

Manuscript

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**FUNCTIONING AND ECONOMIC DEVELOPMENT OF
THE IRAQI GAS INDUSTRY**

*Specialty: Economy and management of national economy
(Economics, organization and management of enterprises,
industries and complexes in industry)*

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Scientific secretary
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GENERAL DESCRIPTION OF THE DISSERTATION

The relevance of the research topic is based on the fact that, at the current development stage of the energy sector in Iraq, especially as a Middle-East country exporting oil and gas products, despite the existing trends towards an increased use of environmentally friendly standards and energy saving technology, there is no significant consumption of gas as a clean fuel. The gas industry is attractive to investors and producers when it comes to economic benefits. In the context of this study, the gas industry is identified as part of the oil and gas sector where enterprises are engaged in industrial and commercial activities for production and sales of associated petroleum and free gas.

The leader in the global oil-and-gas industry is the Middle-East region, which is actively developing the oil business segment as part of this sector. In 2022 the Iraqi natural gas reserves amount to at least 3.5 trillion cubic meters, which ranks Iraq on the 11th place among the countries with the world's largest gas reserves. In 2020–2021 the Iraq's international market share was 6.3 %. However, this does not prevent it from remaining the second largest producer and supplier of oil products after Saudi Arabia.

The oil and gas development segment of the energy industry in the Middle-East countries started developing in the first third of the 20th century. The leading role was given to the oil industry. The 1970s and 1980s were marked by an emerging interest in the gas industry, whose development faced problems of the military, political, organizational, and economic nature for a long time. In the context of a high demand for the oil-and-gas industry products, tightening environmental requirements, and a trend towards decreasing oil prices, many countries are trying to develop their gas sectors, varying in terms of the industry's investment attractiveness (gas reserves, gas types, production amounts, consumption, infrastructure, export orientation, transport component, impact of sanctions, and long-term regional conflicts).

The totality of the criterion data can affect both the economic situation in the individual development of the Iraq's domestic sector and the overall development of the Middle-East region's gas industry. The combined effect of internal industry-related and external social, economic, and political factors in each of the Middle-East countries, contributes to creating competitive advantages in the gas industry for many oil-and-gas countries in this region. Having 2 % of world gas reserves, like many other oil and gas producing countries in the Middle-East, Iraq has traditionally specialized exclusively in oil, using its great competitive advantages (holding 9 % of the world's oil reserves with extremely low production costs). However, the country's growing financial dependence on a mono-product, the environmental requirements to stop flaring associated petroleum gas, the need to meet the drastically increased domestic demand for gas, the need to develop related industries, especially petrochemistry and fertilizer production, and the need to increase national income, brought close attention to the gas industry. Currently, there is an opportunity to reconstruct and develop the gas industry in Iraq, which determines the relevance of the subject area of this thesis.

The exploration level of the research area lies in the fact that the basis of this thesis were studies by Russian and foreign researchers: on the problems of the current situation and reconstruction of the Iraqi economy and its oil and gas sector – H.I. Al Khalidi, H.S. Aziz, I. Aidrous, V. Semicheva, and A. Berezina; on the issues of the global gas market – N. Arkhipova, I. Mironova, Yu. Borovsky, O. Braginsky, N. Gafarov and I. Mescherin; on the issues of the global energy sector – K. Denchev and D. Ergin; on the issues of investment in Iraq – M. Ismail, M. Kulikov and M. Sabry. Nevertheless, many issues related to the current research of the Iraqi gas industry have not been studied or require repeated research due to fundamentally change economic

and investment landscape of this country over the past 20 to 40 years.

The aim of this dissertation is developing proposals to ensure sustainable economic development of the Iraqi gas industry in the context of its increasing importance in the structure of the oil-and-gas sector and the impact of modern environmental, economic, social, political and technological factors.

The main scientific idea of the dissertation is developing a methodical approach to determining the trends in the economic development of the Iraqi gas industry using a system of contracts and tenders, tools for strategic planning, comprehensive accounting of opportunities for investment in associated and free gas, and the factors affecting the current status and prospects of the gas industry.

