

International Conference on Photovoltaic Systems – EnerTrends 2025

Introduction

On June 10 and 11, 2025, the ***International Conference on Photovoltaic Systems and Technologies: Trends and Innovations – EnerTrends 2025*** was held at the Salitre branch of the Bogotá Chamber of Commerce, Colombia. The event was organized by the Universidad Nacional de Colombia, the European consortium CACTUS, and the Laboratory of Innovation in High Voltage and Renewable Energies – LIATER, with the aim of creating an academic, technical, and strategic forum focused on the development and advancement of solar photovoltaic energy.

Over the conference of two days, participants shared research, experiences, technological advancements, and regulatory perspectives, bringing together key stakeholders from the energy sector at both national and international levels. The conference was consolidated as a platform that promotes energy transition, encourages industrial innovation, and strengthens local capacities within the Colombian and Latin American context.

During the conference, approximately **101 participants** were registered, including students, researchers, professors, energy sector entrepreneurs, institutional representatives, and professionals from financial and environmental organizations. The attendance reflected the growing interest in renewable energies as a strategic pillar for sustainable development.

Speakers and Program

The academic program of the EnerTrends 2025 Conference featured a diverse and international agenda, composed of high-level speakers from academic institutions, government agencies, and companies in the energy sector. Over the conference of the two-day event, keynote lectures, technical presentations, and discussion panels were held, addressing key topics for the development of solar photovoltaic energy such as eco-design, local manufacturing, regulation, agrivoltaics, maintenance, climate resilience, data analysis, financing, and technological innovation.

Tuesday, June 10, 2025

The first day of the conference began with the opening remarks by *Sonia Monroy*, Dean of the Faculty of Engineering at the Universidad Nacional de Colombia, who welcomed attendees and highlighted the importance of strengthening national capacities in the field of renewable energy.

The academic agenda continued with the inaugural lecture titled “Eco-design strategies in Photovoltaics”, delivered by *Delfina Muñoz*, researcher at the French Alternative Energies and Atomic Energy Commission (CEA) and CACTUS representative.



Next, *Felipe Valencia*, Chief Technology Officer at ATAMOSTEC (Chile) and CACTUS representative, presented the lecture “Experience in the Operation and Maintenance of Photovoltaic Plants”, in which he shared lessons learned and best practices applied in large-scale projects in the desert regions of northern Chile.

Afterward, the discussion panel “Manufacturing Photovoltaic Systems in Colombia: Challenges and Opportunities for Local Development” was held. This space brought together *Delfina Muñoz* (CEA), *Felipe Valencia* (ATAMOSTEC), and *Miguel Hernández*, President of ACOSOL, moderated by *Omar Prias*, professor at the Universidad Nacional de Colombia.

In the afternoon session, five technical and academic presentations were delivered:

- *Álvaro Zambrano* (Universidad Nacional de Colombia) presented “Agrovoltaic Systems for Food and Energy Security”, with examples applied in rural contexts.
- *Alberto Prada* (Quimaldi Instruments SAS) presented “Verification and Electrical Safety Measures in Photovoltaic Installations”, emphasizing technical protocols and standards.
- *Milton Pérez* (Universidad de Antioquia) shared advances in “Perovskite Photovoltaic Mini-Modules by Printing Methods”, highlighting the potential of these emerging materials in applied research.
- *Jhonatan Chamorro* (Universidad Nacional de Colombia) explained the optimization of autonomous systems through simulation in his work “Optimization of an Off-Grid Photovoltaic System for a Remote Monitoring Prototype in the Colombian Amazon Using Monte Carlo Simulations”.
- *Américo Ariel Rubin de Celis Vidal* (Universidad Privada de Tacna – Peru) presented the paper “Proposal for the Sizing of Photovoltaic Solar Power Plants in the Arid Zones of Southern Peru: An Approach Based on ARIMAX Models and Time Series Forecasting”, focusing on statistical tools for regional energy planning.

The day concluded with a lecture by Professor *Rodrigo Palma*, from the Universidad de Chile titled “Experience in Chile in Renewable Energies, Operation, and Strategies for Future Development”. In his presentation, he shared the country's progress in integrating renewable sources, long-term planning, institutional frameworks that have enabled greater penetration of clean energy into the electricity matrix, and the importance of the relationship between academia, government, and industry in sustained sectoral development.

