A concession agreement as an effective mechanism for the development of innovative activities in the housing and utilities sector

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Abstract. The state of the housing and utilities sector is one of the most significant indicators of the level of development of the national economy. In many countries, the state of the housing and utilities sector does not fully satisfy needs of the population. Under the slow economic development, an innovative development path can ensure high quality and reliability of services provided. The concession mechanism of cooperation between government and businesses should become a key tool which can attract investment in the development of innovative activities in the housing and utilities sector. The author has developed a support scheme for the investment and innovation project implemented in the housing and utilities sector using a concession agreement within the PPP which ensures stability of the industry and improves quality of services provided. The scheme of concession tools can be used to achieve a social and economic effect. The article presents a method for assessing the economic effect of concession agreements used when implementing the investment and innovation projects in the housing and utilities sector taking into account risks. It can balance interests of the government and housing and utilities companies. The concession mechanism will contribute to the development of the most promising areas of the housing and utilities sector.

1. Introduction
The process of implementing reforms in the housing and utilities system of the Russian Federation can be attributed to one of the most protracted modern reforms. Currently, special attention is paid to problems of the housing and utilities sector: the increasing share of fixed assets depreciation, low quality of services and high capital intensity.

In the market economic conditions, in order to provide high-quality housing and utilities services and ensure financial stability of housing and utilities companies, competitiveness is crucial. It should be based on innovative approaches to the management of the housing and utilities sector. However, the lack of effective methods and mechanisms for managing investment and innovation activities is a problem [7, 12, 18, 19]. The concession mechanism within the public-private partnership can be an effective tool for the development of investment and innovation activities in the housing and utilities sector.

Concession agreements are widely used to attract private capital in order to modernize the housing and utilities sector [1, 3]. In Russia, the need for investment is 25.9 trillion rubles, including 17.8 trillion - for the modernization and construction of transport infrastructure. The energy sector requires 5.5 trillion rubles, the information and communications sector needs2 trillion rubles, the water supply and sanitation system needs about 0.5 trillion rubles [14].

The concession agreement in the housing and utilities sector is a contract concluded between public
agencies represented by federal, regional, local authorities and housing and utilities companies aimed at developing investment and innovative activities of the housing and utilities sector and ensuring the socio-economic effect.

2. The investment and innovation project support scheme in the housing and utilities sector using a concession agreement within the PPP

The author has developed a support scheme for the investment and innovation project using a concession agreement (Figure 1).

![Scheme of support for investment and innovation projects in the housing sector using a concession agreement](image)

**Figure 1.** Scheme of support for investment and innovation projects in the housing sector using a concession agreement

The effectiveness of innovative and investment projects depends on the coordination of actions of all participants in the investment process.
The scheme of concession tools makes it possible to support the innovation and investment project in the housing and utilities sector to achieve a social and economic effect.

The review of a competitive proposal of housing and utilities companies by government agencies. A concession agreement is concluded as a result of open / closed tenders.

Housing and utilities companies (concessionaires) submit proposals to the public authorities (concessors) [7, 8]. They attach an investment and innovation project to the documents. The authorized bodies evaluate the effectiveness of the project (financial efficiency; socio-economic effect) and determine comparative advantages [17].

3. The financial and economic model for assessing the effectiveness of the innovation and investment project in the housing and utilities sector

The effectiveness of concession results involves an assessment of each stage of the concession relationship: preparatory, organizational, and implementation ones.

At the preparatory stage, the effectiveness of the investment-innovative housing and utilities project is assessed. It is preceded by the determination of its comparative advantage.

To assess the financial effectiveness of the investment and innovation project, it is necessary to calculate the net present value:

\[
NPV_{ip} = \sum_{t=1}^{T} \frac{CF_t - K_t}{(1+R)^t} + \frac{V_t}{(1+R)^T}
\]  

(1)

where \( NPV_{ip} \) – net value of the investment and innovation project;
\( CF_t \) – total discounted cash flow balance;
\( K_t \) – concession payment;
\( R \) - annual return on capital;
\( V_t \) - value of assets created;
\( T \) – implementation term;
\( t \) – implementation time.

The innovation and investment project is effective if \( NPV_{ip} \geq 0 \) [16].

An assessment of the socio-economic effect of the investment and innovation project is carried out by correlating goals of federal / municipal programs.

If the project is recognized effective according to each of the specified criteria, its comparative advantage is determined.

Evaluation of the effectiveness of the federal project and determination of its comparative advantage are carried out by the federal authorized body (the Ministry of Economic Development of Russia); the authorized body of the region of the Russian Federation evaluates regional and municipal projects.

**Determination of the comparative advantage of the project.** To determine the effectiveness of the concession agreement, it is necessary to determine comparative advantages for the federal / municipal budgets.

The comparative advantage of the investment and innovation project is recognized provided that:

\[
\begin{aligned}
K_{vfm} &= 1 - \frac{PBV_{ppp} + PRV_{ppp}}{PBV_{cp} + PRV_{cp}} \geq 0 \\
PBV_{cp} + PRV_{cp} &\geq 0 \\
\end{aligned}
\]  

(2)

\[
\begin{aligned}
K_{vfm} &= \frac{PBV_{ppp} + PRV_{ppp}}{PBV_{cp} + PRV_{cp}} - 1 \geq 0 \\
PBV_{cp} + PRV_{cp} &\leq 0 \\
\end{aligned}
\]  

(3)

where \( K_{vfm} \) – coefficient of comparison of benefits of the project when implementing the federal / municipal concession agreement.

