REVIEW

by **Prof. Dr. Eng. Vasil Dimitrov Dimitrov,**

Todor Kableshkov Higher School of Transport – Sofia,

of the materials submitted for participation in a competition for the academic position of "PROFESSOR" in

field of higher education – 5. Technical sciences,

professional field – 5.2. Electrical engineering, electronics and automation,

specialty – Electrical power supply and electrical equipment (Lighting and installation equipment)

In the competition for AP "professor", announced in the State Gazette, issue 48/13.06.2025 and on the website of TU-Gabrovo for the needs of the Department of "Electrical Power Supply and Electrical Equipment" at the Faculty of "Electrical Engineering and Electronics", Assoc. Prof. Dr. Eng. Plamen Tsenkov Tsankov participated as a candidate.

1. Brief biographical data

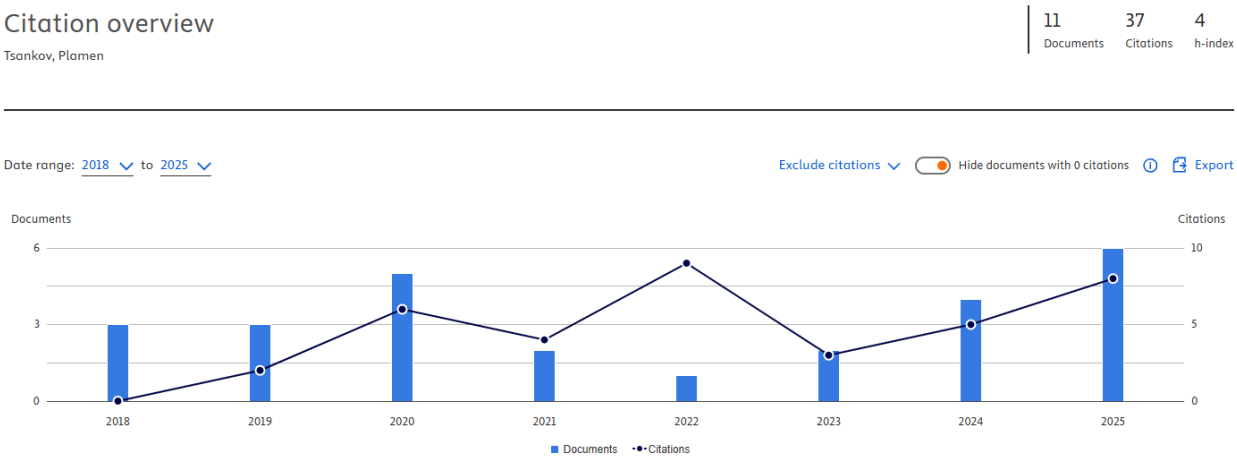
Plamen Tsenkov Tsankov graduated from the Technical University of Gabrovo in 1995 with a qualification of "Electrical Engineer", specialty "Electrical Power Supply and Electrical Equipment". Since 1997 he has been appointed as an assistant in the Department of "Electrical Power Supply and Electrical Equipment", since 2001 he has been a senior assistant, and since 2011 - chief assistant. In 2013 he acquired the educational and scientific degree "Doctor" in "Lighting Technology and Light Sources" and since 2015, after winning a competition, he has been an Associate Professor at the Technical University of Gabrovo. Since 2016, he has been the Head of the Department of "Electrical Power Supply and Electrical Equipment", for the period 2020 - 2024 he is the Vice-Rector for Research, and is currently the Vice-Rector for Academic Activities.

2. General description of the materials presented

The candidate has submitted a total of 34 scientific publications, 2 textbooks, a published patent application and 2 recognized utility models under this competition. I have no common publications with the candidate. 5 documents (in the form of official notes) have been submitted to certify the candidate's academic and scientific-applied activities. All required documents from the REGULATIONS for acquiring scientific degrees and holding academic positions at TU - Gabrovo (PPNS and ZAD) have been submitted.

3. Impact of the candidate's scientific publications in the scientific community (known citations)

When consulting the world-renowned scientific information database Scopus, for the period 2018-2025, 26 publications by the candidate are visible - h-index = 4 (excluding self-citations), which is a high mark for the achieved prominence in scientific circles (39 citations in 11 documents). 20 publications are indexed in Web of Science, 7 of them - in the Web of Science Core Collection.



