

Concession Agreements and Life Cycle Contracts in the Transport Infrastructure: Challenges for Successful Implementation

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Abstract: *The form of state participation in the creation of public goods depends substantially on the industry and level of development of the country. In the transport sector, various forms of public-private partnerships are common, from concession agreements to life-cycle contracts. The choice of the form of partnership should be determined by the distribution of risks and obligations between the parties, the possibility of obtaining operational and investment cash flows, the composition and value of transaction costs.*

The purpose of the study is to identify the problems of applying various forms of public-private partnerships in Russia and abroad in the transport sector. The advantages and disadvantages of various forms of public-private partnerships are presented, the necessity of using public-private partnerships in the mineral sector is substantiated. It was revealed that the composition of participants in various forms of public-private partnerships is the same, but their interests are different and must be reconciled in terms of the contract. For a life-cycle contract and a concession agreement, the distribution of state obligations in investment and operating activities is different. The shortcomings of the life-cycle related to the conclusion of contracts in general and with the specifics of the contract itself are presented in detail.

Index Terms: *public-private partnership, concession agreements, life-cycle contracts, transport infrastructure, mining projects, territories with inadequate infrastructure.*

I. INTRODUCTION

For the last few decades, many developed countries have been reconsidering state participation in the creation of public goods. Nowadays, there is a legislative and institutional framework for state participation including both traditional government contracts and different forms of public-private partnership (PPP). The forms of PPP vary depending on the industry and the level of the country's development, ranging from the classical contracts (concession) to relatively new ones (for example, life cycle contract). The developed countries of Europe and North America, Australia, Central and Eastern European countries with a transition economy, developing countries of Asia, Central and South America and Africa have acquired extensive experience in the implementation of the PPP projects. This fact confirms that the mechanism of PPP aimed at solving long-term social and economic problems can be

easily adapted to various systems of government.

Traditionally the number of PPP projects reaches its maximum in the transport sector. On the one hand, the state is obliged to create adequate conditions for interior transport. This is especially significant for countries having a vast area, with territories where transport accessibility is provided mainly by air. Construction of roads and railways in such conditions is a priority. On the other hand, when using PPP options, there should be a financially reliable consumer and sufficient traffic for the constructed facilities. The solution to this problem is not always possible due to the lack of effective retail demand, traffic volume, or both.

The PPPs are most widely used for the construction of highways and related infrastructure. For example, in foreign countries, the share of toll sections in the total length of roads is insignificant; however, the share of the toll roads in the national highway system is substantial: for example, in Japan, toll roads represent 60.9% of highways, in France - 80.6%, in Italy - 84.8%. In Austria, the Ypsilon project was successfully implemented in 2011. This project involved the construction of the high-speed roads in the mountainous areas of the country (the A5 highway) and subsequent transfer of the constructed facilities to a specialized enterprise responsible for the operation and maintenance of the highways for 30 years. In Sweden, three large-scale projects are being currently implemented drawing on the key principles of PPP: *risk sharing* that enables cost optimization, the *full responsibility* of partners during all stages of the project and *close cooperation* in order to obtain maximum benefits for all partners. One of the aspects of the PPP's effectiveness is a significant reduction in unit costs. For example, construction of a high-speed highway Lisbon - Madrid was carried out within the framework of PPP and costs per 1 km amounted to 7 million euros (as compared to the usual costs of 16-24 million euros per 1 km of a high-speed highway in Europe).

However, despite the above-mentioned advantages, this tool cannot be considered as a universal way to develop a transport system. The construction of toll roads causes social discontent emerging among the general public and local residents. For example, in Germany, a similar government initiative has caused public protests (73% of residents strongly opposed the idea of road pricing). In the UK, the project of a highway around Birmingham is considered to be a failure as only 25% of drivers use the toll highway. In France, the toll rates have increased by 7-11% over the period of five years.

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Besides, the principles of tariff formation imply faster growth of price rates for busy highways in order to offset the losses from low-traffic routes - a principle that indicates insufficient economic soundness of the projects.

In Russia, the concessions have been applied for the construction of large transport infrastructure facilities and highways (Western High-Speed Diameter in St. Petersburg, Moscow Metro stations) and for the airport reconstruction (Sheremetyevo Airport in Moscow). At the same time, there is no significant experience in the construction of high-speed rail lines in Russia, and some projects (sections of the Moscow-Kazan highway) cannot be successfully implemented due to the ambiguity of passenger traffic and unjustified tariffs. In this example, the number of potential passengers cannot be determined due to the increase in fare 10 times compared with the base fare [1].

