

Evaluating the effectiveness of housing and utility services of the Tomsk region, Russia

*Evgenia Trush*¹, *Kristina Filyushina*¹, *Maria Ustinova*¹, *Olga Egorova*¹, *Svetlana Grigashkina*^{2,*}

¹Tomsk State University of Architecture and Civil Engineering

²Kuzbass Technical University of Gorbachev T.F.

Abstract. In modern conditions, requirements to the quality of housing and communal services are increasing, since this area of life is socially significant. Unsolved problems in the housing and utilities sector indicate a crisis in the housing sector. This study is aimed at the problem of using communal services, creating an effective economic and managerial model that takes into account the diversity of existing tools.

1 Introduction

The annual turnover in housing and utilities is about 4 trillion rubles, which corresponds to 5.8% of Russia's GDP. It would seem that the current state of affairs in the sphere of the livelihood of the population should satisfy both the population itself and the legislative and executive powers of all levels [1]. The real situation confirms that as a result, the housing and communal reform became a tragedy for the owners of residential premises in an apartment building (multi-apartment house) and PR-base for almost all Russian political parties [2]. According to VTsIOM in 2012-2013. HCC problems ranked first (58% and 52%). In 2014 - the second place, the percentage of people increased to 60%.

It is possible to single out three objective components that are necessary for the conversion of FCC.

1. Effective (cost-effective) technology.
2. Institutional environment that is necessary for the effective use of the industry.
3. Natural and climatic and other objective characteristics that affect the efficiency of application of existing technologies.

According to a survey conducted by All-Russia Public Opinion Research Center (VCIOM) in 2013-2015, the greatest dissatisfaction of citizens is associated with the low quality of the services provided (table 1).

Table 1. Structure of claims for the provision of housing and communal.

Answer Options	In% of the number of respondents	
	2013	2015
Poor quality of water	32.3	37.9

* Corresponding author: grigashkina_si@mail.ru

Unsanitary basement condition	11.5	27
Hot / Cold water supply breakdowns	17,1/10.4	48/42
Power supply breakdowns	14.5	28
Irregular cleaning of the yard	36.6	38
Old paint of the common premises	33.6	37
Poor roofs, walls, ceilings	27.4	36
Faulty sewer pipes	20.9	33
Frequent elevator breakdowns	7	11

As it can be seen from the table, the respondents still make the greatest number of complaints about the cleaning of common premises, hot and cold-water supply breakdowns, poor quality of water, and cleaning of the yard area. In addition, the percentage of comments only increases, and for some indicators exceeds 50% (breakdowns in hot and cold water supply). The undisputed leader in the number of violations in this area is the activity of managing organizations.

The urgency of the change is all the more obvious because at present, the housing and utility complex is turning into an arena of ever-increasing competition between major companies [3]. And the further, the more difficult it will be for the state to regain lost positions, to increase the efficiency of the country's housing sector by promoting high-quality services to the market. To assess these opportunities, we turn to the analysis of the world housing complex.

Fluctuations in housing construction in Russia are noticeably lower than in other countries, for example, in Brazil (Figure 1). This area, which links the financial situation of the population, the construction industry and the financial system, is characterized by long-term drops in activity, the gap between potential demand and the financial capabilities of the population and banks.

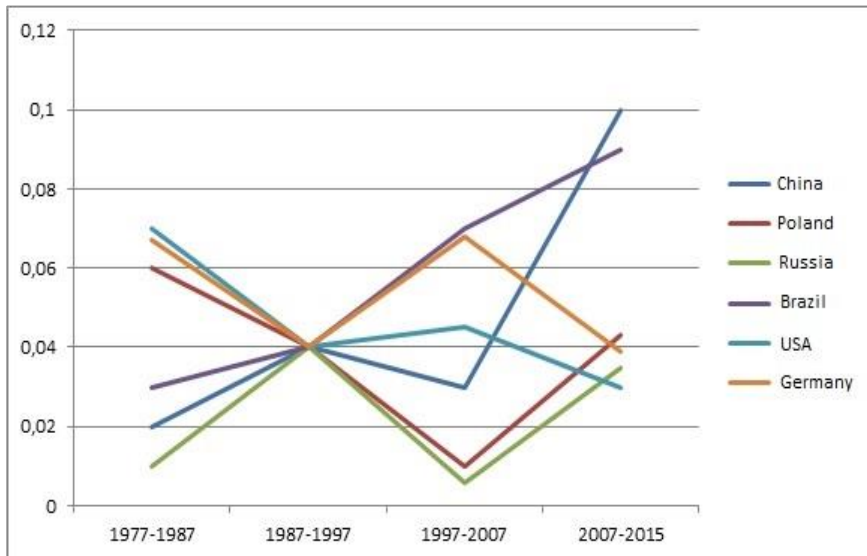


Fig. 1. Commissioning of residential premises (units) in the world, 1977-2015.

