

REVIEW

by Professor Daniela Nikolova Bobeva-Philipova, PhD

Institute for Economic Research at the Bulgarian Academy of Sciences

of a dissertation submitted for the award of the academic degree **Doctor**

in Higher Education Area 3. Social, Economic and Legal Sciences,

Professional Field 3.8 Economics

Author: Anton Lyubomirov Ivanov

Title: *Final Investment Decision for the Construction of a Nuclear Power Plant in the Context of a Liberalized Electricity Market in Bulgaria (Methodological and Applied Aspects)*

1. General Description of the Submitted Materials

By Order No. 319/04.05.2026 of the Director of the Institute for Economic Research at the Bulgarian Academy of Sciences, I was appointed as a member of the scientific jury for the defense of a dissertation for the award of the academic degree **Doctor** to Anton Lyubomirov Ivanov in Professional Field 3.8 Economics, entitled “*Final Investment Decision for the Construction of a Nuclear Power Plant in the Context of a Liberalized Electricity Market in Bulgaria (Methodological and Applied Aspects)*”.

This review is based on the following materials provided to me:

1. Dissertation thesis;
2. Dissertation abstract;
3. List of publications;
4. Report on compliance with the minimum requirements for obtaining the educational and scientific degree “Doctor”.

The submitted documents comply with the established requirements and provide sufficient grounds for a comprehensive assessment of the candidate’s scientific contribution.

2. Relevance of the Topic and Appropriateness of the Research Objectives and Tasks

There is hardly any need to justify the relevance and significance of the topic, given that not only in Bulgaria but also in many countries the establishment of new nuclear generating capacities has been under discussion for years. The dissertation responds to the need for a comprehensive scientifically grounded approach to such a long-term decision of major importance for the economy, as well as for national and regional security.

The author has thoroughly substantiated the relevance of the topic not only from a practical perspective but also from the standpoint of scientific research, insofar as such decisions are often made on the basis of considerations other than rigorous, scientifically grounded multicriteria analysis.

3. Knowledge of the Research Problem

The author demonstrates an in-depth understanding of the research problem in all its complexity and detail. He has reviewed an impressive volume of literature, including studies by Bulgarian scholars in the fields of energy economics, fundamental economic analysis, the green transition, and nuclear energy.

The literature review reveals profound knowledge of the theoretical aspects of the topic, while the candidate's curriculum vitae indicates that his professional activity has been entirely related to the subject of the dissertation. The candidate is a well-established and highly respected specialist within professional circles and a widely recognized energy expert in the public sphere.

Particularly noteworthy is his excellent knowledge of the applicable European regulatory framework. Further evidence of his expertise is the comprehensive historical and economic analysis of ownership concepts related to nuclear generation capacities over the last twenty-five years, through which the interests and motivations of the principal stakeholders have been identified.

4. Research Methodology

The topic is characterized by exceptional complexity arising from its interdisciplinary nature, specificity, temporal uncertainty, social significance, and its European and geopolitical dimensions. The integration of all these aspects and the associated academic challenges makes the attempt to develop a comprehensive methodology and conduct research based on it a significant achievement in itself. The fact that even certain individual components of the study have no equivalent in Bulgarian economic literature further emphasizes the author's contribution.

The methodology cannot be adequately described merely as a combination of quantitative and qualitative methods. The author applies an original methodological framework that incorporates both a historical approach to examining changes in strategies concerning the construction of nuclear capacities and a comparative approach based on an analysis of ownership structures of nuclear power plants in the European Union and other countries. The study combines macroeconomic and microeconomic technical analysis and includes a PEST/SWOT assessment.

The quantitative analysis relies on reliable databases, which enhances the credibility of the conclusions. Data from the International Atomic Energy Agency (IAEA), as well as data from the National Statistical Institute concerning energy production, energy consumption, and electricity generation and consumption, have been utilized.

Having followed the author's work for several years, I would like to emphasize that his literature review and independent interpretation of the economic dimensions of the subject demonstrate considerable progress, justifying the assessment of the dissertation as a profound economic study.

The limitations of the research are clearly and specifically formulated. Citations are presented in accordance with academic standards.

I particularly appreciate the author's decision to include, at the end of the dissertation, a glossary of terms and definitions. Such a practice is rarely encountered in doctoral theses, yet it is especially useful and important in interdisciplinary research, where clarification of the integrated conceptual framework is essential.

5. Characteristics and Evaluation of the Dissertation

The object and subject of the study are defined concisely, clearly, and correctly.