The PPP projects in the field of railway transport and energy generation are more difficult to implement due to the lack of legal regulation. For example, according to the Russian Federal Law on Concession Agreements, neither PJSC "Russian Railways" (that has a special legal status of a single economic entity in the field of railway transport), nor any other owner of the railway infrastructure facilities can enter concession.

Guarantees to the private investor at income decreasing or growth of investment and operational expenses are important problems. Therefore, further development of the PPP forms is necessary.

Therefore, there is an emerging need to develop various types of PPP contracts and to transform them into so-called quasi-concession agreements. Life-cycle contract (LCC) is one of the types of such agreement. Thus far, there are just a few life-cycle contracts implemented in Russia, primarily in the field of road construction (sections of the Moscow – St. Petersburg highway, "Don" highway and others). At the same time, in Europe, there are hundreds of successful projects implemented under the framework of life-cycle contracts.

As international practice shows (Market Update, 2013), life-cycle contracts are the most widely used in the transport industry (50%). In 2013, five of the six European largest projects were implemented in this area (railway project aimed at constructing and operating a rolling stock in the UK, construction of the highway in Italy, the ring road in Milan, the highway in Turkey, the highway network Schiphol-Amsterdam-Almere in the Netherlands).

In this regard, it becomes significantly important for both researchers and practitioners to analyze the international legislative framework that regulates and facilitates the implementation of concession agreements and life-cycle contracts. Such analysis may bring valuable insights into the application of such type of contracts within the Russian economic and legislative environment.

II. LITERATURE REVIEW

Thus far, well-established theoretical foundations of the PPP have emerged in both Russian and international academic research. The forms of PPP projects and the level of their practical implementation vary significantly across the countries. According to the classification of Kuznetsov [2], only the UK, Australia and Ireland are at the third (the most

advanced) stage of PPP development. This stage is characterized by elaboration of the PPP models, advancement of the risk calculation system, enlargement of the projects' life cycle, participation of institutional investors in the projects, and development of the specialized training system for personnel working in the sphere of PPP. Other developed countries are in the second stage of PPP development. This stage implies creation of the departments specialized in the life-cycle contracts within the government ministries, development of new concession models, expansion of the application sphere of the life-cycle contracts, stimulation of the new sources of funding, application of the life-cycle contracts for the development of the service sector and increase in the number of ongoing PPP projects. The rest of the countries, including Russia, are still at the first stage of PPP development - establishing a legislative framework and acquiring the first experience with the life-cycle contracts.

At the same time, many researchers argue that modern academic literature lacks a comprehensive analysis of such a specific form of PPP as a life-cycle contract [3, 4, 5].

Even under the context of such extensive international experience, academic literature does not provide a coherent conclusion about the benefits of any particular model of PPP. Despite the fact that PPP can be applied to solve certain problems, its greater efficiency as compared to the traditional system of government procurement has not yet been fully confirmed [6]. Academic literature obviously lacks the research studying the models and mechanisms of PPP implemented not only in the traditional projects of social welfare development aimed at meeting consumer demand but also in the integrated capital-intensive industrial projects in the field of transport and energy aimed at producing non-consumer goods [7].

For efficient operation of large mining enterprises in regions with underdeveloped infrastructure, construction of a railway and energy facilities are necessary. Several similar construction projects started in the Siberian regions. Large integrated enterprises are characteristic of the mineral sector in the global economy [8]; they often have their own electricity generation, at the same time, the transport infrastructure must be created with the participation of the state.

For example, the efficient operation of the Eleget mining and processing plant (the Tyva Republic), which determines the feasibility and the time frame for the developmental projects of a large coal basin, is dependent upon the construction of a railway facility. The timeframe of these projects have been repeatedly postponed due to the emerging uncontrolled circumstances that have significantly changed the terms and conditions of project implementation (construction time, capacity of mining and processing enterprises, number of employees, and total amount of investments) making projects' profile totally different from the ones determined in the license agreement. In this regard, the construction of the railway facility is a crucial point facilitating the whole project of the coal basin development.

The estimated railway construction costs are admitted to be approximately around 156 billion rubles [9]. The funding of this project has been always a sophisticated and controversial issue due to the significant amount of required investments and high risks [10]. The decline in the global coal prices raises the level of project's uncertainty in terms of the payback period as even under the context of global price stability the expected payback period is estimated to be 15 years. Initial project rationale was built upon the PPP model involving the state support. However, thus far, the modalities of the state support for this project have not yet been clearly determined. This example shows that there is a need for extensive state participation in the form of an appropriate PPP model aimed at addressing the infrastructure problems crucial for the regions with underdeveloped infrastructure facilities.