Tasks to be solved in this study:

1. Identifying the main factors in the functioning of the Iraqi gas industry based on an analysis of its current status, efficiency, problems, and prospects; determining the key directions for the economic development of the Iraqi gas industry.

2. Summarizing the specifics of oil-and-gas and gas investment contracts in Iraq; stating recommendations for their practical use considering their possible application to free and associated gas.

3. Refining the formula for cash income from oil and gas production when using engineering service contracts in order to enhance the predictability of results and costs for stakeholders, including the government and private businesses.

4. Developing a methodological approach to optimize the stakeholders' income under an investment contract, which will improve the overall efficiency of the contract system.

5. Proposing licensing rounds for strategically important oil and gas fields; justifying the economic feasibility of investing in associated gas.

6. Developing an algorithm for choosing a strategic development direction for the gas industry considering the impact of various factors; making a strategic choice for Iraq based on the presented methodological approach.

The object of study is the gas segment of the Iraqi oil and gas sector identified as the production and sales of associated petroleum and free gas.

The subject of study is economic and managerial relations and methods in the functioning and development of the gas industry as exemplified by Iraq.

The information background of this study consists of reference and analytical materials available on the websites of the World Bank, the International Energy Agency and OPEC; data from the Ministry of Energy of the Russian Federation and the Ministry of Oil of Iraq; data from the Iraq Comprehensive Energy Development Strategy until 2030 and other sources in the study area.

During the work on the dissertation the author used monographic publications and periodicals in russian, arabic and english, both in paper and in electronic form.

Scientific novelty of the dissertation:

1. The economic, political, social, environmental, technical and technological factors of the functioning of the Iraqi gas industry have been identified, taking into account the competitive industry opportunities and limitations of the region, the directions for the development of the contract system, oil and gas auctions and strategic planning have been identified, allowing to increase the efficiency of the economic development of the Iraqi gas industry.

2. The features of oil and gas and gas investment contracts in Iraq are summarized, recommendations for their practical application are formulated, according to which service contracts are necessary for free gas, service contracts for associated petroleum gas, as well as production sharing contracts if non-state companies act as operators.

3. The formula of monetary income from the extraction of associated and free gas when using technical service contracts has been clarified by introducing a reduction factor in production at hydrocarbon fields, which makes it possible to increase the predictability of the results and costs of participants, including the state and private companies, and to increase the efficiency of the contract system.

4. Based on the theory of contracts, a methodological approach to optimizing the income of participants in an investment contract is proposed. Within the framework of the presented algorithm, it is proposed to set the share of state revenue in the amount of 25-50% in the form of royalties, depending on the type of oil and gas fields.

5. The criteria for the selection of oil and gas companies, the reasons for the transfer and change of ownership shares during auctions in Iraq are summarized, licensing rounds for strategically important hydrocarbons are proposed the economic feasibility of investing in associated petroleum gas, which allows reducing dependence on its import and ensuring an increase in state budget revenues, is justified.

6. An algorithm for choosing a strategic direction for the development of the gas industry is presented, which is a hierarchical model in which the degree of influence of various factors on the process of sectoral functioning and development is determined, the impact of strategic directions on achieving the goals of actors - the Council of Ministers of Iraq, the Ministries of Oil and Energy, public, private and public-private companies is assessed.

Theoretical and practical significance of this dissertation.

The thesis is aimed at expanding the scientific knowledge in the field of creating approaches ensuring an effective development of the Iraqi gas industry which includes, in the context of this study, the production and sales of free and associated petroleum gas. The provisions of our study can be used to elaborate and implement

strategic development areas of the gas segment of the oil-and-gas sector. It is advisable to use the provisions of this study in correlation with the Iraqi Comprehensive Energy Development Strategy until 2030 for the purpose of developing and implementing the energy policy.

The results of this research have been implemented as part of the scientific activities of the separate division of the Federal Research Center "Kola Science Center of the Russian Academy of Sciences" Institute of Economic Problems named after G.P. Luzin. The author has been issued a certificate of implementation dated on the 20th of May 2022.

Research methodology and methods.