\( PBV_{ppp} \) - net discounted expenses of the innovation concession project
\( PBV_{cp} \) - net value of the federal / municipal contract.
$PRV_{pp}$ – the total amount of obligations of the public partner in case of risks of the innovative concession project

$PRV_{cp}$ - the total amount of obligations of the public legal entity in case of risks of the federal / municipal contract \[16\].

In addition, it is necessary to assess risks that may arise between the parties to the investment and innovation project in the HUS.

The distribution of risks between the parties to the concession agreement is carried out by including terms on special obligations (Table 1). Special circumstances are various events that may occur during the execution of the concession agreement. They affect investment and innovation activities of the housing and utilities companies.

**Table 1.** The list of risks of investment and innovation activities in the housing and utilities sector

| Name of a risk | Risks at the preparatory stage |
|----------------|-------------------------------|
|                | provision of land, engineering infrastructure; land preparation; failure to meet the deadline for facility designing; failure to meet the deadline for preparatory activities |
|                |                                |
|                | elimination of consequences of actions of third parties; elimination of natural disasters; elimination of environmental consequences; failure to meet the deadlines for construction / reconstruction of the housing and utilities facility; failure to meet the deadlines for commissioning the housing and utilities facility; an increase in construction costs due to the increased exchange rate; an increase in construction costs due to the increased inflation rate; an increase in construction costs due to the increased interest rate |
|                |                                |
|                | Maintenance risks |
|                | an increase in maintenance costs for the facility transferred to the public partner; an increase in maintenance costs due to an increase in the exchange rate; increase in maintenance costs due to an increase in the inflation rate; increase in maintenance costs due to an increase in the interest rate; increase in maintenance costs due to an increase in the tax rate |
|                |                                |
|                | Income Risks |
|                | non-receipt of payments ensuring minimum profitability; a decrease in revenue due to a decrease in the volume of services; a decrease in revenue due to lower prices (tariffs) for housing services; a decrease in revenue due to non-payment |
|                |                                |
|                | Other risks |
|                | termination of the agreement by public bodies; termination of the agreement by the housing and utilities company; loss of the facility; force majeure circumstances; other risks |

When determining the financial efficiency and comparative advantages, the negative result of the evaluation is the basis for finalizing the investment and innovation project or refusing to implement it.

If the authorized body makes a decision on the possibility of concluding the concession agreement, the public bodies conduct negotiations with housing and utilities companies in order to discuss the terms of the concession agreement \[4, 14\].

The efficiency of the concession project can be evaluated in the following areas:
1. Economic efficiency is determined by assessing financial consequences of the concessionaire's participation in the investment and innovation project [2, 13].

2. Social efficiency is determined by evaluating results of the project that can improve quality of life of the population, including quality of infrastructure facilities, roads, transport infrastructure, health and education infrastructure, increase the number of jobs in the region, improve working conditions [5]. When calculating social efficiency, it is necessary to take into account indirect results of the concession project, such as changes in the income of enterprises and citizens, the market value of real estate, loss of natural resources as a result of accidents.

Thus, the main goal of housing and utilities companies is to maximize profits, and the main goal of public bodies is to protect public interests.

When implementing the investment-innovative project, the parties are interconnected by the terms of the concession agreement and other relations [10, 13]. The authorized bodies exercise control over the concession facility and activities of housing and utilities companies [11, 20]. The fact that housing and utilities companies interact with consumers determines their special relations with society. In this regard, the control over activities of housing and utilities companies and the concession facility should be carried out by consumers and specialized public organizations. Information on compliance / non-compliance with public interests should be received by both housing and utilities companies and public authorities [9].

An important stage is the monitoring of changes in the concession facility when implementing the investment-innovative project, which involves an assessment of socio-economic efficiency of the concession project. The compliance of the results achieved with the conditions of the concession agreement and the goals set by the concessionaire is assessed.

The implementation of a new investment and innovative concession mechanism in the housing and utilities sector will increase the level of competitiveness by improving the efficiency of innovative processes. All changes will positively affect organizational and economic relations that contribute to the effective management of the housing and utilities sector.

4. Conclusion

Given the lack of budgetary funds, the public system of management of the housing and utilities sector focuses on the use of a concession agreement within the public-private partnership as the main way to overcome large-scale infrastructure imbalances. The government (concessor) transfers real estate objects and related movable property to a private person (concessionaire) for temporary possession and use, and the housing and utilities company undertakes to improve them (reconstruct, modernize, etc.) for the development of innovative activities. Thus, the use of the concession mechanism is aimed at enhancing innovation activities of the housing and utilities sector, developing the industry of innovative technologies for the production of housing and utilities services. The application of innovative investment methods by housing and utilities companies will contribute to the implementation of modern highly efficient technologies and equipment, provision of high-quality services and efficiency of housing and utilities companies. As a result, costs of housing and utilities services and housing and utilities fees will be reduced.

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