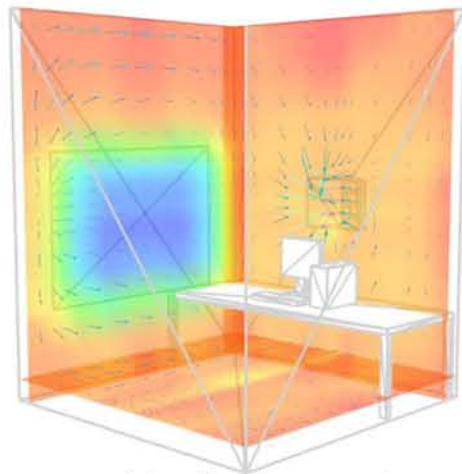


# Calibrated Building Energy Simulation

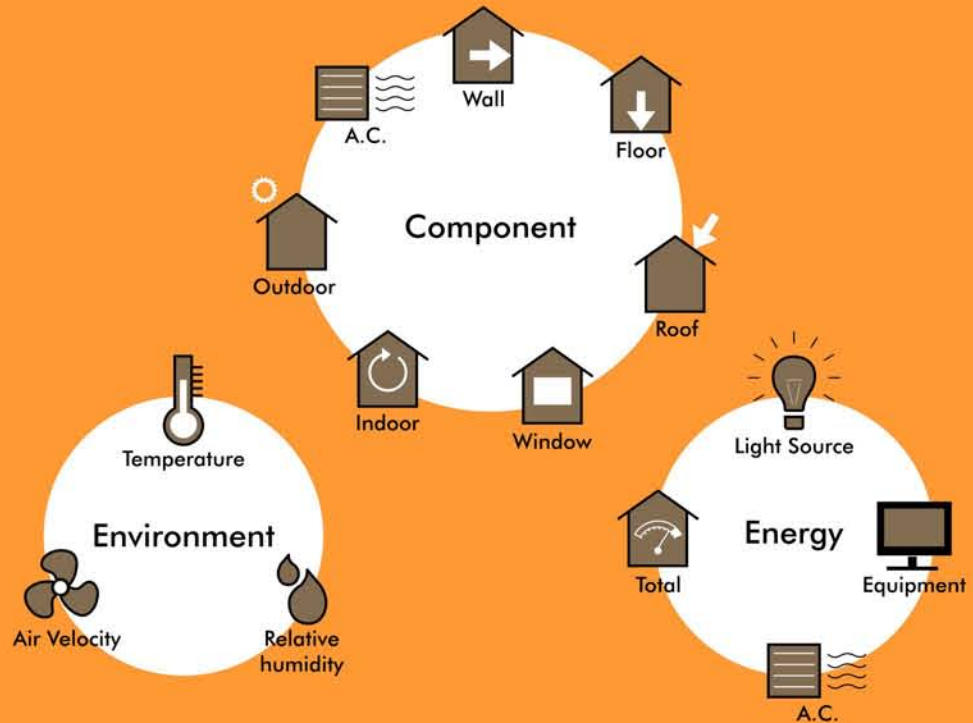
## Background

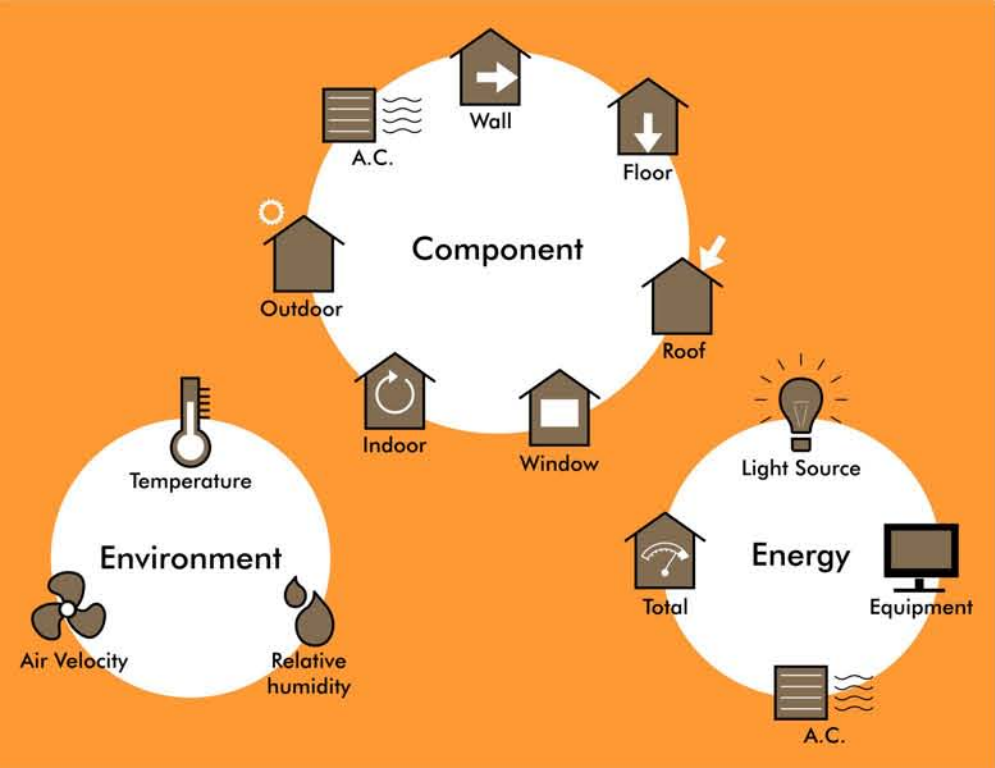
Energy simulation and modeling tools are playing vital role in designing energy-efficient buildings and in understanding the performance of various design and technologies. These tools also help in estimating the potential of energy-efficient measures and implications of policy intervention.

While these simulation tools are developed using years of research in building physics, building system research, computer software technology and human behaviours, it is very well understood by scientific community that energy calculations in virtual world will differ in comparison to real world. The reasons and causes behind the differences have been studied in various parts of the world. However, looking at Indian context, such exercise has not been conducted enough to generate critical knowledge mass.



The energy model calibration exercise compares the simulated outputs with on-site measured data and then tries to derive parallels to understand deviation. This exercise will also help in developing detailed strategy to calibrate future virtual energy models.





## About Project

The research exercise aims to develop calibrated building energy simulation using approaches outlined in International Standards and guidelines (ASHRAE Guideline 14-2002, IPMVP-2002).

Initially, two identical life size test beds will be constructed having different building envelope characteristics. One test bed will be constructed using 'business as usual' construction materials and practices and the second test bed will be constructed using resource-efficient construction materials. High accuracy sensing and monitoring system will be installed on these test beds to measure important environmental and energy conditions such as temperature, relative humidity, air velocity and energy use.

