O P I N I O N

by Assoc. Prof. Plamen Tsenkov Tsankov, PhD, Technical University - Gabrovo

on the materials submitted for participation in the competition for the academic position of "associate professor" in the field of higher education - 5. Technical Sciences, in the professional field - 5.2. Electrical Engineering, Electronics and Automation, specialty - “Electric Power Distribution and Electrical Equipment”.

In the competition for associate professor, announced in the State Gazette, No. 48/13.06.2025 and on the website of the Technical University of Gabrovo for the needs of the Department of Electric Power Distribution and Electrical Equipment at the Faculty of Electrical Engineering and Electronics, Senior Assistant Professor Dr. Eng. Lyubomir Diyanov Dimitrov is participating as a candidate.

1. Overview of the content and results of the presented works

Candidate Senior Assistant Professor Lyubomir Dimitrov, PhD, presents the following main materials for the competition:

- 11 publications referenced in Scopus for Group B.4. Habilitation thesis - scientific publications (no less than 10) in publications that are referenced and indexed in world-renowned scientific information databases. One of the publications [B.4.10] is in a publication with SJR=0.24;
- 2 publications for Group G.7. Scientific publication in journals that are referenced and indexed in world-renowned scientific information databases, one of which [G.7.2] is in a journal with SJR=0.21;
- 33 publications for Group G.8. Scientific publication in non-indexed peer-reviewed journals or in edited collective volumes;
- 1 textbook and 1 teaching aid;
- 24 citations of publications, 23 of which are in publications referenced in Scopus and Web of Science.

The abstracts of the works are divided into 4 thematic areas:

- *Research on the behavior and characteristics of electric vehicles and their components (8 publications)* – The publications assess the electrical energy losses of an asynchronous electric motor for a compact electric vehicle under different parameters and loads [B.4.4]; the influence of mechanical equipment on the behavior of electric drives is studied [B.4.9]; losses in steel and optimal values of the rotation speed of an asynchronous motor with a short-circuited rotor under different conditions are determined [G.7.1]; a new type of traction DC motor for electric vehicles has been investigated, an overview of the state and trends in the development of electric vehicles in Bulgaria has been made [G.8.12], [G.8.13], as well as an analysis of charging stations and their prospects for development; the results related to the expansion of electromobility and sustainable development were summarized, and conclusions were drawn [G.8.16], [G.8.17];

- *Research on electrical equipment units, machines, and mechanisms (8 publications)* - The energy efficiency of ventilation and pumping systems has been studied through the application of frequency control [B.4.6], [B.4.7]; Mathematical modeling was performed to evaluate electrical losses in drive motors and their components under various conditions [G.8.5]; experimental studies of asynchronous motors and centrifugal pumps were conducted, including an analysis of the influence of the supply voltage and harmonic components [G.8.14]; changes in electrical quantities during the operation of electric hoists [G.8.15] and air conditioning systems [G.8.20], [G.8.21] were investigated. The results obtained provide conclusions for improving energy efficiency and the impact of appliances on the power supply network;

- *Research on the operational behavior of asynchronous motors with short-circuited rotors (10 publications)* - Technical parameters, characteristics, and electromechanical model of high-voltage asynchronous motors with short-circuited rotors are examined [B.4.1], [B.4.2], [G.8.4]; the influence of the supply voltage, frequency [B.4.3] and motor parameters on energy losses in frequency-controlled drives [B.4.5], [G.8.1] is assessed; the influence of the supply voltage on the dynamics of low-voltage and new three-phase asynchronous motors has been investigated [G.8.5], [G.8.8]; the results of the development of a test bench and experimental investigation of a new energy-efficient three-phase asynchronous motor are presented [G.8.9], [G.8.10];

- *Studies on the change in characteristic electrical quantities of electrical equipment and facilities (7 publications)* - An electromechanical model has been developed and the operating modes of high-

voltage electric drives have been analyzed [B.4.1], as well as the effects of non-nominal conditions on their efficiency [B.4.2]; the influence of voltage and frequency on energy losses during frequency regulation has been assessed [B.4.3], [B.4.5], [G.8.1]; the impact of the resistance torque on the operation of pump units [G.8.4] and the dynamic behavior of low-voltage and new three-phase motors [G.8.5], [G.8.8] have been investigated; the results of the development of a test bench and experimental study of an energy-efficient three-phase asynchronous motor have been presented [G.8.9], [G.8.10];

- *Practical measurements with digital measuring equipment (4 publications)* – Characteristics and operating modes of electrical machines in a public building are presented - elevators with asynchronous motors and power transformers [B.4.8]; data on energy from hydroelectric power plants [G.7.2] and the energy status of street lighting in Gabrovo are analyzed; operating modes and energy-efficient practices in industrial induction furnaces are studied [G.8.7], [G.8.11]; the influence of nonlinear loads on transformers and electric motors, as well as their impact on the efficiency of the power supply system, has been investigated [G.8.15], [G.8.18].

