Living and Sustainability: An Environmental Critique of Design and Building Practices, Locally and Globally

1. Paper / Proposal Title:
Analysis of operational data about energy and water uses to inform social housing design

2. Format:
Conference presentation with Written paper

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4. University or Company Affiliation:
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5. Abstract (300 words):
In recent years, the post occupancy evaluation is becoming part of the design process, since it allows the assessment of how well buildings match users' needs once they are occupied, the identification of ways to improve building design, performance and fitness for purpose.

Following this research field, the paper focuses on the opportunity to use data from building monitoring systems as instruments to identify critical design and operational

issues to be handed over new design projects. Both methodological approach and the application on a case study are discussed.

The case study refers to a large environmentally friendly social housing intervention recently built near Milan in Northern Italy. Seven blocks of building for a total of 323 flats designed to achieve high environmental performance in operation. The great majority of flats are class A rated, very highly insulated and ventilated with stairs-centralized mechanical ventilation systems with heat recovery. Seven centralized water-to-water heat pumps supplies hot and refrigerated water for heating and cooling and supplies domestic hot water as well. There are radiant panels as heating and cooling terminals. A building monitoring system is installed and allows the real-time collection and analysis of building performance data and energy and water consumption data.

The following questions are addressed and discussed: Are the real energy costs comparable with the expected ones? Are the occupants aware of energy issues by properly acting on the control devices, such as thermostats? Which is the weight of different energy uses in the individual energy bill? Are there significant differences in the heating and cooling costs due to design topics such as the orientation, the S/V index, the window-to-wall ratio, etc. of different flats? Does the energy system design fit with the variable energy demand of each flat during the year?

6. Author(s) Biography (200 words each):

Marco Filippi, M.Sc. in Mechanical Engineering, is professor emeritus at the Politecnico di Torino, where he was full professor, vice-rector, member of the Academic Senate, deputy dean of the Faculty of Architecture and director of the PhD course "Technological Innovation in Built Environment".
In the Department of Energy he founded and led the research group TEBE (http://www.polito.it/tebe) generally working on energy efficient buildings, indoor environmental engineering, lighting and acoustics. He taught building physics and building services and he is author or co-author of more than 400 scientific papers, didactic papers, chapters of books and editorials.

He is member of the Accademia delle Scienze in Turin and past president and honorary member of the Associazione Italiana Condizionamento dell'Aria Riscaldamento Refrigerazione (AICARR), the Italian society of the engineers involved with air conditioning, heating and refrigeration.
At present he operates in the academic network as tutor of Master and PhD students and in the professional network as supervisor of building design and construction processes and energy management contracts, and as consulting engineer in the fields of efficient use of energy, indoor environment engineering and technologies for preservation of architectural and artistic heritage.

Elisa Sirombo graduated cum Laude in 2010 at the Turin Polithecnic, and post-graduated in 2012 in a II level Master "Sustainable construction and energy efficiency".

She is grant researcher at the Department of Energy of the Polytechnic University of Turin since 2013, as part of the TEBE group, working on sustainable design of buildings. She is involved in some research projects: "Green School", promoted with the metropolitan city of Turin, aimed at developing methods and tools for the sustainable management of existing school facilities, their sustainability assessment and improvement engaging students and teachers; the European project I-town, aimed at developing new training tools and contents in the field of sustainability for blue collars working in the building construction industry; a internal research project focused on the development of methodologies for the optimization of the building components which affect energy demand and indoor comfort conditions, from the concept design stage to the final one.

Registered architect, LEED AP BD+C, O+M, GBC HOME AP and Itaca protocol accredited professional, she also works as consultant in the field of energy and environmental sustainability with a specific focus on building physics issues and certification processes.