
MANAGEMENT

A method for managing the risk balances of stakeholders in wind power projects

A. V. Sevostianova

National Transport University, Kyiv, Ukraine
Corresponding author. Email: Sevostianova1607@gmail.com

Paper received 24.04.20; Accepted for publication 16.05.20.

<https://doi.org/10.31174/SEND-HS2020-232VIII40-10>

Abstract. The article reviews the current approaches to managing the stakeholders of wind power projects and assessing their capabilities. A method for managing the risk balance of stakeholders in wind power projects has been developed, which, through the use of creative thinking and design thinking methods, enhances the low and medium-sized opportunities for harmonized stakeholders. This method makes it possible to evaluate and improve the risk balance of the stakeholder capability component and to increase the effectiveness of management decision making.

Keywords: *wind power project; stakeholders, stakeholder management.*

Introduction. Stakeholder behavior is determined by their interests, which are relatively stable over time, and different groups are willing to make different efforts to influence the progress of wind power projects (WPP) in order to adjust behavior in accordance with those interests. The best results in managing WPPs can be achieved through stakeholder engagement [1-2]. Each stakeholder has their own influence on the implementation of the project, which can be positive, negative or neutral [3]. The positive impact of stakeholders on the implementation of WPP is beneficial because it helps to implement the project. Negative influence is generally not beneficial, but can sometimes be reversed. Neutral impact does not affect the implementation of the project in any way, but sometimes it can be changed by external factors, and then from neutral to become either positive or negative. It is important for the project manager and the project team not to overlook the neutral impact as a negative influence, or to make efforts to change the neutral position to a positive one.

According to the PMBoK standard [4], project risk is an unspecified event or condition that has a negative or positive effect on project objectives, such as content, timetable, cost and quality, and the objectives of project risk management are to increase the likelihood of occurrence and enhance the impact of favorable events and reduce the likelihood of adverse events occurring and attenuating during the project implementation. Risk, as uncertainty, can also be measured by the combination of the likelihood of a threat / opportunity and the magnitude of their impact on goals [3]. The reasons for the negative deviations in the project can be both risks that lead to threats [5] and low opportunities, which may adversely affect the objectives of the project.

The risk management method of WPP stakeholders [7], improves the effectiveness of management decision-making by reducing the high and medium-sized threats for threatening stakeholders. To ensure effective management of WPP stakeholders, the key issue remains the optimization of the stakeholder capability component of their risk balances.

A brief overview of publications on the topic. Stakeholder management in project management is presented in PMBoK [4], National ICB Standard [8], International Standard AA1000 Stakeholder Engagement Standard 2018.

Stakeholder management approaches, in particular the partnership approach and the protection method, are discussed in [10]. A dynamic analysis of project stakeholder management methods and tools was performed in [11], two schools of stakeholder theory were noted: the first focused on managing stakeholders to eliminate their negative impact on project goals, the second focused on human relationships within the framework of human relations. management and insists on managing interactions between different stakeholders. Sources [12, 13] propose a method of systematically integrated stakeholder activity modeling for interaction management tasks and modeling of stakeholder activity in projects based on an integrated cognitive map of the interaction environment. The authors of [14] propose a method of proactive communication of the municipal energy efficiency project management system with stakeholders. The analysis of models and methods of managing stakeholders of wind power projects was carried out in [15]. In the articles [16-17] identified external and internal WPP stakeholders, quantified the opportunities and threats for these stakeholders, determined the magnitudes of risk balances (opportunities and threats) for each stakeholder, ranked them according to the risk balances. A mathematical model for the risk management of WPP stakeholders is presented in a source [18], which mathematically describes the possible states of the system of interaction and opportunities of stakeholders of wind power projects, with the probable values of risk balances for each stakeholder. The analysis of design thinking on the organization of project work of students was carried out in [19], management of creative potential in teams of IT projects in [20].

An analysis of the materials in the literature shows that the existing methods are imperfect and incomplete, they do not sufficiently take into account the opportunities of WPP stakeholders and do not allow optimizing the management of risk balances by analyzing and enhancing the capabilities of stakeholders. Therefore, the exploration and modernization of the risk balance management of WPP stakeholders through chance management using creative thinking and design thinking are urgent, needing concretization and refinement.

The purpose of the article is to develop a method of managing the balance of risks of stakeholders of wind power projects, which allows to evaluate and improve the

risk balances of the components of the capabilities of stakeholders and to increase the effectiveness of management decisions, by increasing the low and average chances for harmonized designers and designers.

Outline of the main material and results of the study.

Risk Management of Risk Management Stakeholders is based on the conceptual model of risk balance (opportunities and threats) of WPP stakeholders [6] and the mathematical model of risk management of WPP stakeholders [18]. Stakeholders can be divided into three groups: threatening, harmonized and chance, by the magnitude of their risk balances.