Wednesday, June 11, 2025

The second day of the EnerTrends 2025 Conference began with the lecture “Challenges of Interconnecting Power Systems with Inverter-Based Resources”, delivered by *Ernesto Pérez*, researcher at the Universidad Nacional de Colombia – Medellín campus, member of the CACTUS consortium, and associate professor at Duke University.

Following this, *Antonio Jiménez Rivera*, Executive Director of the Comisión de Regulación de Energía y Gas (CREG), presented the lecture “Current Status and Future of Regulation in Colombia in the Field of Renewable Energy Sources”.

Next, *Pedro Pineda*, from the Universidad de Puerto Rico and member of the STORM Project funded by the National Science Foundation (NSF), delivered the presentation “Energy Resilience in Communities Vulnerable to Extreme Climate Events”. His talk focused on energy adaptation strategies in insular and rural settings, based on distributed infrastructure and community participation models.

Subsequently, *Andrés Fernández*, representative of the company Ingeniería Creativa (ICREA), delivered the lecture “Performance Evaluation of Solar Farms with Frequent Reactive Power Injection into the Grid”.

The day continued with the panel “Strategies and Opportunities for Financing Photovoltaic Systems in Colombia”, moderated by *Ricardo Ramírez*, professor at the Universidad Nacional de Colombia, and featuring *Mauricio Pinzón* (FENOGÉ), *Tatiana Rúa* (Bancolombia), *Boris Ramírez* (Climate Fund Managers), and *Sebastián Guerrero* (Seos Energy). The discussion addressed innovative financial schemes, international climate funds, and mechanisms to facilitate access to capital for solar projects.

In the afternoon session, six technical and academic presentations were held:

- *Aurelio Rojas* (DEHN) presented “Lightning and Surge Protection of Photovoltaic Systems”, with a focus on standards and technologies applicable in tropical zones.
- *Erick Garzón* (SOLSTA) delivered the talk “New Technologies for the Maintenance of Photovoltaic Systems”, sharing experiences and innovative tools for improving diagnostics, monitoring, and operational efficiency in solar systems.
- *Geraldine Aristizábal* (Pemsa) presented “Pemsa: Contributing to the Sector through Sustainable Innovation”, highlighting cable management and electrical protection solutions tailored for the renewable energy sector.
- *Fabio Gómez* (Universidad de Santander) presented “TRNSYS Simulation Model for Predicting the Performance of Photovoltaic Rooftops: Case Study at Universidad de Santander (UDES)”.
- *Luis Carrillo* (Universidad Distrital Francisco José de Caldas) presented “Predicting Instantaneous Efficiency of Photovoltaic Systems Using Machine Learning and Environmental Variables in Colombia”.
- *Javier Rosero* (Universidad Nacional de Colombia) presented “Frequency Stability Analysis in Distribution Networks with Photovoltaic Penetration Through Simulation”, sharing results from dynamic modeling in Colombian power grids.

The day concluded with two high-level conferences:

Rodrigo Palma (Universidad de Chile) presented the case study “Lessons from the Power Outage on Tuesday, February 25, 2025, in Chile”, reflecting on the challenges of operational resilience and planning in large-scale contingencies.

Manuel Peña, Acting Director of the Unidad de Planeación Minero Energética (UPME), closed the event with the lecture “Renewable Energy Expansion Plan”, outlining the institutional roadmap to integrate clean energy into Colombia’s national energy system in the coming years.

Commercial Exhibition

The commercial exhibition of the International Conference on Photovoltaic Systems and Technologies - EnerTrends 2025 welcomed approximately 150 attendees, including professionals from the energy sector, electrical technicians, engineers, students, and institutional representatives. This space enabled direct interaction between attendees and



leading companies in the market, promoting knowledge exchange, exploration of new technologies, and the strengthening of strategic partnerships.

A total of eight companies representing various sectors related to sustainable energy, instrumentation, automation, and electrical protection participated in the exhibition. Their presence was essential to enhancing the overall experience of the congress, offering a high-level technological showcase.

Among the participating companies, **ICREA** stood out as an independent engineering firm with extensive experience in the development, construction, and operation of solar farms and energy storage projects. Its technical consulting expertise added significant value for professionals seeking to improve the efficiency and feasibility of their projects.

