

ABSTRACT

to the thesis for the degree of Doctor of Philosophy (PhD) in the specialty
«6D050600 - Economy» of Bekturganova Makpal Sattikulovna

«Priorities and economic mechanisms of transition to low-carbon development of oil and gas sector of Kazakhstan»

The relevance of the topic of the research. The Republic of Kazakhstan, having approved the UN Sustainable Development Goals (UN SDGs), ratified 22 international environmental conventions, including the Paris climate agreement (2015), adopted the Strategy «Kazakhstan-2050» (2012), the Concept for transition of the Republic of Kazakhstan to «Green Economy» (2013), the Strategic Development Plan of the Republic of Kazakhstan until 2025 (2018) confirmed its commitment to the strategic course on the formation of a new model of economic growth, taking into account the «green principles» of development.

In addition, as a full member of the UN and a participant in international processes, our country has made international commitments to reduce greenhouse gas emissions by 15-25% by 2030 regarding to 1990.

Currently, the World bank, the European bank for reconstruction and development (EBRD), the Asian development bank (ADB), a number of UN agencies – United Nations Development Programme (UNDP), UN Environment programme (UNEP), the United Nations Framework Convention on Climate Change (UNFCCC), the Economic and Social Commission for Asia and the Pacific (ESCAP) and other international organizations are actively conducting research on the adaptation of the global economy to climate change and to devise mechanisms of mitigating the rate of climate change. In a number of countries, the Organization for Economic Cooperation and Development (OECD) has already developed and implemented strategies for the transition to low - carbon development, involving comprehensive measures for decarbonization – «cleaning up the economy from carbon».

One of the most important components of the concept of sustainable development, ensuring economic growth without damaging the environment is the concept of low-carbon economy development, which became widespread after the acceptance of the Paris climate agreement in 2015. In the framework of implementation of climate commitments, Kazakhstan plans to design national low-carbon development strategy.

Therefore, the proposed thesis is especially relevant now. Since the purpose of this thesis is fully consistent with the objectives set in the Strategy «Kazakhstan-2025», the Concept of transition to a «green economy» and other government policy documents, which underlined the need for a transition to low-carbon development of the most important basic sectors of the economy. All this once again confirms the importance and relevance of this thesis.

The purpose and tasks of the study. The aim of the thesis is to develop the theoretical bases of the transition to low-carbon development in the oil and gas sector

of Kazakhstan and substantiate the economic mechanisms of decarbonization in the conditions of industrial and innovative development of the national economy.

In accordance with the intended purpose the following tasks are solved:

- develop conceptual approaches for low-carbon development of the oil and gas sector based on the study of foreign experience in using economic mechanisms for decarbonizing the economy;
- substantiate methods for assessing the low-carbon potential of the oil and gas industry;
- analyze the current state and role of the oil and gas sector in ensuring sustainable economic development;
- analyze organizational and economic mechanisms for the transition of the oil and gas sector to low-carbon development;
- develop forecast scenarios for reducing greenhouse gas emissions in the oil and gas sector until 2030;
- develop recommendations to improve economic mechanisms for decarbonizing the oil and gas sector in Kazakhstan.

The object of the study. The object of the research is the oil and gas complex of the Republic of Kazakhstan.

The subject of the study. The subject of the research is economic relations on the transition to low-carbon development and the development of decarbonization mechanisms of individual sectors of the national economy.

The theoretical and methodological base of research. Theoretical and methodological base of the study were the methodological basis of the concept of sustainable development, the UN reports of the Intergovernmental expert Committee on climate change UNFCCC, the methodology of the forecasts and models for low-carbon development world Bank, Regional initiatives to reduce greenhouse gas emissions, the UN, the OECD, the works of foreign and Kazakhstan scientists on issues of sustainable development, models of «green economy» and low-carbon development and climate change. Approaches and methods of predictive modeling, correlation, statistical, comparative analysis and other methods of scientific research were used in the development of scenarios of decarbonization of the oil and gas complex.

Information base of research. The information base of the research were the reports and the Strategic Plan until 2025 of the Ministry of Energy of the Republic of Kazakhstan, the analytical reports of JSC "Kazenergy", the statistics of the Committee on statistics of the Ministry of national economy of the Republic of Kazakhstan, as well as materials of international forums, scientific and practical conferences of the UNFCCC on climate change, periodicals and Internet resource networks.

Scientific novelty. Scientific novelty of the research is the formulation of the problem of decarbonization of the oil and gas sector and obtaining the following new results:

- on the basis of generalization of the world theory and practice on sustainable development.: the author's interpretation of *the concept of low-carbon development, the basic principles, criteria and ways of its implementation in the oil*

and gas sector. Based on the study of foreign experience in the use of economic mechanisms of carbon regulation (ETS, carbon tax and their integrated use), the proposals for the use of a two-level system of carbon trade in the Republic of Kazakhstan are justified;

- methodological approaches to assessing the decarbonization of the oil and gas complex based on the use of mathematical models and a set of target indicators (*intensity of greenhouse gas emissions, energy intensity of the production process, decarbonization of production, energy efficiency in production*) have been adapted;

- based on the analysis of the potential of the oil and gas sector in the transition to low-carbon development and regulatory, institutional frameworks in the field environmental regulation of the proposals and recommendations are given for new draft edition of the Environmental code of the RK, in particular to Chapter 5, relating to carbon regulation;

- scenarios (*basic, optimistic, pessimistic*) of decarbonization in the oil and gas sector until 2030 were developed based on the studied methodological approaches and the use of predictive modeling methods;

- developed recommendations for improving the economic indicators of decarbonization in the oil and gas complex of the Republic of Kazakhstan, providing for elements of paid quotas and carbon tax accounting for enterprises not included in the National greenhouse gas emissions Plan for 2018-2021.