The theoretical and methodological background of our study is the theory of resource nationalism, the theory of investment, the theory of investment value, and the theory of risks. We used such general scientific methods as induction and deduction, analysis and synthesis, the scientific abstraction method, the observation method, the expert method, the graphical method, the grouping method, the logical method, the historical method, and meta-analysis. In this thesis, we have also used special methods for collecting and processing statistical data, including the analysis of time series and forecasting, the factorial method and investment analysis methods, the analysis of the regulatory framework, and the analogy method.

Provisions submitted for defense:

1. The factors identified as a result of our analysis of the gas industry operations in Iraq prove the need for an increase, as part of the oil-and-gas sector structure, in the share of the gas segment development in the absence of a unified Middle-East strategy, which limits possible competitive advantages at the national level: development of industries, including gas processing and related industries; at the regional level: cooperation in the field of gas infrastructure and a cumulative increase in gas exports from the region's countries.

2. As a key development line for the Iraqi gas industry, we should consider the transformation of existing oil-and-gas contracts into service ones; it is advisable to apply a methodical approach to the profit distribution using ad valorem rates, which gives investors more freedom, being economically justified as it allows the government to increase the revenue indicators while reducing the production costs.

3. We have proven that the optimal strategic direction at this stage for the gas industry should be its development that provides for investment in associated petroleum gas, an independent full provision of the Iraqi industry needs in this resource, and refusal to import gas from abroad. Given the changing external and internal conditions for the gas industry operations, it is advisable to use secondary data and calculations to adjust the direction chosen as part of the presented algorithm.

The research result reliability is ensured by the compliance of the research methodology with the main provisions of the theories of economic growth, strategic planning, contracts, and tenders, using scientific research methods, references to many Russian and foreign sources, and the approbation of the study results.

The author's personal contribution consists in setting the goal and objectives of the thesis research; our analysis of foreign and domestic scientific publications on the research topic; our choice of methods; our substantiation of the development lines for the system of contracts and tenders; our elaboration and justification of the strategic development line for the gas industry in Iraq.

Approbation of results. The main ideas and scientific results of this thesis were presented at the VI International Scientific and Practical Conference "Technological Perspective: New Markets and Economic Growth Points" (TECHNOPERSPECTIVE-2020) on November 12 to 13, 2020 at the Saint Petersburg State University; the conference "Subsoil Use Issues" in the section "Economics of Sustainable Development and Global Investment Trends" with the

paper "Political and Economic Challenges of Creating the Gas Industry in Iraq" on March 22, 2021 at the Saint Petersburg Mining University; the All-Russian Scientific and Practical Conference with Foreign Participation "Digital Economy, Smart Innovations, and Technology" (INPROM-2021) in Saint Petersburg on April 18 to 20, 2021 with the paper "Modification of Contracts as a Factor in Increasing the Investment Attractiveness of the Iraqi Gas Industry"; the International Scientific and Theoretical Conference "Communication Strategies for the Information Society" on October 22 to 23, 2021 at the Saint Petersburg Polytechnic University of Peter the Great with the paper "Cooperation of the Government and Business in the Oil-and-Gas Industry Development: The Experience of the Middle-East Countries".

Publications. The results of the dissertation are reflected in 6 scientific articles, including 3 articles in publications from the list of the Ministry of Science and Higher Education of the Russian Federation, and one article in the abstract and citation database Scopus.

Structure. This dissertation consists of an introduction, three chapters, list of references and appendices. The list of references consists of 169 titles. The text of the dissertation is presented on 179 pages.

Acknowledgments. The author expresses his deep and sincere gratitude to his scientific supervisor Tatyana Semenova and the Department of Economics, Organization, and Management of the Saint Petersburg Mining University.

MAIN CONTENT OF THE DISSERTATION

In the Introduction, we have substantiated the relevance of the topic, described the goal, objectives, and scientific novelty of our study, explained its theoretical and practical significance, and outlined the main provisions submitted for defense.

In the First Chapter, we have presented a theoretical study of the fundamentals of the Iraqi gas industry operation and development; substantiated its growing role in the structure of the oil-and-gas sector and the territorial economy.

In the Second Chapter, we have analyzed the current status and development trends of the Iraqi gas industry; reviewed its state regulation; developed proposals to use strategic planning methods in managing the gas industry's economic development.

