

SAHARA: Supporting Affordable Heat Action for Resilient Academic Institutions



Health & Well-Being



Education & Learning Outcome



Buildings & Appliances



Awareness Generation



Refrigerant Demand & Energy Consumption

Access to cooling for attaining thermal comfort is no longer a luxury but, rather, a necessity for enhancing the overall quality of life, productivity, and well-being.

CONTEXT

India's Heat Stress and Access to Cooling Scenario

India is one of the largest and fastest-growing economies in the world, with its average temperature being projected to rise by up to $\sim 2.4^{\circ}\text{C}^*$ by the end of the 21st century—which would result in extreme heat stress, with devastating impacts on human health and energy security. In addition, it has been estimated that an increase in surface temperature and humidity, specifically, will further intensify the heat stress across India, particularly over the Indo-Gangetic and Indus river basins. Regardless of the growing economy and pressing climatic need for cooling, according to the India Cooling Action Plan 2019, India has one of the lowest access to cooling, with per capita space cooling energy consumption at 69 kilowatt-hours (kWh) compared to the world average of 272 kWh. Therefore, with around 4 trillion person cooling degree days per year, coupled with a lack of access to cooling and thermal comfort, rising temperatures, rapid population growth, and urbanisation will not only amplify heat stress but will also fuel the demand for space cooling.

Parenthetically, various studies have indicated that India's rapidly changing climate will have a severe impact on the entire ecosystem, particularly children who are identified as one of the vulnerable groups and are adversely impacted by heat stress. Also, according to AEEE's 2021 Decoding Evaporative Air Coolers report, there is a lack of discussion about thermal comfort or the need for space cooling technologies for academic institutions and evaporative air coolers' potential application in these settings. The report suggested that i) efforts should be made to provide thermal comfort in settings used by children and ii) there is a need to undertake a technology assessment study to determine which type of evaporative air cooler (EAC) could be best suited for these settings for achieving thermal comfort. In comparison to conventional room air conditioners, EACs are 80–85% affordable, consume 80–90% less electricity, have low operational and maintenance costs, and are Non-Global Warming Potential (GWP) refrigerant-based space cooling solutions.

* Under an intermediate scenario of Representative Concentration Pathway (RCP) 4.5, the country's average temperature could rise by up to 2.4°C as per Ministry of Earth Sciences (MOES), Government of India's 2020 'Assessment of Climate Change over the Indian Region' report.



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Need for Thermal Comfort in India's Academic Institutions

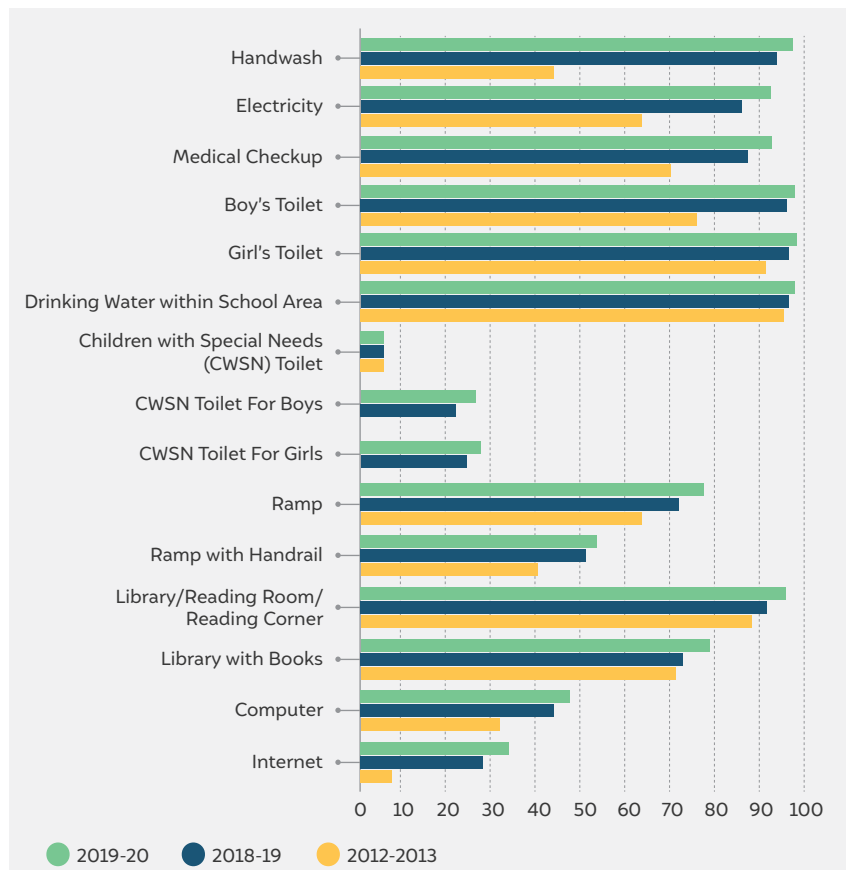


As per the Unified District Information Systems for Education Plus (UDISE+) 2019-20 report by the Ministry of Education, India has more than **15,00,000 lakhs (1.5 million) schools**, of which the 11,16,932 lakhs schools are managed by the government and 3,37,499 are managed by private entities.

