Perspectives of comprehensive mineral exploitation based on the principles of public-private partnership

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Abstract. The opportunities of the public-private partnership instruments using to shift the paradigm of the natural resources development in the fuel and energy complex of Russia are highlighted in the article. Three main directions of PPP projects development in the subsoil use are pointed out. The role of innovations in the implementation of the most perspective PPP projects in the fuel and energy complex of Russia is shown.

1. Introduction

Fuel and energy complex of Russia plays a significant role in the development of the country. According to the State Balance data Russia is the undisputed world leader in the natural gas reserves; oil and condensate reserves account for 20.1 billion tonnes and ensure the fifth place in the world rankings with a share of 3% of the world reserves. Fuel and energy complex (FEC) of Russia provides about 50% of federal budget revenues, 70% of export earnings and jobs for millions of Russians in mining and related industries. Nowadays it forms the basis and will form the basis in the foreseeable future for the formation of the country’s budget [2]. However, the exaggerated role of FEC in Russia has led to the formation of “enclave dual economy”, which, according to the well-known American economist G. Stiglitz, is characterized by such features as focus on the extensive extraction of natural resources and the existence of two sectors that are isolated from each other, i.e. highly profitable export-oriented commodity sector is mainly based on the extraction of rents and a lagging underdeveloped manufacturing sector [3]. Enclave economy is weakly receptive to innovative development and hardly moves from the innovation system of “technology push” (the fundamental knowledge generated according to the state efforts) to the innovative system of “market traction” (innovations generated by the efforts of businesses) [4]. It is important to note that a full-fledged internal market has not formed in the enclave economy and created institutions (rules of game) are not effective and conserve prevailing situation [5].

FEC is itself undergoing the negative effects of the enclave economy that consist in the deterioration of the resource base due to the depletion of existing fields, reduction in the size and quality of new geological discoveries, increase in the costs for development of complex and distant provinces. High depreciation of production assets, wide technological gap between Russia and developed countries, high level of dependence on imports of equipment, materials and services as well as excessive dependence on unstable external energy markets are characteristics of modern Russian
FEC. Steady decreasing of demand and energy prices drop in the world market as well as outbreak of geopolitical crisis in 2014 that led to the introduction of sanctions against Russia exacerbated these problems by making it impossible to continue the country development mainly due to the natural energy resources production and sales in the external market. The problem of search for a new model of FEC development is very important. It seems that the solution of this problem is closely connected with the shift from the extensive use of natural resources to the integrated development of natural resources with sustainable socio-economic development of the territories and mutually beneficial partnership of science, authorities and business on the principles of public-private partnership (PPP) [6]. All the factors mentioned above make it actual to search for the perspective directions and forms of PPP directed at the formation of a new paradigm of development of the Russian FEC.

The purpose of this paper is to research into the perspective areas of science, authorities and business partnership on the principles of PPP in the fuel and energy sector adapted to the specific Russian conditions.

2. Discussion of the problem

Despite the fact that the speeches of the country’s leadership and the “Energy Strategy of Russia for the period 2035” highlight that with the help of PPP it is planned to create an effective instrument for import substitution and cross-sectoral cooperation, which solve the problem of attracting investments as well as contribute “the formation of scientific, technological and industrial base for the development and production of high-quality power equipment and provide services in the key fuel and energy technology areas for sustainable operation and development” [7], the public-private partnership in the fuel and energy sector has not received wide implementation in Russia. This fact can be explained by three main reasons. Firstly, there is no clear conceptual approach to PPP in Russia. Secondly, national model of PPP in Russia is in infant phase, and legislation, standards and forms of PPP projects are not developed. Thirdly, Russian legislation contains a number of serious limitations of PPP projects implementation in the fuel and energy sector.