In the Third Chapter, we have proposed some opportunities to ensure the economic development of the Iraqi gas industry. We have developed methodological approaches to optimizing the stakeholder's income under investment contracts and tenders and made a choice of a strategic development line for the Iraqi gas industry.

The main results are disclosed in the following provisions for the dissertation defense:

1. The factors identified as a result of our analysis of the gas industry operations in Iraq prove the need for an increase, as part of the oil-and-gas sector structure, in the share of the gas segment development in the absence of a unified Middle East strategy, which limits possible competitive advantages at the national level: development of industries, including gas processing and related industries; at the regional level: cooperation in the field of gas infrastructure and a cumulative increase in gas exports from the region's countries.

Iraq holds about 5 % of the proven reserves of natural gas in the Middle-East region and almost 2 % of the global reserves. In addition, in view of the agreements concluded by Iraq with international companies who invest in associated petroleum gas and the increasing investment amounts, we can predict the growth of natural gas reserves in this country.

The proven reserves of natural gas are approximately 3.73 trillion cubic meters, which corresponds to the fifth rank in the Arab

world. Associated gas accounts for 83 % of reserves, free gas, for 17 %, respectively. Table 1 shows the proven gas reserves in Iraq, considering production and consumption.

Table 1 – Proved gas reserves in Iraq compared to the world, taking into account production and consumption (2011-2020)

Gas in Iraq and world		Reserves, production and consumption of gas				
		2011	2014	2017	2020	Growth
Reserves (trillion, m ³)	World	188,721	198,891	197,280	203,230	0.8%
	Iraq	3,170	3,158	3,160	3,730	1.8%
Production (billion, m ³)	World	2,938,600	3,323,800	3,501,700	3,867,900	3%
	Iraq	17,520	20,496	24,510	31,240	7%
Consumption (billion, m ³)	World	2,937,800	3,317,500	3,466,500	3,848,900	1.8%
	Iraq*	10,140	8,520	8,851	17,000	3.8%
Burning (billion, m ³)	World	101,358	137,315	146,120	103,040	0.6%
	Iraq	7,380	11,976	15,659	14,240	4.5%

* excluding imports

The main factors in the global oil-and-gas industry development in the context of Iraq are:

- *Economic factors.* There are two scenarios in the economic development forecasts for the industry. According to the first scenario, it is presumed that developing new deposits is required to meet the growing demand, including a 40 % increase in the production by 2030. At the same time, only projects with a low oil production cost will be relevant, which gives Iraq great advantages both in terms of cheap production and cheap oil supplies due to the proximity of its southern fields to ports. According to the second scenario, the trends of recent years show a constant decrease in the oil price due to energy saving, the new technology, and the discovery of many fields in different countries. With low prices, producers are forced to reduce their investment in exploration and development of new fields. As a result of reduced demand and lower oil prices, Iraq will not receive the revenue required.

- *Political factors.* First, their membership in OPEC has a positive impact on the oil-producing countries, allowing them to control the stability and predictability of oil prices. In addition, according many researchers, the oil-and-gas industry is quite heavily politicized, i.e., in order to increase pressure on some oil-producing countries, a policy of lowering oil prices is implemented, as a result of which all oil-producing countries suffer losses. The author believes that a multipolar world is more stable and safer for the development of the oil-and-gas sector worldwide.

- *Social factors.* By 2030, Asian countries will account for 60 % of the world's urban population growth. Growing urbanization results in a growing energy consumption. The expected population growth to 9 billion people by 2040 also promotes the industry development. The global gas consumption is also increasing due to the Asia-Pacific region countries. At the same time, the gas consumption growth rate exceeds the oil consumption growth rate in the world and in the Asia-Pacific region.

- *Environmental factors*. International requirements for the widespread adoption and implementation of environmental standards encourage the use of environmentally friendly and environmentally neutral technology.

- *Engineering and technological factors*. The avalanche-like development of technology, including in the fuel and energy sector, is rapidly changing the traditional roles of all industry stakeholders.

