

TO THE MEMBERS OF THE SCIENTIFIC JURY
FOR THE PROCEDURE FOR THE ACQUISITION OF
EDUCATIONAL AND SCIENTIFIC DEGREE "DOCTOR"
IN THE DOCTORAL PROGRAMME "FINANCE,
MONEY CIRCULATION, CREDIT AND INSURANCE"
(FINANCE)

OPINION

Prepared the opinion: Assoc. Prof. Krasimira Borisova Slaveva, PhD, „D. A. Tsenov Academy of Economics“ - Svishtov, Department of Statistics and Applied Mathematics, Scientific area “Statistics and Demography”.

Author of the dissertation: Emil Hristov Alexandrov, PhD student, full-time form of doctoral study, education financed by the state, in the field of higher education: 3. Social, economic and legal sciences, professional direction: 3.8. Economy, doctoral program: Finance, money circulation, credit and insurance (Finance).

Theme of the dissertation work: "Financial and economic assessment of investments in the production of energy efficient building materials "

Scientific adviser: Prof. Stoyan Prodanov, PhD

Reason for submitting the review: participation in the scientific jury for defence of the dissertation paper acc. to Order №1127/22.11.2023 by the Rector of „D. A. Tsenov Academy of Economics“ – Svishtov.

This review has been prepared in accordance with the requirements of the existing Law on the Development of the Academic Staff, the Rules for its Application and the Rules for the Development of the „D. A. Tsenov Academy of Economics“ - Svishtov.

I. General presentation of the dissertation work:

The dissertation on the topic "Financial and economic evaluation of investments in the production of energy-efficient building materials" with author Emil Hristov Alexandrov has a volume of 266 pages, appendices and bibliographic reference. The dissertation contains 28 figures and 76 tables. The bibliography contains 107 sources. On the subject of the dissertation, 4 publications, three articles, one of which was co-authored, and one report were made.

The title of the dissertation is well formulated and clearly directs the reader to the researched issues. In the dissertation, the author gives a reasoned answer to what are the expected effects of investments in the production of energy-efficient building materials for the purposes of implementing the regulations on improving energy efficiency, introduced in the European Union through a study of the financial-economic impact of these investments on users and the theoretical-technological aspects of this process.

II. Assessment of the form and content of the dissertation.

The dissertation follows the established as a standard structure, including an introduction, three chapters, conclusion, appendices, a list of cited and used literature, a reference for

compliance with the national requirements under the PP of ZRASRB, a declaration of originality.

In the introduction, the basic formal requirements regarding mandatory attributes are fulfilled and the object, the subject, the research thesis are correctly defined. the purpose and tasks of the study. Its content clearly substantiates the relevance of the study of insulating building materials that ensure energy efficiency.

The object of study in this dissertation is the insulating building materials providing energy efficiency. **The subject** of research in the dissertation is consumer demand for energy efficiency insulation building materials, which forms a positive financial and economic assessment of investment in their production.

The leading **thesis** of the dissertation is formulated as follows: the development of technologies for the production of insulation building materials forms a supply that provides customer demand for financially and economically sound solutions for investment in energy efficiency projects in the building stock in an environment of high EU green deal targets and energy price dynamics for end users.

The aim of the thesis is to justify the demand for investment in the production of insulating building materials for the purpose of improving energy efficiency, by studying the theoretical and technological aspects of this process and the financial and economic impact of these investments on consumers.

In order to achieve the so formulated research objective the following tasks are set for implementation:

1. To derive the theoretical framework of energy efficiency investments.
2. To justify the methodological framework and management context in the process of implementation of energy efficiency projects.
3. Conduct a survey of end-user attitudes towards scalable energy efficiency investments, manufacturing innovations in insulation materials, and growing demand for complex energy efficiency solutions with increased quality and cost.

The information base of the research, including both official statistical data of NSI and Eurostat, as well as a field survey of the type of survey among individuals and companies. **The methodology** of the research is based on the specialized literature on the topic of the dissertation, the methods of analysis and synthesis, the principles of the system approach, logical, comparative and statistical analysis and econometric modeling are applied. Microsoft Excel and the statistical package IBM SPSS Statistics were used in the processing of the empirical data.

In the introduction, the restrictive conditions of the study are very precisely defined in terms of the time scope - the last five-year period from 2019 to 2023, with a clear consideration of the force majeure impact of the pandemic crisis and the war in Ukraine on the price parameters in the area of investments in energy efficiency, and that national energy efficiency programs aimed at multi-owner multi-storey structures remain outside the scope of this work.