Among the studies devoted to the PPP the most influential are the studies of E. Osborne, P. Steven, E. Klijn, G. Teisman, G. Hodge, C. Greve, E.R. Yescombe et al. [8-12]. The following conceptual approaches can be pointed out in the context of foreign and Russian theoretical PPP studies. It is crucial to note that they differ in the understanding of the role and place of the PPP in the modern market economy. According to the first approach PPP is considered in its broadest sense and includes all forms of cooperation between business and authorities, including joint ventures, corporate social responsibility, philanthropy, and even government subsidies and financial and organizational support for business [13]. The broad approach allows the place of PPP in the public sector of economy to be shown, as well as possible directions of joint participation of business and state in the FEC development to be identified. However, this approach hides the features of PPP, its specific mechanisms and forms, benefits and risks. The inability to clearly define the permissible limits and priorities for the use of PPP in the fuel and energy industry is the main drawback of the approach.

The second approach is based on the concept of “New Public Management” (Y. Van Ham, H. Koppenjan, M.B. Gerrard, E.S. Savas, H. Delmone, V.G. Varnavskiy, M.A. Deryabina, N.D. Holodnaya) [13-20]. According to this approach PPP is a way to implement the instruments of project commercial management in traditional branches of the public sector (medicine, public health, protection of public order, public utilities) and to increase efficiency of state property management in the infrastructure sectors, such as transport. PPP is represented as an instrument of state regulation and privatization alternative according to the approach. The main focus of this approach is on the implementation of the approved foreign organizational schemes and ways of financing projects prevailing in developed countries. The main advantage of the approach is the detailed analysis of PPP specifics as a form of interaction between business and authorities, and the main drawback is the implementation of developed countries experience only. Most followers of this approach do not analyze country-specific PPP models and do not consider the possibility of using PPP in fuel and
energy complex. One can say with some proviso that this approach is most prevalent in the foreign and Russian literature.

The third approach, being the most perspective for the study of the possibility of using PPP in fuel and energy sphere, considers PPP projects as an instrument for national, international, regional, city and municipal economic and social development, as a way to overcome the economic crisis in some countries and sectors of economy (D.W. Brinkerhoff, J.M. Brinkerhoff, S. Agere, A.E. Kontorovich, S.M. Nikitenko, E.V. Goosen et al.) [6, 20-21]. According to this approach PPP features are clearly defined, i.e. project nature of the interaction (PPP is a long-term project with a clearly defined timeframe); voluntary and mutually beneficial co-operation between partners; formal co-operation between partners on the basis of contracts and agreements with a clear structure of interaction to share risks and benefits; joint participation of businesses and authorities in the financing and management and/or implementation of the project [6]. At the same time the approach admits the possibility of the PPP forms existence in the country or the sector, and that bears the character of a project but do not meet all characteristics of PPP. To distinguish these projects and programs from the “classic” PPP it is supposed to indicate them as quasi-PPP (“almost” PPP) [22]. This approach can exactly identify the most perspective areas and features of PPP development in the fuel and energy sector in Russia.

Let us consider the Russian experience of the PPP partnership development. PPP projects market began to develop in Russia after the formal adoption of the Federal Law from 21.07.2005 No. 115-FZ “On Concession Agreements” (hereinafter the Law on Concessions). There was a rapid increase in the number of projects and investments for the period 2005-2015. According to the official portal “Unified information system of public-private partnership in the Russian Federation” (hereinafter PPP Information portal) by the middle of 2016 decisions had been made to implement 1339 projects, and 873 of them are being implemented at the moment. The number of projects has increased almost 10 times compared to 2014. Table 1 indicates the dynamics of the registered projects in Russia. It should be noted that in the Siberian and Far Eastern Federal Districts, where the main resource-extracting companies in Russia are located, the growth in the quantity of projects was the highest [23]:

| District                         | Number of PPP projects by year | Growth from 2014 to 2015 (times) |
|---------------------------------|-------------------------------|----------------------------------|
| Central Federal District        | 59, 21, 292                  | 14                               |
| Northwestern Federal District   | 46, 23, 114                  | 5                                |
| Volga Federal District          | 36, 34, 342                  | 10                               |
| Southern Federal District       | 14, 10, 61                   | 6                                |
| North Caucasian Federal District| 9, 4, 28                     | 7                                |
| Ural Federal District           | 25, 11, 49                   | 4.5                              |
| Siberian Federal District       | 103, 24, 256                 | 11                               |
| Far Eastern Federal District    | 19, 4, 143                   | 36                               |
| Russian Federation (total)      | 311, 131, 1285               | 9.8                              |

