REPUBLIC OF AZERBAIJAN

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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

IN THE REPUBLIC OF AZERBAIJAN IN ENERGY INFRASTRUCTURE IMPROVING THE ORGANIZATIONAL-ECONOMIC MECHANISM OF TECHNICAL REGULATION

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STUDY OVERVIEW

Relevance of the topic and the degree of its elaboration. Historically and logically, infrastructure complexes formed on the basis of the division of Labor have a special place and importance in the economic system. Currently, the expansion and complication of the functions performed by the infrastructure is taking place in connection with the development processes. The growing importance of infrastructure in the organization and management of production challenges its general configuration, changing the traditional requirements for its individual elements. One of the most important and leading roles in the environment of infrastructure complexes lies with power engineering, which is a set of large natural and artificial subsystems serving the creation, distribution and use of all types of energy resources. It is the energy infrastructure that provides one of the daily necessities of human economic activity. Modern global challenges, growing development trends of scientific and Technical Progress become the basis for the introduction of new economic and technical tools in the functioning and management of the energy infrastructure complex. As a new organizational and economic mechanism in this sphere, the Institute of technical regulation increases its effectiveness. It is essential and necessary that Azerbaijan, which has plenty of energy resources and an infrastructure complex that meets its production potential, can benefit from this efficiency. In addition, at the present stage, in the context of expansion of new economic reform measures and deepening institutional changes, the development of the energy infrastructure complex stands out as one of the priority tasks. Thus, taking into account the determining factor and sustainable stimulating image of the energy infrastructure of the economy and the population, this conceptual state documents on "Azerbaijan 2030: National Priorities for Socio-Economic Development" and "Strategic Roadmap for key sectors of the national economy" the reality is reflected. Therefore, the issues of improving the system of energy infrastructure and investing its provision with new regulatory mechanisms should be considered as one of the most important resource elements of sustainable achievement of the strategic development of the national

economy. From this point of view, the development of the concept of its development with the introduction of new organizational and economic mechanisms of energy infrastructure is one of the actual problems of the research carried out. Improving market relations, modern geostrategic realities, solving the issues of restoring the energy infrastructure of the Karabakh and East Zangazur economic regions in the post-conflict period and other new system-forming factors in this direction have once again conditioned this relevance and its transformation into the subject of research. In this context, the study of the processes and functional aspects of the formation of energy infrastructure, the analysis of its impact on the socio-economic situation, as well as the development of perspective directions for its development by technical regulatory mechanisms served as the basis for choosing the topic of the dissertation being implemented. At the same time, it should be emphasized that at the modern stage, the development of the problem in theoretical and applied terms has not been widely carried out and a clearly formulated state strategy in accordance with modern requirements for the development of the field has not been developed.

In the dissertation, the energy sector, its infrastructure complex, as well as the study of the problems of technical regulation within the framework of this system, were sourced from the research of domestic and foreign economist scientists. In the process of studying the problem, along with economist scientists, other scientists and specialists, who are technicians and lawyers, who enrich the conceptual base of the field, also referred to research. Research on the problems of scientific and technical progress of the energy sector and its infrastructure complex and conceptual issues on the development of the national economy, covering the management and regulation of the field in general Azerbaijani scientists A.K.Mirzajanzada, K.B.Yusifzadeh, Z.A.Samadzadeh, A.A.Nadirov, A.F.Musayev, G.C.Imanov, A.K.Nuriyev, M.A.Mammadov, A.A.Agayeva, S.A.Samadzadeh, M.A.Atakishiyev, E.M.Hajizadeh, C.A.Sultanov, R.M.Jabiyev, S.T.Valiyev, T.A.Huseynov, M.A.Akhundov, A.S.Shakaraliyev, B.S.Khidirov, G.A.Safarov, T.N.Aliyev, Z.A.Abdullayev and reflected in the works of others.

Theoretical foundations of infrastructure activities, developments on energy complex issues have been considered in numerous studies, among which are well-known foreign scientists M.E.Porter, H.D.Kotz, Y.K.Wicksell, A.V.Bryukhanova, L.D.Qitelman, A.I.Kuznesova, N.I.Voropay. In the field of technical regulation, scientists from Turkey Y.M.Atamer, G.K.Guner, O.Ozgener, A.Stars and others, russian scientists V.Y.Belobragin, A.B.Glichev, E.P.Gubin, T.A.Guseva, V.V.Okrepilov, I.Y.Matushkuna, S.A.Vilkova and the research of others is important.

At the same time, it should be emphasized that, despite the fact that the authors referring to their works have carried out extensive research on the problems associated with the energy sector and its infrastructure complex at the global, regional and national levels, precise mechanisms that stimulate sectoral development have not been widely and systematically presented in these studies. Also, from this point of view, approaches to assessing the impact of enterprises included in the energy infrastructure complex on the efficiency of the economy cannot be considered sufficient. The main inadequacy is due to a small study of the problems of development of the energy infrastructure complex in the context of technical regulation, which is a new phenomenon, and a number of theoretical and methodological issues in this sphere still remain the subject of discussion.

Object and subject of research: The object of the study is the infrastructure complex and its economic entities covering both parts of the national energy sector. The subject of the study is the basic factors, functional indicators and characteristic institutional and economic relations affecting the improvement of technical regulation system and its organizational and economic mechanism in modernization of Azerbaijan's energy infrastructure complex.

