



Promoting Cool Roof and Passive Ventilation Concepts for Indoor Temperature Comfort

(On going project)

Lead Institution:

TARU Leading Edge Pvt. Ltd.

Partner Institutions:

Surat Municipal Corporation (SMC), (SUDA), Indore Municipal Corporation (IMC), Government Departments, National Institutions, Technical Experts, Community Based Organisations and Civil Society members

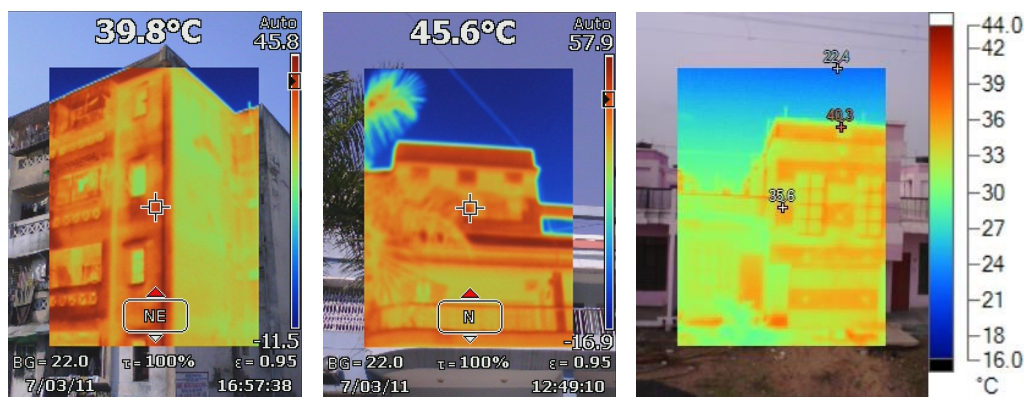
Beneficiaries:

This project will benefit all sections of the society, especially the poor and slum dwellers who have low capacity to invest on space cooling devices. It will also significantly reduce electricity bills of industries and other large buildings, and improve the thermal comfort and productivity of workers.

Background:

Indore was earlier known for cool evenings known as “Shab-e-Malwa” even in hottest summers. Throughout the month of May daytime temperatures generally used to reach highs of around 40°C. At night the average minimum temperature used to drop down to around 25°C. In recent times the highest recorded temperature in May has been 48°C.

Surat, a coastal city suffers from high humidity throughout the year. Even mild summers are quite uncomfortable affecting the work efficiency of people. Throughout the month of May, daytime temperatures will generally reach highs of around 36°C. At night the average minimum temperature drops down to around 27°C. In recent times the highest recorded temperature in May has been 44°C. The humidity in May is about 67% increasing at the end of the month to about 75%, further aggravating discomfort. Climate change and variability can further make the situation worse, affecting the indoor comfort.



The expansion of the cities resulting in increasing heat island effects as well as climate change has caused these extremes becoming common events every summer over last decade. While green housing is being promoted, Indian cities already have a significant proportion of houses built over last three decades or older, which have minimal provisions for passive space cooling. The paradigm of **Low rise – High density (LRHD)** growth that was followed by urban planners until recently has excluded possibility of using centralised space cooling systems. This pattern also takes high heat input from the sun due to higher ratio of exposed roof area to floor areas. The cost of retrofitting existing building stock to make them energy efficient is a very costly affair and therefore other simpler cost effective options need to be explored to minimise energy consumption.

Poor settlements and slums are very dense and have low ventilation facilities and the poor cannot afford electricity bills for space cooling, especially under rapidly growing tariff regime. The poor live mostly in houses with either tin sheet or asbestos roofs or thin concrete roofs often without sufficient ventilation also. The rooms heat up fast and the indoor atmosphere is quite hot and humid. Even good ventilation can significantly reduce the temperatures in these houses. Simpler and cost effective options like roof ventilators need to be explored for those settlements depending on passive cooling principles in addition to cool roofs. Ready-made affordable technologies or modules are either not readily available or popular in India.

Cool roofing is one such technology that is becoming popular in developed countries. India had a tradition of whitewashing/ white tiled flooring of the roofs and walls, especially in desert regions. A variety of cost effective options are available in the market ranging from simple lime wash with adhesives to polyurethane based insulation materials. This low tech options combined with the improved ventilation can improve indoor comfort for all sections of the society.

Objective:

Mainstream these technologies in state and central government poor housing schemes through advocacy and support.

Project Components:

This project would include the following:

- 1) Contextualising a variety of cool roof technology options
- 2) Providing options for passive ventilation
- 3) Organising state level workshops and establish collaboration with various stakeholders
- 4) Organise a national level competition to
 - a. Design a variety of option sets for demonstration in a variety of buildings including public buildings, slum and low income houses
 - b. Display energy saving and temperature information through equipment
 - c. Provide support for sourcing of technologies and materials
- 5) Capacity building of human resources and providing support to install such technological options
- 6) Advocacy and support for inclusion of thermal comfort enhancement in poor housing schemes

Implementing Approach:

- 1) Develop a suite of technology options suitable for a variety of houses ranging from slums to middle income households
- 2) Promote the cool roof concept on city/state scale so that energy saving also will be achieved.
- 3) Develop mechanisms for promoting cool roof concept in new housing projects with special focus on poor housing programmes.

Key Achievements:

- 1) Organised a technical workshop on Thermal Comfort in Indore and Surat
- 2) Successfully completed stage I of Thermal Comfort Design Competition
- 3) Calculators to assess thermal comfort component in buildings
- 4) Installation of equipment and data monitoring is in progress

Organisation Details:

TARU Leading Edge Pvt. Ltd is a private research consultancy organization with an expertise is primarily in six core sectors: Disaster Risk Management & Climate Change, Governance & Institutions, Natural Resource Management, Social Development, Urban Development, and Water, Sanitation & Hygiene. Within these sectors we undertake policy analysis, strategy development, action research, programme design, project management support, assessments and evaluations.

ACCCRN was launched in 2008 and is funded by The Rockefeller Foundation as part of their 9-year initiative aimed at building Climate Change Resilience. Climate change resilience is the capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate impact circumstances while continuing to function at an acceptable level. Simply, it is the ability to survive, recover from, and even thrive in changing climatic conditions. ACCCRN works at the nexus of climate change, vulnerable and poor communities, and urbanization.

Surat Municipal Corporation is a local self government which has come into being under the Bombay Provincial Municipal Act, 1949. It carries out all the obligatory functions and discretionary functions entrusted by the BPMC Act, 1949 with the mission to make Surat a dynamic, vibrant, beautiful, self-reliant and sustainable city with all basic amenities, to provide a better quality of life.

Surat Urban Development Agency constituted under the Gujarat Town Planning and Urban Development Act, 1976 on 31.01.1978

Indore Municipal Corporation is the governing body of the city of Indore in the Indian state of Madhya Pradesh. The municipal corporation consists of democratically-elected members, is headed by a mayor and administers the city's infrastructure, public services and police. Members from the state's leading various political parties hold elected offices in the corporation

IDA - Town and country planning office, Bhopal, has been preparing the master plans for Indore. The role of IDA is to implement the master plan. The present master plan is proposed for the year 2011. The function of IDA is to control and regulate the development. If the private developers make plans for any institutional, residential or any other area, then they are required to be approved by IDA.