III. RESULTS AND DISCUSSION

The choice between different forms of PPP such as concession agreements, which are the most traditional and common form of PPP, and life cycle contracts, which are considerably less common, should be based on the analysis of the institutional and economic factors relevant for the project. These types of PPP contracts differ in terms of distribution of risk and responsibilities between the parties, possibilities of project funding, specific aspects of project financing and amount and structure of the transaction costs.

All forms of PPP (including concession agreements and life-cycle contracts) include three principal parties: the state (client), private company (service provider) and individuals (consumers).

In Russia, the concession agreements emerged in 2005 and nowadays are considered to be the most regulated form of PPP. Significant changes were introduced in the legislation in 2014 aimed at minimizing the project risks and developing special mechanisms for ensuring the partners' obligations in concession projects. The Government of the Russian Federation in the Decree No. 1087 "Determining the Cases of Life-Cycle Contracts Application" has determined an exhaustive list of infrastructure facilities that can be created, operated and maintained within the framework of life-cycle contracts. The list includes transport infrastructure facilities: roads, ports, airports, metro, railway, off-street and electric ground transport, ships and aircraft, as well as unique capital construction facilities and public utility facilities.

The concession agreement determines and integrates the concessionaire's obligations to design, construct, maintain and technologically upgrade the operated facility. In fact, the essence of the concession agreement is close to the life-cycle contract. Article 10 of the Federal Law "On the Railway Transport" opens an opportunity to create a railway infrastructure under private ownership and to develop it at the expenses of the infrastructure owners. The legal framework regulating the implementation of investment projects aimed at creating and reconstructing the railway infrastructure does not provide any restrictions to apply quasi-concession agreements. Existing legislation needs to be updated either by integrating a possibility to use modern tools and mechanisms of the investment attraction or by assigning the unequal legal status of PJSC "Russian Railways" in regard to other owners of the public railway transport infrastructure (similar to the

state-owned company "Avtodor").

The principal added value of the life-cycle contract is that it enables the state to utilize the facility without being involved in its production, subsequent maintenance and disposal. Over the past decades, many developed countries have acquired extensive experience with life cycle contracts, having developed a regulatory framework and institutional mechanisms that set the framework and principles of public-private collaboration. Life-cycle contracts are usually applied in the fields where there is a need for continuous collaboration under the context of long-term projects. First of all, it concerns infrastructure projects - construction of roads, sea and river ports, airports, public utility infrastructure, metro, land electric transport, etc. Besides it also concerns long-term projects aimed at constructing and further operating of other public sector facilities, such as hospitals, schools, etc.

International experience has shown that it is not always possible for concessionaires to completely offset the risks arising within the implementation of the concession agreement. Particularly, it concerns the risks of construction costs overruns or income losses occurring during the operation of infrastructure facilities. Such risks are usually induced by various uncontrolled risk factors that can hardly be managed. In this regard, traditional integrated scenario and probabilistic economic analysis should be complemented by an institutional analysis of the external environment focusing on the specific terms of concession agreements applied in particular industries and countries.

A state determines the project parameters based on the public interests and seeking to minimize the budget expenditures it assigns the majority of project risks to the private partner. In this regard, a private actor being not involved in the development of key initial project parameters can only partially secure its commercial interest within the frames defined by the state. In practice, this leads to the emergence of non-viable projects.

Such type of risks must be assumed by the grantor of the concession, represented by the appropriate state or municipal authority. However, thus far, there is no well-developed mechanism to compensate for such risk. In theory and practice, there is a prevailing approach, according to which the compensation for risk is essentially replaced by the compensation for costs overruns or income losses. Such an approach does not correspond to the principal idea of risk sharing that should be aimed at reducing uncertainty and contributing to the achievement of common goals. Under the context when the grantor of the concession can evade the fulfillment of the pre-determined obligations and the concessionaire cannot be sure to fully compensate for the uncontrolled risks, the economic efficiency of the infrastructure projects is becoming reduced. At the same time, the concessionaire has incentives to transfer manageable costs and lost income to the grantor of the concession. Therefore, the amount of compensation for costs overruns and income losses beyond the concessionaire's control should be determined within the project's feasibility study.

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According to the report of International Bank for Reconstruction and Development on the recommended terms of PPP projects (PUBLIC-PRIVATE-PARTNERSHIP, 2018), a grantor of the concession bears the following risks:

1. All risks associated with the land plot provided to the concessionaire (the compliance of the land plot with the requirements established by the agreement, the absence of archaeological objects on the site, the absence of third-party rights to the site, etc.).