4. Overview of the content and results in the presented papers

According to the REGULATIONS for acquiring scientific degrees and occupying academic positions at TU - Gabrovo (PPNS and ZAD) for occupying the AP "professor" in area 5. Technical sciences, it is necessary to meet the requirements for Groups of indicators: A (50 points), V (100 points), G (200 points), D (100 points) and E (150 points). The total number of publications must be greater than 30, of which at least five in sole authorship and three with IF (WoS). Two published textbooks/books, at least one defended PhD student and Supervising of three projects and/or contracts for attracted funds are also required. After a thorough review of the competition documents, it can be concluded that these requirements are met and the candidate's research activity is entirely in the specialty of the competition:

Indicator A – 50 points: the candidate holds the ESD "Doctor" for a developed and defended dissertation on the topic "*Optimization of optical systems for lighting fixtures*", Diploma No. 0016/30.04.2013. A list of publications on the dissertation is presented with the documents for this competition.

Indicator V: the candidate has presented **10** scientific publications in journals, referenced and indexed in world-renowned databases of scientific information *Scopus and/or Web of Science* - Indicator **V4:** *Habilitation thesis on the topic "Research and analysis of parameters and characteristics of components of photovoltaic power plants and LED lighting fixtures"***.** Of the publications, 2 are in sole authorship and 8 are co-authored: 1 publication with 2 authors, 3 – with 3 authors, 2 – with 4 authors, 1 – with 5 authors and 1 – with 7 authors (in 5 of the publications the candidate is the first author, in 1 – second, in 1 – third and in 1 – seventh) – **total 260.57** p., which significantly exceeds the requirements.

4 articles have been published in specialized scientific journals:

- *Energy and Buildings, Elsevier BV* (**IF = 7.1**; SJR = 1.631 – Q1/2024) - one;
- *Applied Sciences Switzerland, MDPI* (**IF = 2.5**; SJR = 0.52 – Q2/2024) - one;
- *Green Energy and Technology, Springer Nature* (SJR = 0.225 – Q3/2019) - two.

6 reports were presented at the international scientific conferences in Bulgaria *LIGHTING 2022-2024*, published on the IEEE Xplore Digital Library platforms.

Indicator G – for participation in the competition, the candidate has submitted **24 scientific publications**, 7 of which are in English and 17 in Bulgarian. They are distributed as follows:

G7 - Scientific publications in editions referenced and indexed in world-renowned databases with scientific information – 3 in co-authorship: 1 publication with 3, 1 - with 4 and 1 - with 6 authors – total of **30** p. (in 1 of the publications the candidate is the first author, in 1 – second and in 1 – sixth): articles in specialized scientific journals:

- *Materials, MDPI* (**IF = 3.2**; SJR = 0.614 – Q2/2024);
- *Green Energy and Technology, Springer Nature* (SJR = 0.225 – Q3/2019).
- *Asian Journal of Water, Environment and Pollution* (**IF = 0.7;** SJR = 0.197 – Q4/2024);

G8 - Scientific publications in non-refereed journals with scientific review or in edited collective works: 21 – 4 in sole authorship and 17 in co-authorship (8 with two authors, 6 - with three, 2 - with 4, 1 – with 5 authors) – total **214.02** pts.

Eight of the publications are in specialized scientific journals (4 of them - abroad): "*Contemporary Materials*" (Journal of the Academy of Sciences and Arts of the Republic of Srpska - Bosnia and Herzegovina), Yearbook of the Technical University - Sofia, Journal of the Technical University of Gabrovo, magazine "*Textiles and Clothing*". 13 reports have been presented at international scientific conferences in Bulgaria *"Energy Forum", "UNITECH", Lighting BulLight.*

Total for **Indicator G - 244.02 points,** which significantly exceeds the requirements.

4 of the publications have an impact factor (WoS) and 7 have an impact rank SJR (Scopus).

Indicator D – for participation in the competition, the candidate has submitted 31 citations of his publications in editions, referenced and indexed in world-renowned databases of scientific information (Scopus), of which 17 *are from foreign authors* – **310 p**.

Attached is a list of 6 reviews prepared by the candidate for the specialized scientific journals *Energies, Sustainability* and *Applied Sciences* at MDPI – **60 p.**

The total number of points under Indicator **D12 – 370 p.,** significantly exceeds the requirements.

Indicator E – to participate in the competition, the candidate has submitted the following information:

Indicator E17 – Assoc. Prof. Plamen Tsankov was the scientific supervisor of two successfully defended PhD students at TU-Gabrovo (verified through a reference in NACID): MSc.Eng. Milko Todorov Yovchev (2019), MSc.Eng. Elizabeta Trayko Arsova (2024) **– 80 p.**

Indicator E20: the candidate has submitted an official note from the University Center for Scientific Research and Technology at TU-Gabrovo certifying that he was the Head of 8 scientific research contracts financed with funds from the state budget: **160 p**.

