Energy security of residential buildings as an aspect of managerial activity in the modern concept of globalization

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Abstract. The paper shows the management aspects of ensuring the safety of residential buildings. The article presents an analytical review of the state of the existing heat supply systems in the Russian Federation, assesses their energy security, highlights the results of research into the causes of accidents in engineering systems in water-bearing communications, and provides methods and comparative calculations of failures of these systems. It is indicated that according to the results of the All-Russian Census of 2010, the total population of the Russian Federation at the time of the survey was 142 million 857 thousand people living in more than 1100 settlements that have the status of the city (subject to their identification by population, administrative and national economic significance and the nature of the building), as well as in almost 160,000 rural settlements. It should be noted that in accordance with the classification of settlements in the Russian Federation, there are five main categories, namely: The above classification of settlements has formed the basis for the analysis of the existing processes of functioning of the heat supply systems of the Russian Federation at the objects of housing, social and industrial development from the point of view of energy security. Thus, for example, it turned out that in large cities with multi-storey buildings the centralized heat supply system is dominated by a system consisting of one or several sources of heat, heat networks having different diameter of pipelines, their number and length, and also serving various types of heat consumers) from cogeneration plants (CHP) of public use, or industrial enterprises. As for the welterweight and small towns, including urban-type settlements with a multi-storey building of the post-war period, they, as a rule, have the majority of IGFs, fed from the city or district boiler houses.

1. Introduction

Ensuring and supporting the energy security of the state, in particular in the sphere of housing and communal services (hereinafter - housing and communal services) of large cities and urban agglomerations, both in the coming years and in the future, should become the determining factor that will contribute to economic growth and dynamic development of the national economy. Analyzing the state of energy efficiency in the Russian Federation in comparison with other countries and regions of the world, one can formulate one of the basic requirements for ensuring energy independence and energy security - the need to achieve a high level of energy efficiency in the production of products and services. The level of energy consumption in the Russian Federation, both in the industrial sector and in the housing and communal services sector, currently does not correspond to the world one, far exceeding the corresponding indicators of the developed countries of Europe and the US, which negatively affects the level of energy security and economic competitiveness. In addition, due to a constant increase in the
level of world and domestic prices for fuel and energy resources, this leads to a significant reduction in
the profitability of domestic production and a decline in the level of GDP in the Russian Federation.

It should be noted that studies of this scientific problem should take into account existing world
trends and current challenges, primarily related to the assessment of the impact of the implementation
of the relevant provisions, the desire to adapt to European standards.

2. Methods
Due to the special complexity and extreme urgency in the contemporary realities of the Russian
economy, the subject matter studied is the subject of analysis by economist scholars and lawyers and is
now vividly debated in the scientific and business circles. So, the works [2-4] are devoted to the
assessment of the current state, the analysis of problems and the search for directions for improving the
economic and legal support for energy saving and energy security in the Russian Federation.

Institutional aspects of energy saving investments and issues of reforming the tariff policy of the Russian
Federation, in particular in housing and communal services, taking into account the requirements of the
relevant EU directives, have been investigated and developed in [5-9]. A profound and comprehensive
analysis of various aspects of the development of urban agglomerations in the Russian Federation and
the world contains the works of many domestic and foreign researchers [10-12].

However, despite the considerable scientific reserve, the issues related to overcoming the risks of
increasing the cost of energy resources, reducing their unjustified costs by increasing the energy
efficiency potential and resource saving in housing and communal services, and attracting additional
financial resources to overcome the loss-making of municipal enterprises in urban agglomerations of
the Russian Federation remain insufficiently illuminated Federation in modern conditions of
management.

In this regard, the purpose of the article is to develop proposals for the provision and support of
energy security in the area of housing and communal services in urban agglomerations, taking into
account the requirements and limitations of relevant provisions of the law, the advantages and threats of
their implementation.

