

BILEVEL MATHEMATICAL PROGRAMMING PROBLEMS AND TOOLS FOR DEVELOPMENT OF RAW MATERIAL BASE¹

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The report is devoted to discussing the problem of forming a mechanism for coordinating long-term interests of the state, the private investor and the general public during the development of the raw material base on a public- private partnership (PPP). Meaningful basis approach is the concept of an state active role in the process of territory development, giving tax breaks and taking on not only a part of a general-purpose infrastructure projects , but also part of the costs of compensation for environmental losses caused by the implementation of investment projects.

The proposed research tools problem is a combination of a planning model that generates the optimal mechanism of interaction between government and the private investor, and forecasting models, the purpose of which is to produce data for the planning model and assess the effects of the area program development, using a specific mechanism of PPP.

Basic production planning model is a bilevel integer programming problem, where the state set aside the upper level and a private investor retracted lower. At the entrance of the model uses the following data:

- set of investment projects implemented by the private investor;
- set of infrastructure projects undertaken by the state;
- list of environmental projects necessary to compensate for environmental losses caused by the implementation of investment and infrastructure projects.

Model outputs are software development of mineral resource base and the PPP mechanism that identifies the costs in the implementation of infrastructure and environmental projects between the state and the investor.

Not all the original data planning problem can be obtained directly from the existing design data. Part of the data is pre-prepared in the forecasting model, significantly more detail representing the projects economy and ecology on the one hand, and especially the existing course socio-economic development on the other. Organizing iterative process at each step of the planning information base model corrects conjugate forecasting model, we obtain a complex econometric models, allowing support management decision-making process in the development of an effective mechanism for PPP.

The report is supposed to extend the core formulation including tax benefits, and also consider setting in which the top level of a multicriteria problem is solved.

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