

ACCOMMODATION OF INTERESTS OF THE STATE, BUSINESS AND CIVIL SOCIETY IN ENVIRONMENTAL PROJECTS IMPLEMENTED THROUGH PUBLIC PRIVATE PARTNERSHIP IN THE RUSSIAN FEDERATION

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Abstract

Environmental projects have a number of distinctive features, among them an increased capital/output ratio, relatively high risks, lengthy payback periods, and outcomes that are hard to evaluate using financial indicators. Public private partnership (PPP) appears to be a viable approach for the implementation of such projects; however, existing mechanisms for the accommodation of long-term interest of the state, business and civil society are inadequate to ensure their success. In this context, the author presents an algorithm of multi-criteria analysis to evaluate the social efficiency of PPP-based environmental projects, which takes into account the impact of both financial and non-financial outcomes and includes crowdsourcing public opinion into the final decision-making process. Special priority is given to the assessment of multiplicative effects, as their role and impact on the feasibility of investment are often underestimated. The author's conclusions and recommendations are illustrated using the case study of a construction project for a municipal solid waste processing facility.

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I believe that we can still save our planet and all of its inhabitants.
—Leonardo DiCaprio, American actor

Introduction

The indispensable prerequisites for effective solutions to environmental problems are, above all, a high level of environmental awareness by the population and quality legislation regulating the rules of natural resource exploitation and environmental protection. However, these are not sufficient conditions, if for no other reason than because without a sensible state environmental policy and the implementation of a critical mass of investment projects aimed at environmental protection, it is practically impossible to achieve a human living environment less polluted by industrial and post-consumer waste, or a higher quality of potable water and air.

Such projects usually have a number of distinctive features, the most significant among which are the large volume of initial investment, lengthy payback periods, and increased participation risks both for investors and for investment recipients. This is exactly why, as demonstrated by international experience, there is a wide range of possibilities for their implementation through various types of public-private partnership (PPP), which is an array of forms of both medium and long-term partnership between the state and the private sector aimed at the achievement of socially important objectives on mutually beneficial terms. It is rather telling that the history of PPP began in the mid-16th century with a channel construction project near the town of Salon-de-Provence in France³, directly relevant to the area of environmental management.

It should also be noted that the state, represented by authorized agencies, can content itself with a formalist approach to the assessment of such projects, while lacking awareness and consideration of vital interests of the population of the territory in question. We can recall a lot of cases where public authorities supported and even lobbied projects that would (or actually did) have extremely environmentally damaging consequences. One especially infamous example was the project to divert the flow of Northern and Siberian rivers in the former Soviet Union, which was halted due to the efforts of the scientific community and the creative intelligentsia⁴.

This is why active involvement of civil society in the preliminary examination process is an integral element of planning investment projects aimed at integrated use of natural resources and environmental protection using various PPP models. Only an approach based on an informal accommodation of interests of the state, the private sector, and civil society can give practical meaning to the Leonardo DiCaprio quote that serves as the epigraph for this article.

One serious obstacle to this is the disparity of planning horizons among the stakeholders of environmental engineering projects. In point of fact, the interests of civil society are usually long term; its competent representatives require a comprehensive account of all possible remote effects of investment decisions represented by environmental quality indicators rather than in monetary terms.

³ Marylène Soma Bonfillon. *Le Canal de Craponne un exemple de maîtrise de l'eau en Provence occidentale 1554-1954*. Accessed July 28, 2017. http://www.asainfo.fr/doc/doc/Res-these_MBonfillon.pdf

⁴ Theodore Shabad. *Soviet, after studies, shelves plan to turn Siberian rivers*. 1983. *The New York Times*, December 16. Accessed July 28, 2017. <http://www.nytimes.com/1983/12/16/world/soviet-after-studies-shelves-plan-to-turn-siberian-rivers.html>

As for potential project participants from the private sector, they are mainly focused on short-term financial gain, often at the expense of future environmental damage. Similar short-sighted thinking is also typical of civil servants involved in project discussions, particularly if they are not sure of their career prospects and lack sufficient motivation to assess the implications of the decisions being made beyond their immediate superiors' terms of office.

Although according to Spinoza's maxim, "the appeal to authority is not a valid argument," it is appropriate at this point to refer to the point of view of Nobel Peace Prize laureate Muhammad Yunus. In an interview for the book *22 Ideas to Fix the World: Conversations with the World's Foremost Thinkers* (Dutkiewicz and Sakwa 2014), he stipulates that deterioration of the environment, low quality of healthcare, and insufficient food safety are all consequences of a "cult of money." It is difficult to disagree with his opinion that earning money cannot be a goal in itself; it should be the means to overcome the challenges faced by humanity.

It is important to note that the differences in planning horizons and motivation of project stakeholders are the key reason for the lack of mutual trust between them, and will not disappear on its own. Meanwhile, if this issue is not resolved, we cannot count on the development of PPP for the implementation of investment projects aimed at sustainable use of natural resources and environmental protection. The task of reducing the interests of environmental project participants to a "common denominator" is further exacerbated by the fact that it is often challenging or even pointless to represent their outcomes in the form of conventional financial indicators. The strengthening of trust between PPP participants is not a one-way street: the role of the state is undoubtedly important, but by no means absolute. Reciprocal effort on the part of the private partner is also extremely important, such as for maintaining a solid positive reputation of its management, complete transparency of financial flows, disclosure of objective information about its owners, existence of a clear environmental strategy, etc.

However, since we cannot reasonably expect any PPP participants to forfeit their own interests, the main focus of this article will be on the development of specific recommendations for a methodology to accommodate the interests of the state, business and civil society; to strengthen trust between them; and to ensure the priority of long-term project implementation objectives over short-term financial goals of certain participants. Its key elements are as follows:

To maintain continuity of assessment of social and commercial outcomes of environmental PPP projects, which would contribute to the accommodation of the participants' long-term interests.

- To develop a methodology for the evaluation of the social return on investment for environmental projects, taking into account the balance of financial and non-financial outcomes;
- To involve concerned representatives of civil society in the discussion of environment-oriented projects at preliminary stages using crowdsourcing techniques;
- To identify multiplicative effects and provide a quantitative assessment of their impact on investment decision-making concerning the feasibility of environmental PPP projects;
- To maintain continuity of assessment of social and commercial outcomes of environmental PPP projects, which would contribute to the accommodation of the participants' long-term interests.