Despite a large number of definitions of the concept of "energy security", contained in the scientific
literature or listed in regulatory legal acts according to the subjects of their regulation, they are all tied
to the context by which this problem is considered [2, 4]. This is due to the absence until now of the
legal uniformity of the Russian Federation of a single, unified, established definition of energy security
that would fully disclose the content of the concept, taking into account the challenges of modern
realities of the economy, including, in particular, the exacerbation in recent years of threats and risks in
the energy sector Security and the requirements of the relevant provisions of the law. It should be
emphasized that the most acceptable for the purposes and objectives of the article is the definition of
this term, given in paragraph 5 of the Guidelines for Calculating the Level of Economic Security of the
Russian Federation, according to which energy security is a state of the economy, which contributes to
the efficient use of the country's energy resources The energy market of a sufficient number of energy
producers and suppliers, as well as the availability, differentiation and environmental friendliness of
energy resources In [13].

3. Results
The legislation consolidates the commitments made earlier in the framework of the European Energy
Community and establishes a clear timetable for their implementation from the date of entry into force
of the agreement. These commitments provide for the implementation of a number of European
directives aimed at transforming the environment in the electricity and natural gas markets (directives
of the Second and Third Energy Packages) as well as the technical and technological structure of
production capacities and the energy balance in general (directives on energy efficiency, use of
renewable sources Energy, limiting emissions of harmful substances and the like) [8]. At the same time,
according to experts, the most financially tangible block of obligations is precisely the implementation
of projects on energy efficiency - the total costs (including non-consumable expenses of the population)
of which by 2020 may amount to 86.0 billion euros. The total cost of implementing infrastructure-related commitments by 2020 may amount to 100.7 billion euros (in addition to investments envisaged by the Energy Strategy of the Russian Federation until 2030. [14]). Given that more than half of the energy efficiency spending needs to fall on the household sector, where the energy saving potential is the most economically viable, the ability to meet the targets for reducing final energy consumption will depend on the effectiveness of the introduction of interconnected systems of clear price signals and compensation mechanisms formed with the participation State.

At the same time, among the main factors-threats to energy security in the sphere of housing and communal services, within the framework of the legislation, one should include:

- a high percentage of the moral and technical deterioration of the communal infrastructure and, in general, the basic energy funds and building structures, the use of obsolete technologies; Unsatisfactory technical condition of external networks and objects of heat, water supply and sanitation (in particular, heat losses through poor-quality pipe insulation and pipe damage in some cases make up 15-25% of the released thermal energy against 13%, stipulated by the approved standards). The values of the indicators, reflecting the current critical state of the housing and communal services in general, and the infrastructure facilities, networks and enterprises of the area, are impressive: in some cities of the Russian Federation (and this is not a single case, but rather a trend inherent in the vast majority of cities and urban agglomerations) Losses are 70-80%; The heat loss on the routes in places reaches 90%; Half of the heat that enters the apartment buildings is lost; Less than half of the houses are equipped with heat meters; Communal payments owe more than 8 billion rubles for consumed gas, the vodokanals' debt for electricity is about 2 billion rubles, and the state has not paid 4.5 billion rubles in the difference in tariffs [15];
- The permissible service life of energy-generating equipment has been exhausted (in many cities it exceeds 20 years), which needs substantial modernization, most boiler houses operate at low efficiency (less than 80%); Outdated ignition devices and automation are installed on boilers, which does not allow saving energy resources, leads to a significant (from 10 to 50% depending on the city) gas overruns compared to modern boilers, as well as to additional air pollution;
- the unsatisfactory level of thermal insulation of buildings of housing stock and budgetary institutions (the age of a significant number of residential houses that were built without taking into account the prospects for energy saving, reached 40-50 years);
- lack of active effective energy saving policy and stimulating energy efficiency both at the national level and at the level of individual utilities, households, consumers of services of all categories (population, budget organizations, commercial consumers);
- insufficient development in cities and agglomerations of energy planning, energy management systems; There are no clear indicators for assessing the state of utility systems and technologies for monitoring their measurement; There are no standards for the provision of public services, on the basis of which it is possible to evaluate the activity of operators of infrastructure systems and formulate clear targets for the future [7]. Realization of this task is complicated by the fact that, due to a decrease in interest in urban planning and energy planning, most of the design institutes that had a high potential for the development of energy plans and corresponding accompanying documentation at the required technical level were destroyed or significantly weakened in recent decades;
- imperfection of the tax and tariff (price) policy of the state in the energy sector, as well as the shortcomings of the relevant legislation; Energy markets in the Russian Federation are mostly formal: tariffs for end consumers are still not fully determined by the price market situation, and the cause of the appearance of price disproportions is the imperfection of the structure of markets and tariff policy due to excessive administrative interference.