In the first chapter, an in-depth theoretical overview of the literary sources dedicated to the main aspects of investments and more specifically to investments in energy efficiency was carried out. The thesis elaborates the theoretical and practical dimensions of energy efficiency investments and implementation, the nature and characteristics of energy efficiency and energy efficiency in buildings, as well as European and national instruments for short-term and long-term building efficiency. The possibilities provided by the financial-economic approaches for evaluation and analysis of the circumstances that require the application of energy-efficient solutions and the performance of subjective evaluations based on the results of analyzes based on the application of a wide range of statistical and econometric methods are clarified. The doctoral student presents the theoretical and practical dimensions of the possibility of designing and building an integrated installation for the production of energy-efficient building materials. Based on the review of the literature on investments in energy

efficiency, the most frequently applied research methods and approaches have been identified. A theoretical review of the nature and characteristics of energy efficiency as a complex concept related to energy saving, energy consumption, energy sufficiency and energy transition in all sectors of the world, as well as energy efficiency in buildings, has been carried out. On this basis, the author derives the following definition of energy efficiency - "energy efficiency is a key tool to guide the achievement of an ambitious, economically efficient and socially just transition to achieve a climate-neutral economy, aiming to implement it as an integral part of sustainable growth and innovation". The benefits of investing in energy efficiency are presented and the factors that make it difficult or limiting to take actions to improve energy efficiency are clarified. The effects of improving energy efficiency are clarified, namely: increasing the comfort and standard of living for citizens, creating sustainable jobs, maintaining better health, reducing the level of pollution, alleviating energy poverty, improving long-term competitiveness and cost saving etc.

The second chapter presents the methodological framework for research and evaluation of energy efficiency investments, the opportunities provided by financial controlling during a crisis, as well as the results of the analysis of the state and trends of sector F "Construction" in Bulgaria. Organized and conducted a special empirical study - a survey, for which a special questionnaire on the topic "Investments in energy efficiency" was developed. The questionnaire is structured in nine sections. Almost 50% of the questions and answers are presented on a Likert scale. The possibilities for the financial and economic assessment of investments are clarified, and various models are presented on the basis of which to choose the most suitable investment scheme and method of financing, corresponding to the interests of investors. The possibilities and limitations of the various methods for financial and economic evaluation of investments, the most common difficulties with the acquisition of reliable data and the problems caused by the confidentiality of the data are presented. The analysis of the state and trends in sector F "Construction" shows the need to increase the integration of energy efficiency in the Bulgarian construction sector, as an example of which one can consider the construction of an integrated plant for the production of high-quality energy-efficient building materials, thus to make them more accessible to the Bulgarian market and to meet the requirements of European energy standards. Therefore, this will achieve significant effects for the sector - high efficiency and carbon neutrality.

The third chapter is dedicated to the presentation of the results of the conducted survey in the following sequence: first, a description of the respondents, the reasons for investments in energy efficiency and budgeting of energy needs; second, analyzing the environmental aspects, the advantages of the insulation technology and the energy efficiency budget; third, presentation of the grant programs, the effectiveness of the technologies, the impact of the COVID-19 pandemic and the social attitudes towards energy efficiency; fourth, carrying out a financial assessment of state investments to support the increase of energy efficiency in Bulgaria. The profile of the respondents is characterized. Important aspects of electricity consumption, the benefits of home renovation, energy efficiency, etc. have been identified. It was found that more than 23% of respondents believe that housing should be rehabilitated at the expense of programs and public funds, according to 17%, the rehabilitation of their home should be carried out through a combination of personal participation up to 20%. The collected information shows that 40% live in homes without available internal insulation, while 42% of the respondents do not have external insulation, and 65.7% of the respondents answer that they have fully available energy-saving joinery. For 30% of the respondents, the priority in the future is the investment in external insulation of the home in which they live. According to 33% of the respondents, the cost of electricity is a significant reason for installing external insulation of the home. It has been identified that the qualities and usefulness of some insulation materials are not well known. In general, in the third chapter, the collected data from the conducted survey are analyzed in great detail, and what has been indicated so far only gives some strokes, but does not exhaust them.

In the conclusion, in a synthesized form, the main conclusions of the conducted research are presented, they correspond to the set goal and tasks and show their implementation and categorically reflect what was done by the author.

A total of 107 literary sources are included in the bibliographic reference. Definitions, opinions, methods, etc. used, are presented correctly and are reflected by citation on the relevant page and in the list of references.

The dissertation work is characterized by the depth of the scope of the research, both of a theoretical and a practical-applied and methodological nature. The doctoral student shows a high degree of knowledge of the researched issues, has revealed the features and specific features of the research object, has thoroughly analyzed the opinions and achievements of other authors and very precisely manages to highlight the theoretical and practical dimensions of investments and the implementation of energy efficiency, has characterized the European and national tools for short-term and long-term efficiency of buildings, clarified the peculiarities of investments in the construction sector, assessed the need for energy-efficient solutions and successfully applied a wide range of statistical and econometric analysis methods. The chosen research approaches and the formulated conclusions are correct and well-founded.

