

Mitigating Strategy for Urban Heat Island: Biomimicry Approach Case of Delhi

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Abstract

The need for widespread urbanisation has increased due to population growth. Because of this, there is now a phenomenon called an Urban Heat Island (UHI), which is defined as greater air or surface temperatures in urban areas than in rural areas. The local climate, the urban fabric, the materials used, and the surfaces all contribute to UHI. Architects (2014) found that with every 0.6 °C increase in midsummer temperature, peak hour power demand climbs 1.5 to 2% for Delhi. It has been projected that for every degree over a (locally specified) cut-off point, mortality rates for populations inside the European Union increase by 1 to 4%. However, in the middle of the hot buildings and humid streets, nature provides us with a multitude of clever cooling strategies that we might imitate. A creative approach to problem-solving, bioinspiration also called biomimicry draws inspiration from nature to develop and innovate across a range of industries. It offers aesthetically pleasing in addition to useful solutions. A few of the bio-inspired techniques include using materials with high reflectance, which are similar to the skin of Saharan ants, imitating the colour and reflectance variations of zebra skin for differential heating, and adding water features and vegetation that are modelled after human skin's evapotranspiration. Quite a few architectural components use these biomimetic concepts. Sun protection is actively provided by kinetic facades. Albedo is decreased by the use of materials with high reflectivity. Differential heating caused by the incorporation of materials with varying degrees of reflectance creates convection currents. A localised cooling effect is achieved by the interspersions of green walls, water features, and porous materials that retain water. The goal of this study is to develop sustainable urban environments with lower UHI impacts by using biomimetic concepts, such as green infrastructure and bio-inspired materials. This research also tries to investigate how biomimicry might enhance thermal comfort, energy efficiency, and general resilience in urban environments.

Keywords: *Biomimicry, Urban Heat Island, Albedo, Materials, Building Skin*