One of the main expected effects of the liberalization of the energy market in the Russian Federation has traditionally been the decline in energy prices due to the following factors: increased profitability and increased competition between extracting (generating) and supplying companies; The possibility of avoiding an intermediary link in the purchase of natural gas and electricity by qualified consumers; The
abolition of explicit or implicit cross-subsidization of certain groups of consumers. However, the experience of the countries of Eastern Europe, where under some similar conditions the energy market is being liberalized, which is ahead of the liberalization process in the Russian Federation, testifies to the risks of the reverse effect of institutions and their market transformations in the short term. Thus, according to the results of the expert assessment of the relevant scientists, the implementation by the Russian Federation of obligations within the framework of the legislation (through bilateral agreements) in the context of the non-competitive structure of the electricity and natural gas market in the short and medium term may lead to higher energy prices. The implementation of the provisions of Directive 2001/80 / EC by 2018 may entail a significant increase in the average price of thermal power plants during 2013-2017. From 7 to 15%, depending on the volume of investment of dust and gas cleaning activities (from 2.8 to 6 billion euros) [8].

The complexity and severity of the problems under consideration is reinforced by political instability, the systemic financial and economic crisis that continues in the Russian Federation, and the rapid growth in the cost of energy resources and the corresponding rise in the cost of housing and communal services. Taking into account the increase in tariffs for energy carriers and the steady trend of their continued steady growth in prices for material and technical resources, the change in the minimum wage level, the rise in the cost of subcontractor organizations, the revision of tariffs for housing and communal services and bringing them to an economically sound level appeared to be an objective necessity. “Unpopular” measures to increase (in the long run) the level of tariffs are also caused by high energy, resource and material consumption of public services (the share of energy carriers in the structure of tariffs for heat supply services is 60%, for water services - 30% [15]) in Tandem with a long containment of tariff growth for many previous years. At the same time, along with raising the tariffs, benefits will be introduced for the unprotected strata of the population. Thus, the expenses of the Russian Federation to cover the population in the tariffs for gas, heat and electricity in 2019 will amount to 43 billion rubles (1.9% of GDP), in 2017 it is projected to increase this indicator to 61.3 billion rubles (2.4% of GDP) [16].

In addition, the commission implementing state regulation in the energy and utilities sectors decided to improve the regulatory framework for introducing incentive regulation for energy supply companies from January 1, 2016, which is stipulated by law. Such regulation is intended to create an attractive investment climate for the development and modernization of energy facilities in the Russian Federation and provides for the establishment of fixed tariffs for the transmission and supply of electricity for the long term. This will create the prerequisites for optimizing (reducing) costs by energy companies and improving the quality and reliability of electricity supply to consumers.

In this regard, as well as taking into account the legislative requirements regarding the pricing of gas and electricity supplies for industrial consumers in the domestic market [1], the most important issues that require urgent solutions are the unformed competitive energy market and the infrastructure necessary for it, the opacity of the economic Activity of natural monopolies, as well as the inability to provide real self-financing of the fuel and energy complex (hereinafter - FEC). Perhaps, just the desire to solve the problem of real self-financing of domestic energy is explained by the repeated mention in the text of the National Energy Strategy of the Russian Federation for the period until 2030 of the need for a gradual approach of the price of strategic resources (electricity, natural gas and oil products) to the level of prices in the liberalized EU markets [14]. However, as a warning, it should be emphasized that price energy shocks affect, first of all, the level of production costs, reducing its competitiveness, that is, lead to a slowdown (reduction) in GDP growth rates.

