УНИВЕРСИТЕТ
ПО АРХИТЕКТУРА
СТРОИТЕЛСТВО
И ГЕОДЕЗИЯ

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УНИВЕРСИТЕТ
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REVIEW

by Prof. Dr. Ivan [redacted] Paligorov – University of Forestry, Professional field 3.7. Administration and Management, scientific specialty Economics and Management

of the dissertation on the topic: **ECOLOGICAL APPROACH TO STRUCTURAL PLANNING IN ENERGY PROJECTS FROM RENEWABLE SOURCES**

submitted for the acquisition of the PhD in the professional field 5.7. Architecture, Civil Engineering and Geodesy, scientific specialty "Land Management and Protection of Agricultural Lands (incl. Property Management)",

by doctoral student Asst. Eng. Bisera [redacted] Ivanova, from the Department of "Sustainable Land Use and Property Management" of the University of Architecture, Civil Engineering and Geodesy (UACEG).

1. Brief biographical data

Eng. Bisera Ivanova is a graduate of the University of Architecture, Civil Engineering and Geodesy (UACEG), with a degree in Geodesy in the Department of Land and Property Management. In 2020, she obtained a Master's degree.

She started working as a software developer in an international technology company, which allowed her to specialize in the field of spatial data and three-dimensional modeling.

Since 2021, she has been enrolled as a full-time doctoral student by order No. 164 of 26.02.2021 of the Rector of UACEG, and since 2022 - in a part-time form of study, as an assistant professor in the Department of Land and Property Management at UACEG. She was enrolled with the right to defend by order No. 296/01.04.2025 of the Rector of UACEG.

The dissertation is directed for defense by a decision of the extended departmental council of the department "Sustainable Land Use and Property Management" dated 30.06.2026.

As an assistant, she leads exercises in the disciplines "Organization of Agricultural Territories", "Management of Protected Areas", "Property Management", "Ecology", "Geodesy" and "Territorial Organization".

Her scientific and professional interests are focused on the sustainable development of territories, their organization and planning, land and property management and the combination of investment processes with environmental protection requirements. She participates in the development of projects in the field of spatial planning, including general and detailed spatial plans.

She is a member of the Academic Council of the University of Architecture, Civil Engineering and Geodesy.

2. General description of the submitted materials

The submitted dissertation work contains 116 pages of main text (pp. 8–123), with 10 figures and 12 tables in the text. In an appendix with a total volume of 33 pages, information is summarized and presented in 6 parts on the requirements of the regulatory documents, summarized information and evaluation criteria, with rich map material. The bibliography covers 135 literary sources, of which 70 in Cyrillic and 65 in Latin, as well as 6 sources of spatial and statistical data.

The materials are accompanied by 3 publications, 2 of which are independent and 1 in co-authorship, published in the period 2024-2026, of which the joint publication is in English. Two of the publications are in the journal "Geodesy, Cartography, Land Management", and the publication in English is in a collection of scientific papers from the International Scientific Conference of the Faculty of Geodesy of the Technical University of Sofia.

All publications have been peer-reviewed before publication.

Declarations of originality of the dissertation work and meeting the minimum national requirements have been submitted.

3. Reflection of the candidate's scientific publications in the literature (known citations)

No references to noted citations or interest in the publications were found in the documents. This is probably due to the relatively short period after their publication. It can be argued that the results of the scientific research have been published in an authoritative scientific journal with scientific peer-review and presented at authoritative international conferences, which guarantees their presentation to specialists in this field, as well as to all specialists, students, doctoral students and postgraduates interested in the topic, as well as participants in scientific forums.

4. General characteristics of the candidate's activities

4.1. Educational and pedagogical activity (work with students and doctoral students)

I have no direct observations of the educational and pedagogical activity of Eng. Bisera Ivanova, but as a lecturer I can assume that since the department has assigned the teaching of exercises in the disciplines "Organization of Agricultural Territories", "Management of Protected Areas", "Property Management", "Ecology", "Geodesy" and "Territorial Organization" since 2022, she is doing well.

4.2. Scientific and applied scientific activity

From the submitted scientific publications and the dissertation work, it is evident that the scientific and professional interests of Eng. Ivanova are directed towards the sustainable development of territories, their organization and planning, the management of lands and properties and the combination of investment processes with the requirements for environmental protection. Moreover, she participates in the development of projects in the field of spatial planning, including general and detailed spatial plans, which allows her to constantly build on and expand her knowledge and professional skills.

4.3. Implementation activity

No certificates of implementation or registration of patents or utility models were found in the submitted documents. But the nature of the work, focused on resolving conflicts related to the protection of agricultural lands, in the context of accelerated and intensive development of photovoltaic power plants, through the approaches of spatial planning, suggests that some of the proposed approaches and methodologies for assessing and selecting territorial alternatives for photovoltaic power plants at the level of a general spatial plan could find application in practice. This fully applies to the proposed variant of a production zoning zone for the production and storage of electricity from renewable energy sources - storage of electricity zone, with the relevant zoning rules and norms determining the conditions for limiting soil sealing, preserving soil functions, dismantling and reclamation of the territory after cessation of activity.