The risk-management method for WPP stakeholder management [7] is based on reducing the magnitude of threats to threatening stakeholders by applying the decision tree method (translating them from the threatening to the harmonized set). To improve the effectiveness of managing the WPP stakeholder by enhancing the components of the risk balance sheets for harmonized stakeholders, a method for managing the balance of the WPP stakeholder is proposed.

The design-thinking cycle involves monitoring the identification of unmet needs in context and constraints, in relation to a particular situation or opportunity, setting the boundaries of opportunities and scope for innovation, generating ideas, testing and final decision-making [19]. Creative thinking is the ability, by combining heterogeneous elements, to see something new (knowledge, forms, solutions) that has a significant socio-economic effect [20]. If creativity plays a crucial role in the process of generating creative ideas, then their perception and proper implementation depend on design thinking, which combines concrete actions, adaptability, expertise and more, which in turn leads to the generation of the right decisions for the development of complex dynamic systems, the construction of effective research. and expert use of cognitive abilities.

A block diagram of an algorithm for implementing the method of managing the balance of risks of WPP stakeholders is presented in Picture 1.

Let us describe in more detail the proposed method of risk management of WPP stakeholders:

1. The procedure for initiating risk balance management is carried out.

2. The information base needed to manage the risk balances of WPP stakeholders is filled: information is collected on the WPP, the identified stakeholders of such projects, their estimates and the formation of appropriate sets of harmonized and chance stake holders obtained by applying the risk management method of stakeholder 7.

3. For each harmonized stakeholder of the plural $S_G = \{S_1; \dots; S_d; \dots; S_h\}$, where h – the number of harmonized WPP stakeholders, d – harmonized stakeholder number, ($d = \overline{1; h}$).

4. Identify opportunities harmonized stakeholder value.

The possibility of d stakeholder of WPP is determined by the formula:

$$C_{di} = \sum_{i=1}^n P_{di} \cdot V_{di}, \quad (1)$$

where P_{di} – the probability of their occurrence i possibility of a harmonized WPP stakeholder; V_{di} - the gain from their i opportunity, UAH, n - the number of opportunities for a harmonized stakeholder.

Formed harmonized set of capabilities stakeholder $C_d = \{C_{d1}; \dots; C_{di}; \dots; C_{dn}\}$, where C_{di} –

the possibility of a d harmonized WPP stakeholder; n - is the number of opportunities for a stakeholder, and i is the number of opportunities for a d stakeholder, ($i = \overline{1; n}$).

1. The harmonized stakeholder capabilities are evaluated by the probability matrix.

As a result of the assessment, the capabilities of a harmonized stakeholder are divided into three groups: high, medium and low.

2. Harmonized stakeholder capability rating.

3. Harmonized stakeholder capability rating R_C .

4. Increasing the low and medium capacity of a harmonized stakeholder through creative and design methods.

For each harmonized low- and mid-range multi-stakeholder from the amount $S_G = \{S_1; \dots; S_f; \dots; S_g\}$, where g – number of harmonized low- and medium-sized stakeholders, f – the stakeholder number, ($f = \overline{1; g}$).

4.1. Stakeholder opportunities are considered and detailed S_f . The current difficulties of the stakeholder and the elements that do not allow the development of its capabilities are determined.

4.2. Search for patterns and insights in stakeholder capabilities S_f .

4.3. Identify and formulate directions and clear tasks for enhancing stakeholder capabilities.

4.4. A list of tasks to enhance the capacity of the stakeholder S_f .

4.5. Developing ideas for using creative thinking is an ideation.

4.6. Creating a prototype for empowerment - prototyping.

4.7. Testing with the participation of experts, senior executives, managers and potential users of WPP.

4.8. Conversion of stakeholder opportunities S_f .

If the opportunity is increased, the enhanced opportunities are accepted as a harmonized stakeholder S_f .

5. Increased opportunities for a harmonized stakeholder.

6. Determining the new BR_f risk balance.

7. A new risk balance for a harmonized stakeholder S_f .

8. Stakeholder membership is determined by the number of chance stakeholders $\{S_C\}$.

The limit is checked:

$$BR_f > 0, \quad (2)$$

where BR_f risk balance for f -th harmonized WPP stakeholder.

9. If the stakeholder does not belong to the set of chance stakeholders, he is added to the set of reserve stakeholders.

The amount of reserve increased by 1.

$$S_R = S_R + 1 \quad (3)$$

10. Provided that BR_f , satisfies equality, then this stakeholder refers to the chance set S_C ,

$$S_C = S_C + 1 \quad (4)$$

The number of chance stakeholders has increased by 1.