2 Review of scientific publications

In the process of conducting the work on the analysis and classification of problems in the development of the housing and utilities sector, the authors used the works of Russian and Soviet scientists: I.V. Akulenkova, A.N. Asaula, E.M. Blekha, T.Yu. Ovsyannikova, E.V.

Pesotskaya, V.V. Peshkova, L.G. Selyutina, Yu. F. Simionova, V.A. Sirotkina, I.V. Smirnova, E.B. Smirnova, I.V. Zwigun, B.C. Chekalina [8, 9]. The authors in the evaluation in issues of the real estate market and investment in the housing sector analysis are actively used the works of scientists: I.I. Borovkova, V.A. Volodko, H.M. Gumba, L.M. Kaplan, S.N. Maksimova, S.R. Khachatryan [10, 11]. In the results of the study of issues of management and regulation of housing policy, the authors of the article used the works: S.A. Astafieva, A.P. Biryukova, N.V. Vasilyeva, A.M. Platonov, V.G. Smirnov. The scope of the literature studied allowed the authors to conclude that the active growth and increased requirements from the authorities and the public regarding the quality of housing services, changes in the current regulatory framework, and the lack of necessary statistical data do not fully reflect the existing scientific and practical approaches in the industry. Theoretical and methodological approaches to solving the problems of the industry are currently relevant, tools for assessing and improving the efficiency of housing and utilities at the regional and municipal levels of the Tomsk region are not sufficiently used in practice.

3 Methodology

The modern institutional environment cannot initiate a stable functioning of the housing complex. Most of the problems pointed out by notorious and Russian researchers belong to the category of inconsistency of the institutional environment with the features of market regulation in the country.

Table 2. Stages of technology development and management.

Laboratory Management 1900-1950				
	"Genera- tion"	"Selec- tion"	"Implementa- tion of innovative ideas"	
Researchers	√	√	√	All leadership and promotion of research works carried out by the researchers themselves. Their functions include the generation and selection of innovative ideas, the implementation of research projects in enterprises and the use of innovations.
Production workers				
Partners and consumers				
Corporate management of innovative projects 1950-1970				
Researchers	√	√	√	Corporate managers are aware of the need to manage the scientific research activities. Now companies are focusing on projects that serve their business goals.
Production workers	√	√	√	
Partners and consumers				
Formation of corporate innovation portfolio 1970-1990				
Researchers	√	√	√	At this stage, the growth of industrial R&D is increasing. The prospects of companies depend on the scientific research activities, which are selected on the basis of portfolio matrices, analysis of competitiveness, life cycle, discount methods.
Production workers	√	√	√	
Marketers	√	√	√	
Partners and consumers				

Governance through joint decision making 1990-2010 to the present				
Researchers	√	√	√	In the process of developing innovation the views of buyers and suppliers are taken into account. This is a process of coordinated decision-making based on the method of joint participation of stakeholders.
Production workers	√	√	√	
Marketers	√	√	√	
Partners and consumers	√	√	√	
Business models based on multilateral platforms - innovations, revolutionizing the business of 2010 to present				
Researchers	√	√	√	This category of business models got its name due to the fact that it is based on multilateral platforms. Using the tools of existing platforms, the company can in various forms provide access to interested partners to its customer base or offers of its products or services. All partners of the company are considered as clients of the company, since bring her additional income by paying for services associated with the use of the platform.
Production workers	√	√	√	
Marketers	√	√	√	
Partners and consumers	√	√	√	

Thus, for the modernization of the housing and utilities complex, it is necessary to adjust the old and introduce new regulatory tools that would allow implementing the basic principles of the regulation of the housing and utilities sector, as well as linking all the tools and subjects of the regulatory process into an appropriate mechanism[4,5]. Bringing this process to a higher (regional) level of government involvement in it will allow to avoid duplication in solving problems. It will help to get closer to the government and make joint decisions with it at the level of legislation that will allow to reduce tariffs for services.

