

SMART NET ZERO ENERGY BUILDINGS

The decarbonization of the economy, advocated by the Sustainable Development Solutions Network and claimed to be finally on its way after the Paris COP meeting, continues to be a top priority for the energy sector to help addressing not only climate change, but also resource shortages and local air quality and pollution issues.

In this context, it is required to cover the building sector energy uses through a wide development and diffusion of renewable based low-carbon generation technologies to be deployed at the building scale, but it is equally important to lower the energy demand of our buildings, through a continuous and integrated process, to be applied to new and existing buildings.

The Energy performance of buildings directive in 2010 has firstly introduced the concept of “nearly zero energy building”, but as per the implementations in the regulations in force in the EU countries, this is still not enough to reach the ambitious objective of a fully decarbonized economy by 2050.

Research is instead currently directed towards the more specific concept of “net zero energy building” (NZEB) defined as a high energy performance building able to cover all its energy requirements through renewable sources. Besides the well known importance of high performance opaque and transparent envelopes, other topics currently under investigation in this area are the technological feasibility of smart applications in NZEBs (e.g. controls of openings and systems) electrical storages systems to smooth the demand curves and guarantee higher “load match” and to optimize the interaction of the building with the electricity grid, thus enhancing the “flexibility” of the building and opening the way to effective demand response and provision of services to the grid.

The session welcomes paper on the following themes (not exclusively, the list is for explanatory purpose):

- Smart integration of renewable energy technology in the building sector,
- Smart management of net zero energy buildings,
- Energy storage at the building scale,
- “Load Match” and smart building grid interaction: modelling, service provision and optimization,
- Energy flexible buildings

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Short Curriculum Vitae

Full professor of Building physics and energy systems since 2011 at the University of Palermo, his scientific activity is mainly oriented towards energy and environmental topics, with focus on energy efficiency in buildings, technologies powered by renewable energy and decarbonization strategies of systems and processes. His experience on international level on building science and LCA is clarified by the coordination of several national and International research projects on energy-environmental topics, his teaching experiences in international courses and seminars and by the participation to many International Energy Agency work groups: task 27 (Performance of Solar Facade Components), 38 (Solar air-conditioning and refrigeration), 48 (Quality Assurance & Support Measures for Solar Cooling Systems) and 40 (Towards Solar net zero energy buildings), Annex 57 (Evaluation of embodied energy and CO_{2eq} for building construction) and 62 (Ventilative cooling). He is also author of more than 280 in the fields of energy efficiency in buildings and building simulation, Life Cycle Assessment of buildings and renewable energy systems, multicriteria decision making, industrial ecology. Since June 2014, he is coordinator of the Ph.D. course in “Energy and information Technologies” at the University of Palermo. Since December 2015 he is member of the Scientific Council of the University of Palermo..

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Short Curriculum Vitae

Master Degree cum laude in Electrical Engineering in 1979. From 1981 to 1983 Researcher at CREL - the Electrical Research Center of ENEL (Italian Electricity Board) in Milano, Italy. From 1984 to 1987 he was with Ansaldo S.p.A working in Power Plant automation and electric power systems.

Full Professor of Power System Automation since 2000 at University of Genova. His research activity covers: smartgrids, dynamic security assessment, power system automation, development of models for turbogas and combined-cycle generating units, load shedding strategies, distribution automation, distributed generation, liberalized energy market.

Author of over 220 scientific publications and Lecturer for more than 35 years in: conventional and renewable generation, Management and control of electric power systems and markets, Power systems in hospital structures. Scientific Responsible for over 80 Research Projects including 5 European Projects, 6 National Research projects and project with Italian Companies.

Delegate for Energy Efficiency Issues for the University. President AEE of the AEIT (Federazione Italiana di Elettrotecnica, Elettronica, Automazione, Informatica e Telecomunicazioni) IEEE Sister Society Member of the Board for FIRE – Italian Society for the rational use of energy. Chair of the IEEE Power & Energy Italy Chapter.