Tackling heatwaves: Why India must revisit its options for cooling

With heatwaves here to stay, India should consider mitigative-adaptive options for cooling.

By Dr Indu K Murthy

Several parts of India reeled under a heatwave in April with temperatures soaring from 43 Degree Celsius to 46 Degree Celsius - the highest since 1901. The grim news is that in the decades to come, India is expected to suffer more frequent and intense heat waves as a result of climate change, according to the Intergovernmental Panel on Climate Change and district-level climate projections made for India at the Center for Study of Science, Technology and Policy.

Changes in the environment such as frequent heatwaves can lead to societies taking actions that can worsen the situation. Climate change is one such trigger that carries maladaptation risk. While adaptation is one of the mainstays of addressing climate change, maladaptation refers to 'actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future.' Maladaptation occurs when adaptation results in increased emissions of greenhouse gases; disproportionate burdening of the most vulnerable; high opportunity costs; and reduced incentives to adapt.

In the context of heatwaves, maladaptation results when adaptation leads to increased energy consumption, with an increased reliance on air conditioners (AC). This results in increased emissions and warming of the air, making the situation worse for households who cannot afford ACs. It, therefore, becomes important to explore alternate adaptation actions cognisant of the fact that adaptation goes beyond dealing with individual risks, areas, and sectors.

India Cooling Action Plan (ICAP)

The India Cooling Action plan (ICAP) was launched in 2019 by the Ministry of Environment, Forest and Climate Change, providing the much-needed policy push for sustainable cooling. One of the key goals under this is to reduce cooling demand across sectors by 20 per cent to 25 per cent and cooling energy requirements by 25 per cent to 40 per cent by 2037-38. The ICAP fuels the need to ask the question: are there alternate adaptation strategies for ACs? Broadly, adaptation strategies could be classified as green infrastructure, physical infrastructure, and behaviour and these typically act at different scales — city-level, individual building-level, and household-level, respectively.

Creating green spaces in an urban environment is one of the key strategies adopted for adaptation to heatwaves. Building-scale policies rely on construction standards for new buildings and specify requirements for comfort during heatwaves such as the use of reflective materials for roofs and walls. Such a cool-roof initiative has been pioneered in the cities of Bhopal, Surat, Ahmedabad, and Udaipur. Behavioural change is the other adaptation action and it relies on individuals changing the way they use ACs such as fine-tuning of cooling setpoints to optimise energy consumption and thermal comfort,

The Challenges

Each of these strategies poses certain challenges. Firstly, creating green spaces could be faced with constraints of land and pricing. Further, its effect on cooling is dependent on evapotranspiration (evaporation and plant transpiration), which in turn is dependent on water available for the vegetation—a potential challenge during heatwaves. Secondly, improvement in building insulation may have a significant impact on energy consumption for ACs, but reflective roofs while reducing heating demand during summer may increase this demand during winter, as a result of the loss of the passive benefits

of solar warming. Finally, behavioural change, which has the largest impact on energy consumption, is dependent on personal choices and, therefore, slow to come by. While all three strategies have a positive impact on thermal comfort, their impact on electricity consumption is varied, and therefore there is a need to implement them together. While these measures may not totally replace ACs, they may decrease the duration of thermal heat stress inside buildings, while lessening energy consumption and reducing degradation of external thermal comfort. Additionally, this could help tide over the demand for extra energy as it occurs at a time when energy production cannot match the demand, as witnessed in India—the worst in more than six years.

Adaptation Strategies

There is thus a need to promote appropriately planned adaptation strategies that limit the reliance on ACs, thereby reducing the energy required during heatwaves for cooling and also negating the increase in outside air temperature due to heat released by ACs. In the context of climate change, an integrated cooling strategy helps delay the period when ACs become inevitable for ensuring thermal comfort, limiting adverse health impacts, and consumption of energy for ACs.

The India Meterological Department (IMD) provides heatwave guidance in various forms: daily impact-based heatwave warning bulletin; an extended outlook for two weeks; a seasonal forecast outlook, and an interactive map for actual temperature and heatwaves. City-level heat action plans exist for cities such as Ahmedabad, Bhubaneswar, Nagpur, and Mumbai. But in a large part of India, the response is still reactionary. There is, therefore, a need to develop mitigative-adaptive approaches—that reduce loss of lives, livelihoods, and crop yields; increase the resilience of infrastructure systems, and help cope with a spike in energy demand, while also reducing emissions, therein recognising the profound link between mitigation and adaptation. Only then can we move the needle towards securing a low-carbon pathway in the long-term.

[This piece was written exclusively for ETEnergyworld. Dr Indu K Murthy heads the Climate, Environment and Sustainability team at the Center for Study of Science, Technology and Policy (CSTEP), a research-based think tank]