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STATEMENT

by Prof. Plamen Tsenkov Tsankov, PhD Eng., Technical University of 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, professional field 5.2 Electrical Engineering, Electronics and Automation, scientific specialty "Power Supply and Electrical Equipment" (Non-conventional and Renewable Energy Sources).

The competition for the academic position of Associate Professor was announced in the State Gazette, No. 65 of 17 July 2026, for the needs of Burgas State University "Prof. Dr. Asen Zlatarov". The sole candidate is Chief Assistant Professor Vasil Borisov Ivanov, PhD.

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

The candidate has submitted a total of 15 scientific works for the competition, including one monograph – habilitation thesis (criterion B.3), 3 scientific publications in journals indexed and abstracted in internationally recognised scientific databases (criterion G.7), and 11 scientific publications in non-indexed peer-reviewed journals or edited collective volumes (criterion G.8). In addition, four teaching aids have been submitted, meeting the criteria outlined in E.24.1–E.24.4.

With regard to publication activity, the submitted documentation indicates that 14 of the publications are in English. A total of ten works are single-authored, three have one co-author, and one publication has three co-authors. With regard to the publication venues of the candidate, the following have been indicated: four articles in national journals, four papers in the proceedings of international scientific conferences held in Bulgaria, and six papers in scientific proceedings and university yearbooks.

The candidate has submitted evidence of nine citations in scientific publications that are indexed and abstracted in internationally recognised scientific databases, corresponding to 90 points under criterion D.12. A total of four scientific works have been cited, with one of these being cited six times.

The candidate's research is focused primarily on two thematic areas:

– **Design, implementation and investigation of autonomous photovoltaic systems (APV systems).** Systems incorporating photovoltaic panels, storage batteries, inverters with maximum power point tracking (MPPT) algorithms, and monitoring and control systems have been investigated. An algorithm has been developed for evaluating the performance of photovoltaic inverters through daily monitoring of solar radiation, temperature and seasonal variations. Practical applications of autonomous photovoltaic power supplies have also been considered, including the continuous operation of an IP camera and the power supply of a thermoelectric cooling system based on a Peltier module.

– **Modelling, analysis and optimisation of energy processes using Matlab/Simulink.** Models of photovoltaic systems, voltage inverters, electric power transmission cable lines, and series and parallel RLC circuits have been developed and investigated. The harmonic components of inverter output current and voltage, the efficiency of passive notch filters, and resonance phenomena in electrical circuits have been analysed. The possibilities of compensation using reactive components have also been investigated, with the aim of reducing active power losses and improving the quality of electrical energy.

The quantitative assessment of the submitted documentation establishes that the candidate has accumulated a total of 650 points. The minimum national requirements and the minimum requirements stipulated in the Regulations of Burgas State University "Prof. Dr. Asen Zlatarov" for holding the academic position of Associate Professor have been met.

2. General assessment of the candidate's activities

2.1. Teaching and educational activities (work with students and doctoral candidates)

Chief Assistant Professor Vasil Ivanov has 13 years of professional experience in higher education as a lecturer at Burgas State University "Prof. Dr. Asen Zlatarov". According to the submitted statement of teaching workload for the competition, he has completed 865 contact hours with students from various degree programmes and educational qualification levels: Bachelor's degree – 573 hours, Professional Bachelor's degree – 112 hours, and Master's degree – 180 hours.

The submitted documentation also indicates a substantial teaching workload during the last three academic years, amounting to 1,469 hours at Bachelor's level and 771 hours at Master's level. The candidate is the author of four teaching aids, published in 2025 by Burgas State University "Prof. Dr. Asen Zlatarov", in the subjects "Electrical Measurements" and "Electromechanical Devices".

He has developed curricula for courses related to electrical engineering, electronics, electrical measurements, electromechanical devices and renewable energy sources for programmes at Bachelor's, Professional Bachelor's and Master's levels. Since 2016, he has supervised 9 graduation projects by students in the Electronics programme and 20 graduation projects by students in the Electrical Engineering programme at Master's level, all of which have been successfully defended.

The above information provides grounds for assessing the candidate's teaching and educational activities as very good.