PEMSA contributed its leadership in cable management solutions, offering robust and sustainable systems for the industrial, construction, and renewable energy sectors. Its strong focus on quality and innovation was widely recognized by visitors.

Quimaldi Instruments S.A.S., with over 35 years of experience in the Colombian market, showcased its portfolio of electrical instrumentation for low, medium, and high voltage, complemented by calibration services and technical support. These offerings generated strong interest among technicians and electrical engineers.

I+D Electrónica, a distributor of electronic products, presented a diverse range of solutions aimed at industry, education, research, and automation. Its products targeting the maker segment and rapid prototyping drew particular attention from students and developers.

SOLSTAS.A.S., the official representative of PV*SOL, Meteonorm, and SolarCleano in Colombia, presented a remarkable display of software tools and training services for the design and simulation of photovoltaic systems, attracting project designers and technical consultants.

DEHN, an international company specializing in lightning and surge protection, exhibited advanced solutions designed to ensure the safety of people, equipment, and critical infrastructure.

SEISA, with over four decades of experience, showcased measurement, calibration, and control equipment, highlighting the ONAC accreditation of its laboratory, which builds confidence in the quality and reliability of its processes.

Additionally, **Energía y Movilidad** joined the exhibition as a provider of integrated solutions focused on electrical protection, energy efficiency, and the adoption of sustainable technologies. Its emphasis on electrical safety and sustainable mobility complemented the technical offering of the event.

Finally, **LIATER** and **LABE**, two specialized laboratories in electrical testing and calibration, participated in the exhibition, showcasing their capabilities in precision measurements and compliance with national and international standards. Their involvement highlighted the importance of technical reliability and certification in renewable energy systems.





The presence of these companies contributed to a robust commercial exhibition with significant technical and commercial value, reinforcing dialogue among industry, academia, and energy professionals. Their participation was key to fostering synergies aimed at advancing renewable energy in Colombia and Latin America.

Conclusions

The EnerTrends 2025 Conference brought together academia, industry, and public institutions around the development of solar photovoltaic energy. Through lectures, panels, and a commercial exhibition, key topics such as regulation, maintenance, financing, resilience, and emerging technologies were addressed.

The participation of national and international experts strengthened technical dialogue and provided valuable insights for the consolidation of the sector in Colombia. The strong interest shown by attendees reflected a growing commitment to energy transition and sustainable development.

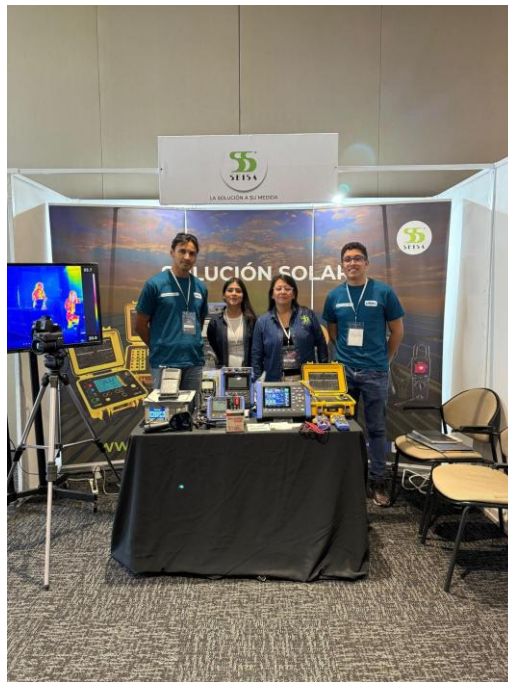
Insert an image here



Funded by
the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101132182.









Results

The conference had 101 participants and involved 8 CACTUS members.

The commercial exhibition had 10 companies and laboratories from Colombia with the participation of 150 attendees.

Training Activity

Date

Number of attendees

Place and country

Consortium Partners involved

Additional Notes

International Conference on Photovoltaic Systems and Technologies.

10 and 11 – June 2025

150

Universidad Nacional de Colombia. Bogotá D.C.

LIATER - Universidad Nacional de Colombia



© Members of the CACTUS Consortium



Funded by
the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101132182.