Easing life of Economic weaker section with Modern Techniques

[EE HU-301]

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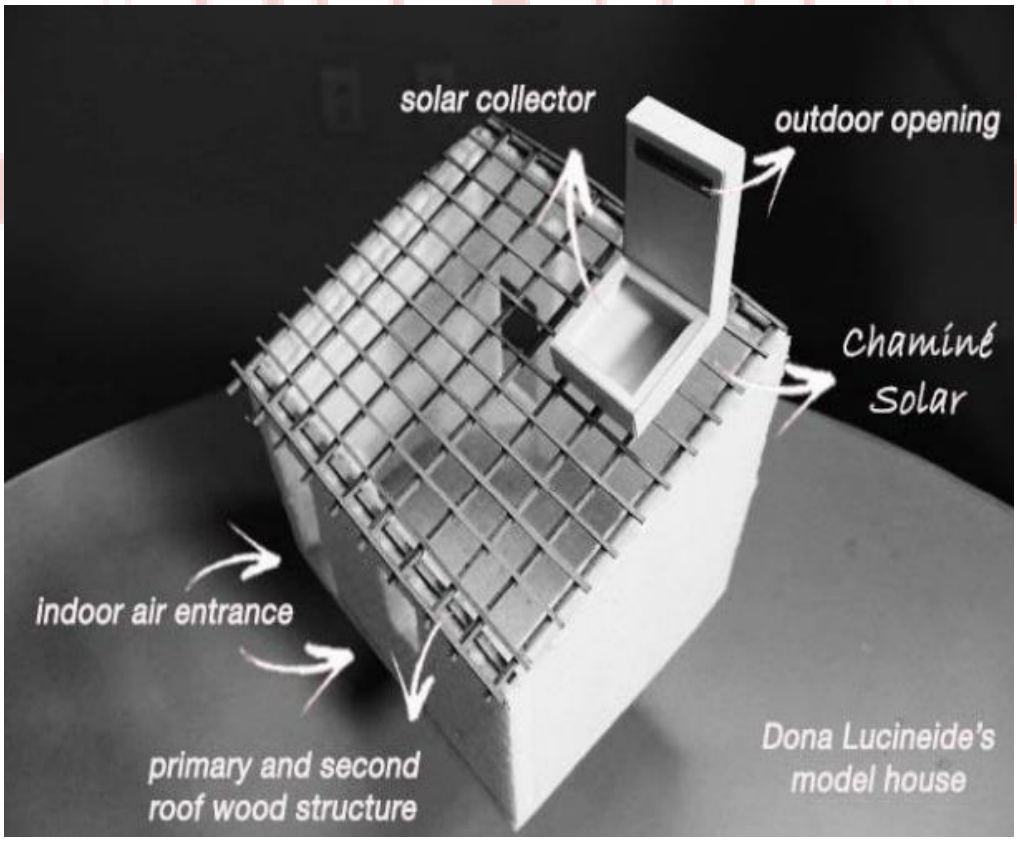
INTRODUCTION

In this project we have shown the various application of solar energy in the form of solar chimneys, solar domes and passive cooling which can prove to be a substantial help in improving slum life at a low cost. These techniques are used at a low scale in countries like India and Portugal, but they have a potential to serve a much larger scale especially in tropical and sub-tropical countries.

Solar chimney

- A solar chimney – often referred to as a thermal chimney – is a way of improving the natural ventilation of buildings by using convection of air heated by passive solar energy. A simple description of a solar chimney is that of a vertical shaft utilizing solar energy to enhance the natural stack ventilation through a building.
- The solar chimney has been in use for centuries, particularly in the Middle East and Near East by the Persians, as well as in Europe by the Romans.



Solar dome

- The micro solar dome is a device that can capture sunlight and concentrate it in a gloomy room. It has transformed the lives of around 130 families of the Lal Bagh slum in north Delhi as the amount of light has increased while the electricity bill has dropped
- Because of poor ventilation, sunlight doesn't enter most of these shanties and the families have to either remain in dark or switch on the bulbs and tube lights even during daytime.

Passive cooling

Another method that may be used to improve life in the slum is passive cooling. Passive cooling is a building design approach that focuses on heat gain control and heat dissipation in a building in order to improve the indoor thermal comfort with low or no energy consumption. This approach works either by preventing heat from entering the interior (heat gain prevention) or by removing heat from the building (natural cooling). Natural cooling utilizes on-site energy, available from the natural environment, combined with the architectural design of building components (e.g. building envelope), rather than mechanical systems to dissipate heat. Therefore, natural cooling depends not only on the architectural design of the building but on how the site's natural resources are used as heat sinks (i.e., everything that absorbs or dissipates heat). Examples of on-site heat sinks are the upper atmosphere (night sky), the outdoor air (wind), and the earth/soil. Passive cooling covers all natural processes and techniques of heat dissipation and modulation without the use of energy. Some authors consider that minor and simple mechanical systems (e.g., pumps and economizers) can be integrated in passive cooling techniques, as long they are used to enhance the effectiveness of the natural cooling process.