ABSTRACT

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Development of the Expert Assessment System for Environmental and Technological Industrial Transformation Projects

Relevance of the research topic is driven by the growing attention to the sustainable development, green economy as well as achieving national and international goals in these areas. The number of scientific publications and regulatory legal acts related to the development, assessment and implementation of green projects is increasing continually. The goals and basic trends of the sustainable development of the Russian Federation and the criteria for green projects were approved in 2021. The President Address to the Federal Assembly (02/21/2023) and speeches at various forums and during working trips around the country (2022–2023) emphasized the need to expand programmes aimed at improving the environmental situation, reducing environmental pollution, and increasing resource efficiency of manufacturing processes. The green economy establishment is included in the priorities of the Russian presidency of the Eurasian Economic Union (EAEU) in 2023.

The overall objective of the research is to develop an expert assessment system for the environmental and technological industrial transformation projects as sustainable development instruments aimed at enhancing resource efficiency and environmental performance as well as establishing circular economy and reducing carbon intensity of the manufacturing processes.

To fulfil the objective, the following **tasks** should be accomplished:

- to analyse the requirements and recommendations for sustainable development projects established at the international and national levels;
- to develop an algorithm and criteria for assessment of industrial development projects aimed at increasing resource efficiency and environmental performance as well as forming circular economy and reducing carbon intensity of manufacturing processes;
- to develop inputs for the formation of a unified expert assessment system for environmental and technological industrial transformation projects for the Best Available Techniques (BAT) implementation areas;
- to conduct a comparative expert assessment of selected industrial development projects at the BAT application areas using the proposed algorithm and criteria;
- to determine the possibilities for harmonisation of the approaches to assess green industrial development projects for the purpose of Eurasian integration.

The scientific novelty of the research.

- The author has established the system of principles for increasing resource efficiency and preventing negative environmental impacts (NEI); a classification of international and national instruments for supporting green projects is proposed based on analytical results of the review of mechanisms ensuring the development and implementation of green projects.
- A novel algorithm for the expert assessment of industrial development projects at the BAT application areas was developed; the integrated criterion $K = K_1 \wedge K_2 \wedge K_3$ has been modified taking into account the achievement of the sectoral technological emission parameters (K_1),

resource efficiency parameters (K_2) as well as achieving additional requirements (K_3) in such fields of forming circular economy, reducing the carbon intensity of production, etc.

– Principles for conducting expert assessment of industrial environmental and technological transformation projects within the BAT implementation areas are formulated; GOST R 113.00.06-2020 "Best available techniques. Procedure for Selecting and Appointing Experts to Determine Compliance with the Best Available Techniques. General requirements" and PNST 823-2023 "The Best Available Techniques. Voluntary Expert Assessment. Methodological Recommendations on the Procedure".

– Based on the results of the comparative analysis of projects for the development of EAEU industrial enterprises of the BAT implementation areas (pulp and paper production and production of building materials), it is shown that expert assessment using the complex criterion K allows to pre-financially select projects aimed at increasing the production resource efficiency and environmental performance.

– Recommendations have been developed for improving the model Eurasian green project taxonomy and principles for selecting green projects, including (1) identifying common BAT implementation areas; (2) conducting a comparative analysis of the resource efficiency and environmental performance, as well as the carbon intensity of industry; (3) formation of the Eurasian BAT expert community.

The practical significance of the research involves the possibility of using its results to formulate approaches to the assessment of (1) Environmental Performance Enhancement Programmes developed by Russian enterprises, (2) applications for Integrated Environmental Permits prepared by the installations with a negative impact on the environment and (3) competitive selection of the BAT implementation projects applying for the government support. The results of the work were used for preparing the Concept for the introduction of green economy principles to the EAEU. The results are also used for advanced BAT training courses for personnel on the basis of ANO "Soyuzexpertiza".