Indicator E23: the candidate has presented 2 university textbooks in co-authorship – **40 p.**:

- ✓ **Tsankov** P., M. Yovchev. *Textbook on Industrial Power Supply Systems*, University Publishing House "Vasil Aprilov" - Gabrovo, ISBN: 978-954-683-723-3, 2025
- ✓ **Tsankov** P., M. Yovchev, *Textbook of Lighting and Installation Technology*, University Publishing House "Vasil Aprilov" - Gabrovo, ISBN: 978-954-683-700-4, 2024

Indicator E25: the candidate has submitted a Published Patent Application – **20** p.:

Applicant number: BG/P/2025/114068 of 25.03.2025, H. T. Ibrishimov, M. T. Yovchev, **P. Ts. Tsankov,** *Automated system for controlling the lighting system of road tunnels.*

Indicator E26: the candidate has submitted **2** Recognized utility model applications – **80** p.:

Utility model No. 3375, **P. Ts. Tsankov,** B. I. Ivanov, *LED street lighting fixture*, 2019 (Acting)

Utility Model No. 5035 U1, H. T. Ibrishimov, M. T. Yovchev, **P. Ts. Tsankov,** *Automated system for controlling the lighting system of road tunnels,* 2025 (Acting)

The total number of points under Indicator **E** is **380 points,** which significantly exceeds the requirements.

The implementation of the criteria by Indicator Groups is summarized in Table 1.

Table 1

Group of indicators	**Points according to MNR**	**Candidate points**	**Indicator points**
A	50	50	Indicator A.1 – **50 points.**
V	100	260.57	Indicator B.4 – **260.57 points.**
G	200	244.02	Indicator D.7 – 3 **0 points.** Indicator D.8 – **214.02 points.**
D	100	370	Indicator D.12 – **370 points.**
E	150	380	Indicator E.17 – **80 points.** Indicator E.20 – **160 points.** Indicator E.23 – **40 points.** Indicator E.25 – **20 points.** Indicator E.26 – **80 points.**
PPNS and ZAD in **TU-Gabrovo**	number of publications > 30		34
	In sole authorship ≥ 5		6 (in *Scopus*)
	Publications with IF (WoS) ≥ 3		4
	Textbooks/books ≥ 2		2
	PhD student defended ≥ 1		2
	Project supervising contracts ≥ 3		8

In conclusion, I believe that the materials submitted for the competition fully satisfy the minimum national requirements and those of the Technical University of Gabrovo for holding the academic position of "professor".

5. General characteristics of the candidate's activities

5.1. Educational and pedagogical activities (work with students and PhD students)

Official notes are presented for:

- the candidate's lecture activity over the last four academic years: he has lectured in the disciplines "Power Supply", "Lighting and Installation Equipment", "Industrial Power Supply Systems", "Automated Design in Power Supply and Electrical Equipment" for the Bachelor's Degree Programmes and "Automatic Devices in the Power Industry", "Optimization and Management of Power Supply Systems" for the Master's Degree Programmes, etc.;

- for 14 developed curricula.

It can be concluded that the candidate's pedagogical training and teaching activities are at a high professional level.

5.2. Scientific and applied scientific activities

The candidate's active research and applied scientific activities are focused mainly on the following thematic areas:

- Research, modeling and optimization of the lighting and electrotechnical parameters and characteristics of LED light sources and luminaires;
- Study, design, optimization of internal and external lighting systems;
- Research on power supply systems with photovoltaic power plants.

5.3. Implementation activity

An official note from the Management of TU - Gabrovo was presented that Assoc. Prof. Dr. Eng. Pl. Tsankov participated in the construction of two teaching laboratories ("Electrical Equipment" and "Operation of Automatic Devices and Systems") and two specialized research laboratories ("Power Supply and Lighting Equipment" and "Renewable Energy Sources and Energy Efficiency"). He has two recognized useful models. He has led 8 research projects, successfully completed.

All of these activities of the candidate prove his abilities to conduct scientific research and applied scientific *activity and demonstrate teamwork skills.*

6. Contributions (scientific, scientific - applied, applied).

I agree in essence with the contributions proposed by the candidate. They are jointly summarized based on the contributions in the submitted publications under Indicators V4, G7 and G8. They can be attributed to *Creation of new models, methods, constructions, technologies; Proving with new means significant new aspects of already existing scientific problems; Obtaining confirmatory facts.*

The contributions can be summarized as follows:

6.1. Contributions in the habilitation thesis:

Scientific:

✓ Methods have been developed for analyzing photometric characteristics of LED luminaires with different optical systems.