The Iraqi Energy Strategy 2030 provides for investing USD 372 billion in the development of oil production and transportation and USD 93 billion in the production and processing of natural gas. However, budgetary funds in Iraq are used inefficiently.

2. As a key development line for the Iraqi gas industry, we should consider the transformation of existing oil-and-gas contracts into service ones; it is advisable to apply a methodical approach to the profit distribution using ad valorem rates, which gives investors more freedom, being economically justified as it allows the government to increase the revenue indicators while reducing the production costs.

The scientific result of our study is systematizing the development factors of the Iraqi gas industry with substantiation of its strategic development direction and proposals for developing the contract system. A service contract gives the investor more freedom of action: the profit distribution under previous contracts was based on the declared discrete value, whereas service contracts imply the profits distribution based on ad valorem rates. This approach is more advisable in terms of economics, since its use, when entering into contracts on oil-and-gas field development, will allow the government to achieve higher revenue figures while lowering the production costs. The methods for applying this approach are presented at Figure 1.

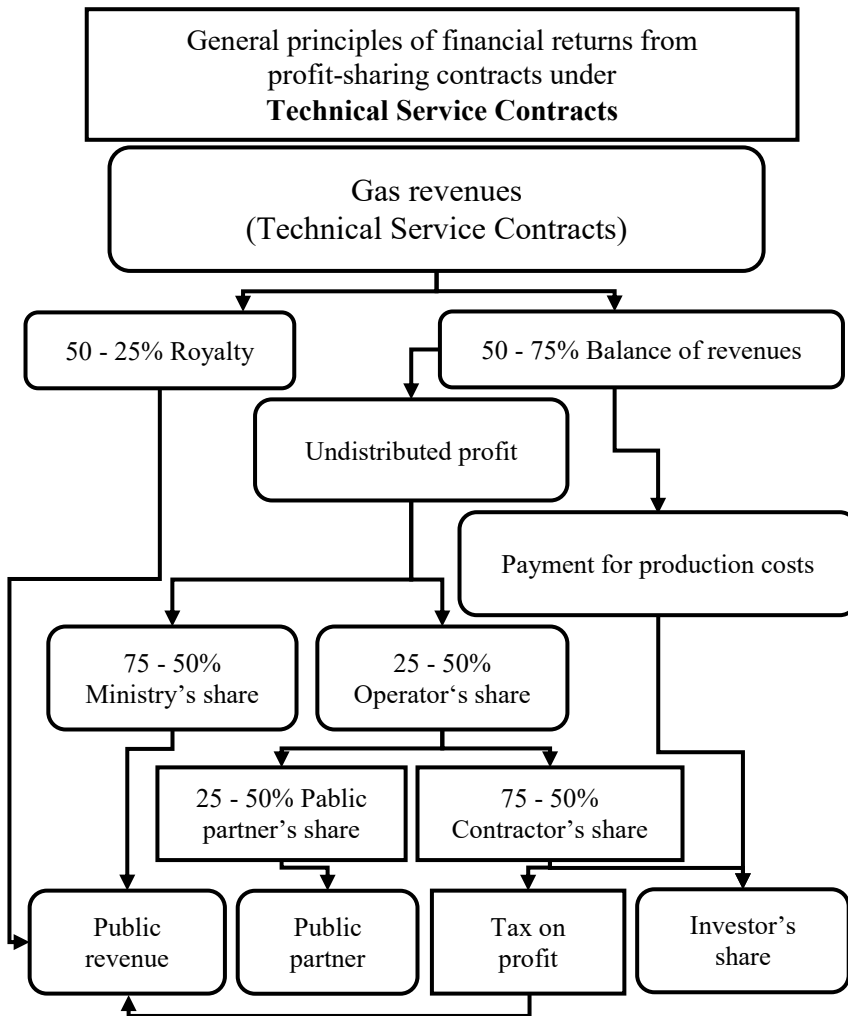


Figure 1 – Methodological approach to revenue-sharing while investing in natural gas

Upon selling a certain amount of commercial gas over a certain period, the company receives the sales revenue equal to 100 %. Under the applicable service contract, 25 to 50 % of the

revenue shall be paid as royalties to the government. The rest of proceeds is divided into two parts: payment to the contractor for production costs incurred by the latter when developing the field, and the profit. Our calculation for practical application of this method is presented at Figure 2.