Another feature of the official Russian market of PPP projects is that the projects of the fuel and energy sector are almost not represented. Only five projects out of 1285 can be attributed to the sphere of subsoil use in 2015 after the Federal Law of 13.07.2015 N 224-FZ “On public-private partnership, municipal-private partnership in the Russian Federation and the introduction of changes into the Russian Federation legislative acts” (hereinafter the PPP Act) was introduced in 2016. PPP projects in the sphere of subsoil use were excluded from the database as not corresponding to the national legislation after adoption of the amendments to the Law on Concessions.

According to the quality of the PPP projects and the volume of attracted investments the Russian PPP projects also do not entirely correspond to the main features of the classic PPP projects. Most PPP
projects are short-term in contrast to the country-leaders such as the USA, Great Britain and Canada. Almost 30% of PPP projects that are registered in the PPP Information Portal have a 3-year implementation period or less, while in most countries implementation duration of PPP projects is 10 or more years. Russian projects have differences in the mechanism of financing. An unusually high proportion of investment made by the state characterizes Russian PPP projects. If in the developed countries this share usually is less than 25%, then Russian successful PPP projects get more than 50% of budgetary investments.

This is the reason why the total share of private investment in PPP projects in Russia is not only much lower than in the developed countries but also lower than in the BRICS countries, i.e. in Brazil and India. Total private investment in PPP projects in Brazil and India represents 18.89% and 9.47% of GDP respectively, then in Russia the share of the total private investment is less than 1% as shown in Figure 1 [23]. Many Russian PPP projects do not differ from ordinary projects implemented by means of budgetary investments on free and irrevocable basis, while the classic PPP projects involve an investment mechanism for raising funds through issuance of bonds with the use of private financial institutions and funds. It is not surprising that many Russian researchers study PPP projects only as a way to attract budget investments [23]:

Figure 1. Share of private investment in PPP projects to nominal GDP (%).

A major factor that limits the development of PPP projects in Russia in general and, particular, in the subsoil use is the presence of a large number of quasi-PPP projects in the actual practice. Infrastructure projects that are implemented on the basis of the State order and agreements on social and economic cooperation between regional authorities and businesses as well as federal and regional programs considered as PPP projects according to some regional laws on PPP. Some Russian regions consider ordinary business support programs as PPP. Their formation and operation are regulated by the general rules of civil law, that is not adapted for this, or even these programs are outside of the legal field at all.

Special place among quasi-PPP occupy agreements between authorities and businesses about socio-economic development as well as large mining-extracting companies programs of regions and territories development that are widely used in natural resources extracting regions. Table 2 from [23] contains a complete list of such quasi-PPP forms projects that are included in the PPP Information portal database. Column “quantity” provides data about the number of specific forms of the projects included in the database. However, these figures do not reflect the real picture because most of these forms of partnership between business and authorities is not legally regulated, which prevents from recording and tracking them officially. Earlier studies fulfilled by the authors have shown that the number of quasi-PPP projects is a hundred times greater than the number of classical PPP projects realized in Russia [24].
Table 2. Forms and quantity of quasi-PPP projects included in PPP-info database (beginning of 2016).

| Forms                                                                 | Quantity |
|-----------------------------------------------------------------------|----------|
| Investment agreements                                                 | 16       |
| Long-term investment contracts with an investment component            | 1        |
| Credit agreements with Vnesheconombank                                 | 1        |
| The contract of uncompensated use of property                          | 2        |
| Agreements on social and economic cooperation                          | 7        |
| As a part of the non-commercial organizations law                      | 1        |
| Production sharing agreements                                          | 5        |
| Overall quasi-PPP projects (share of the total number of projects)     | 28 (2%)  |

Despite the fact that most of the Russian projects are concession agreements in the infrastructure and social sphere, there is a positive experience in the implementation of PPP projects in industries engaged in production, processing and transportation of natural resources. Examples according to [23, 25]: building transport infrastructure for the development of mineral resources of the south-east of the Chita region, construction of the railway line Kyzyl – Kuragino in conjunction with the development of mineral resources base of the Republic of Tuva, a program of integrated development of the Lower Angara region (see Table 3).