The quantitative assessment of the candidate's publication activity shows that the minimum national requirements by groups and indicators, as well as the minimum scientometric requirements of TU-Gabrovo for the academic position of "associate professor" have been met.

2. General characteristics of the candidate's activities

2.1. Teaching and pedagogical activity (work with students and doctoral students)

Candidate Dr. Eng. Lyubomir Dimitrov began teaching in 2010 at the Department of Electric Power Distribution and Electrical Equipment at the Faculty of Electrical Engineering and Electronics at the Technical University of Gabrovo.

In recent years, the candidate has lectured and conducted exercises in the academic disciplines of "Relay Protection," "Operation of Automatic Devices and Systems," "Electrical Equipment," "Electrical Equipment of Production Machines and Processes," and "Electrical Equipment of Automated and Robotic Devices" from the curricula of the "Electric Power Engineering and Electrical Equipment" specialty. He has participated in the development of teaching documentation for 6 academic disciplines in the Bachelor's and Master's degree programs in the specialty " Electric Power Engineering and Electrical Equipment".

Senior Assistant Professor Dr. Eng. Lyubomir Dimitrov participated in the creation of two teaching laboratories at the Department of Power Supply and Electrical Equipment – in Electrical Equipment – 2704 and in Operation of Automatic Devices and Systems – 2610.

Over the past 5 years, the candidate has supervised 42 graduate students and reviewed 54 theses. He has also participated in thesis defense committees.

2.2. Scientific and applied scientific activity

In addition to the publishing activities described in point 1, Assoc. Prof. Lyubomir Dimitrov, PhD, is the head of a contract with an external client on the topic of "Measurement and analysis of electrical loads in a medical center" and a participant in a team working on two projects under operational programs and nine university research projects at the Technical University of Gabrovo.

2.3. Implementation activity

The candidate has not provided documents proving implementation. Several of his practical developments in electrical equipment and electromobility are presented in the publications for the competition. Senior Assistant Professor Dr. Lyubomir Dimitrov participated in the creation of several laboratory stands in the laboratories of "Electrical Equipment" and "Operation of Automatic Devices and Systems" in the Department of "Electric Power Distribution and Electrical Equipment".

3. Contributions (scientific, scientific-applied, applied)**. Significance of contributions to science and practice**

The author's report on the contributions in the candidate's scientific works presents six contributions, which I accept and would classify as follows:

- *Scientific-applied:*

1. A computer mathematical model has been created and applied to assess the electrical losses occurring in electric motors and in the individual components of electric drives under different operating modes and conditions.

2. Energy-efficient approaches and technical solutions for optimizing the operation of machines and mechanisms in electrical equipment systems have been developed and tested.

3. The operational behavior of asynchronous motors with short-circuited rotors has been investigated through electromechanical modeling and experimental testing of a new energy-efficient three-phase motor.

4. Theoretical and experimental studies have been conducted on a new type of traction DC motor designed to drive electric vehicles.

- *Applied:*

5. The characteristics and dependencies of electric vehicles and their components have been determined based on studies of their functionality and operating modes.

6. Practical measurements and analysis of the quality of electrical energy for different types of electrical loads have been carried out, and the results have been summarized and conclusions have been drawn for improving energy efficiency.

I believe that the scientific-applied and applied contributions are significant for science and useful for practice and scientific research work in the candidate's research areas.

4. Assessment of the candidate's personal contribution

Of the scientific publications submitted for the competition, 4 (11%) are independent, in 8 (22%) the candidate is the first author, and in 10 (27%) he is the second author, which gives reason to believe that the personal contribution of Assoc. Prof. Dr. Eng. Lyubomir Dimitrov to the publications is significant.

5. Critical comments and recommendations

There are no significant critical comments. I would recommend that Senior Assistant Professor Dr. Lyubomir Dimitrov expand his international mobility and publishing activities, as well as develop his implementation projects for the protection of intellectual property.

6. Personal impressions

I have known Assoc. Prof. Lyubomir Dimitrov, PhD, since his student years and later from his work as an assistant and senior assistant at the Department of Electrical Power Distribution and Electrical Equipment at the Technical University of Gabrovo. He is a friendly and highly qualified young colleague who performs his educational and research duties at the Technical University of Gabrovo with great professionalism.

7. Conclusion:

In view of the above, I propose that Senior Assistant Professor Lyubomir Diyanov Dimitrov, PhD, be elected as an associate professor in the field of higher education - 5. Technical Sciences, professional field - 5.2. Electrical Engineering, Electronics and Automation, specialty - " Electrical Power Distribution and Electrical Equipment".

08.11.2025 Member of the jury:

/ Assoc. Prof. Plamen Tsankov /