Methodology

The opinions of Russian economists on the topic of PPP have undergone a certain evolution over the last 20 years. The term “private public partnership,” which was universally accepted in the mid-1990s, has almost gone out of use, replaced by “public private partnership.” The reason behind this switch lies not so much in the literary preferences of specific authors, but rather in the development of certain economic processes. Prior to the August crisis of 1998, the state was weak and most resources were concentrated in the hands of large businesses; consequently, it was business that played the senior partner role in the business-state tandem. Thus, describing their interaction in terms of “private public partnership” objectively reflected the economic situation at the time. However, the situation has changed dramatically since then, with the state transforming from a passive follower into the dominant partner possessing both adequate financial resources and the opportunities to create necessary institutions for the development of PPP. Naturally, in these conditions the transition to the term “public private partnership” was simply an objective reflection of the status quo. Besides, this is the term predominantly used in other countries (The World Bank 2014; *National Public-Private Partnership Guidance* 2013; OECD 2012).

Current trends show a pronounced interest towards public private partnership in Russia. For example, a unified information system for PPP was launched in 2013 at <http://www.pppi.ru/> with the assistance of the Ministry of Economic Development of the Russian Federation, and more recently, a federal law on PPP was adopted⁵, which stipulates the following requisite elements of a PPP contract:

- The private partner undertakes the construction and/or reconstruction (also referred to as creation) of the object of the contract;
- The private partner provides full or partial funding for the creation of the object of the contract;
- The private partner is responsible for the operation and/or maintenance of the object of the contract;
- The private partner is entitled to the property rights for the object of the contract in case of encumbrance in accordance with the legislation.

Since this article deals with problems related to the evaluation of environmental PPP project efficiency, we should mention the fact that the PPP law has a special section in the PPP contract object list for facilities that deal with handling, disposal, processing, and storage of municipal solid waste (MPW).

In accordance with Article 9, paragraph 4 of the federal law on PPP, a key requirement for a methodology of efficiency assessment for PPP projects is to identify their comparative advantages using the following ratios:

Ratio 1. Net present cost value of budget funds of the Russian Federation in the case of project implementation through PPP / by execution of a public contract (as an alternative to PPP);

⁵ Federal Law No. 224-FZ dated 13 July 2015 On Public Private Partnership, Municipal Private Partnership in the Russian Federation and Amendments to Certain Regulatory Acts of the Russian Federation. http://www.consultant.ru/document/cons_doc_LAW_182660/

Ratio 2. Extent of liabilities assumed by the public partner in the case of project implementation through PPP / by execution of a public contract.

However, we believe that these comparative advantages alone are not sufficient grounds for positive evaluation of PPP projects; in some cases, this approach may lead to unsound investment decisions. Some arguments in favour of this statement are presented below.

The law in question contains a significant reference rule stating that the methodology used to assess PPP project efficiency and calculate their comparative advantage must be approved by the federal executive agency authorized to carry out state investment policy (Article 9, paragraph 7 of the federal Law on PPP). Although critical values for ratios 1 and 2 above are not established by law, simple economic logic dictates that each of them must equal <1 for an efficient PPP project. After perfunctory consideration, it seems that when using the PPP model in comparison with alternative methods of state-supported investment, lower volumes of budget expenses and the public partner's liabilities can be considered as requisite conditions of PPP efficiency.

The original roots of this approach can be traced back to the international experience of application of the value-for-money criterion, which is defined in HM Treasury (2006) as the ratio of the integrated costs of construction and maintenance of an infrastructural facility to the quality of services provided to its potential customers. The popularity of this method can be partially explained by the basic assumptions made when comparing the alternatives. Essentially, it is assumed that the participation of the private partner in a PPP project allows one to lower both capital and operational expenses in comparison with budget financing; for example, up to 15% for school construction (The World Bank 2013). However, to prove the accuracy of such assumptions, more compelling evidence is required than the existing anecdotal observations.

We believe the following consideration to be more significant. Any PPP project not only requires a certain volume of budget expenditure, but also generates tax and non-tax revenues for different levels of the budgetary system, in the form of tax revenue from direct participants of the project as well as multiplicative effects in related sectors of the economy. Essentially, these are consolidated budget revenues, comprised of the following:

- Nontax revenues, including land registry fees; interest on loans allocated to the private partner by the state (directly from the budget or by a relevant development institution); principal payments; dividend on shares; proceeds from private partner shares purchased previously in the open market; guarantee payments; license charges, etc.
- Direct tax revenues from project participants, including the companies that are recipients of investment in the PPP model and the building contractors involved in project implementation in its investment phase.
- Indirect tax revenues incidental to project implementation. These include the augmentation of tax payments of all project stakeholders registered in the Russian Federation: manufacturers of materials and equipment for the construction of objects financed from development institution funds; suppliers of materials and parts for the production of goods or provision of services in the operation phase of the project; and consumers of these goods or services. The inclusion of indirect tax revenues into the evaluation of the efficiency of investment projects allows for the acknowledgement of the tax multiplier arising from their implementation.

In this context it becomes obvious that if the minimization of budget costs is considered the main efficiency criterion, the issue of consolidated revenues is overlooked and has no impact on the conclusion made about the existence or lack of comparative advantages of the PPP approach. It should be particularly emphasized that the importance of multiplicative effects for the assessment of investment efficiency is usually underestimated, not just for PPP projects but for any other projects implemented with any kind of state support. Meanwhile, it could possibly bring about a complete overhaul of the logic behind investment decision-making about the feasibility of a project that was previously considered inefficient (or, conversely, its non-feasibility in the case that the multiplicative effect of the project turns out to be negative). This applies to both budgetary and commercial efficiency of the project for the private partner. Further on we shall illustrate this point by calculating the efficiency of a municipal solid waste processing project as an example.

In light of the above, it is essential to note that various attempts to minimize budget expenses and transfer PPP project risks to the private partner can be explained from the position of common sense, but cannot fully support the required balance between stakeholder interests, often acting as a hurdle to successful project implementation. Following the logic established by Peter Drucker, the guru of modern management, that the focus should always be on maximizing opportunities rather than minimizing risks⁶, we shall focus on the revenue-based rather than the cost-based approach to the accommodation of stakeholder interests, with obligatory acknowledgement of multiplicative effects of PPP project implementation.

Results and discussion

The goal for the evaluation of PPP projects (especially environmental ones) has inevitably shifted from traditional assessments of commercial efficiency, characteristic of the primacy of business interests over those of the state, towards the justification of the social impact of investment projects that have high significance for society as a whole and are implemented with private sector investment resources through the PPP model.