Aims and objectives of the study: The aims of the dissertation is to analyze and evaluate the system of indicators of the potential of the energy sector and infrastructure of Azerbaijan in terms of modern global challenges, new realities and scientific achievements, to define and put forward a substantiated conceptual proposal in this direction.

Proceeding from the goal, within the framework of the selected scientific problem, the following scientific objectives are set out, which determine and solve the logic of the dissertation research and its structure:

- to analyze the fundamentals and functional features of the theoretical concept of the energy sector and its infrastructure complex;
- to disclose the axiological essence and content of technical regulation, to distinguish and systematize its characteristic features and main elements;
- to assess the role and importance of technical regulation in increasing the rationality of energy infrastructure in the sphere of modern economic relations;
- analyze and evaluate the current state of the infrastructure complex of the national energy sector on the basis of a retroceptive vision and a new situational approach and enrich the reform base in this sphere with substantiated new concepts;
- to assess the state of national energy security by making calculations from the point of view of key energy efficiency and to identify its strengths and weaknesses, opportunities and threats on the basis of SWOT analysis;
- to assess the modern level of the normative-legal framework and institutional system of technical regulation in Azerbaijan, to put forward proposals that determine the necessary sphere of its application in the national energy infrastructure complex;
- to form a resource base and a system of integral elements of the organizational - economic mechanism for the restoration of the energy sector of the Karabakh region and infrastructure reconstruction in the post-conflict period;
- to carry out work and prepare relevant proposals on the formation of appropriate optimal infrastructure complex, which stipulates innovative development in the energy sector and justifies the transition to a liberal market model;
- to identify a group of technical regulations that pave the way for effective development in the national energy infrastructure on the basis of advanced world experience and to prepare substantiated

conceptual proposals on improvement of organizational and economic mechanism of technical regulation system on the field.

The basis of research methods is a systematic and situational approach to the study of knowledge in the scientific, as well as economic, technical and legal spheres. The research process was carried out using the tools and mechanisms of empirical, theoretical research, scientific logic, expert evaluation, statistical grouping, schematics, graphical description and other economic analysis, reflecting the principles of verification.

Benchmarking and cluster approach methods were also widely used in the research process to ensure efficient performance. The theoretical and methodological basis of the research in the dissertation is the concepts presented in the scientific works of national and foreign scientists on the mechanisms of technical regulation in the energy sector, research works of the world's leading organizations in the field, legislative acts. The information-empirical base of the study is based on conceptual state documents on Azerbaijan 2030: national priorities for socio-economic development and “the main directions of the strategic roadmap for key sectors of the national economy”, the law of the Republic of Azerbaijan “on technical regulation” and other relevant state programs, reports, statistical data and author's calculation and analysis materials.

The main provisions of the defense:

- presentation of a new analytical interpretation based on the global challenges, the expansion of digitalization and the transition of development to the next phase of industrial revolutions, the functional aspects of the energy sector, the modern system of indicators;
- modern scientifically modified interpretation of the content and essence of the infrastructure based on the analysis of theoretical and practical aspects of the energy complex, determination of its organizational impact factors and functional features;
- substantiation of the axiological quality of technical regulation and its impact on economic growth against the background of modern economic relations, assessment of the importance of the efficiency of energy infrastructure;

- assessment of the current state of the infrastructure complex of the national energy sector, enrichment of the reform base with new concepts and assessment of national energy security on the basis of SWOT analysis;
- The current state of the institutional system and normative-legal base of technical regulation in Azerbaijan was analyzed and evaluated and directions for improvement in this area were put forward on the basis of advanced international experience;
- analysis of the technical regulation system in the national energy infrastructure complex as a modern economic event and instrument, identification of the group of elements determining the feasibility of its necessary scope of application;
- development of a system of measures characterizing the appropriate organizational and economic mechanism for building a new energy infrastructure in the liberated territories and a model of a green energy cluster of prakiti importance for the region;
- to put forward reasoning proposals on the formation of optimal infrastructure complex with oligopolic structure, ensuring sustainable and innovative development in the national energy sector and transition to a liberal market model in this direction;
- by making generalizations on analyzes and evaluations in terms of advanced world experience, putting forward conceptual specific ideas on determining the group of technical regulations that are the basis for sustainable development and efficiency in the national energy infrastructure and improving the organizational-economic mechanism of technical regulation in the field.