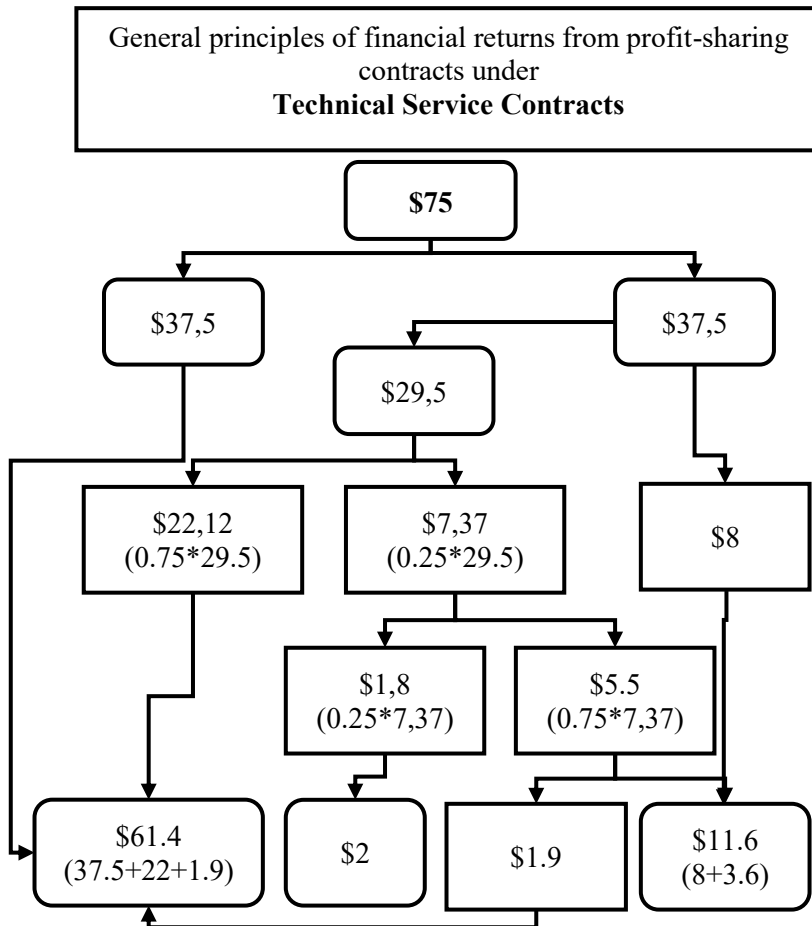


Figure 2 – Calculated profit-sharing when investing in natural gas

We propose the following adjusted formulas 1 and 2 of cash income from oil and gas production under engineering service contracts:

$$GS = P_o * P_r - P * (RF * PF * ReF) * (1 - GP) * (1 - Lt) * Pr - C * Pr \quad (1),$$

$$CS = P * (RF * PF * ReF) * (1 - GP) * (1 - Lt) * Pr + C * Pr \quad (2)$$

GS – government share. $\geq 50\%$ P_o

CS – contractor share. $\leq 50\%$ P_o

GP – government partner.

P_o – expected price of oil and gas;

P_r – expected production of oil and gas.

Lt – expected profit tax.

P – profit.

Rf – (R-Factor) = (Total income)/(Total costs)100%.

Pf – (P-Factor) = (Actual production)/(Planned production)100%.

ReF – (Re-Factor) = (Actual production)/(Reduced production) 100%.

C – costs of oil and gas production.

Our research has shown that Iraq loses 6 % of its total national income, if it does not invest in associated gas and depends on gas imported from abroad, whereas if it invests in associated gas, this provides an increase by 5 % of the national income while reducing losses from 6 % to 1 %. The economic feasibility of promoting investment in associated gas can also be confirmed using the following analytical data. Natural gas is imported to Iraq from abroad (for generating electricity) at a price of USD 245 to 350 per thousand cubic meters of natural gas, whilst producing natural gas from APG costs the Iraqi government USD 35 to 105 per thousand cubic meters.

