



SPECIAL SESSION XXI

Smart Solutions and Technologies for Sustainable and Climate Resilient Buildings

ORGANIZED AND CHAIRED BY

- **Prof. Giorgia Peri**
University of Palermo, Italy
- **Dr. Laura Cirrincione**
University of Palermo, Italy

Ever since, cities demand a constant energy supply resulting in significant pollutant emissions, undergoing continuous urbanization processes (due to both demographic variations and migratory flows). Indeed, recent JRC and IEA reports indicate that urban settlements account for 30% of global energy consumption, corresponding to 26% of energy-related carbon emissions. On the other hand, it cannot be overlooked the fact that cities have to face the ongoing climate change and its negative effects, which represent a fundamental threat to which quite often cities are unable to cope with.

In light of this, there is a need to achieve a transition to more environmentally and economically sustainable and resilient cities, especially in the context of current and future climate change and energy crisis scenarios.

Global policies and regulations aimed at supporting climate change mitigation and adaptation strategies for a clean and sustainable energy transition, considering resource availability, and economic and environmental aspects, have increasingly targeted buildings, urban energy efficiency, and carbon neutrality. Efficient use of energy and environmental conservation of buildings, which are predominant components and key nodes of urban contexts (as recipients of the various activities that people carry out in them), play in fact a crucial role in climate change-related policies, not only at the national but also at the global level.

Because of this, buildings are called to embody effective actions in order of limiting their energy consumption, moderating the pressure they exert on the environment, while simultaneously maintaining (or even increasing) the lifestyle of occupants and being resilient to the threat posed by the climate change.

These apparently contradictory aims can be achieved at the same time by recurring to the adoption of both high efficient technologies and proper components of the building envelope that act as “active” or “passive” systems, respectively.

Starting from these assumptions, the special session aims to collect high-quality research activities and products (original research articles, reviews, and case studies are welcome) focused on smart and sustainable solutions, technologies, and strategies addressing the above-mentioned issues, thereby fostering energy efficiency, decarbonization of built environments, and climate resilience particularly in the building sector.



Main topics:

- **Energy optimization of a building or a group of buildings**
- **Buildings sustainability and resilience**
- **Passive and active energy technologies and strategies**
- **Advanced or new materials for building envelope**
- **Smart buildings, districts, and energy communities**
- **Sustainability and carbon neutrality in the built environment**
- **Urban energy planning**
- **Nearly Zero Energy Buildings (NZEB)**
- **Positive Energy Buildings (PEB)**
- **Positive Energy Districts (PED)**
- **Renewable Energy Systems (RES)**
- **User-centric solutions in the building sector (i.e., inducing lasting behavioral changes towards sustainable living)**
- **Social aspects related to energy use**