The results reflecting the **scientific novelty of the study** are as follows:

- functional features of the energy sector are analyzed in the context of modern production relations and requirements and indicators of liberal economy, such as “energy sector”, “infrastructure”, “complex”, “energy infrastructure”, etc. the classification of the positions of local and foreign researchers on the essence and elements of the concepts was carried out, their scientific interpretation was presented in a new apsect, a separate definition of the energy infrastructure was formed, a proactive model structure of

the relevant sphere was developed which created a special definition of the energy infrastructure and gave it value and content;

- the axiological basis and characteristic features of the technical regulation were analyzed, systematized by appropriate generalizations, its role and importance in increasing the rationality of energy infrastructure in the sphere of modern economic relations were evaluated;
- in retrosceptive and new situational approach, the current state of the infrastructure complex of the national energy sector was analyzed and evaluated, new concepts were put forward that enrich the reformation base in this area, strengths and weaknesses, opportunities and threats of energy security were identified by creating a matrix based on the SWOT analysis, and the system of indicators by algorithmic, it is justified that the country's energy security risks are very low and the implemented form of energy policy is based on the abundance of natural resources and the perfection of infrastructure potential;
- the current state of institutional system and normative-legal base of technical regulation in Azerbaijan was analyzed and evaluated, complex proposals were put forward that would provide improvements in this direction on the basis of advanced international experience;
- functional structural model of prakiti significant green energy cluster and its organizational-economic mechanism have been developed in the direction of restoration of energy sector and formation of new infrastructure in the liberated zone;
- the formation of an optimal infrastructure complex with oligopolic structure in the national energy sector, which expands sectoral diversification, accelerates innovative development, increases competitiveness and conditions the transition to the iberian market model, is substantiated;
- the structural elements determining the improvement of organizational and economic mechanism of technical regulation in national energy infrastructure have been identified and the group of technical regulations have been substantiated which are the basis for sustainable development in the field.

Theoretical and practical significance of the research. The theoretical significance of the study lies in the development of the theoretical foundations of the concept of energy infrastructure and enriching it with scientific knowledge on the mechanisms of technical regulation. It is also possible to use the materials of the dissertation work and the results obtained, as well as in the direction of conducting further research to be carried out in this area. The practical importance of the research is that the results obtained here, the proposed proposals can be used in the preparation of conceptual state documents on technical regulation and in the implementation of the state program on adapting the national standardization system to international requirements.

Approbation and application. The main provisions of the research work "Directions of increasing energy efficiency in Azerbaijan", "Science and technology in modern society: problems, forecasts and their solutions" international scientific-practical virtual conference, Turkey, Izmir, September 26-27, 2020; "The role and importance of technical regulation in increasing efficiency in the energy sector", "Energy Security and Energy Efficiency: Global Challenges and National Interests". Materials of the first international scientific-practical virtual conference, Azerbaijan-Estonia-Georgia-Ukraine, 18-19 June 2021; "Problems of technical regulation in Azerbaijan's energy sector and directions for improvement of its institutional system", national scientific conference "Global challenges and perspectives in economic development" dedicated to the 99 anniversary of the birth of national leader Heydar Aliyev, Baku, Western Caspian University, May 11, 2022 was presented at national and international level scientific and scientific-practical conferences held on the mentioned dates.

The main results of the research were accepted by "Ganja Non-Ferrous Metal Processing" JSC and International Ecoenergetics Academy for future application (*"Ganja Nonferrous Metal Processing" JSC - act dated 03.09.22 and reference number 1111/206 of the International Ecoenergetics Academy dated 09.03.22*).

17 journal articles and 11 conference proceedings were published on the main provisions of the study. Of the 17 journal articles published, 3 were published abroad, and of the 11 conference materials, 2 were published abroad.

The name of the organization in which the dissertation work is performed. Institute Of Economic Scientific Research Of The Ministry Of Economy Of The Republic Of Azerbaijan.

The structural sections of the thesis and its total volume. The structure of the dissertation, consisting of an introduction, three chapters, nine paragraphs, conclusion and list of literature, is determined in a logical structure according to the content, subject and object of research, goals and objectives. The total volume of work covers 172 pages. The number of signs consists of 7 tables, 14 scheme, 8 pictures, 2 graphs, as well as 194 signs, excluding 264905 numbers of lists of literature. The sign number is classified according to the structure of the dissertation, including cover and contents 1762, introduction 18436, Chapter I 80444, Chapter II 71072, Chapter III 74295 and Conclusion part 20658.

MAIN CONTENT OF THE WORK

In the **introductory** part of the dissertation work, the relevance of the topic, the degree of its elaboration are substantiated, the object and subject, goals and objectives, research methods, the main provisions to be defended are determined, scientific novelty, theoretical and practical significance, approbation and application, the name, structure and volume of the organization to which it is performed are presented.

In Chapter I of the dissertation "**Theoretical aspects of technical regulation in energy infrastructure**", of the essence and functional features of the energy sector of the economy were investigated, modern theoretical and methodological design in the field of energy infrastructure complex was determined, the role and importance of technical regulation in increasing the efficiency of energy infrastructure were.