✓ Optimization tasks have been formulated for street lighting design - to optimize the power of the luminaires, the height of the poles and the inclination of the luminaires.

✓ Through regression analysis of hourly variations in solar radiation, a model has been created to predict the electricity production from a photovoltaic power plant.

Scientific - applied:

✓ Spectral changes during warm-up of LED lamps and their influence on the correlated color temperature and color rendering index were studied.

✓ Spectral measurements and a comparative analysis of the emission of dangerous blue light (blue light hazard) from different LED luminaires were carried out.

✓ The influence of the presence of dust and ash on the efficiency of photovoltaic panels in a continental climate has been studied.
✓ Cyber risks for photovoltaic systems with hybrid inverters have been analyzed in terms of power system stability.

6.2. Contributions in publications:

Scientific:
✓ Methods have been developed:
- for analysis of photometric characteristics of LED luminaires with different optical systems,
- for technical and economic assessment of lighting system modernization, including sensitivity analysis to changes in electricity prices and inflation,
- for three-dimensional computer modeling and analysis of optical systems using Monte Carlo Ray-tracing for lens shape optimization of LED luminaires.

Scientific - applied:
✓ Economic analyses of the development of PV energy in Bulgaria have been carried out, including an assessment of the profitability of grid-connected and autonomous systems.
✓ The temperature coefficients of voltage, current and power of amorphous and polycrystalline PV modules under real conditions have been studied.
✓ The higher harmonics of the current and the power factor of LED luminaires during dimming and color temperature control were analyzed.

Applied:
✓ A prototype of a greenhouse LED luminaire with controlled spectral distribution has been created.
✓ Projects have been implemented to modernize street lighting, leading to savings in electricity and a reduction in CO_2 emissions.
✓ Energy audits and optimizations of interior lighting in industrial enterprises have been carried out, with proven profitability and rapid return on investment.
✓ Experimental photovoltaic power plants have been built at TU - Gabrovo with different technologies, allowing for comparison under real conditions of five types of photovoltaic modules.
✓ Measuring stands and laboratory methodologies have been developed for testing photometric, spectral and electrotechnical parameters.
✓ Intelligent monitoring and remote control systems (GSM/GPRS, cloud platforms) have been implemented, which increase reliability and reduce maintenance costs.
✓ A battery charge control device has been developed for an autonomous photovoltaic lighting system (PV-LED).

7. Assessment of the candidate's personal contribution

The contributions are the candidate's personal work, which is evident from the large number of scientific studies published in editions indexed in Web of Science and Scopus, from the participation in a large number of research and business projects, and from the numerous citations of scientific works in representative foreign publications.

8. Critical notes and recommendations

I have no significant comments on the presented scientific production. The documents are systematized and described precisely, professionally and at a high level. I have some recommendations, especially regarding the future development of the candidate: to participate in the publication of monographs and in international research projects; to share his rich teaching experience with colleagues from foreign universities (e.g. under the Erasmus+ program).

9. Personal impressions

I do not personally know Assoc. Prof. Dr. Eng. Plamen Tsankov. He is a member of *IEEE,* of the *International Commission on Illumination (CIE),* of The Boards of Directors of the Federation of Scientific and Technical Unions in Bulgaria, of the Union of Electronics, Electrical Engineering and Communications, of the National Lighting Committee in Bulgaria. He is the Chairman of the Territorial Organization of the STU - Gabrovo and of the EEACT Professional Section in the Regional CEID College - Gabrovo. He is also a member of the Bulgarian National Lighting Committee and the Union of Physicists in Bulgaria. The qualitative and strict shaping and arrangement of the materials for the competition and his active activity as a scientist, researcher, manager and public figure are impressive. The general characteristic of the candidate is that Assoc. Prof. Dr. Eng. Plamen Tsankov is a lecturer with authority, who has gone through all stages of academic development, has a high level of scientific research and applied activity, a well-known scientist in our country and abroad.

10. Conclusion:

Considering the above, I propose Assoc. Prof. Dr. Eng. Plamen Tsenkov Tsankov
to be elected as "PROFESSOR" in
field of higher education – 5. Technical sciences,
professional field – 5.2. Electrical engineering, electronics and automation,
specialty – Electrical power supply and electrical equipment (Lighting and installation equipment).

07.11.2025 Reviewer:

/Prof. Vasil Dimitrov/