

## **“Sustainable” energy recovery and rehabilitation. The Capuchin Convent - Altamura (Italy)**

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The issues related to sustainability and recovery of built heritage are related to anthropogenic transformation activities of the environment; it generates the idea of “sustainable recovery” that is a suitable combination between energy saving, environment conservation and cultural heritage restoration.

The aim of the research is to address the functional/technological adaptation of historical buildings as well as the equipment adaptation, using technological interventions that can improve both the living comfort that energy efficiency of the building, respecting its historical and architectural characteristics.

Nowadays, to reduce the pollutants emission, the built heritage requires a significant technological adaptation, in terms of energy and equipments; in fact the potential energy saving in the construction sector is enormous. The built heritage represents 40% of energy consumption and 36% of greenhouse gas emissions in Europe. If it considers that in Italy 80% of the building has more than 30 years, it is clear that is necessary to find solutions that enable historical centers and monuments in a position to actively contribute to climate change.

The topics of adaptation and functional/technological transformation, through an adequate energy regeneration, finds an experimental application in a case study: the recovery of the Capuchin Convent in Altamura (Italy). In order to recover the whole structure, it has been designed a recovery intervention that aims to improve energy performance of building, in accordance with its characteristics and values. Analyzing the structure, it has been highlighted energy criticalities of the building. This has led to the design interventions aimed at upgrading the energy efficiency of building, using high performance materials and a suitable selection of equipments. The obtained energy performance is the one required by the current standards.

This leads to reinforce the concept of “sustainable recovery” as a process of integrated conservation of the building; the process can ensure the survival of historic buildings values, designing functions that aims to meet the current living conditions and to respect the character and values of the built heritage.

**Keywords:** Energy Recovery, Rehabilitation, Suitable Interventions, Built Heritage, Adaptation.