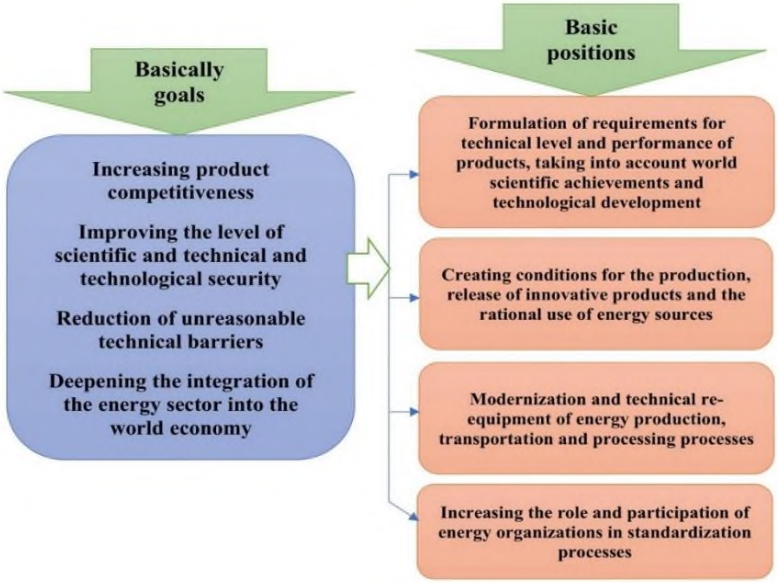
The analysis and assessments carried out here first of all justify the fact that the energy sector is at the heart of the economy as a whole. It also acts as a separate sector of the economy by interacting with energy production and transmission facilities and adds special added value to economic development. Strongly depends on its products, material services, all other types of production, as well as the existence of the people themselves. This reality is embodied in the creative, protective and reinforcing essence of the energy security of the energy sector and its leading economic functional nature. The energy sector, being an economic and technical category, has legal norms, carries a creative system of turnover and also forms the subject of environmental legislation. From an organizational and technical point of view, the energy sector is a structure that encompasses the exploration and production of natural energy resources, the transformation of primary natural energy sources and the acquisition of secondary energy from them, as well as enterprises and organizations that carry out the distribution and use of energy for the needs of the population. From this point of view, a two-ring modern model of the energy sector of the economy is developed and the scheme is presented.

In the research work, along with the quantitative and qualitative indicators of the energy sector, studies are carried out in the direction of the infrastructure complex, which embodies this sector in the subsystem. First of all, analysis and assessments on the essence of infrastructure, basic principles of its formation, functional features are carried out, the opening of the Genesis, etymology of the concepts of “infrastructure” and “infrastructure complex”, scientific interpretation of the system designation in classical economics and modern theory are given. Theoretical and methodological design of the strategic content characterizing its versatility and complexity in the energy sector is defined and on this basis its proactive model is formulated and presented.

The role and importance of technical regulation in increasing the efficiency of energy infrastructure is assessed and indicated that its axiological basis is aimed at maximum integration of the national

market into the world economic system and ensuring compliance of mandatory requirements for products with international norms and rules. Technical regulation also acts as an integral part of general state regulation. Social essentiality is also characteristic of him. Technical regulations are the most important application element of technical regulation. Technical regulations is a document that is mandatory for execution, covering the production processes and methods, including the characteristics of any product or its associated administrative provisions. It can also include terminology, symbols, packaging, marking or labeling requirements, or can be entirely devoted to these issues. In this regard, it differs from the concepts of "standardization" and "standard".

The analysis and research carried out to assess the role and importance of technical regulation in increasing the efficiency of energy infrastructure gives grounds to determine its functionality in this sphere. In this regard, the author presents a scheme that integrally reflects the goals and objectives of technical regulation in the energy sector and its infrastructure complex:



Scheme 1. Goals and objectives of technical regulation of the energy sector and its infrastructure complex.

The analysis and research shows once again that this phenomenal formation acts as an important element of modern market regulation and an important instrument of Public Administration in this direction. It provides for the creation of an active competitive environment in economic and social life and stimulates the introduction of innovations. The impact effects of technical regulation bring more growth than activities in the field of tariff regulation of GDP.

Chapter II of the dissertation entitled "**Analysis and evaluation of the infrastructure complex of the energy sector of the Republic of Azerbaijan and its technical regulation system**" included retrospective analysis of the current state of the national energy sector and its infrastructure complex in the context of reforms strategy carried out in the country, institutional system and normative-legal base of technical regulation in here, the national energy sector and its infrastructure complex have also been analyzed and evaluated the existing application sphere of technical regulation.

The analysis of the infrastructure complex of the energy sector of Azerbaijan was carried out on the basis of the success concept of the national oil strategy formed by great leader Haydar Aliyev and effectively realized by President Ilham Aliyev, its potential was assessed, scientists of the system of modern facilities were identified and unified and grouped. The indicators reflecting the current state of the infrastructure complex of the national energy sector are reflected in the following table:

Table 1.

Energy sector in the Republic of Azerbaijan infrastructure indicators reflecting the current state (*2022*)

Indicators	Unit of measurement	Volume	Indicators	Unit of measurement	Volume
Oil production	mil. tons	32,6	Gas Consumption	bil. m^3	13,5
Oil exports	mil. tons	26,3	Elect. generation	bil. kW·h	28,9
Oil refining	mil. tons	6,2	Elect. consumption	bil. kW·h	23,1
Gas production	bil. m^3	46,7	Electricity exports	bil. kW·h	3,0
Gas exports	bil. m^3	22,3			

When comparing and evaluating the data in Table 1, we see an increasing dynamism in the country in exchange for energy power. This power also strengthens the country's energy security. Summarizing the analysis and assessments, we see that energy security in the country is sufficient in both links of energy production. The following formula composition should be used to obtain such a designation:

$$E_{RSR} = \{E_{ORSR} + E_{GRSR} + E_{ESC}\} = \{E_{Pr} = E_{PrOR} + E_{PrGR} + E_{EG}\} : \{E_{C} = E_{COR} + E_{CGR} + E_{EC}\} \quad (1)$$

Here:

E_{RSR}	energy resource security ratio;
E_{ORSR}	oil resource security ratio;
E_{GRSR}	gas resource security ratio;
E_{ESC}	electricity supply coefficient;
E_{Pr}	energy production in the republic
E_{PrOR}	energy production on oil resources
E_{PrGR}	energy production from gas resources;
E_{EG}	electricity generation;
E_{C}	energy consumption in the republic;
E_{COR}	energy consumption on oil resources;
E_{CGR}	energy consumption on gas resources
E_{EC}	electricity consumption.