However, none of the reports (inclusive of the one mentioned above) or policies focusing on India's education sector encompasses thermal comfort as one of the key priorities for the school infrastructure, as shown in Figure 1. Thus, it can be said that thermal comfort in India's academic sector has never been prioritised, while it can provide multiple benefits. Moreover, India's policy and regulatory framework do not bestow information on the associated benefits of providing access to thermal comfort for children in academic institutions; this area has been least focused on. Therefore, India faces the challenge of providing access to thermal comfort for children in India's academic institutions.

Achieving thermal comfort in the academic sector can bring about systemic changes on multiple fronts ranging from increased attendance to enhanced quality of education and improved quality of life. Furthermore, bringing the students closer to using EAC, a Non-GWP refrigerant-based space cooling solution to achieve thermal comfort in the constantly warming world, can lead to wider adoption of energy-efficient space cooling appliances— leading to **Thermal Comfort for a Billion Lives (TCBL)**. Therefore, with the recommendations of the 'Decoding Evaporative Air Coolers' report being the foundation stone, the AEEE team has collaborated with Symphony Ltd. to take forward the initiative of **Enhancing Thermal comfort in India's Academic Institutions: A Pathway to achieve TCBL**. The project envisions providing access to thermal comfort for children in India's academic institutions, which is the most neglected area.

Figure 1: Percentage of school having specific infrastructure facility (2012-2020)



! Information on Thermal Comfort is NOT available/considered, which is key a developmental need.

Source: India Ministry of Education, "Unified District Information Systems for Education Plus (UDISE+) 2019-20," 2019, https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/udise_201920.pdf.

Relevance to National Priorities



India's Panchamrit Commitments

India's Net Zero Commitments at COP26



P3 (Pro-Planet People) Movement

Promoting Climate Cautions Behaviour



India Cooling Action Plan (ICAP)

Recommendations & Implementation of ICAP



Atmanirbhar Bharat

Promote make in India Appliance and Equipment



BEE's Star Labelling Scheme

Standards and Labelling Programme



Montreal Protocol & Kigali Amendment

HCFC Phaseout Management Plan (HPMP)



ABOUT THE PROJECT

Objective: To mainstream super-energy efficient and sustainable cooling solutions in India's academic Institutions for bringing in systemic changes and ensuring thermal comfort for a Billion Lives (TCBL).

OUTCOMES

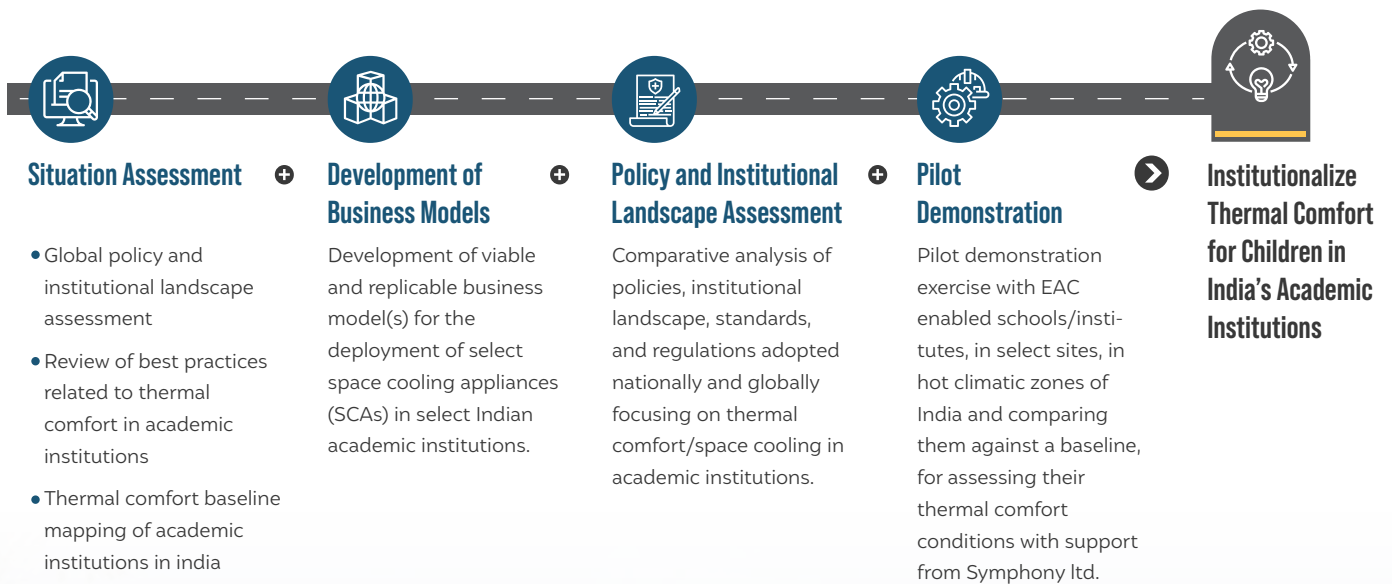
- Enhanced thermal comfort conditions for children in India's academic institutions through EACs.
- Improved willingness of students to attend school.
- Improved educational outcomes through enhanced attendance of students.
- Increased adoption of energy efficient space cooling appliances to achieve thermally comfortable conditions.