2.2. Scientific and applied research activities

The scientific and applied research activities of Chief Assistant Professor Vasil Ivanov are related to the investigation, modelling and optimisation of autonomous photovoltaic systems and energy processes. The candidate has led two research projects funded by the University Fund for Scientific Research and Artistic Activities: Project NIH 419/2018, entitled "Design, Implementation and Investigation of an Autonomous Intelligent Low-Power Supply System", and Project NIH-535/2026, entitled "Investigation of the Operating Energy Modes of Autonomous Photovoltaic Systems Using Electronic and Electromechanical Converters". He has also participated in the national research project NIH 367/16, "Investigation of the Efficiency of a Voltage Inverter for Photovoltaic Systems through Modelling in the MATLAB/SIMULINK Software Environment".

The candidate has contributed to the establishment and development of the laboratory facilities of the Department of Electrical Engineering, Electronics and Mechanical Engineering at Burgas State University "Prof. Dr. Asen Zlatarov", having developed 10 laboratory training setups.

His participation in the peer review of 4 papers submitted to international scientific conferences indexed in Scopus during the period 2020–2024 is also indicated.

2.3. Implementation activities

The competition documentation describes developments and experimental implementations related to autonomous photovoltaic systems, power supply solutions for low-power consumers, thermoelectric cooling systems based on Peltier modules, and laboratory training setups. No documents evidencing implementations beyond these developments and experimental implementations have been submitted.

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

I accept the contributions formulated in the candidate's statement of scientific contributions. They are predominantly of a scientifically applied and applied nature and are related to the modelling, investigation and optimisation of photovoltaic and electrical power systems, as well as to improving the quality and efficiency of electrical energy conversion and transmission.

The more significant scientific and scientifically applied contributions can be summarised as follows:

– Development and application of models in the Matlab/Simulink environment for investigating photovoltaic modules and systems, photovoltaic inverters, power transmission lines and electrical circuits under various operating conditions.

– Modelling and investigation of harmonic distortion in the output current and voltage of photovoltaic inverters through frequency-response analysis and the application of Fourier transform. The efficiency of passive resonant filters in reducing harmonic components and improving power quality has been investigated.

– Development and experimental investigation of autonomous photovoltaic systems incorporating photovoltaic panels, storage batteries, inverters with maximum power point tracking (MPPT) algorithms, and monitoring and control systems. The influence of solar radiation, temperature and seasonal variations on system performance has been analysed.

– Investigation of practical applications of autonomous photovoltaic power supplies, including the continuous operation of an IP camera and the power supply of a thermoelectric cooling system based on a Peltier module.

– Proposal and investigation of approaches to improving the efficiency of electric power transmission lines through compensation using reactive components, with the aim of reducing active power losses and improving the voltage at the end of the line.

– Modelling and analysis of resonance phenomena in series and parallel RLC circuits, as well as investigation of the influence of inverter conversion parameters on active power losses.

From a teaching and methodological perspective, the contributions are related to the development of four teaching aids in the subjects "Electrical Measurements" and "Electromechanical Devices". They include original circuit diagrams, laboratory assignments, tests and questions, and support practical training, independent study, and the assessment of students' knowledge and skills.

The contributions presented are significant for the development and practical application of methods for modelling and investigating photovoltaic and electrical power systems, as well as for improving the educational process in the relevant technical disciplines.

4. Assessment of the candidate's personal contribution

Of the scientific publications submitted for the competition, 10 (71%) are independent, 3 have one co-author (21%), and one has three co-authors. These data, together with the candidate's leadership of two research projects and participation in six additional projects, provide grounds for concluding that Chief Assistant Professor Eng. Vasil Borisov Ivanov has made a substantial personal contribution to the scientific results presented.

5. Personal impressions

I have no direct personal impressions of the candidate. My assessment is based on the documents and materials submitted concerning his scientific and teaching activities.

6. Conclusion

In view of the above, I propose that Chief Assistant Professor Borisov Ivanov, PhD Eng., be elected as an Associate Professor in the field of higher education 5. Technical Sciences, professional field 5.2 Electrical Engineering, Electronics and Automation, scientific specialty "Power Supply and Electrical Equipment" (Non-conventional and Renewable Energy Sources).

Digitally signed by Plamen Tsenkov Tsankov

05 November 2026 Member of the Scientific Jury: Date: 2026.11.05 19:23:34 +02'00'

/ Prof. Plamen Tsankov, PhD Eng. /