MINISTRY OF EDUCATION, RESEARCH, DEVELOPMENT AND YOUTH OF THE SLOVAK REPUBLIC

VER 2026

Periodic Assessment of Research, Development, Artistic and Other Creative Activities VER 2026

Final Report of the Electrical Engineering Sub-panel

1. Introduction

This report presents the findings of the scientific assessment Sub-panel responsible for evaluating the research outputs submitted by several institutions in the domain of Electrical Engineering. The Sub-panel consisted of:

- **Johan Driesen**, KU Leuven, Belgium (Chair)
- **Cristian Fabrega Allego**, University of Barcelona, Spain
- **Gianluca Setti**, Politecnico di Torino, Italy

The evaluation focused on the originality, significance, and rigour of the research outputs, complemented by assessments of social impact case studies and descriptions of the creative research environment. The overall aim was to provide a fair, transparent, and discipline-appropriate evaluation of the submitted work.

2. Methodology

2.1 Step 1 – Initial Screening of Research Outputs

Each institution submitted a set of approximately 24–25 research papers.

The Sub-panel first conducted a general thematic overview of these submissions. The following broad range of engineering topics were present

- Power engineering
- Renewable energy
- E-mobility (electric mobility)
- Energy storage
- Power electronics and drives
- Aviation technologies (aircraft engines, electric aircraft)
- Magnetics
- Control systems
- Signal processing
- Sensors
- Photovoltaic cells
- Materials
- Semiconductor devices and superconductors
- Electrochemistry
- Nuclear energy
- Biomedical instrumentation
- Optics
- Telecommunications and digital technologies

The three Sub-panel members declared their interests based on their complementary expertise to ensure broad coverage.

2.2 Step 2 – Division of Evaluative Tasks

Following discussion, the sets of papers were distributed such that each paper was initially reviewed by two out of the three Sub-panel members.

Additional considerations:

- Only one interdisciplinary output was submitted; this was jointly reviewed by all Sub-panel members.
- Impact studies and creative environment sections were examined by the same assessors reviewing the corresponding institution's research outputs.
- One output entry in the form of a patent written in Slovak (with an English summary) required special attention.

2.3 Step 3 – Evaluation Criteria

Each research output, primarily journal and conference papers, was evaluated according to the following criteria:

Originality and Creativity

- Introduction of new concepts, materials, methods, data, or interpretations.
- Clear contribution that extends or challenges the state of the art.

Significance

- Relevance and importance of the addressed problem.
- Potential for broader conceptual or practical impact.
- Assessment independent of journal prestige or bibliometrics.

Rigour

- Soundness and clarity of methods.
- Logical support for conclusions.

- Engagement with state-of-the-art research.

Each criterion was scored on a 1–10 scale, and an average score was recorded alongside brief assessor notes. Cases of disagreement greater than one point triggered a joint discussion to reach consensus.

The aggregated scores informed classification into the following quality categories:

3. Quality-Level Categories

3.1 World-Leading

- Ground-breaking innovations introducing new concepts or technologies.
- Clear advancement of the international state of the art.
- High originality and strong methodological rigour.
- Evident international influence or leadership.

3.2 Internationally Excellent

- Strong and original contributions advancing the field.
- Robust validation (experimental, theoretical, or modelling).
- Significant progress, though not transformative.

3.3 Internationally Recognised

- Solid, credible research aligned with international literature.
- Incremental contributions with moderate originality.

- Methodologically sound but with limited scope of influence.

3.4 Nationally Recognised

- Technically sound but incremental work.
- Limited novelty and narrow technical focus.
- Restricted international relevance.

3.5 Below Nationally Recognised

- Insufficient originality or methodological quality.
- Misalignment with the research area.
- Submissions consisting only of abstracts or incomplete publications.

4. Assessment of Social Impact Studies

Each institution submitted 1–2 social impact case studies.

The Sub-panel applied the following evaluative characteristics:

Strengths of High-Quality Impact Cases

- Clear translation of research into practical outcomes.
- Evidence of adoption by stakeholders (industry, public bodies, policy actors).
- Tangible societal, economic, or environmental benefits.
- Clear identification of beneficiaries.
- Independent verification and measurable reach.

Weaknesses Leading to Lower Scores

- Weak causal link between research and impact.
- Prospective, rather than achieved, impacts.
- Insufficient evidence.
- Over-emphasis on academic results instead of real-world benefits.
- Limited stakeholder adoption and verification.

5. Assessment of the Creative Research Environment

Strengths of Strong Environments

- Clear strategic research direction and scientific profile.
- Active national and international collaborations.
- Structured human-resource development (PhD support, mentoring).
- Stable teams and adequate institutional support.
- Success in competitive funding, especially internationally.
- Strong research infrastructure.

Weaknesses of Weaker Environments

- Strategies lacking priorities, measurable goals, or benchmarking.
- Limited international competitiveness or engagement.
- Fragmented research activities.

- Lack of detail on career development or mentoring.
- Weak doctoral training structures.
- Concerns regarding long-term sustainability (funding, staffing, planning).

6. Overall Reflections

The Sub-panel observed the following overarching trends:

- General research quality was good, with several outputs reaching very high international standards.
- Some outputs would traditionally fall under Mechanical Engineering, Materials Science, or Physics, but were evaluated within the Electrical Engineering frame.
- Most papers appeared in appropriate, internationally recognised journals, though some were published in:
    - overly broad journals
    - local journals with limited impact
    - journals associated with weaker or potentially predatory practices
- In some cases, publication choices suggested limited ambition, financial constraints (e.g. related to open access fees), or established local traditions.
- A focus on quality over quantity is strongly encouraged.
- The “Below Nationally Recognised” classification was used mainly when submissions were incomplete (e.g. only abstract) or clearly misaligned with the panel’s focus.

- International collaborations were evident in some institutions, producing strong work; however, it should be made possible that the specific contribution of Slovak partners can be stressed.
- Social impact and creative environment sections were sometimes brief and uneven in structure, making evaluation challenging.
- Creative environment descriptions were especially limited in many cases.

7. Conclusion

The Sub-panel concludes that the institutions collectively demonstrate solid research activity in Electrical Engineering, with contributions of internationally excellent work. Strengthening publication strategies, clarifying institutional research profiles, improving documentation of impacts and environment, and maintaining accurate classification of outputs will support more robust assessments in future cycles.

Sub-panel members

Johan Driesen, Katholieke Universiteit Leuven (Sub-panel Chair)

Cristian Fabrega Gallego, Universitat de Barcelona

Gianluca Setti, Politecnico di Torino