A comprehensive approach to efficiency assessment for such projects involves three interconnected stages:

1. Assessing the social efficiency of the project (if the result is negative, the assessment stops and next two stages are not required);
2. Assessing the commercial efficiency of the project (if the result is negative, there is no point in selecting any PPP model for the project);
3. Selection of a suitable PPP model.

A new term, “collaborative governance,” which implies that implementation of such projects involve private companies and the general population as well as the government (Bevir 2012), has recently emerged to characterize the specific features of managing projects aimed at solving socially significant problems. In the context of the collaborative governance of PPP projects, a positive assessment of their social efficiency based on the guidelines published by international organizations (European Commission 2008), the World Bank (Belli et al. 2008), or similar Russian

⁶ See, for example, Drucker, Peter F. *Innovation and entrepreneurship: practice and principles*. New York: HarperBusiness, 1993.

documents⁷ may turn out to be a necessary but not sufficient prerequisite for their successful performance.

The fact is that a PPP project can only be implemented when there is a balance between the interests of the public and the private partner when taking into account traditional investment attractiveness indicators for both of them, such as net present value (NPV), internal rate of return (IRR), payback period (PP) and profitability index (PI)⁸. This means that, for example, the net present value must be positive not only for society as a whole, but also for the state budget and the private partner. Additional mechanisms should be in place to resolve a possible conflict of interest between the private and the public partner; for example, if the budget efficiency of the project is positive but it is commercially inefficient.

Another valid point is that it is impossible to reduce all kinds of positive and negative implications of socially important projects, particularly environmental ones, solely to financial indicators. The relevant methodology is explained in-depth in guidelines published by the European Commission (2008), the World Bank (2014) and the International Finance Corporation (Lysy 1999) (see also EPEC 2011 and New Zealand Treasury 2016). Despite the complexity of its application for the purposes of social efficiency assessment, its practical value is obvious, even though if it does not invalidate the general conclusion about the existence of a whole class of effects that are pointless to convert into traditional financial indicators.

It should be noted that in such cases good quality expert appraisal is much more useful than fruitless (and often even harmful) attempts to reduce any kind of external effects to the usual cost indicators in the face of objective reality. Such “financial fetishism” only increases entropy and the risk of ill-founded investment decision-making.

With regard to environmental projects, it is crucial to present their outcomes as specific target indicators reflecting the prospects of environmental improvement as a result of their implementation. These indicators should be easy to understand for the population of the area where the project is based, which is by definition one of its stakeholders.

Another cornerstone of success for a project is the organization of preliminary public discussions with the population using state of the art crowdsourcing techniques. We believe that this approach could be included as a formal requirement in the evaluation of environmental projects; positive results of a public discussion should be a necessary condition of its social efficiency.

Ignoring this rule can have negative consequences, most commonly in the form of public protests against environmental projects, which can lead to a project being delayed or even abandoned entirely. The reason behind these protests is mostly the mistrust of the population (often grounded in bitter experience of similar projects in the past) towards the project’s initiators and the lack of unbiased information about the prospects of environmental improvement. Public unrest based on mistrust and misinformation can sometimes stop environmentally unsound projects, but they may also halt the implementation of projects that would contribute to a healthier environment as well as create new jobs.

⁷ Russian Federation. Ministry of Economy, Ministry of Finance. *Metodicheskie rekomendatsii po otsenke effektivnosti investitsionnykh projektov* [Guidelines for performance evaluation of investment projects]. 2nd ed. 1999.

⁸ The methodologies for the calculation of these indicators are widely covered in economic literature; they are commonly accepted and, as such, are not the topic of this article.

According to the online publication *Gazeta.ru*, ecologically themed protests account for over a quarter of all protest actions in Russia⁹. A number of examples can be cited, including the successful protests against the construction of a silicon plant in Abakan, Republic of Khakassia, and the Yenisei ferroalloy plant near Krasnoyarsk (the reason in both cases being the threat of air pollution, which was not taken into account in the project development phase¹⁰), as well as the halt of a project for the excavation of an iron ore quarry in the village of Zyuzelskiy in the Sverdlovsk region despite the fact that it was well-thought-out and was granted all necessary permits¹¹, among other things.

Similar processes can be observed in other countries. Mass unrest in China has targeted the construction of a copper plant in the southwestern city of Shifang in Sichuan province, the Dalian Fujia Dahua Petrochemical factory in the province of Liaoning, the expansion of a petrochemical complex in the major port city of Ningbo, and the construction of a waste water pipeline to dump industrial waste from a paper factory in the city of Qidong near Shanghai¹². Of course, the involvement of the population in the social evaluation of environmental PPP projects through crowdsourcing technologies cannot be for free, despite the fact that crowdsourcing itself has its roots in volunteerism which does not presume payment for participation in community service. However, the organization of crowdsourcing requires certain expenses for the creation and maintenance of the project website (in a more advanced version, the development and support of a crowdsourcing platform) and aggregation and analysis of the results of the discussion. The use of crowdsourcing to solve socially important problems is discussed in more detail in Margolin and Dutkiewicz (2013).

Nevertheless, as irrevocably proven by the above examples, these expenses are relatively negligible and have a short payback period in contrast to the losses incurred due to delays or abandonment of reasonable and harmless environmental projects. In other cases, when environmental projects are not thoroughly thought out and the risks of their implementation only emerge during public discussion, the expenses related to organizing crowdsourcing are still incommensurably low in comparison to the possible damage to the environment if the project was prematurely funded.

The choice of discount rate (defined here as the minimum acceptable value of return per unit of capital invested) for the evaluation of social investment efficiency also has certain peculiarities. It is usually lowered in comparison to the discount rate used for commercial efficiency calculation. The reason for this approach to the evaluation of projects that have significant impact on the environment is the necessity of taking into account the long term possibilities of environmental damage. Following this logic, negative net cash flows in the final years of the accounting period,

⁹ *Gorod-ad. Ekologicheskie protesty sostavlyayut bolee chetverti vsekh protestnykh aktsii v Rossii* ["Hell City. Environmental projects account for over a quarter of all protest activities in the Russian Federation"] 2010. *Gazeta.ru*, March 26. Accessed November 11, 2016. http://www.gazeta.ru/comments/2010/03/26_a_3343366.shtml

¹⁰ *Rossiye zakhlestnula volna ekologicheskikh protestov* ["Russia is overwhelmed by a wave of environmental protests"]. 2012. *Lenta*, August 07. Accessed November 11, 2016. <http://lenta.ru/articles/2012/08/07/protest/>

¹¹ *Ekologiya protiv deneg: sverdlovskie vlasti ishchut kompromiss mezhdu protestami naseleniya i investproektami*. ["Ecology against money: Sverdlovsk authorities looking for a compromise between civil unrest and investment projects"]. 2014. Accessed November 11, 2016. <http://urbc.ru/1068027274-ekologiya-protiv-deneg.html>

¹² *Ekologicheskaya situatsiya v Kitae - problema dlya vsego mira* ["The environmental situation in China is a problem for the whole world"]. 2013. *Bellona.ru*, March 13. Accessed November 11, 2016. http://www.bellona.ru/articles_ru/articles_2013/1363180361.2

for example due to the costs of compensation for ecological damage, when discounted at a low rate, will have more impact on the final net present value than if the market discount rate is used.

