



Research on solar energy harvesting and storage by means of Active Asphalt Surfaces and Enhanced Geothermal Systems

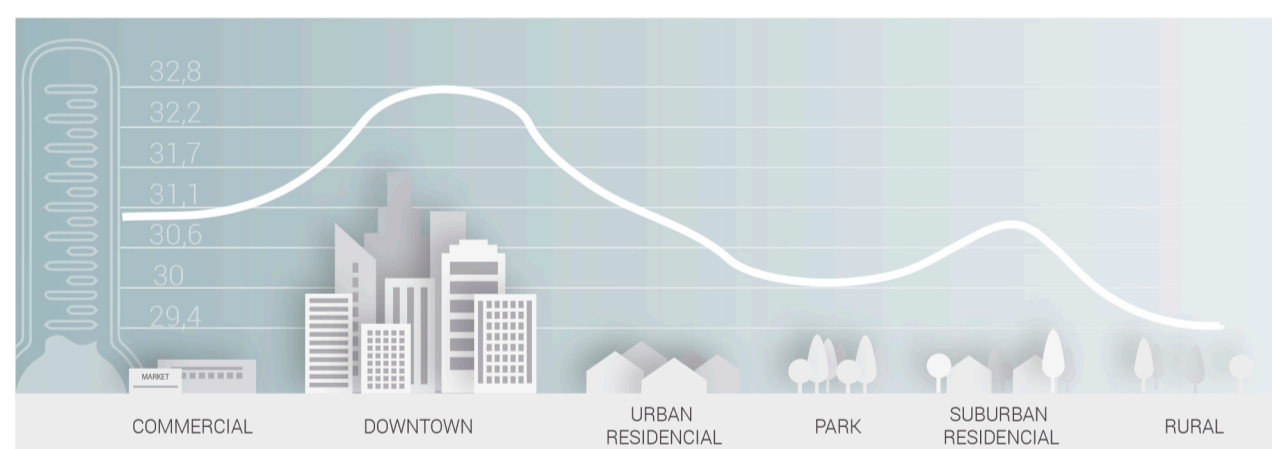
BACKGROUND

The use of fossil fuels to satisfy the increasing energy demand as well as the pollution produced are rising the temperatures and causing health problems. The enlargement of the cities and the paving of existing surfaces are replacing green zones by dark-coloured surfaces capable of absorbing a big amount of energy in form of heat. This energy is emitted back to the atmosphere, especially during night hours, causing the increase of the energy consumption and the CO2 emissions, as well as deteriorating the quality of the sleep of the inhabitants of urban areas.

BENEFITS

Important benefits might be obtained from applying this research like the generation of clean energy that contributes to reduce the CO2 emissions and, therefore, the global warming.

The collection of heat also reduces the temperature of the surfaces and, therefore, contributes to mitigate the "Urban Heat Island" effect.



The extraction of this energy would also improve the asphalt pavement conditions and prevent high temperatures on it, thus increasing its lifespan by avoiding rutting on it.

There are a large number of **applications** that the energy harvested might have: hot water for housing, building heating, snow melting and de-icing of roads, for example.

The main objective of this project is the **design of a new asphalt solar collector** that can collect the maximum possible heat from the surfaces exposed to solar radiation with a reduced cost.

OBJECTIVES

- 01 | The characterization of the most suitable materials, as well as the system geometry and layout, for the collection of the highest possible amount of solar energy.
- 02 | The characterization of the materials and additives that help to optimize the storage in the catchment area.
- 03 | The study of the system efficiency as a whole in relation to the climatic area in order to adapt the design to every specific need.
- 04 | The study of the degradation of the materials used in the collection of heat and the development of the Life Cycle Analysis (LCA) of the constitutive elements of the system.