The main thesis is formulated in a rather complex and carefully structured manner. In essence, the author seeks to demonstrate that a sound decision regarding the construction of new nuclear generation capacities should be based solely on a multicriteria analysis for comparing alternatives, which constitutes the most effective assessment tool and reliably ensures the long-term sustainability of the initiative throughout its implementation period. The call for a more rational decision-making process, free from political, geopolitical, short-term, clientelist, and other considerations, is convincingly substantiated through a comprehensive assessment of risks.

This approach offers advantages over targeted technical and economic models under conditions of a high degree of uncertainty arising from the preliminary nature of the spatial planning, environmental, technical, and financial reports on the basis of which a decision is made either to confirm or reject the implementation of a specific project.

The objective of the dissertation is specified through five research tasks, the execution of which follows a strict academic sequence—from theoretical foundations to applied analysis, culminating in clearly formulated conclusions and recommendations.

The dissertation has been prepared at a high scientific level and is fully consistent with academic standards. Both the topic itself and the manner in which it has been developed contain innovative elements and fill certain cognitive gaps while integrating the author's substantial professional experience. The author constructs a conceptual framework that is not entirely conventional within economic theory.

The dissertation follows a classical three-chapter structure with a logical connection between the chapters.

The first chapter reviews the relevant theories. On this basis, the main challenges of the liberalized electricity market are identified, together with the constraints and requirements they impose on the justification of investment decisions regarding new nuclear power plants. Consideration is given both to the regulatory requirements of the European Union and to the specific characteristics of the Bulgarian economy and energy system. A comprehensive analysis of trends in the energy sector, and particularly in the electricity sector, is carried out, allowing the identification of the key demand-side and supply-side factors.

The second chapter provides a detailed analysis of the project cycle of a nuclear power plant, the methodology for financial and economic assessment, and a thorough justification of the author's views concerning state participation in the construction of nuclear capacities in three dimensions: goal-setting, project design, and state aid. The entire process is adapted to the conditions of a liberalized electricity market. A PEST/SWOT analysis is conducted in combination with applicable assessment methods.

The third chapter applies the analytical framework developed in the first two chapters to formulate a final investment decision regarding the construction of a nuclear power plant in Bulgaria. The study systematically examines, first separately and then in combination, the internal and external factors influencing the market positioning of such a facility. These factors are classified into several groups: political environment, economic environment, technological environment, socio-cultural environment, and the so-called “proximate environment.” Competing alternatives are also formulated and evaluated.

6. Contributions and Significance of the Dissertation for Science and Practice

I consider that the dissertation contains both significant theoretical and practical contributions. Its most important achievement, however, is the successful integration of in-depth engineering and technical assessments with an economic interpretation, explanation, and justification of the role of nuclear energy within the energy mix. It is precisely this emphasis on the economic rationale of nuclear capacities that provides a solid framework for their future development and construction.

Although the dissertation focuses on Bulgaria, I believe that the proposed approach to evaluating and positioning nuclear capacities has broader applicability and relevance.

I agree with the author’s own assessment of the dissertation’s contributions but would particularly highlight the following:

Theoretical Contributions

- Development of an interdisciplinary methodology for substantiating investment decisions regarding the construction of nuclear capacities;
- Identification of the fundamental challenges facing the energy system as a whole, and nuclear energy development in particular, arising from the liberalization of the energy market, while reconciling the concepts of state participation and market liberalization;
- Application of a non-conventional factor analysis framework (“external environment,” “proximate environment,” and “competing alternatives”) for structuring and motivating investment decisions.

Practical Contributions

Among the numerous practical contributions, the following deserve particular emphasis:

- Definition of key indicators (criteria) for assessing investment projects involving the construction of nuclear power plants;
 - Comprehensive evaluation of the prospects for developing new nuclear capacities at the Kozloduy Nuclear Power Plant site and at the Belene Nuclear Power Plant site.
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7. Assessment of the Publications Related to the Dissertation

The doctoral candidate has presented more publications than required, namely four in total. All of them are directly related to the topic of the dissertation.

One article has been published in the journal *Economic Studies*, two have been presented at scientific conferences organized by the Institute for Economic Research at BAS, and one has been published in an edition of the Serbian Academy of Sciences and Arts.

With regard to quality, the earlier publications combine economic analysis with a strong engineering and technical dimension, whereas the latter two publications display a clearly defined economic analytical perspective.

For example, the article:

Anton Ivanov, Nuclear Prospects of Bulgaria, Proceedings of the Scientific Conferences Held on 26 November 2018 and 2 November 2020, Serbian Academy of Sciences and Arts, accepted at the First Meeting of the Department of Technical Sciences held on 18 January 2023,

primarily provides a technical assessment of nuclear energy, but places it within the broader context of the energy mix and its significance for the economy. The assessments and perspectives developed in that article are subsequently elaborated and expanded in the dissertation.