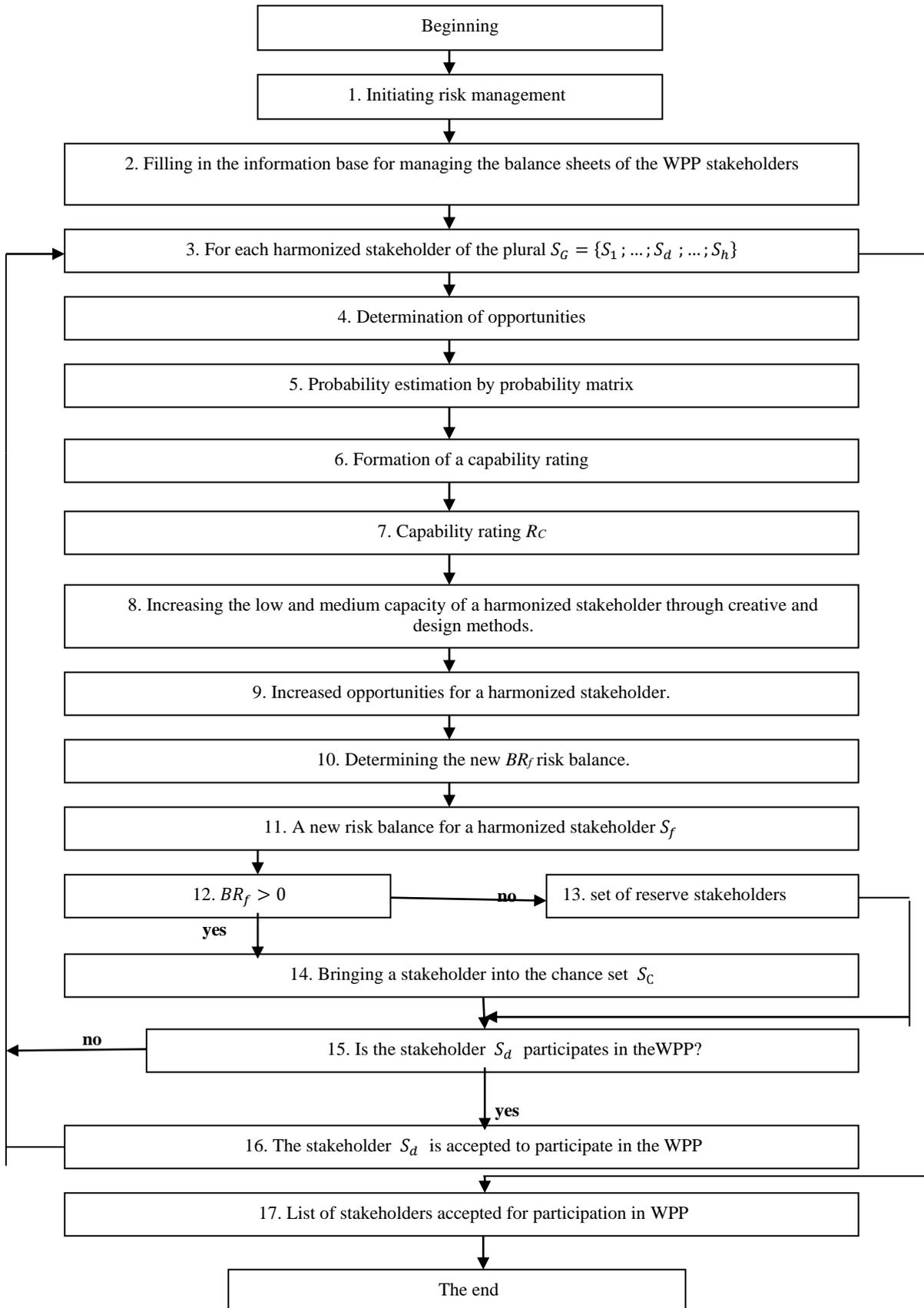
15. Stakeholder check on S_d for participation in WPP. Top executives, together with the head of the project office and commercial department of the enterprise, make a regulatory decision on the acceptance of stakeholders to participate in WPP.

16. In the case of a positive decision, the stakeholder S_d is accepted for participation in the WPP.

If the decision is negative, then the process of enhancing the stakeholder risk balance capability component is re-

peated until a positive result or attribution of a plurality of stakeholder reserves is made.

17. The list of stakeholders who participated in the WPP was obtained.



Pic.1 Flowchart of an algorithm for managing the risk balances of WPP stakeholders

Conclusions. Effective stakeholder management, which takes into account their risk balances and counteracts the enhancement of opportunities and the reduction of risks posed by risks, is the key to the effectiveness of WPP.