Based on our studies and calculations, we made the following conclusions.

1. Oil exploration operations should be continued and expanded to increase its reserves, raise the oil production limit, and

increase the volume of associated gas within the limits of the OPEC oil production; oil reserves can be increased by developing fields in all Iraqi regions.

2. Joint projects with major international gas companies should be continued to enhance exploration and development of free gas to meet the local demand and export opportunities for gas, along with the natural gas development in the western region of Iraq.

3. Increasing the production of gas and its derivatives will contribute to developing relevant industries that are intensive in using clean energy, with investments directed to the private and joint sectors.

4. Development of petrochemical plants is required, mainly to meet local needs and other export-oriented industries; export-oriented industries, such as petrochemicals and others, should be in the same area near Basra because of its ports, the geographic location, and the size of infrastructure.

5. It is advisable to increase the number of filling stations dependent on the supply of natural gas, as it is environmentally friendly.

6. The natural gas service sector, including local and international businesses, should be promoted through investment contracts that are most acceptable to investors.

3. We have proven that the optimal strategic direction at this stage for the gas industry should be its development that provides for investment in associated petroleum gas, an independent full provision of the Iraqi industry needs in this resource, and refusal to import gas from abroad. Given the changing external and internal conditions for the gas industry operations, it is advisable to use secondary data and calculations to adjust the direction chosen as part of the presented algorithm.

Our study showed that it is advisable to carry out strategic planning for the gas industry development using scientific and

methodological principles of the hierarchy analysis method. In this thesis, we have presented a hierarchical model for choosing a strategic development direction for the gas industry using the hierarchy analysis method.

Planning as an iteration process can combine the direct and inverse processes to achieve the desired result. Strategic planning for the gas industry development involves the use of both types of hierarchies. Our study presents an algorithm that allows to use the direct and inverse processes in strategic planning. Iterative processes are envisaged in order to involve secondary data to confirm the research results, to clarify the actor's policies and strategic goals, and to find the optimal solution. In this thesis, we have calculated in practice and applied a special approach to the Iraqi gas industry.

At the first stage, we have assessed the influence of various factors on the operation and development of the gas industry. After having studied the problem in terms of hierarchy, we had to evaluate the existing criteria and each of their alternatives. Elements are compared in pairs along with comparing their impact on the general process description. Table 2 presents the results of assessing the impact of these factors on the gas industry development with indicators of consistency calculated.

Table 2 – Results of assessing factors’ impact on the development of the Iraqi gas industry

Indictors	Factors				
	Political	Social	Economic	Environmental	Technical and Process
Normalized Priority Vector Estimates	0,306	0,055	0,348	0,126	0,165
λ max	5,692				
CR	15,4%				

Next, we have determined the importance of all the actors' objectives, which are compared in pairs. As a result, we have derived priority vectors that reflect the ordering of weights and objectives. Synthesis of priorities starts from the second level. Local priorities are multiplied by the top-level criterion priority and summed for each element of the impact criterion.

The thesis considers five strategic areas of investment as part of the hierarchical model for the Iraqi gas industry development:

1. Investing in associated gas; stopping the use of oil for energy and electricity generation.
2. Investing in associated gas; fully meeting the needs of industries in this resource; refusing to import gas from abroad.
3. Investing in free gas; stopping imports of electricity from abroad.
4. Free basic investment; operation of and investing in petrochemical projects.
5. Investing in natural gas (associated and free); preparing for export operations with natural gas.

The second strategy has been assigned the largest share. In general, investment strategies for natural gas production in Iraq are as follows: the first step is investing in the associated gas processing at oil fields; the second step is investing in free gas fields, because investment costs in associated gas are lower, being directly dependent on the oil field infrastructure.

In this study, in order to select the strategic development direction, we have made calculations for the first direct process. If we need to clarify the strategic area and to involve secondary data, it is advisable to make calculations for the first reverse process, and if required, for the second direct process. The methodology presented allows us to do this.