2. Political risks, including significant adverse actions of the government that compromise the concessionaire's ability to fulfill the pre-determined obligations and (or) leading to additional expenses (war, rallies, protests, terrorist acts, nationalization, expropriation, etc.).

3. Risks related to obtaining permits from the grantor of the concession and its authorities out of the deadlines set by the agreement.

4. A breach of the concession grantor's obligations set by the concession agreement, including the violation of such obligations by the authorities of the concession grantor, is the basis for compensation for losses/additional expenses of the concessionaire.

5. The reduction of a regulated tariff below the level established by the concession agreement is a basis for compensation for the concessionaire.

6. The grantor of the concession is entitled to assume the obligations to reimburse the concessionaire's lost income, especially in the projects where there is no public funding for the grantor.

According to the new procedure of project initiating, a pre-investment study can be carried out by a potential concessionaire. While developing the parameters of the concession agreement, a project initiator can ensure its commercial interest within the limits of the concession grantor's interests. The further adjustment of the concession agreement terms aimed at balancing the interests of both parties will be carried out during the negotiations.

The salient feature of the life-cycle contracts is that it enables the state to enter into an agreement with one private supplier who undertakes to implement the full range of services - from project design and construction to further operation and disposal of the facility at the end of its service life. Such an approach eliminates the problem of opportunistic behavior among private suppliers. Thus, the negative external effects are becoming internalized contributing to the well-being of society.

The concessionaire's interests include a need to ensure the proper level of return on investment and gross proceeds as initially determined by the concession agreement. At the same time, due to direct legislative prohibition, the concessionaire's expenses cannot be reduced by mitigating the quality requirements towards the consumer properties of the facilities under the concession agreement.

The terms of the concession agreement can be changed if the fulfillment of the concession agreement on time is no longer possible due to the occurrence of the circumstances beyond the concessionaire's control. Such circumstances include: force majeure circumstances; a significant change in the initial circumstances, based on which a concession agreement was concluded; a decision of a court or federal antimonopoly body that the concessionaire or the concession

grantor cannot fulfill the obligations determined by the concession agreement due to the decisions, actions (inaction) of state bodies, local self-government bodies and (or) their officials. New mechanisms developed for guaranteeing the interests of the concessionaire make the concession legislation more similar to the investment and civil ones. Protection against the legislative amendment is a classic mechanism of investor protection, while a right to suspend the implementation of a concession agreement can be attributed to the operational measures applied within the civil law relations. A pledge, previously not applicable in the concession mechanisms, is currently allowed in case of direct agreement between the concession grantor, the concessionaire and the creditors.

The disadvantages of the life-cycle contracts can be divided into two groups: the issues induced by the specific nature of this type of contracts and the concerns associated with the contract conclusion [5]. The first group includes the following problems: limited resources and capacities of a private supplier; the complexity of calculation and overestimation of the facility's value; risk of insufficient financing (non-payment risk); high transaction costs. The second group comprises such issues as a high level of market competition; the potential emergence of the "iron triangle", connecting private companies, officials and politicians [11]).

Depending on the subject matter of the contract, there are two types of life-cycle contracts: contracts for infrastructure facilities and contracts for the supply, maintenance and disposal of goods. The nature, specificity and structure of these two types of contracts are inherently different due to the entirely different subject matters. The infrastructure life-cycle contracts being a specific form of PPP ("quasi-PPP") are similar to concessions. The infrastructure life-cycle contracts cannot be concluded for a period of less than 5-10 years, as otherwise the idea of integrating several stages of the life cycle into one contract no longer makes sense. At the same time, no other type of contract can include multiple types of work stipulated by the product's (facility's) life-cycle as it may lead to the violation of the fair competition law.

The principle of financial flows' formation also varies between the concessions and life-cycle contracts. Unlike concessions, where a private firm creates a facility and earns income by charging user fees, the framework of a life-cycle contract does not enable a firm to charge any user fees. If the project involves the user fees, it would be the responsibility of the state to charge it. Upon the facility's delivery, the state makes regular payments to the supplier covering the costs of the initial investments and operating costs. The framework of traditional concession agreement implies that concessionaire charges users of the service (consumer of the goods) with a user fee and fully bears the risk of demand (traffic risk). Under the context of a life-cycle contract, the state client shall pay for the creation and (or) reconstruction of the facility, as well as for its use (operation). Optimization of the project financial model is related to the diversification of the sources of return on investment for a private company.