The current mainstream approach to quantitative assessment of the lowered discount rate (sometimes referred to as the social, public or shadow discount rate) is the social rate of time preferences method (SRTP) (*National Public-Private Partnership Guidance* 2013), which reflects the willingness of society to give up consumption in the present in favour of future consumption¹³. This rate varies from country to country, sometimes quite significantly. For instance, the European Commission (2008) demonstrates an almost threefold difference between EU member states (2.8% in the Netherlands; 8.1% in Hungary). All other conditions being equal, the higher a country's level of development, the lower its SRTP.

Despite the widespread acceptance of the SRTP method, many countries of the world (in particular, the UK, the USA, and South Korea) use a discount rate based on the rate of return on state bonds with a long maturity (20-30 years) similar to the project cycle length.

This approach seems more preferable on the ground since the social discount rate that it yields is practically identical to the SRTP but much easier to calculate given that it is based on standard financial data. In comparison with commercial efficiency assessment, two components of the risk premium are excluded from the calculation, one of which is associated with the risks of the company initiating the project and the other with the risks of the project itself. While the initiator company's risks can be minimized by establishing rigorous requirements to PPP project participants, project risks are assumed by society. By excluding the risk premium from the requirements of the project's financial efficiency, it relies on the possibility of additional long-term advantages, both financial and non-financial.

It is significant to note that the current rate of return on Russian Federation bonds denominated in national currency roughly corresponds to the cost of capital that is currently attracted by companies participating in the *Program to support projects implemented in Russia on the basis of project finance*¹⁴ (further referred to as the *Program*), which amounts to 11.5%. According to the website www.rusbonds.ru, which continuously publishes bond quotes, the effective yield of Russian federal loan bonds (OFZ-29006-PK series) that were issued on October 19, 2016 and will mature on December 31, 2019 comes up to 11.21%¹⁵.

In accordance with the relevant legislation, the *Program* is designed to support projects with a total cost of no less than RUB 1 billion and not more than RUB 20 billion that contribute to one or more strategic development priorities selected by the Government of the Russian Federation. Each project goes through a thorough appraisal procedure; the initiator is required to provide their own investment resources amounting to at least 20% of the total cost of the project. A key element of the *Program* is the possibility of concessional lending by commercial banks, which is secured by Central Bank refinancing and the provision of state guarantees for up to 25% of the loan value. This is the factor that allows us to use an 11.5 % discount rate in further calculations.

¹³ Despite the fact that approaches to the calculation of the social discount rate were developed by Frank Ramsey back in 1928, there has been a recent boom in research on the topic. For example, Sheluntsova (2011) is entirely devoted to the substantiation of the social discount rate. The growth of relevance and popularity of this kind of research reflects the general trend towards increased influence of the social sector on global economic development.

¹⁴ <http://base.garant.ru/70764842>

¹⁵ <http://www.rusbonds.ru/tooldistrib.asp?tool=109045>

Without a doubt, this level of interest rate naturally raises some questions from investors from industrially advanced countries, who find even a 5% annual interest rate overwhelmingly high. Nevertheless, we should bear in mind that the Russian market is significantly different from developed country markets: it is characterized by increased risk (and, consequently, increased interest rates), and, on the other hand, increased investment returns.

The selection of procedures for the adjustment of cash flows to determine the social efficiency of investment and the calculation of the social discount rate are followed by an evaluation of project efficiency as a whole, which is based on the assumption that all profits are received and all expenses are borne by the project initiator (society as a whole in the case of social efficiency evaluation, and a specific private company in the case of commercial efficiency evaluation).

Indisputably, environmental projects have a very high social value, so if the NPV_{total} indicator¹⁶ is positive, then the project can be assumed to be viable at first approximation. In this case, the existence of additional positive environmental impacts is irrelevant, since they are hard to reflect in monetary form; they simply strengthen the conclusion of the project's high social efficiency if NPV_{total} is positive. The only "tight spots" are possible protests by the population caused by mistrust towards project initiators and lack of information about its consequences. As demonstrated above, this risk is alleviated by crowdsourced public discussion.

In a more complicated case, the project's NPV_{total} can be negative but its implementation can contribute to significant nonfinancial outcomes related to environmental improvement. Indeed, if the implementation of a socially significant project is accompanied by impacts and costs that cannot be evaluated in monetary terms, ample opportunities arise for subjective assessment of its feasibility.

Multi-criteria analysis is a tool that allows one to minimize the risks of non-optimal subjective decision-making while taking into account manifold economic and social outcomes of the project within a single methodological framework (for detailed information on this see [8]). It requires expert evaluation of the significance of impacts that are not reducible to cost based indicators. Three possible scenarios are outlined here:

- a. The non-financial effects are insignificant and have almost no effect on the general assessment of social efficiency (the weighting factor for the importance of the project's non-financial effects determined on the basis of expert assessment, $\mu < 0.1$). In this case, if $NPV_{total} < 0$, the project is rejected;
- b. The non-financial effects weighting factor is $0.1 < \mu < 0.5$, that is, financial effects remain dominant, but non-financial effects are strong enough to affect the final decision about project implementation.

With regard to scenario (b), we previously (Margolin and Feldgen 2009) introduced an algorithm based on the principle of multi-criteria analysis of projects with significant non-financial effects common to various types of PPP projects (infrastructural, innovative, environmental). The idea behind that algorithm was to bring together all types of effects (financial and non-financial) into an integrated ranking score and select the optimal scenario for project implementation based on

¹⁶ In this case, the use of the $total$ subscript means that the economic sense of the net present value indicator remains unchanged, but it is calculated according to the rules used for social efficiency assessment, which are different from the approaches traditionally used for commercial projects (European Commission 2008).

the maximum ranking score. One drawback of this approach is that, while it solves the task of comparing different project implementation scenarios, it includes no way to evaluate the social efficiency of the optimal scenario. Essentially, the algorithm leaves open the question of whether the best scenario of project implementation fulfills the requirements of social efficiency.