IMPACTS

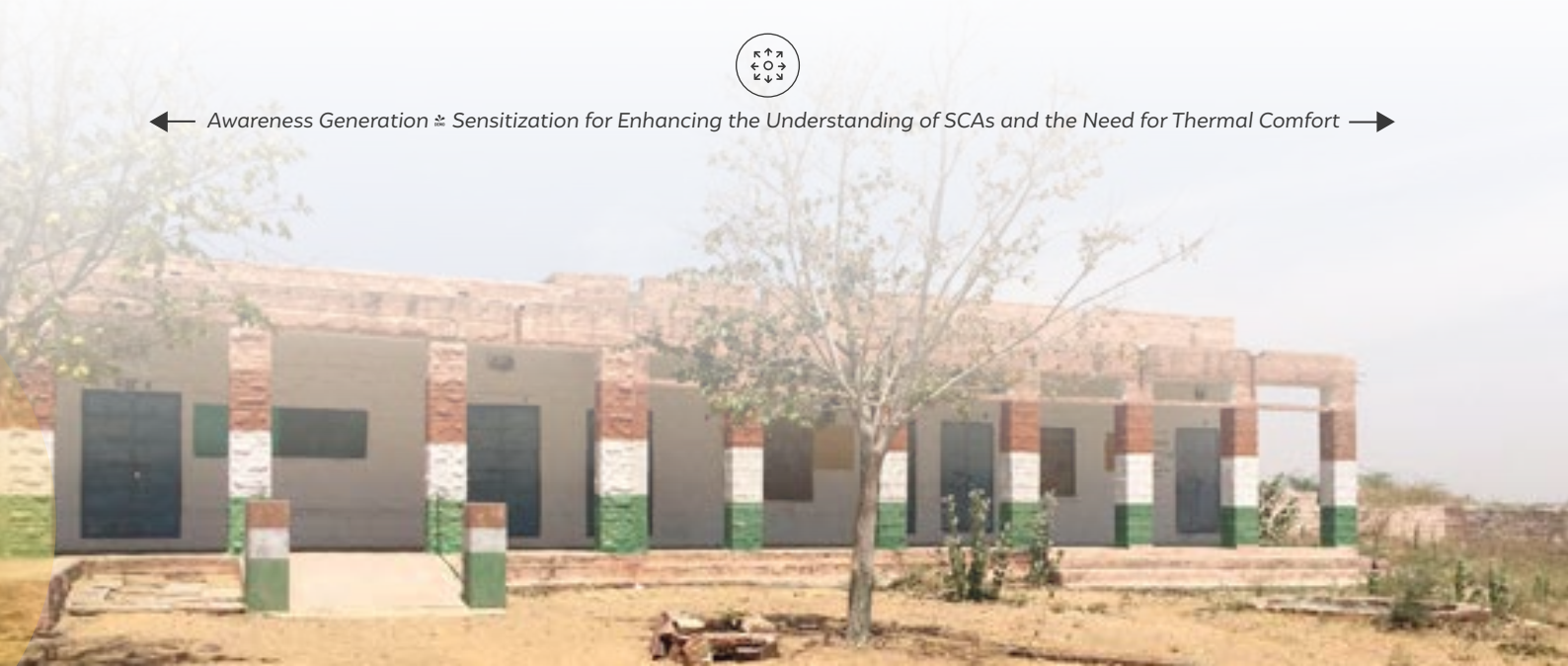
- Achieving thermal comfort for billion lives (TCBL)
- Knowledge sharing about the thermal comfort situation in India's academic institutions
- Supporting sustainable development goals (SDGs)



