Solar thermal systems in municipal buildings – Vila Nova de Gaia, Portugal

Keywords	**Solar Thermal Energy, Municipal Buildings**
Pictures	 
Objectives	To reduce energy consumption and to increase the diversification of energy sources within the Public Buildings in Vila Nova de Gaia.
Description	The implementation of renewable source projects has been one of ENERGAIA's priorities. Therefore and with the objective of an energy cost reduction ENERGAIA, in partnership with GAIANIMA, has been discussing the idea of installing solar thermal systems. GAIANIMA is the Municipal organization in charge of managing sports facilities. The first system to be implemented was at Granja swimming pool. This complex has two pools: an interior and an exterior one. The interior pool works all year except August for maintenance reasons. Only the interior pool has thermal needs Even though, the implemented system considered the possibility of heating the exterior pool every time the interior one is closed for maintenance, and also when the solar thermal system has energy in excess. With this procedure overheating of the collectors is avoided. The Granja project was financially supported by the national programme MAPE (Medida de Apoio ao Aproveitamento do Potencial Energético e Racionalização de Consumos). The programme co-financed projects for installing heating systems through solar thermal systems, to a maximum of 40% of the eligible costs The second developed project was at the Sports Complex of Mergunhos. This complex has a grass football field, a sports hall and bathrooms supporting both sports areas. The implemented solar thermal system has the objective of heating the water for the athletes' showers.
Results / Achievements	The following table presents the data of energy and carbon dioxide (CO_2) saved, as well as the investment needed for each project.

Installation	***Investment***	***Energy Saving***	***CO2 avoided***
	€/m2	kWh/year	kg CO_2/year
Mergunhos Sports Complex	755	29,400	6,300
Granja Swimming Complex	586	233,000	49,932
TOTAL	**-**	**262.400**	**56.232**

Indirect reductions caused, i.e. due to activities and initiatives of information and formation realised together with the implementation of the projects are not taken into account)

ENERGAIA will keep on conceptualising and implementing renewable energy projects. In fact, at this moment a technical-economical evaluation of another solar thermal system is being conducted. This system will heat water for a swimming pool and for its baths.

Friendly advice for replication	Fiscal and monetary incentives, allow the reduction of the payback times of an investment. So, previous to any project implementation, financial supports from authorities must be considered. Another possibility to finance projects would be to use ESCO's, as they will facilitate some market barriers such as the high investment needed for some projects. A way of increasing energetic benefits is to reduce losses, so, associated to the implementation of solar thermal systems, ENERGAIA advises the installation of a water cover on pools. This system reduces the water evaporation during the night, and thus reducing the need for heating.
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