The share of such projects is small. These projects are implemented within the large programs of sectors and regions development and are financed by the means of the Investment Fund of the Russian Federation and do not officially belong to the PPP projects. Two Russian official PPP projects database – Information Portal of the PPP and the official website of the Ministry of Economic Development, that register projects financed with the participation of the Russian Federation Investment Fund, provide information only on 12 PPP projects. Projects related to subsoil use amount less than 1% of all PPP projects registered on both websites. At the same time only 6 projects can be directly attributed to the fuel and energy sector (Table 3).

Table 3. Russian PPP projects in the fuel and energy sector.

| No. | Project name                                                                 | Terms of realization | Industry classification                                      | Project status |
|-----|-----------------------------------------------------------------------------|----------------------|------------------------------------------------------------|----------------|
| 1   | Elaboration of project documentation for the investment project “Integrated Development of South Yakutia” | 2008-2013            | coal mining, enrichment, energetics                        | federal       |
| 2   | Building of transport infrastructure for the development of mineral resources of the south-east of the Trans-Baikal Territory | 2007-2016            | enrichment, transportation                                 | federal       |
| 3   | Complex of refineries and petrochemical plants in Nizhnelemorsk              | 2006-2012            | petroleum refining                                         | federal       |
| 4   | Integrated development of the Lower Angara region                           | 2006-2015            | transportation, energetics, non-ferrous metallurgy         | regional      |
| 5   | Creation of a complex for processing Northern Caspian gas into ethylene, polyethylene and polypropylene (I step) | 2011-2015            | gas processing, energy and transport infrastructure        | regional      |
| 6   | Construction of the railway line Kyzyl-Kuragino in conjunction with the development of mineral resources base of the Republic of Tyva | 2008-2016            | transportation                                             | regional      |
A small number of projects in fuel and energy sector of Russia are largely due to legal limitations. For instance, Part 1 of Art. 3 (PPP Law) established a closed list of objects that can be a subject of the PPP agreement. PPP Law prohibits expressly the conclusion of PPP agreements in respect of natural resources. Licensed character of subsoil use also limits the ability to create PPP projects in the fuel and energy sector and in the framework of the Law on Concessions. Another legal barrier to the development of PPP in the fuel and energy sector is the definition of a private partner in the PPP projects that is given in Part 3 of Art. 3 of the PPP Law, according to which the state and municipal unitary enterprises, state-owned companies as well as non-profit organizations and “offshoots” of state companies can not be private partners in PPP projects. This limitation automatically makes it impossible to participate in PPP projects for most big oil companies, which significant percentage of shares belong to the state.

Organizational structure of the companies from the fuel and energy complex limits seriously the possibilities of PPP development. Most of the regional fuel and energy companies are not independent, they are part of the large vertically integrated groups that were registered and have profit centers in Moscow and St. Petersburg. Parent company accumulates most of the revenues of its regional companies as well as most of the taxes through transfer pricing system in profit centers that limits severely the ability of the implementation of regional PPP projects. It is fair to say that the situation with a relatively small share of PPP projects in the natural resources development is not a specific feature of Russia but is a typical feature for the majority of the countries.

Despite the highlighted problems, the PPP projects in the subsoil use as well as fuel and energy complex can be actively generated in three main directions. The first direction is the creation of specialized production of mineral-raw material orientation on the basis of concession agreements and production sharing agreements. As an example of such PPP in Russia can serve the development projects of Elgitskiiy coal deposit (Republic of Sakha, Neryungri district), oil and gas fields of Evenkia (Yurubcheno-Tokhomskoye, Kuyumbinskoye, Nizhneangarsk group, Sobinsko-Teterinskaya group).