The used tool for evaluating the efficiency of the housing industry by many scientists is based on the preference for research of economic results, the only criterion of their feasibility which is put forward –the economic efficiency, while questions of social importance remain aside. In modern conditions, the issue of evaluating the effectiveness of housing and utility services remains also relevant.

The following factors are used also as the basis for analyzing the direction of development [9]:

- coefficient of renovation of the housing stock;
- coefficient of deterioration of the housing stock.

According to the authors, the main disadvantages of existing indicators include the fact that they do not show a real change in the needs of citizens in comfortable and comfortable housing.

Even though many researchers were being and being engaged in assessing the effectiveness of housing and utility services, there is still no uniform, generally accepted assessment methodology. According to the results of the analysis of modern literature and recognized scientific papers, efficiency assessment tools were proposed, which are presented in Table 2.

Table 3. Tools for the effectiveness of housing and utility services.

Instruments	Researchers	Strengths	Weaknesses
Private indicators	Klimenko A.S., Smirnov E.B.,	They contain a significant number of	Each indicator separately does not give an idea of the degree

	Schlemen MP, Grudinina E.N., Strobin K.B. and etc.	indicators that allow to take into account all aspects of the housing and utilities sector.	of efficiency of the FCC. Due to the lengthy data collection procedure, the lack of statistical information, it is laborious to calculate
Integral indicators	Stolbov P.P., Litvinova O.V., Minaeva I.V. and etc.	Comprehensive assessment in the form of an integral indicator provides an opportunity for comparison in different subjects and periods of time.	Difficulty in determining benchmarks and weighting factors.
Sociological surveys and expert assessments	Khikhlukha L.V., Spivak A.N., Borovkov I.I. and etc.	Allows you to improve and detail the available statistical information.	Subjective, difficult to process information, a large sample volume.

Analysis of the instruments stated above has shown the existence of a pressing problem - the need to change, improve the existing tools for evaluating the effectiveness of housing and utility services in accordance with modern requirements.

4 Research results

Therefore, considering the systematization, we propose the following indicators for assessing the effectiveness of the housing and utility services in table 3.

Table 4. Groups of performance evaluation indicators.

Indicators	Characteristics	Assessment subject
Social	Show specific results of housing and communal services for the population	Quality of living conditions
Technical	Characterize the technical situation of the housing stock (housing putting into operation through all forms of reproduction)	Housing situation
Investment	Show the main sources of investment and the purpose of their investments	Investment situation
Market	Display housing affordability and market development	The efficiency of the industry

Among the designated targets for the development of the industry in the future, the following can be highlighted:

- elimination of problems of dilapidated and emergency housing, lowering the average level of depreciation of the housing stock and municipal infrastructure to standard values [1];
- bringing the housing stock to a state that meets the progressive conditions of energy efficiency, ecology for all groups of the population;
- the achievement of full provision of housing for citizens of the country;
- the end of the program for the relocation of people from the housing stock, related to the emergency and subject to demolition;
- increasing the volume of housing commissioning based on integrated land development and the implementation of a policy of rehabilitation in the territories of the existing buildings;
- stable functioning of all forms of use of the housing stock;
- provision of housing for persons under social and public employment contracts;

- activities of credit and financial mechanisms for the overhaul and reconstruction of apartment buildings with the support of the state, including based on the newly created institutions of public-private partnership [7].

Methods for determining the values of indicators used in evaluating the effectiveness of the housing and utility services are given in Table 4.

Table 5. The system of evaluating the effectiveness of performance of the housing and utilities management system.