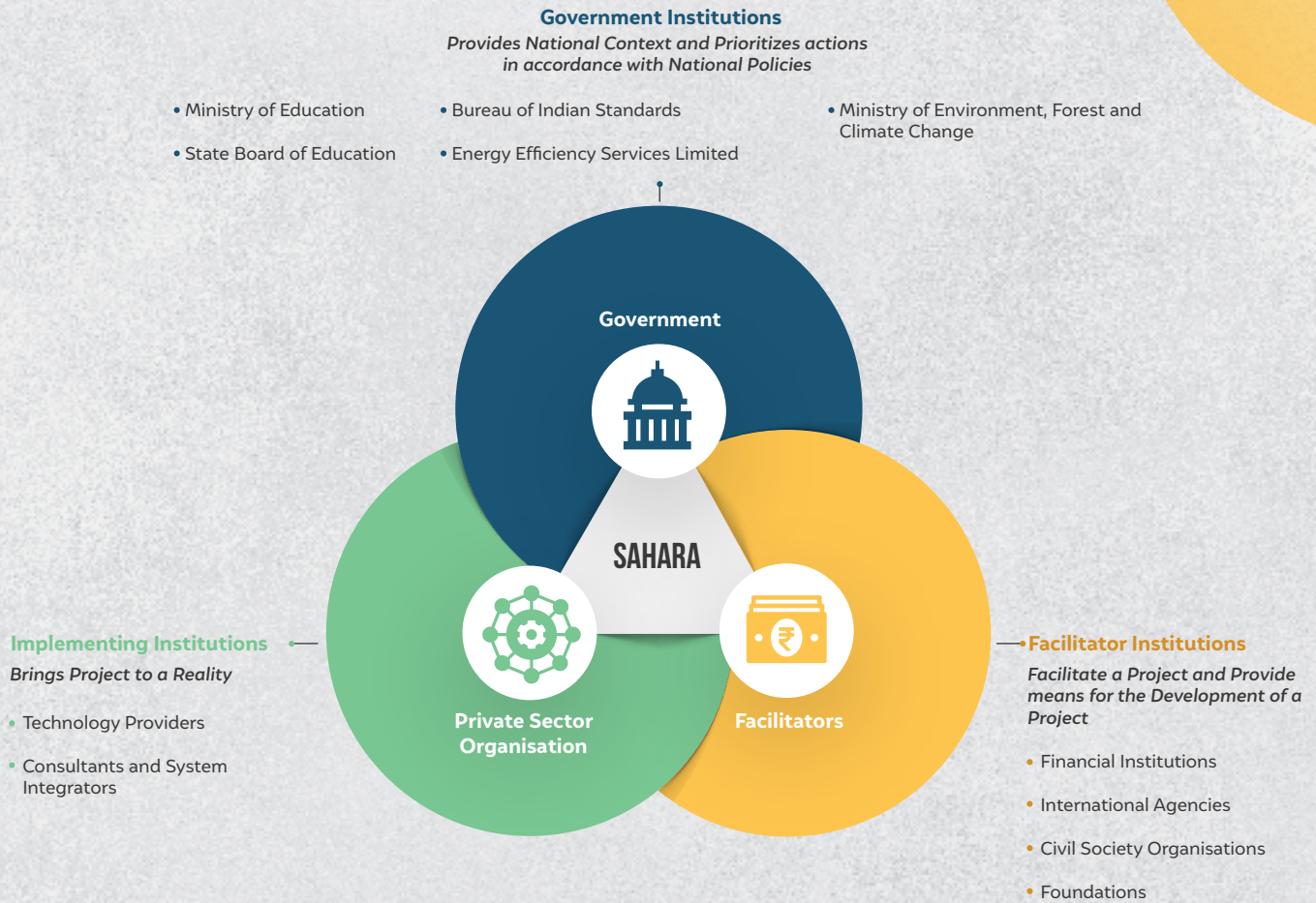
KEY ACTIVITIES



← Awareness Generation ≈ Sensitization for Enhancing the Understanding of SCAs and the Need for Thermal Comfort →



KEY STAKEHOLDERS



“ Collaborative Approach Necessary For Successful Implementation ”

About Symphony Ltd.

Symphony, an Indian Multi-National Company with presence in over 60 countries is the world's largest manufacturer of air-coolers. From inventions to innovations, energy responsibility to environment stewardship, Symphony is a market leader which has been cooling customers for generations. The massive supremacy of Symphony coolers in the residential, industrial and commercial segments has made the brand synonymous with 'cooling'.

About AEEE

Alliance for an Energy Efficient Economy (AEEE), is one of the leading organisations in India that works on creating awareness about energy efficiency as a resource. AEEE supports policy implementation and is an energy efficiency market enabler with a not-for-profit motive. We promote data-driven and evidence-based energy efficiency policies and research.

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