

**OPINION**  
**on a dissertation thesis 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/”**

**submitted by doctoral student Eng. Anton Ivanov,  
scientific supervisor: Prof. Dr. A. Tasev.**

By Order No. 319/04.05.2025 of the Director of the Economic Research Institute at the Bulgarian Academy of Sciences, I have been appointed as a member of the Scientific Jury in the procedure for the defence of the dissertation for the award of the educational and scientific degree “Doctor” to Anton Lyubomirov Ivanov.

The submitted set of materials complies with the requirements of the Development of Academic Staff in the Republic of Bulgaria Act and the Regulations for its implementation, and includes a dissertation, an abstract, publications related to the topic of the research, as well as other documents accompanying the procedure.

The presented dissertation examines the issue of substantiating a final investment decision for the construction of new nuclear capacity in Bulgaria under the conditions of a liberalized electricity market. The author places emphasis on the real factors that influence this type of decision – the high investment cost, the long period required for preparation and implementation, market uncertainty, the role of the state, and the need to compare different project alternatives. In this sense, the research has a clearly expressed practical orientation and is related to one of the important issues concerning the future development of the Bulgarian energy sector.

**Relevance and Significance:**

The topic of the dissertation is relevant in view of the need for Bulgaria to make long-term decisions regarding the development of nuclear energy under the conditions of a changing European electricity market. The author correctly places the research in the context of the energy transition, the declining role of fossil fuels, the increasing share of renewable energy sources, and the need for reliable base-load capacity. The significance of the topic is further strengthened by the fact that Bulgaria has specific project alternatives for new nuclear capacity, including the Kozloduy and Belene sites, as well as an interest in the future development of small modular reactors. In this sense, the dissertation does not address an abstract theoretical problem, but rather a real issue of national importance related to energy security, investment risk, the role of the state, and the sustainable development of the electricity sector.

**Main Theses and Achieved Results:**

The dissertation is structured into an introduction, three chapters, a conclusion, references, and appendices. In the introduction, the author clearly defines the aim of the research – to formulate alternatives and select a sustainable final investment decision for the construction of a nuclear power plant in Bulgaria, taking into account the conditions of the liberalized electricity market in Europe.

The first chapter provides a detailed overview of the development of the electricity sector and the factors influencing the demand and supply of electricity. It examines the processes of electrification, the energy transformation in the European Union, the development of market models, and the regulations of the liberalized electricity market. The author also pays attention to investment risk in nuclear power plant projects and correctly points out that such decisions cannot be considered solely through technical or financial indicators. This part lays the foundation for the subsequent analysis, as it shows the link between energy security, the market environment, the role of base-load capacity, and the need for long-term planning.

The second chapter develops the actual methodological approach for substantiating a sustainable decision to invest in a nuclear power plant. Here, the author examines the cycle of a nuclear project, financial and economic assessments, the specific features of state participation, and the applicable forms of state aid. An important result is that the research builds upon traditional technical and economic analysis by including a wider set of factors through PEST/SWOT analysis and key indicators. Thus, the final investment decision is presented not as a formal final act, but as the result of a consistent assessment of the project, market, institutional, and public environment.

In the third chapter, the proposed approach is applied to the Bulgarian context. The political, economic, technological, and socio-cultural environment is analysed, as well as the factors of the immediate environment relevant to the construction of new nuclear capacity. The author formulates and compares specific alternatives for the development of nuclear energy in Bulgaria, including options related to the Kozloduy and Belene sites. An important practical result is the use of key indicators for comparing the alternatives and bringing quantitative and qualitative indicators into a comparable assessment framework. This allows for a more well-founded choice of investment alternative, without giving preliminary preference to a particular project.

### **Assessment of the Personal Contribution**

The structure of the exposition, the formulation of the thesis and hypotheses, as well as the consistency of the analysis, show that the dissertation is an independently developed research work. There are no grounds to question its authenticity. The formulated contributions and the results achieved may be considered the personal work of the candidate.

### **Publications and Fulfilment of the National Minimum Requirements**

The four scientific publications submitted on the topic of the dissertation reflect the main results of the research. With these publications, the candidate fulfils the national minimum requirements for the award of the educational and scientific degree “Doctor”, as set out in the Development of Academic Staff in the Republic of Bulgaria Act, the Regulations for its implementation, and the Regulations for the Acquisition of Scientific Degrees and the Holding of Academic Positions at the Economic Research Institute at the Bulgarian Academy of Sciences.

### **Critical Remarks, Questions and Recommendations**

The dissertation demonstrates a good understanding of the subject matter and convincingly presents the complexity involved in making a final investment decision for new nuclear capacity. My remarks are mainly recommendatory in nature and do not affect my positive assessment of the work. In some parts, the exposition could be more concise, especially in the sections dealing with general trends in the development of energy and electricity markets. These discussions are useful for providing context, but they could be more directly linked to the main problem of the dissertation – the choice of a sustainable final investment decision for a new nuclear power plant.

As a recommendation, I would also point to the possibility for the author to expand the analysis of public perception of nuclear projects. The dissertation examines political, economic, technological, and social factors; however, in projects of such scale, public trust, communication with local communities, and acceptance of the long-term commitments related to radioactive waste and spent nuclear fuel are of substantial importance for the sustainability of the investment decision.

Somewhat greater attention could also be given to small modular reactors as a future alternative. The dissertation notes the interest in them, but the topic deserves a clearer distinction from large nuclear capacities in terms of implementation timelines, investment risk, regulatory readiness, financing opportunities, and applicability within the Bulgarian electricity system.

In the applied part, it would be useful for the author to present more clearly the sensitivity of the results to changes in individual key indicators, such as the cost of capital, construction period, market price of electricity, and degree of state participation. This would strengthen the practical

applicability of the proposed methodological approach and would show under what conditions a given alternative preserves or loses its advantage.

### **Conclusion**

My overall impression is that the presented dissertation is a comprehensive and in-depth study with clearly expressed scientific and practical-applied value. The work addresses an important issue for the Bulgarian energy sector and proposes a well-argued approach for assessing investment alternatives in the construction of new nuclear capacity.

The minimum national requirements under the Development of Academic Staff in the Republic of Bulgaria Act and the Regulations for its implementation, as well as the minimum requirements of the Regulations for the Acquisition of Scientific Degrees and the Holding of Academic Positions at the Economic Research Institute at the Bulgarian Academy of Sciences, have been fulfilled.

I propose that the members of the Scientific Jury accept the dissertation 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/”, developed by doctoral student Eng. Anton Lyubomirov Ivanov, as successfully completed.

I give a positive assessment of the dissertation and propose that the respected Scientific Jury award Eng. Anton Lyubomirov Ivanov the educational and scientific degree of “Doct

Date: 12.05.2026

Sofia, Bulgaria

Signature:.....

Prof. Dr. Svetoslav Spassov