The monitoring set up will also include outdoor environmental data logging system, a 'Weather Station', to measure sixteen weather parameters which will help in analyzing monitored conditions in context of outdoor environmental situation. The monitoring system will be using wireless mesh-based network with central location and will also have remote monitoring capabilities.

Simultaneously, virtual simulation will be carried out using state-of-art simulation tools. After successful calibration of the simulation models, similar exercise will be conducted in real building and will be monitored for its environmental and energy performance.

Once sufficient measured data has been obtained, the whole building as well as component level comparisons will be made between measured and simulated performance of the buildings and the reasons for the difference in performance will be evaluated. Based on parametric, sensitivity analysis and comparison of results critical knowledge will be developed for Indian context.

This study is an effort initiated by Centre for Sustainable Environment and Energy (CSEE) at CEPT University and is supported by Ministry of New and Renewable Energy, Govt. of India. CSEE is also partnering with local Indian academic and research institutes to accomplish this exercise.

## About CEPT University

CEPT University sponsored by Centre for Environmental Planning and Technology Trust, is a premier institute in India that offers various academic and research programs.

Centre for Sustainable Environment and Energy (CSEE) at CEPT University aims to providing an impetus for research in energy efficiency in built environment & energy - resource management at large.

CSEE has been awarded a status of a "Regional Energy Efficiency Centre on building energy efficiency" by USAID ECOIII program and "Centre for Excellence in Solar Passive Architecture & Green Building Technologies" by Ministry of New and Renewable Energy, Government of India.

## For further information

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