameters of the offered schemes was used. In our opinion, it is not sufficient.

Fourth, distinction between assessment of social and economic effects and the social and economic efficiency is not clear. It is interesting to know whether the project will be realized if its commercial effectiveness is positive and, for example, social or economic effects are low.

Fifth, even if the scheme of financing on the basis of the production sharing agreement is possible theoretically (legislatively), but practically except three already existing Production Sharing Agreements projects – Haryaga, Sakhalin-I and Sakhalin-II – none were used.

Finally, the present scheme does not take into account the possible restrictive measures (sanctions) which are applied at the moment by European Union and United States of America or other types of risks [21].

Nevertheless, in general the developed mechanism will allow estimating adequately schemes of financing of projects taking into account the interest of all stakeholder groups.

CONCLUSION

Results of researches are presented by organizational and economic mechanism of development of hydrocarbon fields of the West Arctic shelf.

On the basis of the obtained data and the executed researches it is possible to make the following conclusions:

- The current state of the global energy markets, growth of global industrial consumption of energy carriers, gradual decrease in traditional oil and gas fields proves need for development of the Arctic shelf. The greatest interest from the point of view of extent of exploration, reserves volume and the available infrastructure facilities are represented by fields of the West Arctic shelf where the Shtokman gas-condensate field is the largest.
- 2. Uniqueness, difficult climatic, technological conditions as well as high capital expenditures of projects of development of offshore fields of the Western Arctic prove the need for an organizational and economic mechanism.
- 3. The organizational and economic mechanism of the oil and gas fields in Arctic shelf includes such stages as assessment and reasons for public efficiency of the project, calculation of cost efficiency of the project in general, development of the investment scheme, evaluation of efficiency for each of participants, complex

assessment of effects, quality of the offered schemes.

- 4. Taking into account the economic importance and scale of projects for development of the Arctic shelf in case of a complex efficiency evaluation it is necessary to consider economic, social, political and innovative effects of implementation.
- 5. The analysis of the offered schemes showed that the greatest efficiency of development of fields is reached by use of the organizational and economic mechanism providing for establishment of a consortium.
- 6. It is necessary to fulfill the evaluation of Arctic oil and gas project by involved groups stakeholders.

In further researches we plan to use a broader quantity of the factors influencing efficiency of development of fields. Including international political factors, such as sanctions or embargo on supplies of equipment.

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