CONCLUSION

The dissertation is a completed scientific and qualification paper which offers a new solution to an urgent scientific problem - the improvement of conceptual and methodological approaches to the development of the Iraqi gas industry. The results of this dissertation are following conclusions and recommendations:

1. The main factors of the functioning of the Iraqi gas industry are identified based on the analysis of its state, efficiency, problems, prospects, and the key directions of economic development of the gas segment of the oil and gas complex of Iraq are determined. The most important factors that need to be taken into account when developing the direction of strategic development of the gas industry, identified in this study as the production and sale of associated and free gas, are economic, political, social, environmental, technical and technological.

2. The features of oil and gas and gas investment contracts in Iraq are summarized, recommendations for their practical use are formulated, taking into account the possibilities of application for free and associated gas. Iraq has large natural gas resources that can be used to increase clean energy by increasing investments in free gas fields, as well as processing associated gas. When drawing up an investment contract for associated gas, decisions taken by OPEC or OPEC+ to increase or decrease oil production are taken into account, and in the case of an investment contract for free gas, they are not taken into account.

3. The formula of monetary income from oil and gas production when using technical service contracts has been clarified. The use of the production reduction coefficient at oil and gas fields allows increasing the predictability of the results and costs of participants, including the state and private companies.

4. Based on the theory of contracts, a methodological approach to optimizing the income of participants in an investment contract is proposed. Within the framework of the presented

algorithm, it is proposed to set the share of state revenue in the amount of 25-50% in the form of royalties, depending on the type of oil and gas fields.

5. Licensing rounds for strategically important hydrocarbon deposits are proposed, the economic feasibility of investing in associated petroleum gas is justified, which allows reducing dependence on its import and ensuring an increase in state budget revenues. It is proved that Iraq loses 6% of the country's total income if it does not invest in associated gas and depends on gas imported from abroad, while if it invests in associated gas, the state's income increases by 5%, losses decrease from 6% to 1%.

6. The algorithm for choosing the strategic direction of development of the Iraqi gas industry is presented, taking into account the influence of various factors, a strategic choice is made based on the presented methodological approach. At the first stage, it is advisable to invest in the processing of associated gas in oil fields, at the second stage - investing in free gas fields, since investment costs in associated gas are lower, since it directly depends on the infrastructure of oil fields. According to the results of the study, a strategic direction has been identified as optimal for Iraq at this stage, related to investing in associated petroleum gas, independently fully meeting the needs of the Iraqi industry in this type of resource, and refusing to import gas from abroad.

Further development of the topic of the dissertation research may be associated with calculations on the first reverse, as well as on the second direct processes based on the use of secondary data, with the further development of a methodological approach to improving the contract system in changing social and economic conditions.

LIST OF SCIENTIFIC ARTICLES PUBLISHED ON THE TOPIC OF THE DISSERTATION

1. Retrospectives and prospects of the Iraqi gas industry / **Al-Dirawi Ali Saeed Abbas**, L. Podolyanets // Eurasian Legal Journal, 2020, No. 12 (151), P. 496–499.

2. The current state of the gas industry in the countries Middle East / **Al-Dirawi Ali Saeed Abbas**, L. Podolyanets // The World Economics, 2020, No. 11, P. 26–36.

3. Ensuring the economic development of the Iraqi gas industry / T. Semenova, **Al-Dirawi Ali Saeed Abbas** // Innovation and investment, 2022, No. 4, P. 28–32.

4. Economic Development of the Iraqi Gas Sector in Conjunction with the Oil Industry. / T. Semenova, **Al-Dirawi Ali Saeed Abbas**, DOI <https://doi.org/10.3390/en15072306> // Energies. — 2022, 15, 2306. (Scopus).

5. The place of Iraq's gas industry among the gas-producing countries of the Middle East / **Al-Dirawi Ali Saeed Abbas**, L. Podolyanets // Technological trends and knowledge-intensive economy: business, industries, regions, 2021, P. 464–473.

6. Interaction between the state and enterprises in the development of the oil and gas industry: the experience of the Middle East countries / T. Semenova, **Al-Dirawi Ali Saeed Abbas** // Communication Strategies of the Information Society: Proceedings of the XIII International Scientific and Theoretical Conference, St. Petersburg, October 22–23, 2021, St. Petersburg: POLYTECH-PRESS, 2021, P. 128-129.