4.4. Contributions (scientific, scientifically applied, applied)

Getting acquainted with the dissertation work allows us to summarize that we have a completed scientific study built on the systematic approach: summary, systematization and identification of a scientific problem, justification and development of an approach for its resolution, testing of a methodology for evaluation, comparison and selection of alternatives for a solution. I accept the scientific and scientifically applied contributions claimed by the doctoral student. Specifically:

- **Scientific contributions**
  - ✓ Based on an analysis of the policy, strategies and trends related to the development of energy from renewable sources, and their impact on spatial planning in Bulgaria, based on the current regulatory framework and spatial planning practice related to the planning and implementation of photovoltaic power plants on agricultural lands in Bulgaria, a conflict has been established in the protection of agricultural lands in the conditions of accelerated development of photovoltaic plants.
  - ✓ The role of the general development plan in limiting the conflict between the accelerated development of photovoltaic power plants, the protection of agricultural lands and the existing tools of spatial planning is substantiated.
  - ✓ An integrated ecological approach to spatial planning has been developed, connecting the ecosystem approach, the concept of ecosystem services, the DPSIR framework and multi-criteria assessment, using the AHP method in a single logical sequence to support spatial decisions.

- **Scientific and applied contributions**
  - ✓ A methodology for the assessment and selection of territorial alternatives for photovoltaic power plants has been developed, including territorial restrictions, a hierarchy of criteria and sub-criteria, indicators, assessment scales, normalization of values, and an integrated environmental sustainability index (ESI) defined by the author.
  - ✓ The applicability of the developed methodology for the assessment, comparison and selection of territorial alternatives at the general development plan level has been confirmed as an analytical tool for substantiating and supporting the process of making development decisions through testing in two municipalities with different territorial characteristics.

- ✓ A variant of a production development zone for the production and storage of electricity from photovoltaic power plants - storage of electricity (RES – Ppe) has been proposed, with the relevant development rules and norms determining the conditions for limiting soil sealing, preserving soil functions, dismantling and reclamation of the territory after cessation of activity.

It can be reasonably argued that the contributions in the presented scientific research are in the professional field 5.7. Architecture, civil engineering and geodesy, scientific specialty "Land management and protection of agricultural lands (incl. Property management)".

5. Assessment of the candidate's personal contribution

The presented dissertation, abstract and publications show that a purposeful scientific research was conducted and the results obtained, summarized in the dissertation, are the personal work of the doctoral candidate. Moreover, the publications are dedicated to individual elements and results from different stages of the scientific research, later presented in the dissertation.

6. Critical notes

No significant omissions, contradictions and errors were found in the presented dissertation, abstract and publications. Some minor notes can be indicated, which are characteristic of this type of scientific research. I would recommend that the work be published, due to the topicality and importance of the topic, but after some elements of the text are refined. For example, many abbreviations are used, including in a foreign language, which are known to specialists, but would make it difficult for the less educated and trained readers, which requires finding a better balance. Taking into account the topicality of the topic and the possibility that some of the issues related to sustainable development are the subject of a wider public discussion, it would not be a bad idea to seek a wider application of the proposed methodology. The established conflict of the accelerated development of the photovoltaic power plants and the associated increase in pressure on agricultural territories, provided that energy goals still remain insufficiently tied to the tools of spatial planning, which necessitated setting this goal of the dissertation research. The directions for future research are very impressive and in this sense the notes should be accepted as recommendations for the future work of the doctoral student in this very relevant and important topic for our society. Of course, the notes can provide the doctoral student with the opportunity to argue her thesis during the defense, as well as the fulfillment of the tasks set and the achievement of the goal of the research.

7. Personal impressions

I have no personal impressions of the doctoral student's teaching work, but I have direct impressions of her participation in scientific conferences, where she presents her own results from her scientific research. She demonstrates creative knowledge of research methods and very good awareness and competence in their application, regardless of their complexity.

8. Conclusion:

I firmly believe that the topic of the dissertation is relevant, and the content of the development is original from a scientific point of view. The dissertation has a clearly formulated problem, a scientific and methodological apparatus has been developed to solve this problem, an experimental study has been conducted, based on the results of which conclusions and

recommendations have been made, as well as guidelines for future studies, which represent undeniable scientific and applied and applied contributions. I appreciate the good preparation and awareness of the doctoral student in the field of management and protection of agricultural lands. In this sense, I believe that the scientific direction of the dissertation is in the field of the scientific specialty Land Management and Protection of Agricultural Lands (incl. Property Management). The dissertation meets the requirements of Art. 12 of the Law on the Academic Staff Development of the Republic of Bulgaria, Art. 27 of the Regulations for the Implementation of the Academic Staff Development Law of the Republic of Bulgaria and on the requirements for the Regulations for the Academic Staff Development in the University of Architecture, Civil Engineering and Geodesy, Sofia, for the acquisition of the educational and scientific degree "Doctor".

Based on the above, I propose with full conviction to the esteemed members of the scientific jury to support the decision to award the educational and scientific degree "Doctor" in professional field 5.7 Architecture, Civil Engineering and Geodesy, scientific specialty "Land Management and Protection of Agricultural Lands" (incl. Property Management) to doctoral student **Eng. Bisera [redacted] Ivanova**, assistant professor in the Department of "Sustainable Land Use and Property Management" of the University of Architecture, Civil Engineering and Geodesy.

Sofia, 18.07.2026

Reviewer:

Prof. Dr. Ivan Paligorov