Smart Photovoltaic Energy Systems for a Sustainable Future

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Editorial

Smart Photovoltaic Energy Systems for a Sustainable Future

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This book is the result of a concerted effort to shed scientific light on the timely theme of "Smart Photovoltaic Energy Systems for a Sustainable Future". It contains successful invited submissions [1–16] that address a broad area of interest to the scientific world from the sightings received until today.

To tackle the climate emergency and meet targets set through the Paris Agreement, the decarbonization of the energy system is needed. Renewables are a major contributor to this solution, and due to technologies maturing and now offering low-cost solutions, they can, in real terms, lead an energy transition. PVs have gathered momentum, and they are expected to expand dramatically over the coming years compared to any other renewable-energy technology due to the following attractive features:

- Mature technology/low O&M cost.
- Increasing efficiency.
- Good grid integration and hybridization prospects.

Integrating PVs without jeopardizing the security of supplies and the economic operation of the power system is quite a challenge. Therefore, PV systems need to be supported by enabling technologies such as smart systems that facilitate their integration under the concept of smart grids employing advance communication systems, IoT usability, and market solutions to serve the vision of an energy transition.

Smart PVs can play a role within the smart grid concept as the backbone of a green energy transition, combined with other technologies as an active component, responsive and adaptive to local needs.

The topics of interest in this Special Issue dwelled around the above needs and were selected from the following list that was provided to the prospective proposers:

- Power system planning and operation with high penetrations of PV.
- Control/coordination strategies in managing disturbances and events.
- Advanced protection of distribution grids with high penetrations of PV.
- Cybersecurity for PV systems integration.
- Integrating energy storage with PV, including microgrid/distributed control functionalities.
- Solar generation analysis and forecasting.
- PV in support of energy islands/communities: planning and operation.
- PV contributing to RES synthesis for supporting an integrated grid.
- Zero energy districts/buildings with PV as the main energy source.
- PV in the built environment.

The response to this Special Issue call was excellent, with many scientists contributing from around the globe, as shown in the populated list below:

- Cyprus (10);
- Greece (13);
- France (2);

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Citation: Efthymiou, V.; Papadimitriou, C.N. Smart Photovoltaic Energy Systems for a Sustainable Future. *Energies* **2022**, *15*, 6710. https://doi.org/10.3390/en15186710

Received: 27 August 2022
Accepted: 11 September 2022
Published: 14 September 2022

- Austria (4);
- Spain (8);
- Croatia (3);
- Chile (3);
- Switzerland (6);
- Poland (6);
- USA (7);
- Italy (6);
- Hungary (5);
- Skopje (1).

The published submissions cover six broad areas of the Special Issue theme, giving evidence of the broadness of the interest. The system approach and how this will contribute to the evolution of sustainable energy communities was central in the published work. This was further reinforced with work on how quality is achieved through PV solution systems offering worthwhile possibilities of addressing the intermittent nature of the solar resource. Details are summarized in Figure 1, divided into the six broad areas of interest revealed through the Special Issue.

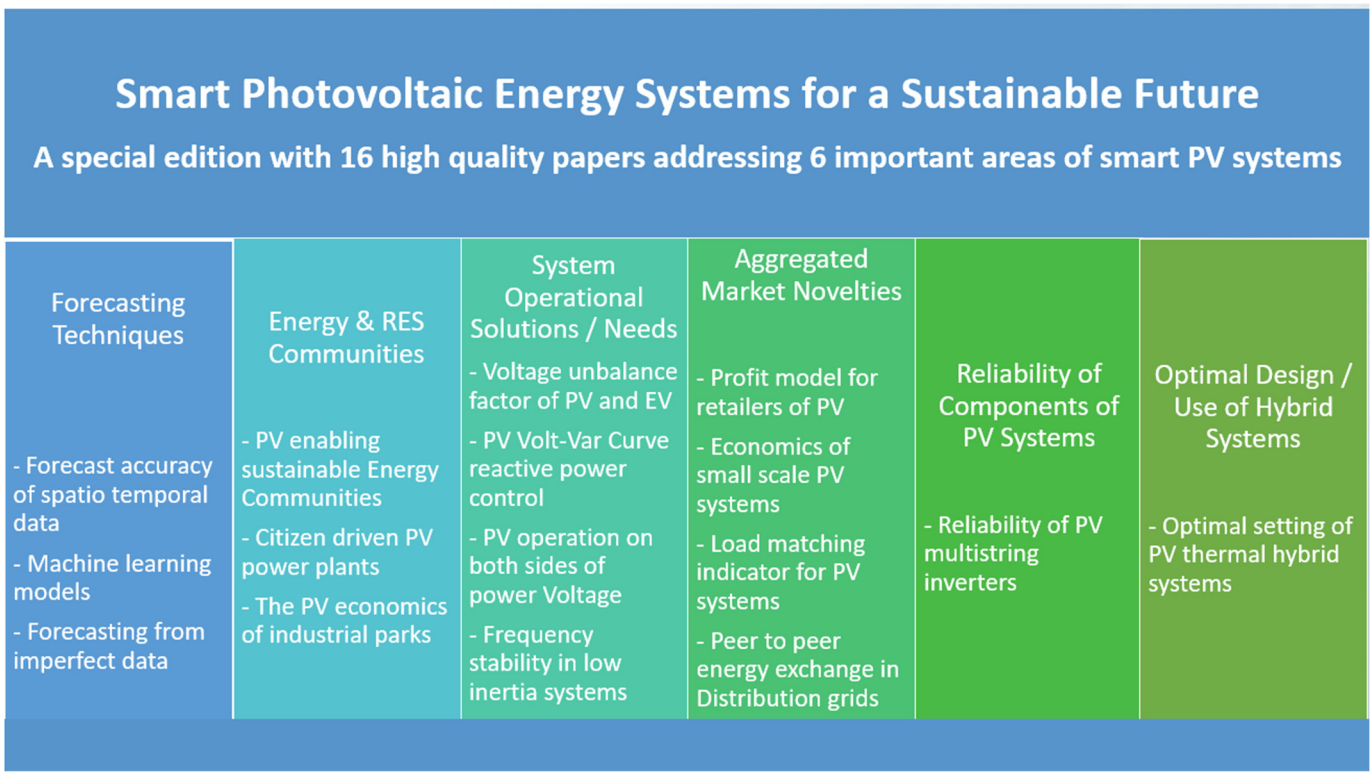

Figure 1. Areas of interest with substantial contributions in the field of smart PV energy systems.

We worked for the success of this special edition of ENERGIE with interest and pleasure, giving the effort required to have the process running smoothly and be rewarding for all contributing. To this effect, we had the important support of the staff and the responsible and valuable contribution of all engaged reviewers. We thank everyone for their timely response that made our work manageable and rewarding.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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