Subject matter	Evaluation Indicators	Units	Calculation
Quality of living conditions	The share of dilapidated (B) and emergency (E) housing stock of the total volume (V) of housing stock	%	$\frac{B+E}{V} \times 100$
	The share of housing stock, equipped with engineering systems (SHS) in the total amount of housing stock (V)	%	$\frac{SHS}{V} \times 100$
	Provision of the population (P) parking spaces	Units per 1 thousand of people	$\frac{P}{1000}$
	Percentage of courtyards adapted for people with limited mobility (LM) in accordance with applicable standards (AS)	%	$\frac{LM}{AS} \times 100$
	Dynamics of the number of recorded cases of children's injuries (DI) at children's play and sports grounds	%	$\frac{DI}{1000} \times 100$
Housing situation	The average market value (AMV) of a standard apartment to the average annual gross cash income (AAGCI) of a family consisting of 3 people	%	$\frac{AMV}{AAGCI} \times 100$
	Average prices in the primary and secondary housing markets	RUR	P_{av}
Investment situation	The share of private investment (PI) in the public sector in the total ($\sum i$)	%	$\frac{PI}{\sum i} \times 100$
	Investment in residential construction per 1000 inhabitants ($\sum i$)	RUR	$\sum i$
The efficiency of the industry	Dynamics of tariffs for public utilities (Ts) based on the beginning of the period (Tf)	%	$\frac{T_s}{T_f} \times 100$
	Dynamics of accidents (A) of utility infrastructure systems as a percentage of prevented (P)	%	$\frac{A}{P} \times 100$
	Share of public complaints about the quality of housing and communal services (PC), public Internet forums registered through specially created by housing and public utilities authorities	%	$\frac{PC}{GA} \times 100$
	Growth (decrease) in the number of public Internet forums (PF) created by the housing and public utilities management bodies	%	$\frac{PF}{GA} \times 100$

Each group of assessment indicators reflects both the degree of fulfillment of specified social, technical, investment and market performance indicators of functioning in the housing and utilities sector of the Tomsk region, as well as key decisions for the successful transition from a traditional bilateral platform to a multilateral activity model at various levels to ensure goals and objectives.

The final calculation of the performance indicators of the housing and utilities sector in accordance with the proposed methodology can be implemented directly based on summary reporting data on industry enterprises and institutions using the necessary statistical data.

5 Conclusion

Based on the proposed methodology for improving indicators, an assessment of the performance of the sector of housing and public utilities can be carried out based on the actual values of the indicators, according to the developed scale.

Table 6. Indicator Effectiveness.

Scale	Meaning of indicators,%
"Effective"	>100
"Reasonably effective"	90-100
"Conditionally effective"	80-90
"Ineffective"	Less than80

The final assessment of the effectiveness is carried out considering the performance indicators of the utilities sector management.

Table 7. The form of the Effectiveness indicators report.

Subject matter	Units	Achieved value	Value in points
Quality of living conditions			
Housing situation			
Investment situation			
The efficiency of the industry			

As a result of the study:

- Existing tools for evaluating the effectiveness of housing and utility services have been classified.
- A method has been developed for evaluating the effectiveness of the housing and utility services.
- An algorithm for constructing an industry efficiency rating based on advanced assessment toolshas been proposed.
- Approbation of improved efficiency assessment tools, which has proven itself at the regional and municipal levels (the system of criteria and indicators maximally considers the specifics of the Tomsk region and is differentiated accordingly), has been implemented.

References

- O.I. Dobrynin, N.N. Minaev, N.R. Shadeyko, A.A. Seliverstov, Yu.A. Kolykhaeva, *Regional Economics: Theory and Practice* **34(409)**, 2-13 (2015)
- T.I. Lebedeva, *Economic-mathematical modeling of socio-economic processes in the formation of a regional development strategy: Dis. Dr. Econ. Sciences* (Izhevsk, 2005)
- O.I. Dobrynin, N.N. Minaev, K.E. Filyushina, Yu.A. Kolykhaeva, *Regional Economics: Theory and Practice* **2(277)**, 56-66 (2015)
- National Center for Public Control in the Housing and Utilities Sector, <http://gkhkontrol.ru/2015/06/24078>
- Experience in solving current problems of housing and communal services by public organizations, Collection of best practices in the field of housing and communal services, housing education and public control* (Moscow, 2014)

6. Yu.A. Merkulieva, E.V. Ufimtseva, Yu.V. Podoprighora, Regional economics: theory and practice **33(408)**, 51-64 (2015)
7. O.I. Dobrynin, N.N. Minaev, K.E. Filyushina, Yu.A. Kolykhaeva, Economic Revival of Russia **3(41)**, 130-137 (2014)
8. A.N. Ryakhovskaya, Economy of the Region **4**, 236-243 (2007)
9. O.I. Dobrynina, Yu.A. Kolykhayev, K.E. Filyushina, N.N. Minaev, *Strategic planning in the housing and utilities complex* (Tomsk, 2014)
10. N. Aste, M. Buzzetti, P. Caputo, M. Manfren, Sustainable Cities and Society **13**, 69-77 (2014)
11. A. Alberini, A. Bigano, Energy Economics **52(1)**, S76-S85 (2015)