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STUDY OF VENTILATED SOLAR WALLS IN A MEDITERRANEAN CLIMATE, INSTALLED IN RESIDENTIAL AND OFFICE BUILDINGS.

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The reduction of energy consumption and the use of energy from renewable sources in the buildings sector, which accounts for 40 % of total energy consumption in the EU, are important measures to reduce energy dependency and greenhouse gas emissions. Energy efficiency improvements should therefore be made in existing buildings, and adopted in new ones. One option is to develop and install building systems and solutions that are more sustainable, such as passive solar systems.

Only a few studies have looked at the behavior of ventilated solar walls (known as Trombe Walls) in temperate climates. This study therefore set out to assess how a Mediterranean climate would affect the performance of this system, particularly in the summer months. This study assesses the dynamic energy performance, i.e. how the ventilated solar walls influence the reduction of energy consumption.

The methodology involved the following steps: definition and characterization of a reference room representing a “living room and workroom, as are typically found in residential housing and office buildings; selection of geographical locations to represent the local microclimate range over the general Mediterranean climate region; definition of a ventilated solar wall system (composition, thermal properties, geometrical and functional characterization), and the dynamic simulation of all scenarios, based on EnergyPlus.

The energy benefits of solar walls for all the scenarios are discussed in light of the results, with special attention given to the influence of shading levels in the summer.