I believe that the presented dissertation has a logical presentation, follows the set goal and research tasks, empirically proves the author's research thesis, and the formulated conclusions and conclusions of the author are very well argued. The dissertation work has a good scientific style, the terms used are applied correctly, and this clearly shows the high degree of knowledge of their essence and content. The research methodology is adequate to the set goals and objectives. The content of the dissertation shows that the doctoral student has fulfilled the set goal and demonstrates skills for handling scientific concepts, for conducting empirical research - a survey based on a questionnaire developed by the doctoral student, shows an aspiration for critical analysis and a sustained scientific style of presentation. Author achievements and contribution moments are available. The technical and visual design of the dissertation work is at a high level - for the visualization of important aspects of the research, appropriate forms of presentation are used - diagrams, tables, graphic images. In the dissertation, an in-depth empirical study was carried out, and the collected information from the survey was summarized and analyzed using appropriate statistical methods, descriptive statistics for the main characteristics of the variation distributions - arithmetic mean, median, mode, standard deviation, dispersion, rank (range of variation), the coefficient of asymmetry, coefficient of kurtosis, methods of analysis of relationships and dependencies - regression and correlation analysis and econometric modeling.

The author's abstract is developed in a volume of 32 pages and is well structured, contains the necessary elements and information that correspond to the content of the dissertation, reflect the results achieved by the author and the main points of contribution.

Four publications are attached to the dissertation - 3 articles (2 independent and one co-authored) and 1 report from a national scientific conference. The presented publications include important parts of the dissertation work and contain significant results of the conducted scientific research, which gives reasons to consider that the dissertation has been approved and popularized to a high degree.

III. Scientific and scientific-applied contributions to the dissertation work

The dissertation contains scientific and scientific-applied contributions that build on the theoretical and empirical research in the field of finance and specifically of investments in energy efficiency. The following stand out as the author's achievements and the basis for deriving contributions:

1. The author's interpretation of the term "energy efficiency" is put forward as follows: energy efficiency is a key tool to guide an ambitious, cost-effective and socially

equitable transition towards a climate-neutral economy, aiming at its implementation as an integral part of sustainable growth and innovation.

2. An innovative option for the construction of an integrated installation for the production of high quality energy efficient building materials is presented, which will achieve accessibility on the Bulgarian market to similar types of building materials, as well as a high degree of sustainability and adaptability to European energy standards.
3. A precise user study has been carried out in the field with a focus on financial and economic evaluation of investments in the production of energy efficient building materials.
4. By summarizing the results obtained from the survey of attitudes towards investment in the production and consumption of energy efficient building materials to achieve an optimal amount of energy efficiency in Bulgaria, the need to take adequate measures based on optimal values of the percentage of renovation by Styrofoam of up to 30% and a price of 62 BGN/m² is derived.
5. A new vision for the expert financial assessment of public investments to support energy efficiency in Bulgaria has been proposed.

I believe that the contributions formulated by the author are actually achieved, show the main merits of the dissertation work and are related to the enrichment of existing knowledge and its application in practice.

IV. Criticisms, recommendations and questions

A thorough familiarization with the dissertation gives me reason to conclude that there are no significant omissions, inaccuracies or contradictions in it. I believe that the dissertation work enriches the available knowledge, contains significant ideas and real results have been achieved. I consider it necessary to point out that the author in the process of research has generated a rich information base that he could use in his future research with the help of SPSS or other specialized software. The questions to the doctoral student are as follows:

1. In what other aspects can the generated information from the conducted sample research be analyzed?
2. Are the attitudes in society favorable for more energy efficient and green investments?

V. Summary conclusion and opinion

The reviewed dissertation on the topic "**Financial and economic assessment of investments in the production of energy efficient building materials**" represents a complete independent scientific study of a theoretical-applied nature on a topical and significant issue. **Doctoral student Emil Hristov Alexandrov** demonstrates solid theoretical knowledge and skills for conducting in-depth scientific research. I believe that the dissertation contains significant scientific and scientific-applied contributions and fully meets the requirements and criteria for obtaining the educational and scientific degree "doctor" from the Law on the Development of the Academic Staff in Bulgaria and the Regulations for its application and the regulations for educational activities at „D. A. Tsenov Academy of Economics“ - Svishtov. All this gives me reason to give a **categorically positive opinion** on the open procedure and to propose to the members of the honorable Scientific jury to award the educational and scientific degree "Doctor" in the doctoral program "**Finance, money circulation, credit and insurance (Finance)**" to **Emil Hristov Alexandrov**.

Date: 20.12.2023

Prepared the opinion:

Svishtov

(Assoc. Prof. Krasimira Slaveva, PhD)