How, then, can this drawback be eliminated? One possible approach is to adjust the social discount rate, factoring in the impact of non-financial effects with the following formula:

$$E^a = E^s \times (1 - \mu), \text{ where:}$$

E^a = adjusted social discount rate; E^s = standard social discount rate.

Then, the adjusted discount rate is used to recalculate the NPV_{total} indicator; and if it is positive, the project is deemed to meet the social efficiency requirement (in the case of $NPV_{\text{total}} < 0$, the project is considered socially inefficient).

- c. The on-financial effects dominate (their weighting factor, $\mu > 0.5$). In this case, traditional approaches to social efficiency calculation are pointless and it is advisable to employ the methodologies for state program evaluation (Margolin 2013; Guide to the Program Assessment Rating Tool 2008) to determine the possibility of achieving the environmental improvement objectives.

In light of the above, environmental projects implemented through PPP and possessing significant socially-important non-financial effects can be evaluated using a modified multi-criteria analysis method, demonstrated by the flowchart in figure 1. The application of this algorithm allows one to either declare a project socially inefficient (in which case it is pointless to calculate commercial efficiency and select an appropriate PPP model), or to come to the conclusion that it is socially efficient and move on to the next stage – the evaluation of the commercial efficiency of the PPP project (this is the second stage of the comprehensive approach introduced at the beginning of this section).

Similar to the assessment of social efficiency, the initial assumption here is that the initiator receives all project benefits and bears all expenses (however, in this case it is the private partner rather than society as a whole). A particular feature of this methodology is the necessity to account for cash flows from operating and investing activities, while cash flows from financing activities are not taken into consideration (they are considered at the stage of evaluation of project participation efficiency for each stakeholder).

Let us consider the results of a commercial efficiency evaluation for an environmentally significant project (assuming that its social efficiency is positive) with the example of a project aimed at the construction of a municipal solid waste (MSW) processing facility.

The problem of MSW processing is becoming more and more urgent. The Moscow metropolitan area alone generates 10 million tons of waste annually, and even more if we include unauthorized landfills. The Moscow region has no garbage recycling plants at all, while the capacity of existing waste disposal sites is almost exhausted¹⁷. A possible PPP project in this sphere would make use

¹⁷ *Situatsiya s utilizatsiei TBO v Moskovskom regione* [The situation with MSW recycling in the Moscow region]. 2014. *Agentstvo gorodskikh novostey*, December 30. Accessed November 11, 2016. <http://www.mskagency.ru/materials/1927613>

of the technology of integrated low-waste¹⁸ MSW processing and disposal: collection of ferrous and non-ferrous scrap metal, production of refuse-derived fuel that can be burned to generate power for the facility, and reducing organic MSW to raw materials for the production of construction supplies. The construction would take place in close proximity to the Timokhovo solid waste landfill in the Noginsky District in Moscow Oblast (in fact, the corresponding feasibility study was conducted and approved back in 1998¹⁹).

If the project in question was implemented under normal market conditions without resorting to the PPP model, it would be limited to two implementation options:

Option 1. Construction of a facility with a capacity of 240 thousand tons of MSW per year for MSW sorting and disposal. The total investment necessary for the facility to reach full capacity is RUR 5 500 million;

Option 2. Construction of a facility with a capacity of 240 thousand tons of MSW per year for MSW sorting and disposal, derivation of secondary metals, a power generating unit and a construction materials production unit. This would lead to an increase in the following: (a) capital expenditure for the construction of the power generating unit and the production unit (RUR 1 100 million); (b) operating costs of RUR 80 million per year (up from RUR 400 million in Option 1 to RUR 480 million) due to special processes used for the extraction of secondary metals in addition to the costs related to the maintenance of the power generating unit and the production unit; (c) revenues from sales of secondary metals, construction materials and electric power (RUR 645 million).

The corresponding aggregated base values are presented in table 1. Characteristically, the second option takes into account the multiplicative effect arising from construction of the facility, which (unlike Option 1) allows us to calculate both direct effects from payments for MSW reception and additional revenues from sales of electric power and construction materials in the open market.

Choosing the second option would give substantial reason to consider the project comprehensive rather than local. For the purposes of this analysis, we use the following definition of comprehensive production: the production of more than one product or service within a single production process. It is evident that Option 1 involves a single service (MSW sorting and processing), and only the second option, which adds the production of secondary metals, electric power and construction materials, makes the whole project comprehensive.

¹⁸ Here and elsewhere we avoid the “wasteless technology” buzzword, which is a scientific abstraction similar to such terms as “perfectly competitive market,” “ideal gas,” “zero gravity” etc.

¹⁹ Administration of the Moscow Region. *Ob utverzhdenii tekhniko-ekonomicheskogo obosnovaniya na stroitel'stvo Kompleksa po pererabotke i utilizatsii tverdykh bytovykh otkhodov v raione pos.Timokhovo Noginskogo raiona Moskovskoi oblasti* [On approval of the feasibility study for the construction of a municipal solid waste facility near the village of Timokhovo in the Noginsky District in Moscow Oblast]. 1998. Accessed November 11, 2016. <http://docs.cntd.ru/document/5808662>

Table 1 Base values for comparison of two options for MSW processing facility construction project²⁰

Indicators	Option 1, RUR million	Option 2, RUR million
Investment	5 500	6 600
Total revenues	1 205	1 850
Including:		
MSW reception fees	1 205	1 205
Sales of secondary metals, construction materials and electric power	-	645
Payments	400	480
Balance	805	1 370

Implementation of the project by a private partner without state support (for instance, in the form of partial assumption of investment risks characteristic of PPP models) assumes the attraction of investment under normal market conditions. The current difficult conditions of the Russian financial market mean that the expected annual interest rate would come up to around 20%.

The prerequisites for the implementation of the project through PPP are its significant environmental importance, incidental to the reduced load on landfills and creation of opportunities for gradual processing of MSW previously accumulated in those landfills. The participation of the state, for example through the *Program to support projects implemented in Russia on the basis of project finance*, would lower risks and, consequently, interest rates (to 11.5% as discussed earlier). The required capital investment for the MSW processing facility varies from RUR 5.5 to 6.6 billion depending on the chosen implementation option, which conforms to the requirements of the *Program*.

