4/ Digital Tool for Optimizing PV Module Transparency [BRITE / CRES]

The Challenge

BRITE faces a significant industrial challenge in **optimizing the transparency of photovoltaic (PV) modules** used in agrivoltaic systems. Currently, transparency levels are selected empirically, relying on manual trial-and-error methods that balance light transmission for crops with energy yield. This approach is time-consuming, non-standardized, and may lead to suboptimal performance.

The challenge is to develop a **systematic, data-driven digital tool** that automatically calculates the **optimal PV transparency** based on key parameters such as **climate zone, crop type, and local solar conditions**. Ideally, the tool would evolve into an **AI-enabled platform** that integrates real-time data from scientific databases, publications, and online weather sources, providing immediate and reliable design recommendations. Such a solution would improve both agricultural productivity and solar energy generation while enhancing design consistency across different sites and crop types.

Technology Readiness Level (TRL)

8–9 BRITE's PV modules are already on the market. The proposed optimization tool would enhance replicability, taking the technology toward full industrial maturity.

Expected Outcomes

- Improved crop and energy yields through data-driven transparency design
- Broader applicability of BRITE's PV modules across diverse crops and regions
- Reduced design time and development costs
- Increased competitiveness and sales through product differentiation

Impact on Operations

Without a standardized optimization tool, module design remains partially empirical, limiting scalability and market expansion. Automating transparency design would **unlock new application areas** (e.g., different crops, building-integrated PV) and **strengthen BRITE's market position** by offering customized, high-performance agrivoltaic solutions.

Current State / Next Actions

Transparency optimization is currently done manually using shading simulations and empirical adjustments. While effective for single-crop studies, the process lacks automation and generalization. Research publications confirm the importance of transparency optimization but no commercial digital tools exist yet.

Next Steps / Collaboration Opportunities: Software and methodology development, AI model training, and joint R&D proposals for EU or national funding programs.

About Brite

BRITE HELLAS is a Greek high-tech company specializing in advanced photovoltaic products, including customized transparent PV modules for building and agricultural applications. Its R&D focuses on product innovation and market adaptation for integrated solar solutions.

About CRES (Centre for Renewable Energy Sources and Saving)

CRES is Greece's national energy research center, specializing in renewable energy, energy efficiency, and smart grid technologies. With extensive experience in **microgrids, distributed energy systems**, and **energy management optimisation**, CRES plays a key role in bridging research and industrial deployment. Through its work in SolarHub and related initiatives, CRES aims to **advance sustainable agri-PV integration**, ensuring that rural and remote areas can fully benefit from clean energy without compromising grid reliability.

Contact

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