It should be noted that if the coefficient of energy supply is greater than the unit, the energy security of the country is established, and if it is small, it is considered insufficient. Reflecting Table 1 indicators in Formula 1, energy safety indicators for oil, gas and electricity in the Republic will be as follows:

E_{ORSR}	oil resource security ratio = 5,3;
E_{GRSR}	gas resource security ratio = 3,5;
E_{ESC}	electricity supply coefficient = 1,3.

The results obtained from the aggregate energy security coefficients once again show that in the context of the main energy carriers in Azerbaijan, it is indisputable that energy security is fully ensured. This is several times superior to oil and gas resources. However, this purpose cannot be considered ideal. Modern requirements are that the energy security of any country is not only assessed in terms of quantity, but also the qualities that are important here. This degree of quality is determined by the following matrix using the SWOT analysis method:

Strengths	**Weaknesses**
Political-economic-social stability	Assignment of most gas resources to foreign liabilities
Domestic natural energy resource potential	Non-compliance of the capacity of gas treatment plants with production gas volumes
Domestic energy production, transportation and service infrastructure	Lack of domestic production of high-octane gasoline
High gasification and its growth rates	Limited competitive private infrastructure
Improving institutional and legal framework	Incomplete formation of the liberal energy market
State priorities - reform strategy	External dependence on a number of high quality energy products
Opportunities	**Threats**
Expanding the application of technical regulation	Risks of sustainable provision of investments in infrastructure reconstruction
Improving energy efficiency	External meeting of separate side production supply segments
Development of new gas fields at the expense of internal resources	Delays in modernization and reconstruction activities
Sustainable innovation and technological advancement	World economic crises and other force majeure

Figure. SWOT analysis matrix of quantitative and qualitative indicators of energy security in the Republic of Azerbaijan

Our SWOT analysis shows that energy security risks in Azerbaijan are very low. However, to make this dynamism more credible and sustainable, all alternatives that strengthen the country's energy security must be brought together, the renewable energy strategy must be deepened, innovation must be increased, energy efficiency issues must be addressed, prospects for nuclear energy must be considered, a new modern system must be formed.

This chapter of the study assesses the institutional system and regulatory framework of technical regulation in Azerbaijan, clarifies the scope of institutions of technical regulation in the country and develops a schematic model of it. The Law on Technical Regulation has been instrumentally analyzed taking into account international experience, its superior features have been noted, the scope of non-subject areas has been indicated, and the methods of assessment and comparison based on benchmarking have been identified. provisions have been put forward.

During the implementation of the analysis and evaluation of the existing application sphere of technical regulation in the national energy infrastructure complex, the relevant provisions of the functional system of the relevant technical regulations of the Eurasian Economic Union, the Eurasian Customs Union and the European Union in the field of energy were identified and presented in analytical mechanism and schematic structure.

Chapter III of the dissertation entitled "**Targets for the development of energy infrastructure, organizational-economic mechanism and directions for the improvement of technical regulation to increase its effectiveness**" analyzes the directions of restoration and reconstruction of the energy sector of the Karabakh region in the post-conflict period, the formation of an optimal infrastructure complex in the national energy sector and improvement, the targets and conclusions that ensure effectiveness are substantiated and relevant proposals have been put forward.

The electricity demand of the liberated territories has been calculated and the forecast indicators for these calculations are reflected in the following table:

Table 2.

Forecast indicators of electricity demand in the liberated territories for 2025-2040

