



## **Thermal Comfort in Low Income Housing**

The Malta Intelligent Energy Management Agency (MIEMA) together with partners from 6 other EU countries (Cyprus, France, Greece, Italy, Spain and Slovenia) covering the whole Northern Mediterranean seacoast are working together to improve energy efficiency and promote energy saving in low income housing in MED area through the project ELIH-Med - Energy efficiency in Low Income Housing in the Mediterranean. The project implementation in Malta is co-financed by the MED Programme (85%) and the Ministry for Energy and Health (15%). MIEMA carried out a pilot project consisting of installation of different energy conservation measures in 35 low income households in Malta.

A very important aspect of the ELIH-Med project is the assessment and improvement of thermal comfort in households. In fact one common feature of the majority of the selected households was very poor thermal properties and management. Most of the residential buildings in Malta that were built until the nineties are built from limestone and very few have double walls or any kind of insulating properties. The roofs of the buildings were mainly made of concrete covered by a bituminous waterproofing membrane which causes high heat gains in summer and significant losses in winter, and results in low indoor comfort levels.

The households participating in the pilot project were assessed through interviews with the tenants and most of them said that their homes are too hot in summer and too cold in winter. Cooling and heating costs are very high and the owners of low income households often find themselves in a situation where they cannot afford to cool or heat their homes. Even though we do not have extremely cold temperatures most of the households in Malta are very cold in winter due to lack of proper heating systems. In fact the most common source of heating is portable gas heaters, that are not very efficient in providing a comfortable ambient temperature and result in increase humidity related problems due to lack of proper ventilation systems.

As a result of this identified common problem, MIEMA installed roof insulation tiles in 20 of the 35 selected households. The laying of insulating tiles reduces the heat losses and gains significantly as it improves the roof structure's U-Value. This intervention helped to improve comfort as well as reduce the demand of energy for both cooling and heating. Apart from the roof insulation, energy efficient air-conditioning units and double-glazed apertures were installed in selected households.

The installation of A++ rated air conditioning units helps to better control ambient temperature thus improving the thermal comfort as well as lowering energy consumption and the related costs. Double-glazed apertures help to reduce heat transfer through doors and windows.

A very important tool to assess the thermal performance of a building is thermal imagery. A thermal camera has been used to assess the performance of the measures undertaken and specifically to show the effectiveness of roof insulation and double-glazed windows. In fact where no insulation was placed the inner side surface of the roof was about 4°C cooler in December than the insulated part which confirms the effectiveness of insulation methods.

The measures to improve the thermal comfort in low income households have been a success as the residents claimed that the roof insulation and double-glazed apertures have improved the indoor comfort consistently, allowing them to reduce the use of heating systems in winter and cooling in summer and reducing their energy bills.



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