If we compare European directives with the current regulatory framework in the Russian Federation, we can now say that it fully complies with the European regulatory principles. Experts attribute this to the fact that it is very difficult to fully open and liberalize the domestic market in a short time, both from a technical and an economic point of view. For example, after the adoption of the first acts on the liberalization of the electric power industry (in 1996) and the gas industry (in 1998), the EU spent almost 10 years reforming it until the markets were fully open [5]. A gradual transition to the European principles of regulating energy markets will, on the one hand, avoid stressful price increases, and on the
other hand, develop mechanisms for balancing the possible burden for the most socially vulnerable segments of the population.

Prior to potential factors, the advantages of implementing the relevant provisions of the legislation for housing and utilities in large cities and urban agglomerations are, in particular, such:

- improving the level of energy security and reducing the energy dependence of the Russian Federation;
- assistance in overcoming the consequences of the financial and economic crisis (through the inflow of investment resources, use of the European experience of anti-crisis programs and EU credits) and, as an important consequence, reducing the risks and dangers that the Russian Federation is burdened with in the energy sector;
- the use of experience and capital of the EU countries for the modernization of the gas transportation system; Modernization of the energy infrastructure of HPPs and TPPs;
- reforming the energy market, including the creation of a competitive environment, the application of market pricing principles, tariff-formation, the regime for stopping cross-subsidization. However, as a warning, it should be emphasized that the overall positive effects will be predicted in the long term (since the chain mechanism will be involved: the liberalization of the energy market increasing competition -> the search by counterparty participants of the market for alternative routes of supply and supply and adjustment of planned consumption by large end users, Allowed for the wholesale market -> increased elasticity of both demand and supply -> transparent and competitive pricing, tariff setting, mind nshenie so-called price volatility, the possibility of reducing the long-term promotion of energy saving -> reduction of energy consumption -> increase the efficiency of the economy as a whole). In the short term, the predictable increase in energy prices and potential corresponding losses for a number of economic agents; Increase energy efficiency and use of renewable energy sources and energy-saving technologies; The expected creation of new jobs in the energy sector, housing and communal services through the implementation of projects to modernize the energy and municipal infrastructure; Wide introduction of the principle of so-called "green procurement".

The removal of restrictions on the European energy market gives local authorities an opportunity to freely choose energy companies for the supply of electricity. In accordance with EU Directive 2001/77 / EC, electricity derived from renewable energy sources or "green electricity" has an advantage in procurement, which is confirmed by the relevant criteria, including the requirements of the expected level of CO2 reduction specified in the proposal [7].

So, now the territorial authorities and local self-government bodies should intensify the implementation of energy-efficient measures, which is the key to maintaining energy security, especially in the housing and communal sector. At the same time, the development of urban agglomerations, thanks to the competitive advantages that form the agglomeration effect in the sphere of life support, is an effective tool that helps to level and minimize the consequences of crisis events in the housing and communal services sector, contributes to the activation of the processes of reforming, modernization and, thus, maintenance of energy security in the place of servicing, in particular:

- optimization (saving) of management costs and reduction of management risks (and, in turn, costs associated with their elimination, minimization, containment or non-admission) due to the reduction of the administrative apparatus, more intensive use and development of infrastructure and concentration of departments and structural units, Interacting in conditions of joint servicing of fixed production assets in cooperation with territorial communities, for example, in the form of joint utilities, Institutions and organizations (the approximate form of the agreement on such cooperation is approved by the Order of the Ministry of Regional Development);
- Increase the investment attractiveness of utilities, as well as the proportion of extra-budgetary sources in the total amount of funds raised for the implementation of priority projects for the development of housing and communal services in urban agglomerations;
— the possibility of closer, mutually beneficial and effective coordination of the development of anti-crisis measures, programs and strategies for the development of housing and communal services, preparation and implementation of investment projects for the development and modernization of urban communal infrastructure through the linkage of spatial and economic development.

