Partner search for Horizon Europe
Operation, Performance and Maintenance of PV Systems
TOPIC ID: HORIZON-CL5-2023-D3-02-13

Call deadline: 05 September 2023
Call opening: 04 May 2023
Call budget: 10.000.000 EUR
Project name: SMART SOLAR PV SYSTEMS

Letter to interested parties:

Dear Sir/Madam, Being the leading technical university in Armenia, as well as possessing modern, innovative technologies and highly qualified specialists, the National Polytechnic University of Armenia (NPUA) plans to apply for the Sustainable, secure and competitive energy supply (HORIZON-CL5-2023-D3-02) open call Operation, Performance and Maintenance of PV Systems . NPUA has initiated the project under the name "**SMART SOLAR PV SYSTEMS**" for applying for the above-given Horizon Europe call. We are in search of cooperation partners, and if you are interested in the call, we would like to cooperate with you as a partner in the consortia for the given Horizon Europe call. We are ready to briefly present the goals of the project and see in what ways we can collaborate. Looking forward to discussing and establishing cooperation.

Objectives of the project:

The energy sector is the source of around three-quarters of greenhouse gas emissions today. Reducing global carbon dioxide (CO_2) emissions to net zero by 2050 is a critical and formidable goal. By 2050, almost 90% of electricity will come from renewable sources, with solar PV and wind accounting for nearly 70% (most of the remainder comes from nuclear). The share of solar PV in renewable sources is dominant. In accordance with the International Energy Agency report (May 2021), solar PV capacity increases 20-fold between now and 2050, and wind power 11-fold.

To enhance significantly the share of solar PV in electricity generation, it is important to increase PV system operation efficiency (performance), reliability, service duration, and profitability, which is the main goal of the proposed project. To achieve this goal different innovative approaches will be investigated and implemented. Particularly the following main approaches will be realized.

Development of effective Solar PV and Thermal hybrid PVT systems.

Solar PVT hybrid systems have the high potential to be an effective and viable method of producing electricity and thermal energy for low-grade heating applications with a reduction in carbon emission. The hybrid system proves to be much more energy efficient with improved electrical efficiency due to the cooling of PV cells and gained thermal energy due to heat absorbed by the fluid or air from the heated PV cells.

It is planned to develop low-cost and high-efficiency PVT systems with water and air coolants by using new low-cost materials and low-cost production sequences. These approaches will allow for increasing the reliability and service life period of the solar PV modules due to the reduced operating temperature. Various optimized operating conditions with smart automated control systems for hybrid PVT systems will be developed and demonstrated as well.

Development of smart cleaning systems for solar PV and PVT modules.

Accumulation of dust particles, snow, and differential pollution on the surface of PV modules, has a very negative effect on the operational efficiency of PV systems. The presence of dust can reduce the efficiency of solar modules by more than 35%. Another factor in reducing the efficiency of solar PV systems is the high ambient temperature. With heating, the efficiency of solar PV systems decreases, which is a typical negative inherent feature of solar cells.

Based on sensor-data analysis automated cleaning systems for solar PV and PVT modules at the plant level will be developed. AI-based new type sensors of environmental influences (dust, snow, environmental pollution) will be developed, tested, and implemented. The sensors will detect the operational temperature and environmental influences and the smart cleaning systems (cleaning robot, water, and air sheet systems) automatically will clean and improve the performance of PV systems. Based on the temperature sensors, the optimized PV module's automated cooling systems will be developed as well.

As several important aspects of the project have already been studied by the research team leading to successfully solving a few identified research problems, moreover, follow-up investigations have already been planned, reaching the above-mentioned objectives are realistic and achievable within the budget and timeframe defined in the HORIZON-CL5-2023-D3-02-13 call.