



RES INTERNATIONAL

INVITED SESSION SUMMARY

Title of Session:

Innovative use of solar resources for the enhancement of the Building energy self-sufficiency

Name, Title and Affiliation of Chair:

Prof Antonio Gagliano University of Catania
Prof. Giuseppe Tina University of Catania
PhD Stefano Aneli University of Catania

Details of Session (including aim and scope):

I

To achieve climate neutrality by 2050, a deep transformation of our society and natural environment is necessary. The increasing energy demands—with specific reference to electrical demand—along with environmental concerns and the cost-effectiveness of RES (renewable energy sources) are the main reasons to integrate energy production, conversion, and storage technologies. Heating, cooling, and water heating account for 80% of household energy consumption in the EU. Globally, fossil fuels account for more than 60% of heating demand in the building sector in 2020, the recent rebound in oil and gas prices again raises questions about the cost competitiveness of renewable technologies for space heating, cooling, and DHW production. However, as non-programmable renewable energy sources (solar, wind) are characterized by uncertainty, and fluctuation, it is very difficult to resolve the mismatches between the production and demand of energy. In this regard, thermal and electric energy storage systems (TES and EES) are crucial for maximizing self-consumption, reducing the difference between peaks and valleys of both demand and production, and improving the flexibility of the electrical system.

This Special Issue aims to collect research experiences about the extension of the use of solar energy as a source of electrical and thermal energy, for instance, utilizing photovoltaic (PV), solar thermal (ST), or photo-thermal (PV/T).

The aims are twofold: to analyze existing solutions from the points of view of technical performance, energy production, costs, safety, and reliability issues, and to look at new and innovative proposals.

We, therefore, papers from different scientific sectors whether innovative technical developments, reviews, case studies, or analytical papers, which present or assess the following topics are welcomed:

- Results and operating experiences derived by different applications (i.e., residential, commercial, industrial, agricultural wastewater treatment, etc.)
- Improvements in the testing, modelling, and adequate thermal and electrical characterization of HVAC systems equipped with energy storage
- Analysis of RES and storage systems' economic feasibility and environmental impacts.
- Impact of electrical and thermal storage within solar communities, heating, and cooling districts
- Increasing self-consumption through electrical and thermal storage systems.

We thus, invite authors to submit original research and cases studies on the latest application in the Innovative use of solar resources

Main Contributing Researchers / Research Centres (tentative, if known at this stage):**Website URL of Call for Papers (if any):****Email & Contact Details:**

antonio.gagliano@unict.it