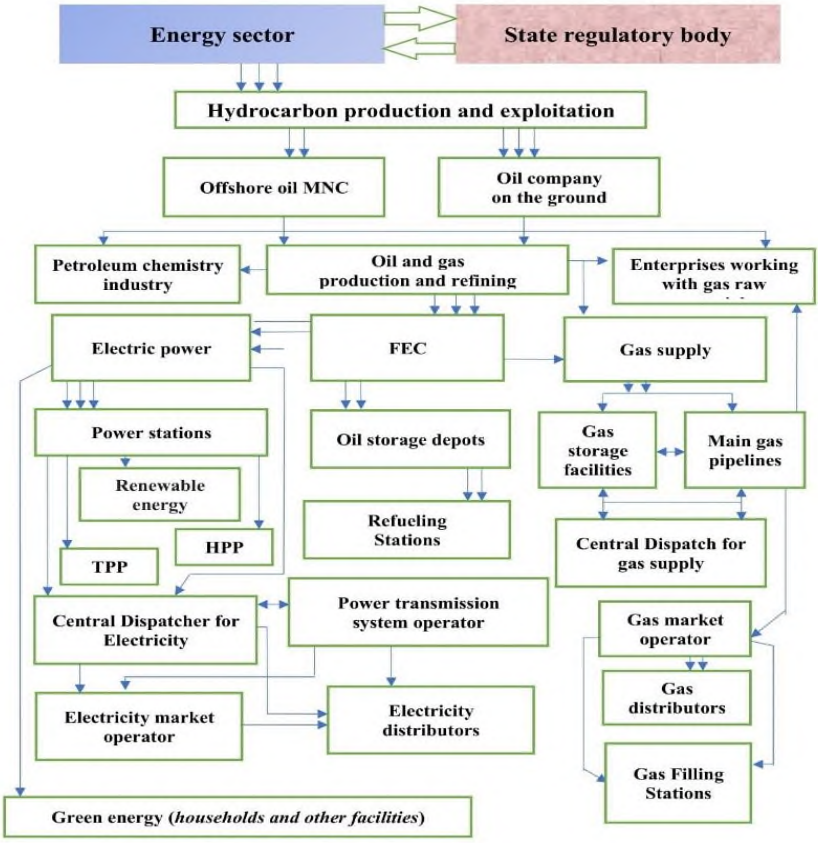
Years	**Power** (*MW*)	**Production** (*billion kWh*)
2025	98-164	0,6-1,0
2030	169-266	1,0-1,6
2035	237-395	1,4-2,8
2040	310-518	1,9-3,2

As can be seen from Table 2, in the next 15-20 years, these areas may have an average power demand of 300-500 MW and 2-3 billion kWh of electricity (*solar, wind and hydro*). According to preliminary estimates, there are about 45 hydroelectric power plants in the liberated territories. Despite the fact that most of them were destroyed and rendered unusable, their potential is estimated at 500 MW (*with the exception of "Khudafarin" and "Giz Galasi" hydroelectric power plants*). It should be noted that in order to obtain the necessary perspective generation power, it is planned to implement the construction project of solar power plant with a capacity of 240 MW (*500 million kWh of electricity per year*) in Jabrayil-Zangilan area. Geothermal energy potential in Kalbajar and Shusha is also evaluated and specified. At the same time, there is a large hydropower potential on Tartarchay, Hekari River, Bazarchay and their tributaries, as well as more than 7,000 MW of solar energy in Gubadli, Zangilan, Jabrayil and Fuzuli regions, as well as 2,000 MW of wind energy potential in Lachin and Kalbajar (*wind in mountainous areas average annual rate of 7-8 m/s*) should be estimated. In total, the energy potential in these areas is 7,2 thousand MW of solar and 2,0 thousand MW of wind energy.

Analyses and assessments on restoration of the energy sector and formation of infrastructure in the liberated territories were carried out on the basis of conceptual features and characteristics of organizational-economic mechanism and associated economic tools and methods, forecasting indicators of electricity demand for 2025-2040 in Karabakh and East Zangazur economic regions were

developed, as well as a system of justified activities In addition, the rational structure of the organizational-economic mechanism of the green energy cluster system was presented on the basis of reorganization of the infrastructure in the post-conflict zone.

An oligopolic market model reflecting the formation of an optimal infrastructure complex in the national energy sector has also been developed:



Scheme 2. Model of oligopolistic market-type optimal infrastructure complex in the energy sector of the of Azerbaijan.

In the dissertation, scientific-analytical interpretations are given, which present each item of this model in an analytical interpretation,

political, economic, natural, environmental factors that condition and influence this optimality are shown.

Proceeding from the existing general approaches, a model system has been formed that determines the full effectiveness of technical regulation in energy infrastructure:

E_{econ} - Economic efficiency - achieving quality improvement, cost savings and cost reduction of energy products using technical regulations;

E_{tech} - Technical efficiency-improving the reliability of production facilities of the power system by means of technical regulation and standardization tools, improving the quality of its products and reducing harmful emissions;

E_{inf} - İnformation efficiency-ensuring full accessibility of all members of the society to the quality and reliability indicators of release products;

E_{soc} - Social effectiveness-improving the quality of work and services, reducing industrial injuries and protecting nature.

All this will certainly be realized with the widespread use of technical regulations. Its full provision will include economic, technical, information and social effectiveness minus the costs associated with the preparation and operation of these technical regulations. It is possible to characterize this model by the following formula:

$$EIK_{full} = (E_{econ} + E_{tech} + E_{inf} + E_{soc}) - TR_{cost} \quad (2)$$

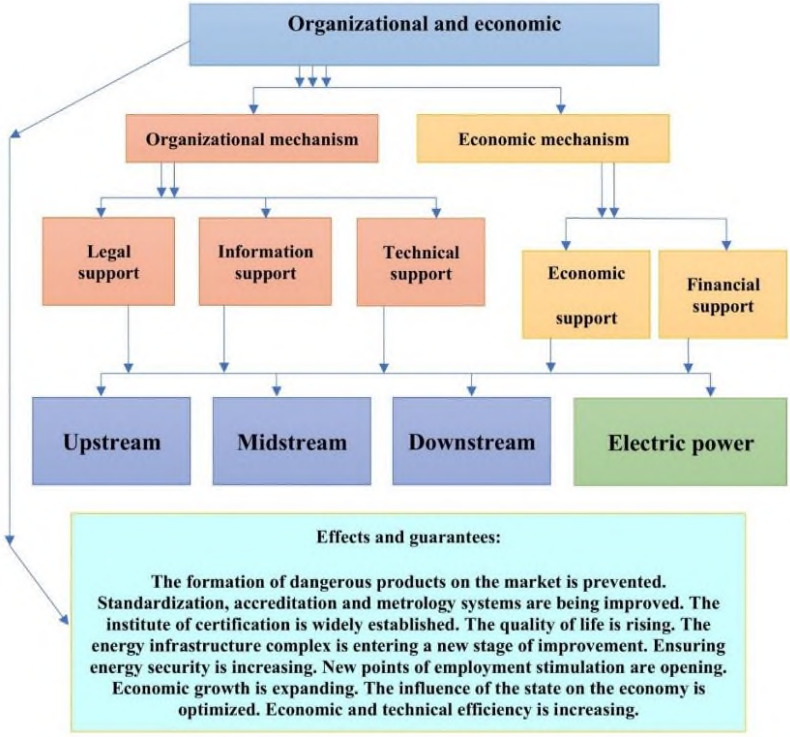
Here:

EIK_{full} full economic efficiency in energy infrastructure;
E_{econ} Economic efficiency;
E_{tech} Technical efficiency;
E_{inf} Information efficiency;
E_{soc} Social effectiveness;
TR_{cost} Costs for the preparation and activities of technical regulations.

The dynamic development of the economy and the influence of foreign political trends make their corrections in the development of

the technical regulation system. Those corrections are accompanied by the elimination of existing and new problems.

While developing the final provisions of the study on improving the organizational-economic mechanism of technical regulation in the energy infrastructure, technical regulations were developed and grouped, the application of which is acceptable in the oil and gas sector and power engineering complex in Azerbaijan on the basis of best international experience, as well as European Parliament's directives. In this regard, the infrastructure complex of the national energy sector has developed a Generalized Scheme-model on the organizational-economic mechanism, which is presented in detail in the technical regulation:



Scheme 3. General conceptual model reflecting the improvement of the organizational and economic mechanism of the institute of technical regulation in the national energy infrastructure.

Undoubtedly, the development of market relations in the economy leads to the minimization of the use of public administration methods and the increase of market methods in energy management with the transition to a more advanced phase of the process. Our research also shows that technical regulation is more effective as a new institutional creation in terms of increasing market methods in energy management, as well as in the optimization of its infrastructure. The organizational-economic mechanism of the presentation of this efficiency in the general conceptual format can be seen again in Scheme 3.

CONCLUSION

As a result of our research work on improving the organizational and economic mechanism of technical regulation in the national energy infrastructure, it is emphasized once again that without the application of any modern technical regulation tools, the efficiency and competitiveness of the national economy cannot be sharply achieved. It is for this reason that the leading world states treat the broad formation of the Institute of technical regulation in the direction of increasing socio-economic activity as one of the priorities of development.

The role and importance of energy infrastructure is great among the areas where technical regulation tools are widely used. This complex acts as an important system of vital activities that provides the needs of the state, the economy and the needs of the population with a much-needed range of energy carriers. Energy infrastructure is one of the traditional areas with strong potential, which is also traditional in the Azerbaijani economy. Based on this, the purpose of the dissertation work to improve the organizational and economic mechanism of technical regulation in the national energy infrastructure is based on the nature of the objectives, as well as the principle and nature of the main provisions of the defense, the following results were obtained:

1. The limitation of separate fundamental scientific methodological design characterizing the energy sector in economic

and technical unity and the absence of special concepts in this direction have been identified once again and the importance of classifying its model structure in theoretical-practical sphere in a combined two - ring form-apstream, midstream, downstream and power generation was substantiated [6, 8];

2. Scientific-theoretical foundations of infrastructure were analyzed in the context of evolution and modern realities, as an economic category it was formed on the basis of social division of labor, as a set of fields providing production of products and services without directly creating material goods, the complex with a multi-type, multilevel, multifunctionally complex economic-technological system was defined in [14];

3. The essence and role of energy infrastructure was disclosed, the set of functions was shown, institutional, technological, economic, social, organizational, structural, environmental and operational factors affecting its activity were revealed, importance in strengthening energy security was substantiated, strategic development directions were identified, territorial-limited multifactorial system was verified and the overall clarified interpretation was presented [14];

4. The axiological essence of the technical regulation, its phenomenal nature and role in modern economic relations in the system have been overcome in the universal context, an analytical interpretation of the growing rationality and importance of all spheres of the economy has been given, the effectiveness of its application in energy infrastructure has been substantiated [12, 17, 18];

5. The priority of the conceptual approach in the wide application of the Institute of technical regulation in the national energy infrastructure complex, the work to be done on the balance of interests and partnership of state bodies and companies, and the expediency of their regulation by precise mechanisms and a special coordination body ("*delivery unit*") is justified [20, 21, 23];