The main positions for the defense:

- the concept of decarbonization of the oil and gas complex is proposed, involving a set of priorities, principles, methods and mechanisms for reducing greenhouse gas emissions. As the main principles of the concept are proposed: the principle of «opportunity costs», «charges for environmental pollution», «the use of energy-saving technologies», «precaution» and the creation of a «low-carbon society»;

- on the basis of generalization of foreign experience methods of estimation of low-carbon potential of oil and gas complex are proved, providing for the integrated use of environmental and economic indicators (*intensity of greenhouse gas emissions, energy intensity of the production process, decarbonization of production, energy efficiency in production*) and economic and mathematical model;

- scenarios for reducing greenhouse gas emissions in the oil and gas sector until 2030 were developed based on the UNFCCC methodology and the use of MACC predictive modeling methods: *basic scenario*, taking into account achievement of planned indicators of oil and gas production; *pessimistic scenario* if national emission reduction commitments are not achieved; *optimistic scenario* - in case of implementation of all measures in accordance with the Strategic Plan - 2025.

- the directions of improving the economic mechanisms of decarbonization of the oil and gas sector are justified, providing for the transition to paid quotas and the introduction of a carbon tax in sectors not included in the draft National Plan for Reducing Emissions for 2021-2023.

The theoretical and practical significance of the study results. The theoretical and methodological developments obtained during the study contribute to the development of the draft Low-carbon Development Strategy until 2050 and the development of the concept of decarbonization of individual industries and enterprises.

The theoretical development of this study can be used in the preparation of educational programs for economic and environmental specialties and in reading courses in the disciplines «Environmental Economics», «Sustainable Development», «Green Economy» and other courses and disciplines.

The connection of this work with other research papers. The dissertation was carried out during the implementation of scientific projects under the fundamental research programs of the Institute of Economics of the Ministry of Education and Science of the Republic of Kazakhstan on the theme «Development of theoretical and methodological foundations of low-carbon development of the economy of Kazakhstan: principles, forecast scenarios and mechanisms for their implementation» (MES RK grant 1740/GF4, number GR 0115RK00797; 2015-2017); Separate scientific conclusions and proposals of the research were used in the preparation of the project “Kazakhstan's path to a knowledge-based economy based on the third technological modernization: strategy, models and development mechanisms” (TF F.0836, number GR 0118RK01076; 2018-2020).

Approbation of research results. Approbation of the thesis was carried out at all stages of its implementation. The main provisions and conclusions of the thesis were discussed at the following international scientific and practical conferences: International scientific and practical conference «Innovation economy and humanization of society and the global world and Kazakhstan», dedicated to the 70th anniversary of the academician of the NIA RK, Doctor of Economics, Professor Sabden O.S. (Almaty, 2017); International scientific and practical conference «Kazakhstan in the global economy: new realities and challenges», dedicated to the 65th anniversary of the Institute of Economics of the Ministry of Education and Science of the Republic of Kazakhstan (Almaty, 2017); International scientific and practical conference «Economic thought of Kazakhstan: search and solutions», dedicated to the 100th anniversary of academician Ashimbayev Tuimebayev Asimbayevich (Almaty, 2018); International Conference on Business and Economics and 14th KODISA International Conference Seoul National University (Seoul, 2018); International scientific and practical conference «Kazakhstan's economy: from the present to the future» (Almaty, 2019); Annual scientific conference «Lomonosov readings-2019. Economic relations in the context of digital transformation» (Moscow, 2019); Round table on the topic «Discussion of the draft of the new Environmental Code of Kazakhstan» within the framework of the implementation of the Address of the Head of State Kassym-Zhomart Tokaev to the people of Kazakhstan «Constructive public dialogue-the basis of stability and prosperity of Kazakhstan» (Almaty, 2019); Round table «Green technologies and prospects for low-carbon development in Kazakhstan», organized by the Council of Young Scientists of the Institute of Economics of the Ministry of Education and Science of the Republic of Kazakhstan (Almaty, 2019).

The results of the thesis were proposed as recommendations for the draft Environmental Code of the Republic of Kazakhstan, regarding «monitoring of the climate and the ozone layer of the Earth, as well as a comprehensive assessment and forecast of their condition», to Article 5, Section 1, Chapter 1 «Instruments of state regulation in the field of greenhouse gas emissions and removals». A scientific report was sent to JSC «Jasyl Damu» on the topic “Development of scenarios for reducing greenhouse gas emissions in the oil and gas sector of the Republic of Kazakhstan until 2030 based on the use of the MACC model,” about which an act was received on the practical application of the results of the dissertation research signed by the Deputy General Director of JSC «Zhasyl Damu» Sergazina G.Kh. (№19-01-390, 25.12.2019.).

Publication of the research results. The main provisions and conclusions to be defended are reflected in 12 scientific papers (62 p.p.), of which 1 article is published in a journal with a nonzero impact factor and is included in the Scopus database, 1 article was published in the journal, indexed in the Scopus database, 3 - in scientific publications recommended by the Committee for control in education and science MES RK, 7 - in the collections of scientific papers based on the materials of international scientific and practical conferences, including 2 that have passed abroad.

The structure and scope of the thesis. The structure of the thesis reflects the logic, the order of research and the algorithm for solving the posed problems. The thesis consists of content, symbols and abbreviations, introduction, three sections, conclusion, list of used sources and six applications. The volume of the research is 121 pages of typewritten text comprising 25 tables, 17 figures. The bibliography includes 141 names.