In addition, it is worth paying special attention to the fact that it is more economically feasible and expedient to use modern forms of management in the area of urban agglomerations where there is considerable economies of scale in the implementation of infrastructure projects aimed at supporting energy security and improving energy efficiency. Housing and communal services. The latter will also contribute to the creation of a competitive environment in the industry, the introduction of technological and managerial innovations, the use of energy-efficient equipment and the reduction of energy, resource and material consumption of services, the reduction of the energy component in the structure of their prime cost and the like. However, the management of the development of urban agglomerations in the Russian Federation is now somewhat hampered by the low level of legislative provision of these processes, which causes the primary need for legal institutionalization of the creation and functioning of agglomerations. Now, due to the lack of clearly defined forms and procedures for such cooperation, this institution practically does not develop and, of course, does not allow us to take advantage of a number of potential competitive advantages that shape the agglomeration effect in the housing and communal services sector.

Thus, supporting the energy security of the state, in particular in the sphere of housing and communal services in urban agglomerations, requires further strategic steps from both state authorities and administration, and from local government and management of utilities. The analysis of the effect on the energy security in the housing and utilities sector of the factors-advantages and threats to the implementation of the Russian Federation obligations in the framework of legislation, the synthesis of relevant specialized literature and reference materials, expert assessments of specialists allows us to formulate the priority directions that make up the mechanism for maintaining energy security in the housing and communal services of major cities and urban areas Agglomerations, which are grouped into blocks of measures aimed at overcoming the risks Nia energy costs, reduce their unnecessary costs through the introduction of energy-saving technologies, as well as activities that create conditions to attract additional financial resources to overcome the loss in the sphere of life support.

4. Conclusions
1. The primary and strategic importance of the issues of providing and maintaining the energy security of the state in general, and in the sphere of housing and communal services in urban agglomerations in particular, is due to the rapid growth in demand for energy resources, as well as their costs coupled with a high risk of possible supply disruptions. Particularly acute these issues are acquired in preparation for the heating season 2017-2018. And the signing of new laws
2. Among the main factors-threats to energy security in the sphere of housing and communal services, the inefficiency of using fuel and energy resources due to the high level of depreciation of fixed assets and infrastructure facilities of the housing and communal services of excessive energy costs of utility equipment, which determines the extraordinary energy intensity of provision of housing and communal services; Absence of an active effective energy saving policy and stimulating energy efficiency; Insufficient development in cities and agglomerations of energy planning, energy management systems; Imperfection of the tax and tariff (price) policy of the state in the energy sector, as well as the shortcomings of the relevant legislation; Rapid dynamics of increase in tariffs for utilities.
3. To the potential factors-advantages of implementing the relevant provisions of the legislation for the housing and communal services of large cities and urban agglomerations include improving the level of energy security and reducing the energy dependence of the Russian Federation through the use of experience and capital of the EU countries in the modernization of the gas transportation system; Modernization of the energy infrastructure of HPPs and TPPs; Reforming the energy market, in particular, the creation of a competitive environment, the application of market pricing principles, tariff
formation; Increase of energy efficiency and use of renewable energy sources, energy saving technologies.

4. Supporting the energy security of the state, in particular in the sphere of housing and communal services in large cities and urban agglomerations, requires strategic steps from both state authorities and management, and from local government and utilities management, including the following main directions: Organizations and financial institutions; Preparation of credit projects for urban infrastructure development; Introduction of energy planning in the practice of local governments; Further improvement of the system of tariff regulation of energy markets in compliance with the relevant requirements of the EU directives, optimization of the tariff policy of enterprises providing heat, water and sanitation services; Creation of favorable conditions for interaction of authorities and businesses in the municipal sector, the use of modern forms of management in the housing and communal services sector. The actual development of urban agglomerations is an effective tool for activating the modernization processes, increasing energy efficiency, supporting energy security in the housing and communal services sector due to the agglomeration effect, which creates a number of competitive advantages that make use of modern forms of management (for example, public-private partnerships) Relevant infrastructure projects in the agglomerations of the most economically viable and Prototype. However, the use of this tool is currently difficult due to the incompleteness of legislative formalization and imperfect legal institutionalization of the processes of education and the functioning of urban agglomerations.

At the same time, the prospects for further research are related to the definition of evaluation criteria, monitoring of the status and calculation of indicators of the forecast level of energy security in the housing and utilities sector of urban agglomerations using the tools of economic and mathematical modeling and forecasting.

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