6. Retrospective and new situational approach analyzes the current state of the national energy sector infrastructure complex to gradually introduce additional resources in the assessed energy infrastructure

and ensure their optimal use, improve the competitive environment, expand the application of digitalization and "Industry-4" achievements, new energy export markets New concepts have been put forward, such as opening up, increasing energy efficiency, developing software documents to increase the share of renewable energy to 30%, identifying strengths and weaknesses, opportunities and threats of energy security by creating a matrix based on SWOT analysis, key energy supply ratio In terms of algorithmic calculations, the system of indicators was evaluated, its management based on the smart control system was substantiated [13, 18];

7. A chronology of historical realities leading to the evolution of the institution of technical regulation in the republic is given, the Law of the Republic of Azerbaijan "On technical regulation" is analyzed on the basis of expert assessment methodology, its socio-economic significance is substantiated, additional provisions are identified [22, 24];

8. On the basis of benchmarking analysis, the factors contributing to the improvement of the institutional system, regulatory framework and state control mechanism of technical regulation in Azerbaijan, including accelerating the introduction of relevant technical regulations in the economy for the production of better and higher safety goods, defining conformity assessment modules and procedures factors grouped, including the development of rules, the development of national standards to replace GOST standards and the expansion of the application of interstate standards, as well as the deepening of reforms in the national accreditation system [25];

9. The national energy sector and its infrastructure complex have been analyzed and evaluated in connection with the current application of technical regulation, production, transportation and preparation of hydrocarbons on the first ring, drilling and landscaping of fields, processes and systems of gas supply, mining equipment, oil and gas chemistry industry and their technological infrastructure, State and private enterprises of fuel and energy complex on, state and private enterprises of electric motors, devices and equipment, technological infrastructure and facilities were determined by justification [24, 25];

10. The current state of the institutional system and normative-legal base of technical regulation in Azerbaijan was analyzed and evaluated, complex proposals were put forward that would provide improvements in this direction on the basis of advanced international experience, in the national energy infrastructure complex, the system of elements that stipulate the expedient application sphere of the Institute of technical regulation and ensure its competitive development is grouped by subjects and objects, while conducting assessments characterizing the success concept of energy efficiency, principled aspects that necessitate its expansion are identified and the development of relevant strategy and state programs [10, 11, 16, 24];

11. The state and prospects of green energy in Azerbaijan, natural resource potential of Karabakh and East Zangazur economic regions, post-war restoration and infrastructure reconstruction were analyzed, the importance of forming green energy clusters that will enhance regional power in the post-conflict period was substantiated and functional structural model of organizational-economic mechanism was developed in this system [19, 27, 28];

12. The importance of new advanced technologies in the oil and gas industry such as seismic construction "UniQ", "Smart Grid" in the electric energy sector, as well as reducing the negative impact on the environment, as well as relevant development scenarios on the basis of oil and gas industry models in a number of world countries and fuel and energy balance indicators in G20 countries [15, 26];

13. Analysis and generalizations on the formation of a new optimal complex based on new goals and restructuring of the national energy sector were carried out, a new market model of the oligopolic format diversified energy infrastructure in a broad interpretation and schematic structure was developed and system quality was justified [19];

14. İn the infrastructure complex of the national energy sector a scheme-model of the general-conceptual character reflecting the improvement of the organizational-economic mechanism of the Institute of technical regulation and its effects and guarantees was developed and the following ***suggestions and recommendations***

[19] Baku, News of Azerbaijan Higher Technical Schools

were put forward in this direction [11-15, 17, 19, 21-25]:

• identification of the coordinating body (*structure*) in the field of technical regulation, ensuring continuous improvement of its institutional system and normative base in an indicative circle on the basis of best practice;

• development of concepts related to technical regulations on different sectors of the economy and adoption of relevant state programs;

• implementation of relevant standards for the creation of new types of products and technologies in the scientific research, experimental design work, elimination of technical barriers to trade, achieving recognition of the results of conformity assessment abroad;

• effective organization of propaganda work in the field of technical regulation and standardization, provision of technical support to the private sector, development of quality infrastructure for the transition to "Industry-4", provision of qualified personnel in the relevant field;

• improving the legislation in the field of technical regulation, in particular, the laws "On technical regulation", "On standardization", "On accreditation in the field of conformity assessment", "On ensuring uniformity of measurements" and "On protection of consumer rights" in accordance with new practical realities;

The results of our analysis and assessments to improve the organizational and economic mechanism of technical regulation in the national energy infrastructure will be accompanied by numerous economic and technical effects of the technical regulation institute, both at the national level and in the context of energy infrastructure. At the same time, first of all, the emergence of hazardous products in the energy sector, as well as in the general market, will be prevented, and the scope of certification and standardization institutions will be expanded and improved. Many areas of the economy, including the energy infrastructure, will enter a new stage of development. The impact of the state's tariff and tax policy on the economy will also be diversified in the context of technical regulation, new points of employment stimulation will be created, energy security will be more effective, and economic growth will be qualitative and sustainable.

The main content of the dissertation is reflected in the following scientific works:

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2. Hajizadeh, N.E. Society for Worldwide Interbank Financial Telecommunications: advantages and risks // – Baku: Cooperation, - 2019. №3, – p. 167-174.

3. Hajizadeh, N.E. Impact of international transactions on the globalization of financial markets // "Modern information, measurement and management systems: problems and prospects". Materials of the first international scientific-practical conference, – Baku: – July 1-2, - 2019. – p. 78-79.

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