Provisions of the research for defence are following:

– classification of international and national instruments for supporting green projects including taxonomies developed by the Asia-Pacific region economies, BRICS, EAEU, European Union (EU), Organization for Economic Cooperation and Development (OECD);

– an algorithm for expert assessment of environmental and technological industrial transformation projects at the BAT application areas, providing for the use of an updated integrated criterion ($K = K_1 \wedge K_2 \wedge K_3$), taking into account the achievement of industry technological emission parameters (K_1), resource efficiency parameters (K_2) as well as achieving additional requirements (K_3) in the field of establishing circular economy, reducing the carbon intensity of production, restoring ecosystem services, etc.;

– principles for the formation and functioning of the BAT expert community: (1) openness (exchange of information, requirements, methods with the external environment); (2) use of BAT Reference Documents (ITS) and BAT parameters to develop expert positions; (3) application of a comprehensive criterion for project assessment; (4) high professional level and objectivity of expert assessment;

– results of the comparative expert assessment and pre-financial selection of industrial development projects in the EAEU member states (pulp and paper production and production of construction materials) using the proposed algorithm and integrated assessment criterion;

– recommendations for the harmonized development of the BAT concept and a model taxonomy for environmental and technological industrial transformation projects within the BAT implementation areas in the EAEU member states, including (1) identification common BAT implementation areas potentially interesting for the Eurasian integration; (2) conducting a comparative analysis of resource efficiency and environmental performance, as well as the carbon intensity of industry; (3) formation of the Eurasian BAT expert community.

Outputs

As a result of the research the author

– has performed an analysis of mechanisms ensuring the development and implementation of sustainable development projects and developed a classification of international and national instruments for supporting green projects including taxonomies developed by the Asia-Pacific region economies, BRICS, EAEU, European Union (EU), Organization for Economic Cooperation and Development (OECD);

– has shown that in relation to industrial development, all taxonomies are prepared taking into account environmental impact prevention principle; if there is BAT concept in jurisdiction, then taking into account BAT requirements;

– has developed an algorithm for expert assessment of environmental and technological industrial transformation projects at the BAT application areas, providing for the use of an updated integrated criterion ($K = K_1 \wedge K_2 \wedge K_3$), taking into account the achievement of industry technological emission parameters (K_1), resource efficiency parameters (K_2) as well as achieving additional requirements (K_3) in the field of establishing circular economy, reducing the carbon intensity of production, restoring ecosystem services, etc.;

– has substantiated the principles for the formation and functioning of the BAT expert community: (1) openness (exchange of information, requirements, methods with the external environment); (2) use of BAT Reference Documents and BAT parameters to develop expert positions; (3) application of a comprehensive criterion for project assessment; (4) high professional level and objectivity of expert assessment;

– has developed GOST R 113.00.06-2020 "Best Available Techniques. Procedure for Selecting and Appointing Experts to Determine Compliance with the Best Available Techniques. General Requirements' and PNST 823-2023 "The Best Available Techniques. Voluntary Expert Assessment. Methodological Recommendations on the Procedure";

– has shown that expert assessment with the integrated criterion K allows for pre-financial selection of projects aimed at increasing the resource and environmental production efficiency at the BAT application areas based on the comparative analysis of projects for the establishment of the EAEU industrial enterprises (pulp and paper production and construction material production); has identified critical parameters contributing to (1) impact on atmospheric air and water systems; (2) raw material use efficiency; (3) energy efficiency; (4) opportunities to

form a circular economy, reduce greenhouse gas emissions, and develop social and environmental business responsibility;

– has developed recommendations for improving the model Eurasian green project taxonomy and principles for selecting green projects, including (1) identifying common BAT implementation areas; (2) conducting a comparative analysis of resource efficiency and environmental performance, as well as the carbon intensity of industry; (3) formation of the Eurasian BAT expert community; the results of the work were used in the draft Concept for the implementation of green economy principles to the EAEU;

– has substantiated the perspective for developing justification for interstate standard series on methodical recommendations for BAT identification and selection of industrial development projects for resource and environmental efficiency enhancement.