Projects of hydrocarbons development in the form of production sharing agreement with the participation of foreign investments can be included in the PPP in the sphere of fuel and energy sector but with some proviso. These projects are: Sakhalin-2, which includes the Piltun-Astohskoe oil and gas condensate field and Lunskoye gas condensate field; Sakhalin-1, including Chaiinskoe, Arkutun-Daginskoe and Odoptinskoe oil and gas fields; “Khariyaga” project; Samotlor oil and gas condensate field development project. It is important to note that this type of PPP projects does not seriously change the paradigm of subsoil use. These projects serve to overcome the crisis as well as an instrument to support the current state of the industry [26].

The second direction is the creation of industrial and social infrastructure in the resource-extraction regions, forming conditions of rational subsoil use, deep processing and enrichment of extracted resources. As a striking example of this PPP project in Russia can serve the construction of the complex of refineries and petrochemical plants in Nizhnekamsk. The initiators of the construction were the Government of Tatarstan and the company PJSC “Tatneft”, which became the main private partner, investor and project coordinator.

The aim of the project was the construction of processing enterprises to refine Tatarstan oil near the site of its production; substitution of oil export with realization of high-quality oil products on the domestic and foreign markets that consistent with the strategic objective of Russia; improvement of the environment through the production of environmentally friendly fuels and compliance with stringent emission requirements for the design of the Complex installations; application of the advanced world technologies. Integration of refineries and petrochemical plants into a single production facility will give impetus to the development of intra- and inter-regional integration of the region’s businesses.

At the first stage of the PPP project realization over 3,000 new jobs were created and apartments for workers were built in the framework of the project as well as kindergarten and a sanatorium complex [22, 26]. It is important to indicate distribution of “responsibilities” between partners. PJSC
“Tatneft” as a private partner was engaged in construction of production facilities using its own funds, whereas state upgraded external infrastructure using means of State Investment Fund: access rail tracks, oil pipeline with pumping station and pipeline for finished products. Approximately 16.5 billion rubles of budget investments from the Investment Fund were allocated for this purpose. At the same time the total cost of the project amounted to over 200 billion rubles. Construction of the plant was started in 2006 and now is in the final stage [26]. PPP projects of the second direction have a significant social component. They provide a large-scale modernization of the transport, energy and social infrastructure and aim at the socio-economic development of the region (increasing employment, standard of living). That is why the PPP projects are much closer to the paradigm shift of subsoil use, but do not change it fundamentally.

The third direction is the integrated development of natural resources. This direction is associated with the projects of new industries formation that focus on creating innovative development centers, developing markets and clusters. Such projects are still very few in the world. PPP projects of the third direction are diversified innovative projects for the fuel and energy industry, including development of innovation centers, technology platforms, etc. The main difference of these projects is due to their focus on the search and selection of basic research oriented ideas, conducting research based on scientific studies, research and development of innovative business projects.

Three technological platforms for the extraction of natural resources and oil and gas refinery approved by the Government Commission on High Technology and Innovation in 2011 can serve as examples of PPP projects of the third direction in fuel and energy complex. Twenty second technological platform is a platform of solid minerals, focused on deep processing and renewing domestic industries with high technologies. The 23rd – technology of hydrocarbon mining and utilization, the result of which should be the development and implementation of new technologies for the production, preparation, processing and transportation, well drilling, etc.; the 24th – deep processing of hydrocarbon resources, which implies the creation of conditions for technological modernization and increasing competitiveness of oil and gas refining, petrochemical industry and organic synthesis procedures using foresight [26]. The main objective of technological platforms is to select the ideas of fundamental research, performance of scientific research on their basis and development of innovative business strategy. As a form of PPP development, it not only creates a fundamentally new technology, but also involves business and research organizations into the process of formation and development of new markets on the basis of close mutual cooperation.

3. Conclusions
The performed analysis shows that the PPP projects in the fuel and energy sector in Russia are developing very slowly. However, PPP projects that focus on innovative model of integrated development of natural resources have potentially great perspectives. These PPP projects can solve fundamentally the problem of resource-extracting regions due to the transition to a new paradigm of subsoil use based on the idea of the integrated use of natural resources and sustainable socio-economic development of territories on the basis of new technologies introduction, formation and development of the internal market.

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