Of crucial importance here is the continuity of assessment of social and commercial outcomes of the project. In relation to the MSW processing facility construction project this means that non-financial effects have practically no impact on the decision about its launch, and, according to figure 1, the discount rate can be set without adjustment for non-financial effects.

²⁰ Table 1 presents a calculation of cash flow values (CF) for the two options under comparison based on initial data from the feasibility study introduced above. Specifically, for Option 1 $CF_1 = (1205 - 400) = \text{RUR } 805$ million; for Option 2 $CF_2 = (1205 + 645 - 480) = \text{RUR } 1370$ million. Further on, when calculating net present values (NPV), each of these two options is considered in relation to two project implementation scenarios: with and without state support. The only difference between these scenarios is the discount rate value, which is lower in the case of state-supported implementation due to a reduction in the risk premium.

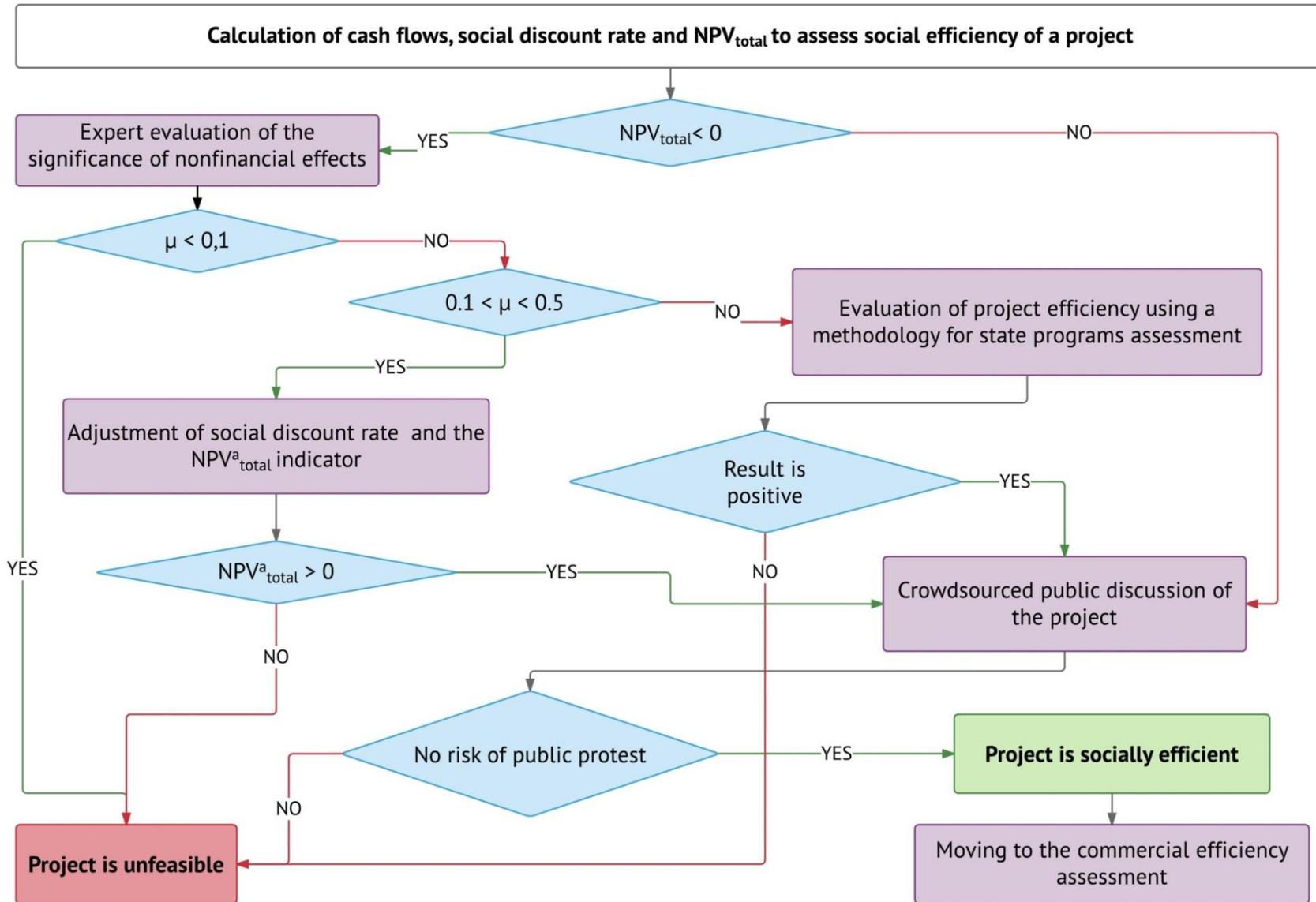


Figure 1 Flowchart demonstrating the application of modified multi-criteria analysis

Summarizing all possible options for the implementation of the MSW facility construction project, figure 2 illustrates the results of an NPV calculation for a commercial efficiency assessment for the following four scenarios:

1. Multiplicative effects are not considered; the project is implemented by a private partner without state participation (Option 1 in table 1; 20% discount rate);
2. Multiplicative effects are considered; the project is implemented by a private partner without state participation (Option 2 in table 1; 20% discount rate);
3. Multiplicative effects are not considered; the project is implemented through PPP (Option 1 in table 1; 11.5% discount rate);
4. Multiplicative effects are considered; the project is implemented through PPP (Option 2 in table 1; 11.5% discount rate).

Figure 2 presents a quantitative assessment of the dynamics of discounted cash flows using the accrued total method during the 12-year accounting period with the corresponding graphical interpretation. The results show that the project as a whole can only be considered efficient in one scenario: when multiplicative effects are fully taken into consideration and the PPP model is used, so that the participation of the public partner maintains the cost of capital on a level not exceeding the discount rate specified in the *Program to support projects implemented in Russia on the basis of project finance*.

There are various ways to attract project investment within a PPP model, such as:

- The private partner attracts investment on market conditions (at 20%), while the state subsidizes the annual interest rate to the level of 11.5%;
- Investment is attracted by including the project in the *Program*.

From our point of view, these budget expenses should not be considered in terms of losses to the budget system. On the contrary, state participation in PPP projects is tantamount to investment in future tax and non-tax revenues from all private sector participants of the project.

Possible budget losses due to underestimation of the significance of multiplicative effects should also be mentioned. If, for instance, the third scenario is chosen (using PPP but with no regard to multiplicative effects), then to maintain commercial efficiency the public partner would have to ensure that the annual cost of capital does not exceed 7% (in which case the total project NPV will be reduced to zero). In turn, this would increase the volume of budget expenses for interest rate subsidies by approximately half. Moreover, the budget system would lose all kinds of tax revenues due to the incomplete exploitation of the project's potential (essentially by abandoning the production and sale of secondary metals, electric power and construction materials).