The article reviews the current approaches to managing stakeholder wind power projects, as well as assessing their capabilities. A method for managing the risk balance of stakeholders in wind power projects has been developed, which, through the use of creative thinking and design thinking methods, enhances the low and medium-sized

opportunities for harmonized stakeholders. This method makes it possible to evaluate and improve the risk balance of the stakeholder capability component and to increase the effectiveness of management decision making. Further research should be directed toward determining the impact of risk balances on the effectiveness of WPP management within the three categories that correspond to the "magic" triangle of project management goals: duration, cost, quality and impact of the stakeholder risk balance on its individual risk tolerance.

REFERENCES

1. Post, J. E., & Preston S. Sachs., (2002). *Redefining the Corporation: Stakeholder Management and Organizational Wealth*. CA: Stanford University Press.
2. Friedman, A., & Miles, S. (2006). *Stakeholders: Theory and Practice*. Oxford: Oxford University Press.
3. Glossary of Terms. Available at: http://megapolis-profi.ru/d/150939/d/ru_-_prince2_glossary_of_terms_v1.3_-_russian-english_1.pdf
4. A guide to body of knowledge project management (PMBOK; also a guide): 5th edition // the Project Management Institute (PMI). *The Standard for Portfolio Management*. USA, p. 586.
5. Danchenko O. B. *Methodology for integrated deviation management in projects*, Candidate Diss. Kyiv, 2015. 347 p. [in Ukrainian]/
6. Bakulich, O.O., Sevostianova A.V. (2019). A conceptual model of balance of risks (opportunities and threats) of stakeholders in wind power projects. *Academic notes of KROK University: Collection. Sciences. BC - Kiev: Univ. "KROK"*, 3 (55), 143–150 [in Ukrainian].
7. Savina, O.Yu. & Sevostianova, A. V. (2020). Method of risk management of stakeholders of wind power projects. *Management of Development of Complex Systems*, (41)[in Ukrainian]
8. IPMA “Individual Competence Baseline” (ICB) Version 4.0 for Project, Programme & Portfolio Management // IPMA, 2015. – 431 p. – URL : <http://products.ipma.world/ipma-product/icb/read-icb/>.
9. Ostanin, V.A. (2014). Chance management and risk management as dialectical opposites of management theory / Ostanin A.V., Rozhkov Y.V. // *Bulletin of KhNPP: coll. scientific slave*. - Khabarovsk: KhGAEP, 6 (74), 4-12.
10. Methods of management and cooperation with stakeholders. [E. resource] - Access mode: <http://www.belerp.com/modules.php?name=Pages&pa=showpage&pid=158> - Title from the screen.
11. Y.Y. Guseva (2018). *Dynamic Analysis of Project Stakeholder Management Methods and Tools* / Guseva Y.Y., Martynenko A.S., Chumachenko I.V. // *Management of development of complex systems*, 34, 27 - 36.
12. Medvedeva, O.M. (2017). The method of system-integrated modeling of stakeholder activity for interaction management problems (on the example of project activity). *Project Management and Production Development*. 4 (64), 73-107.
13. Medvedeva, O.M. (2015). Modeling of stakeholder activity in projects on the basis of an integrated cognitive map of the interaction environment. *Project management and production development*, 1 (53), 5-18.
14. Bushuev, S.D. (2019) Proactive project management of ensuring the energy efficiency of municipal infrastructure. *Bulletin of the National Technical University "KhPI". Ser. : Strategic management, portfolio, program and project management : 36. наук. пр. – Харків : HTU "XIII"*. 1 (1326), 3-10.
15. Sevostianova, A.V. (2019). Analiz modeley ta metodiv upravlinnya steykholderamy proektiv vitroenerhetyky [Analysis of models and methods of managing stakeholders of wind power projects]. *The Proceedings of the International Research Conference: Tezy dopovidey IV Mizhnarodnoyi naukovo-praktychnoyi konferentsiyi Proekt, prohrama, upravlinnya portfelem – Project, Program, Portfolio Management. P3M: Abstracts of the IV International Scientific and Practical Conference*, (pp. 85–89). Odesa. [in Ukraine].
16. Sevostianova, A.V. & Savina, O.Yu. (2019). Identifikatsiya steykholderiv proektiv vitroenerhetyky [Identification of stakeholders of wind power projects]. *Project Management: Status and Perspectives: 15th International Scientific and Practical Conference*, (pp. 67-68). Mykolaiv: NUOS [in Ukraine].
17. Bakulich, O. O. (2019). Identification and analysis of risks (chance and dangers) of stakeholders in wind power projects / O. Bakulich, A. Sevostianova // *Project management and production development: Collection of Scientific Publications*, 2(70), 23 – 41.
18. Sevostianova, A.V. (2019). Mathematical model of anti-risk management of stakeholders in wind power projects. *Science and Education a New Dimension: Natural and technical sciences*. Budapest, Hungary: 2, 30 – 33.