This will facilitate effective structuring of the partnership within the projects that can ensure an effective demand for services (work, goods) but where it is inappropriate to charge the end user with the full user fee (comprising the investment costs). This concerns, for example, the projects aimed at constructing a transport infrastructure facility with relatively low traffic, socio-cultural facilities, etc. At the same time, the decision to apply a life-cycle contract depends on the project details. For example, in Russia, there are ultra-reliable guarantees applied to secure the investors in the highway construction projects: along with the revenues from the operation of highway the concessionaires also receive state subsidies. For instance, the concessionaires of the highway Moscow – St. Petersburg are supposed to get 261 billion rubles of the state subsidies within ten years (in 2010 prices). Thus, the concessionaire's profit of more than 50 billion rubles is already included in the project. The total concession period for this project is 30 years. According to the Ministry of Transport of the Russian Federation, "it is necessary to provide a possibility of granting the concessionaire guarantees of minimum income, as well as state guarantees to secure the concessionaire's credit obligations related to the project implementation". In other words, if the passenger traffic is insufficient to guarantee the profitability of the project, the investor's profit will be ensured by the state budget. There have been economic calculations performed for commercially viable projects implemented on the basis of concession agreements or life-cycle contracts. For example, Russian Railways for the highway Moscow – St. Petersburg" or Western Speed Diameter. These calculations are based on the estimation of passenger traffic. However, the project was overestimated. The socioeconomic effect of the highway Moscow – St. Petersburg was estimated at around 2.3 trillion rubles. According to this estimation, the highway is supposed to have annual passenger traffic of 8-12 million people that is 50% higher than the current level of passenger traffic.

Under the context of industrial railway construction project, passenger and cargo traffic cannot provide sufficient traffic intensity. In this regard, it is necessary to establish a procedure for calculating the amount of state compensation for income loss. The use of life-cycle contracts is recommended in the mineral resource sector, where they can be successfully implemented for the creation of energy and transport infrastructure facilities. Such projects are gaining particular importance in the regions with underdeveloped infrastructure, where their implementation contributes to the integrated development of the mineral resource base as well as to the extension of the industrial value chains [12] or creation added economic results [13]. The following projects may be mentioned among some of the best examples: the development projects of coal deposits in Yakutia and Tyva, the integrated development projects of mineral reserves in South Yakutia and the Lower Angara region, etc. For example, the implementation of the railway construction project in Tyva is important not only for business but also for the state, since this facility is of strategic importance for the economic development of southeastern Siberia. First, this railway connects the deposit with the Trans-Siberian Railway and would become the first railway branch in the Tyva Republic. Secondly, the line would significantly enhance the economic attractiveness of the Tyva Republic and would

reduce the shipping cost, increasing the competitiveness of the republic. Finally, this railway opens an opportunity to expand the markets in China and other Asian countries. The economic rationale for the projects aimed at constructing transport infrastructure facilities for large industrial enterprises, especially in the regions with underdeveloped infrastructure, should be performed according to the special methodology. In such a context, the main difficulty is the assessment of the integral effect of the infrastructure project together with the construction project of mining and processing plant. The absence of such technique obstructs the reliable estimation of the amount of state compensation for the investment expenses or income loss of the investor.

IV. CONCLUSION

1. There is no sufficient evidence proving the effectiveness of the form of PPP as compared to government procurement or various forms of contracts, even taking into account the international experience of concession agreements.

2. The composition of participants in various forms of PPP is the same: the state (customer), private company (concessionaire, service provider), consumers (population, industrial consumers).

3. All participants in concession agreements have different interests that must be reconciled in terms of the contract. Contract options differ in the distribution of risk between the parties, the features and possibilities of financing the project, the composition and amount of transaction costs, the distribution of obligations between the parties.

4. The main value of the life-cycle contract lies in the fact that the state is able to utilize the useful properties of the facility without participating in its construction, subsequent maintenance and disposal.

5. The procedure for the generation of financial flow in the framework of concessions and life cycle contracts is different. Unlike concessions, where a private company creates an object and receives income from consumers, at the conclusion of a life-cycle contract after commissioning the facility, the state makes regular payments to the supplier, taking into account the initial investment and operating costs.

6. The disadvantages of life-cycle contracts include issues with the conclusion of contracts in general and associated with the specifics of the life cycle contract itself. The first group includes the level of market competition; the probability of the appearance of the "iron triangle". The second group includes the limited resources and capacity of the supplier; the complexity of the calculation and the overestimated value of the facility as a whole; the risk of insufficient financing; transaction costs.

7. The use of life cycle contract is recommended in the mineral resource complex so as to build transport infrastructure facilities in regions with underdeveloped infrastructure for the implementation of several projects ensuring the integrated development of the mineral resource base, creating the longest value chains on the basis of a single enterprise, or obtaining additional economic results.

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