Summarizing the results of calculations presented above and in figure 2, the conclusion we can draw is that MSW facility construction project performance can only be efficient in one of the scenarios considered: if the multiplier effects are fully taken into account and the project is implemented jointly by the private and the public partner.

Within the framework of the comprehensive approach discussed above, the final stage of assessment for this project would be the selection of a specific PPP model. As evidenced by both international and Russian experience, concession agreements seem to be the most widespread form of PPP. In Russia, a corresponding law came into effect in 2005, a long time before the law

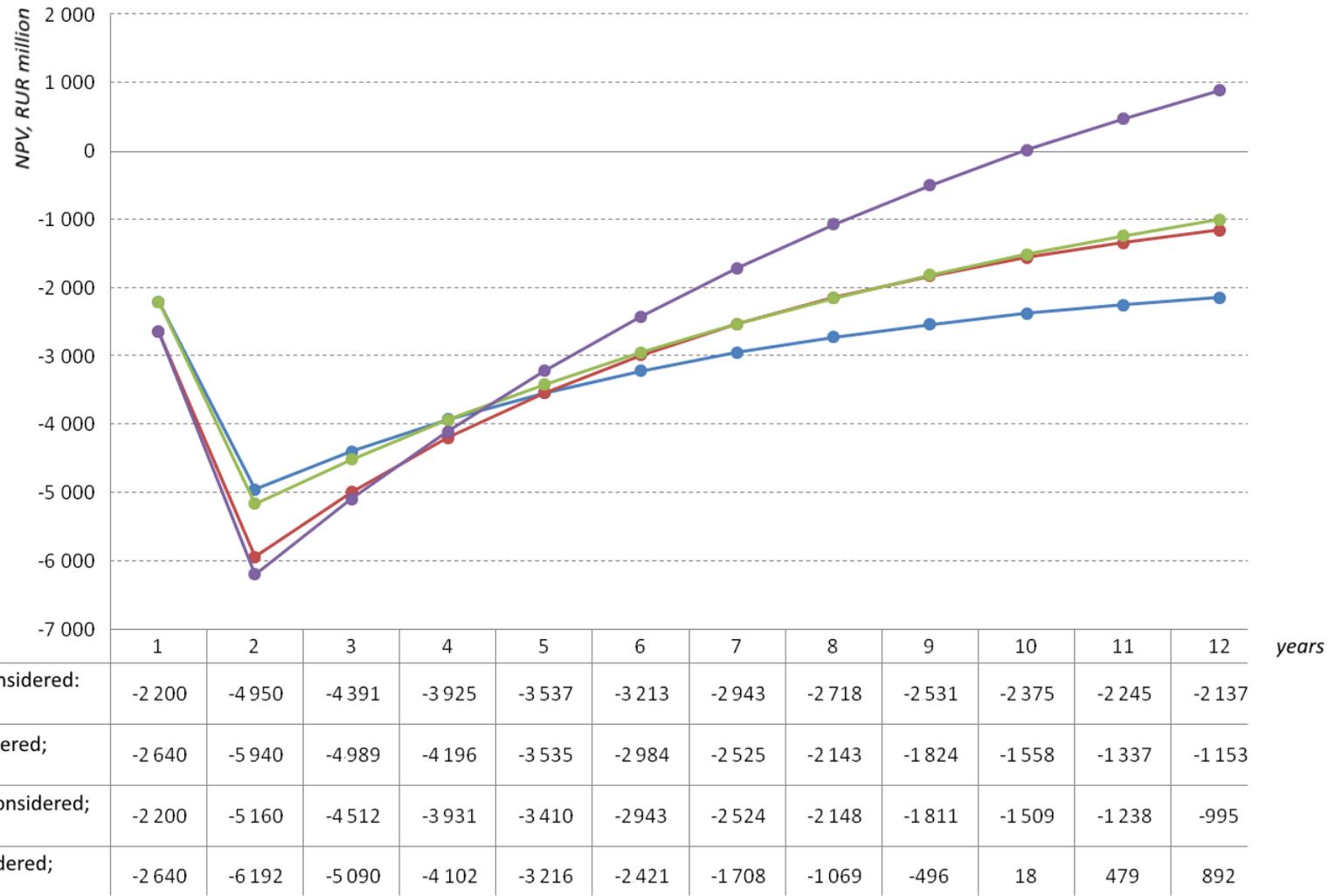


Figure 2 Results of commercial efficiency assessment for four implementation options of a MSW facility construction project

on PPP²¹, and the latest amendments to it were approved in December 2015. However, despite its unquestionable popularity, the concession model is not the only one currently in use. A detailed discussion of types of PPP is provided in Shpakovich and Vasilenok (2014) and Margolin (2012). Other notable approaches include, among others, the lease contract, the management contract, and the very promising life cycle contract. Substantiation of the advantages of a particular model for the implementation of a specific project is a separate and rather difficult task that falls beyond the scope of this article. The crucial point is that there is no need to proceed to the selection of a suitable form of PPP for any specific project before a preliminary evaluation is carried out to determine its viability on the whole and the advisability of a PPP approach.

In closing, let us note that the implementation of a critical mass of environmental projects using the PPP model can become a crucial factor in the accommodation of long-term interests and the strengthening of trust between the state, business and civil society. All other conditions being equal, the higher the mutual trust of investment process participants, the wider the possibilities for successful investment and the solution of environmental problems faced by society today.

Conclusions

1) Successful implementation of environmental projects is inextricably connected to the accommodation of interests of the state, business and civil society, which contributes to the strengthening of trust between them and ensures the priority of long-term project goals over short-term financial objectives of separate participants. Features of these projects, such as the large volume of initial investment, lengthy payback periods, and increased participation risks create objective prerequisites for their implementation through the PPP model. In order to provide an unbiased assessment of the feasibility of environmental projects for society as a whole as well as the public and private partners, this article substantiates recommendations for the development of a social efficiency evaluation methodology, taking into account the balance between financial and non-financial effects of project implementation and the continuity of assessment of social and commercial outcomes of environmental projects.

