

The ROP ERDF Sicily 2014/2020 for planning the energy retrofit of 106 public historic buildings

A Buda¹, V Pracchi¹ and R Sannasardo²

¹ Politecnico di Milano

² Regione Sicilia – Dipartimento Energia

The request by international policies to reduce the green gas emissions of public buildings (2012/27/EC Directive) implies particular attention in the case of historic buildings, where the needs for protection and energy efficiency require a challenging balance to be shared by the many stakeholders involved in the decisional process.

Since 2017 this challenge has been accepted by the **Regional Operational Programme** within the **European regional development fund (ROP ERDF) Sicilia 2014/2020**: in the European funding framework to support cohesion territorial policies, this document programme aims to foster eco-efficiency and reduction of primary energy consumptions of the building stock, particularly in public sector.

Among the actions promoted, the ROP ERDF has designated a budget of 23 million euros for supporting the planning of efficiency improvements of 106 public heritage properties of the Cultural Heritage Department of the Sicily Region, to be completed in 2020. The scope is to promote best practices in the field of public heritage for activating processes of sustainable development in the territory.

The selected 106 case studies are a very valuable part of our built cultural heritage, including constructions of the 11st century as well as modernist architecture. Cases are distinguished by different function (sometimes variable over time) and form of users (direct - such as the visitors of a museum, or indirect - such as heritage officers). Also operating costs are different, as well as the single building conditions and the environmental context (in historic center, in the countryside, in different climate zones, etc.). The sample heterogeneity gives a large-scale overview on the Mediterranean heritage, allowing to assess the efficacy of energy policies (at Regional level) and to suggest feasible retrofit solutions for historic public buildings.

The decision-making retrofit process has seen the involvement of the Politecnico di Milano, with experts of conservation, as well as that of energy experts and of an Energy Service Company (ESCO).

In particular, a detailed analysis of retrofit projects has been carried on 38 selected cases, most representative of the entire building stock. The data emerged from both an energy audit (based on bills and energy simulations) and an on-field survey were the basis to evaluate the feasibility of interventions (on both envelope, installations but also concerning the users' training) in each case.

The inclusion of stakeholders' interviews in the investigation has supported to clarify the efficacy of building and plants management. Going beyond the scope of the project, this wide range of public heritage has made it possible in fact to underline also the most common problems in all cases that can affect the energy performance evaluation of public buildings (estimating for example that the lack of maintenance together with wrong users' behavior can affect consumptions up to the 8%), but also affecting the microclimate comfort (lack of monitoring system, installation design and positioning not adequate to users' comfort / artworks conservation). In order to prove that this experience can contribute to the improvement of regional policies for a sustainable built environment in Mediterranean context, numerous strategies, from an energy and conservation standpoint, have been considered. In the balancing test between diagnosis and buildings conditions many issues arose: the main retrofit principle was to define measures for reaching both a better building preservation and management, accordingly also to the building microclimate, as well as objects and users' needs, as a win-win strategy.

This experience, still ongoing, can be considered exemplary not only for the number of cases, but also for the method, with an innovative process of cooperation between different actors, which led to consider solutions adopting a case-by-case approach.

For more information, see the complete publication: <https://iopscience.iop.org/article/10.1088/1755-1315/296/1/012001>

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