Particular attention should be paid to the article entitled “*On the Effect of Compensation Measures for Final Electricity Consumers in the Free Market.*” To the best of my knowledge, this is one of the few candid studies addressing the effects of compensation schemes, examining not only their impact on consumers but also their consequences for state-owned energy enterprises.

Within this context, the study identifies risks to the financial condition of these enterprises and, most importantly, to their investment capacity—an issue of fundamental importance not only for the energy sector but also for the economy as a whole.

The issue of energy prices is also present in the author's other publications, which are closely linked to developments within energy enterprises, that is, on the supply side of the electricity market.

The publications are characterized by high relevance, strong practical orientation, academic rigor, and analytical depth.

The articles have been published in peer-reviewed scientific outlets and should therefore be duly recognized with a total of 60 points under the applicable scientometric evaluation system.

8. Assessment of Compliance with the Minimum National Requirements

Having reviewed the information contained in the Report on Compliance with the Minimum National Requirements, I consider that the candidate's academic achievements significantly exceed the minimum requirements for obtaining the academic degree of **Doctor** in Professional Field 3.8 Economics.

9. Personal Contribution of the Candidate

The topic under consideration is original and, to the best of my knowledge, has not previously been examined comprehensively. It represents the author's own intellectual work.

The dissertation is the result of independent scientific research, supported by the author's extensive professional experience in the field of energy.

Theoretical sources have been used and cited correctly. My review of the dissertation and the related publications revealed no evidence of plagiarism.

No form of artificial intelligence has been used in the dissertation, including in areas where its use has already become common practice.

10. Dissertation Abstract

The dissertation abstract comprises 41 pages and fully covers the subject matter of the dissertation.

The abstract accurately reflects the logical structure of the dissertation and, to a considerable extent, adequately presents its content.

The elimination of certain technical shortcomings in the abstract (such as the mechanical inclusion of the entire table of contents of the dissertation) could further improve its quality.

11. Critical Remarks and Recommendations

I have no substantial critical remarks that would diminish my overall highly positive assessment of the dissertation.

I believe that the dissertation would benefit from the formulation of explicit research hypotheses. At the beginning of the dissertation, four "Statements" are presented, which could be reformulated as hypotheses, given that they are subsequently argued and validated throughout the study.

The research methodology also deserves a more comprehensive formulation and presentation, both in the dissertation itself and in the abstract.

Questions

1. Does the author believe that the conclusions and recommendations proposed in the dissertation will be taken into consideration in the process of making final decisions regarding nuclear generating capacities in Bulgaria?
2. The author thoroughly substantiates the thesis concerning the key role of the state in nuclear energy development and the construction of new nuclear capacities. Does the expansion of the state-owned energy sector through new public investments involve certain risks, considering the financial condition and governance practices of state-owned enterprises in Bulgaria?
3. From a theoretical perspective, which areas of energy economics does the author consider to be in need of further development, and in what direction should such development proceed?

CONCLUSION

In the overall assessment of the candidate, due consideration should be given to the active and successful integration of Mr. Ivanov's expertise and knowledge into the activities of the Institute for Economic Research, thereby contributing to the Institute's advancement in the field of energy economics research.

Particular note should be made of his participation in the largest scientific energy project undertaken in 2018, his involvement in institutional research projects, contributions to the Annual Report of the Institute for Economic Research, participation in the Institute's conferences, and engagement in numerous other scientific forums in Bulgaria and abroad.

Taken together, these activities demonstrate that the candidate is an active member of the academic community.

In view of the foregoing, I express my unequivocally positive evaluation of the dissertation, the dissertation abstract, and the related publications. I consider that the candidate fully satisfies the requirements established by the applicable legislation and the Regulations of the Institute for Economic Research.

The dissertation contains results that constitute an original contribution to science and complies with all requirements of the **Act on the Development of the Academic Staff in the Republic of Bulgaria** and the corresponding Implementing Regulations.

The dissertation demonstrates that the candidate possesses profound theoretical knowledge and skills in Professional Field **3.8 Economics**, as well as a high capacity for conducting independent scientific research and applying research findings in practice.

For the reasons stated above, I confidently express my positive assessment of the research presented in the dissertation, the dissertation abstract, the achieved results, and the scientific contributions, and I respectfully recommend that the distinguished Scientific Jury award the academic degree of **Doctor to Anton Ivanov** in Higher Education Area **3. Social, Economic and Legal Sciences**, Professional Field **3.8 Economics**.

May 5th 2026

Reviewer: Prof, Dr. Daniela Bobeva -Filipova