2) Unlike popular approaches to the evaluation of PPP project efficiency, which employ the value-for-money criterion focused on a cost-oriented approach (that is, an assessment of the ratio between aggregated expenses for the construction and operation of facilities), this article mostly focuses on a revenue-oriented approach, which presumes taking into account consolidated tax revenues on various levels of the budget system as well as multiplicative effects of environmental PPP projects. As shown by analysis, the significance of taking into account multiplicative effects in investment efficiency evaluation is usually underestimated, both for PPP and other types of projects implemented with state support. Meanwhile, it could possibly bring about a complete overhaul of the logic behind investment decision-making regarding the feasibility of a project that was previously considered inefficient (or, conversely, its non-feasibility in the case if the multiplicative effect if the project turns out to be negative).

3) The article introduces an algorithm for the application of modified multi-criteria analysis to assess social efficiency of environmental PPP projects. Significant features of this algorithm are: consideration of the impact of the balance of financial and non-financial effects on the results of

²¹ Russian Federal Law 115-FZ of July 21, 2005 “O konzessionnykh soglasheniyakh [On concession agreements]”. Accessed November 11, 2016. <http://base.garant.ru/12141176/>

social efficiency evaluation of projects, and the inclusion of crowdsourced public discussion into the decision-making process.

As a rule, insufficient attention is currently given to the organization of public discussion of environmental projects (above all with local communities living in the project implementation area). In turn, this leads to the fact that over a quarter of all protest actions in the Russian Federation have to do with environmental issues (and a similar situation exists in many other countries). Therefore, the inclusion of public discussions into the procedure of feasibility assessment for environmental projects would minimize social risks and create favourable conditions for investment.

The algorithm suggested by the authors and presented in figure 1 allows one to either declare a project socially inefficient (in which case it is pointless to calculate commercial efficiency and select an appropriate PPP model), or to come to the conclusion that it is socially efficient and move on to the next stage – the evaluation of the commercial efficiency of the PPP project.

4) Our case study of a project to construct an MSW processing facility demonstrates that commercial efficiency for the private partner can only be achieved when its multiplicative effects are fully taken into account and the PPP model is used, which presumes that the participation of the public partner will keep the cost of capital at a level not exceeding the social discount rate. It is worth noting that this mechanism of public partner participation can help maintain the continuity of assessment of social and commercial outcomes of environmental PPP projects.

5) On the whole, the accommodation of interests of the state, business and civil society during the implementation of environmental PPP projects is possible if a comprehensive approach is used, including the development of a methodology for the evaluation of social efficiency of investment projects that takes into account the balance between financial and non-financial effects of its implementation; the involvement of interested representatives of civil society into the discussion of environmentally significant projects during their development stage through crowdsourcing technologies; identification of multiplicative effects and quantitative evaluation of their impact on investment decision-making concerning the feasibility of environmental PPP projects; and maintenance of the continuity of assessment of their social and commercial outcomes.

REFERENCES

- Belli, Pedro, Jock Anderson, Howard Barnum, and John Dixon. 2008. *Handbook on Economic Analysis of Investment Operations*. Washington: World Bank.
- Bevir, Mark. 2012. *Governance: A Very Short Introduction*. Oxford: Oxford University Press.
- Dutkiewicz, Piotr and Richard Sakwa, eds. 2014. *22 Ideas to Fix the World: Conversations with the World's Foremost Thinkers*. Moscow: Moscow University Press.
- EPEC (European PPP Expertise Centre). 2011. *The non-financial benefits of PPPs. An overview of concepts and methodology*. Luxembourg: European PPP expertise centre.
- European Commission. 2008. *Guide to Cost Benefit Analysis of Investment Projects*.
- Guide to the Program Assessment Rating Tool. 2008. Washington: Office of Management and Budget.
- HM Treasury. 2006. *Value for Money Assessment Guidance*. Accessed November 4, 2016. http://www.hm-treasury.gov.uk/d/vfm_assessmentguidance061006opt.pdf.
- Lysy, Frank J. 1999. *Assessing development impact*. Washington: IFC.
- Margolin, Andrey and Ferdinand Feldgen, eds. 2009. *The Role of Development Institutions in Increasing Competitiveness of the National Economy*. Moscow: RAGS.
- Margolin, Andrey and Piotr Dutkiewicz, eds. 2013. *Novye tekhnologii gosudarstvennogo upravleniya v zerkale kanadskogo i rossiiskogo opyta* [New technologies of public administration in the mirror of Canadian and Russian experience]. Moscow: MGUU.
- Margolin, Andrey. 2012. "Otsenka effektivnosti proyektov, realizuyemykh s ispolzovaniyem modeli gosudarstvenno-chastnogo partnerstva. [Performance evaluation for projects implemented through public private partnership]" In *Gosudarstvenno-chastnoye partnerstvo: opyt i puti razvitiya v Germanii i v Rossiyskoy Federatsii*. Moscow: MGUU.
- . 2013. "Kriterii effektivnosti pri realizatsii gosudarstvennykh programm. [Efficiency criteria in the implementation of state programmes]". *Gosudarstvennaya Sluzhba*, no. 2 (82).
- National Public-Private Partnership Guidance. 2013. Vol. 5. Canberra: Infrastructure Australia.
- New Zealand Treasury. 2016. "Public Private Partnership (PPP) Guidance." Accessed November 29, 2016. <http://www.treasury.govt.nz/statesector/ppp/guidance>
- OECD (Organisation for Economic Co-operation and Development). 2012. "Recommendation of the Council on Principles for Public Governance of Public-Private Partnerships". Accessed November 4, 2016. <http://acts.oecd.org/Instruments/ShowInstrumentView.aspx?InstrumentID=275&InstrumentPID=281&Lang=en&Book=>
- Russian Federation. 1999. Ministry of Economy, Ministry of Finance. *Metodicheskie rekomendatsii po otsenke effektivnosti investitsionnykh proektov* [Guidelines for performance evaluation of investment projects]. 2nd ed.

Sheluntsova, Maria. 2011. Otsenka sotsial'noi stavki diskontirovaniya v proektakh obshchestvennogo sektora [Evaluating the social discount rate in public sector projects]. Moscow: National Research University Higher School of Economics.

Shpakovich, Denis, and Viktor Vasilenok. 2014. "Razvitiye form gosudarstvenno-chastnogo partnerstva v rossiyskoy ekonomike [Development of Forms of Public-private Partnerships in the Russian Economy]." *Natsional'nyi Issledovatel'skii Universitet Informatsionnykh Tekhnologii, Mekhaniki I Optiki. Nauchnyi Zhurnal*, no. 1(16).

The World Bank. 2013. *Value for Money Analysis: Practices and Challenges*. Washington: The World Bank.

———. 2014. *Public-private Partnership Reference Guide. Version 2.0*. Washington: The World Bank.

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