

# 3 Day- Training & Capacity Building Programme on Performance Evaluation Tools for Sustainable Buildings

1<sup>st</sup> to 3<sup>rd</sup> August, 2019  
at TERI-Southern Regional Centre, Bangalore



The Energy and Resources Institute

Knowledge Partners:



INTEGRATED  
ENVIRONMENTAL  
SOLUTIONS

**Organized by**

# **TERI's Building Science Training Centre**

**The Energy & Resources Institute**

**4th Main, 2nd Cross, Domlur 2nd stage  
Bangalore 560071, Karnataka, India**

**Phone: +91 80 25356590**

**Fax: +91 80 25356589**

**E-mail: [r.kumar@teri.res.in](mailto:r.kumar@teri.res.in)**



**The Energy and Resources Institute**

*...towards global  
sustainable development*

## Background

India, in its commitment to achieve the Sustainable Development Goals (SDGs), has the agenda to promote sustainable and inclusive growth of cities in order to protect the environment. The Nationally Determined Contributions (NDCs) communicated to the Conference of the Parties (CoP) at the UNFCCC, was one of the significant steps in achieving the SDGs. This implies that India would have to achieve its economic growth with minimum levels of emissions by emphasising on new technologies for achieving low carbon growth.

Buildings and construction sector is responsible for energy related CO<sub>2</sub> emissions. In order to achieve the committed SDGs and NDCs, sustainable buildings and sustainable construction practices will play a vital role in achieving environment friendly development.

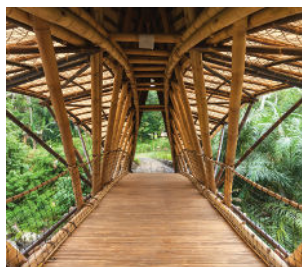


### *Overcoming the challenge:*

The construction industry has a mix of organized and unorganized players right from construction workers to contractors, engineers, architects, material manufacturers etc. As per the report, 82.45% of construction industry players are unskilled. Percentage of Professionals with capacities to undertake sustainable development, further comes down to less than 10%.

Human Resources who build India play a critical role in achieving sustainable development. Thus it is crucial to carry out capacity building of construction industry stakeholders, to enhance skills for integration of environmental parameters and sustainability factors for future development and construction.

The aim of the program is to meet the shortage of trained manpower to undertake sustainable construction and green buildings in the country.





## Green Buildings

All buildings use resources such as land, water, energy, materials and time to fulfil the functional needs of a space over an extended period of time and leave impacts on the environment. Buildings that are resource-efficient and fulfil the functional requirement of the space with minimum negative impact on the environment over the maximum possible time are termed as green buildings.



## About the programme

TERI is organising a 3day programme for engineers and architects from across the country. The training program will be conducted by TERI professionals and renowned architects. The training program will cover concepts of sustainable development, tools available for performance analysis, hands-on exercises for demand calculation of energy, water, waste, use of dynamic software for energy demand calculations, lighting, thermal comfort and Life Cycle Thinking Analysis for green building measures.



# DAY 1

## Session I: Overview and Concepts of Sustainable Development, Codes and Standards in India

Faculty: Ar. Minni Sastry

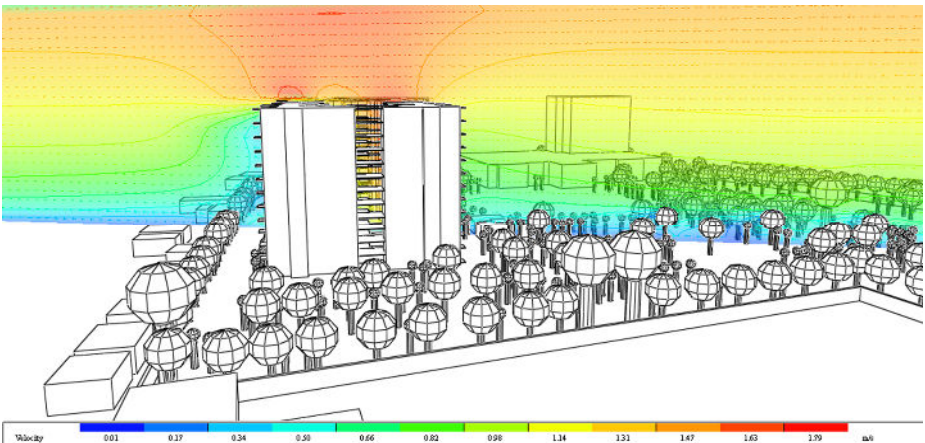
The Technical Session will be covered in an integrated approach, covering all the aspects of designing a green and sustainable building. Solar Passive Architecture, Climate Responsive Design, Efficient Lighting Design, Low Energy Cooling/Heating Systems, Efficient HVAC, Integration of Energy Systems, Sustainable practices during construction, Operational practices to maintain sustainability of building, Human comfort, wellness and performance parameters for resource consumption, all will be covered during the session. The Technical Session will also be covered for existing buildings codes, standards and policies at Centers and State level in India to implement Sustainable Development.



# DAY 1

## Session II: Sustainable Site planning and Microclimate Analysis, Faculty: Ar. Kiriti Sahoo

To maximize the conservation of resources, it is crucial to carry out climate and micro climate analysis as the first step towards sustainable development in order to optimize the utilization of resources. Environmental parameters such as wind movement at neighborhood level through CFD analysis, micro-climate air temperatures and solar irradiation received at campus level are some of the analysis which will be taught through hand holding exercises. Outdoor and indoor thermal comfort calculations and analysis using software such as TRNSYS will be taught during the session.

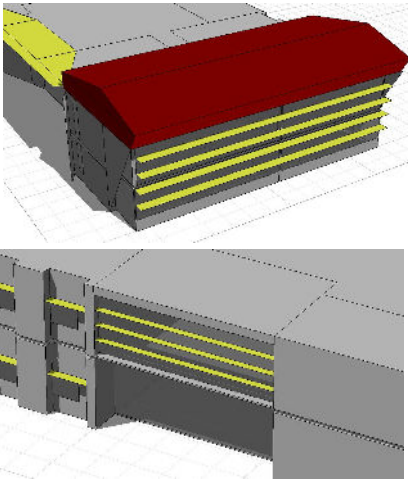


# DAY 2

## Session III

### Introduction on integration of daylight, efficient lighting and Calculation methods

Faculty: Ar. Vini Halve



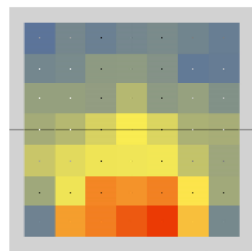
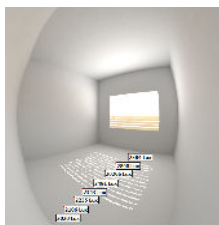
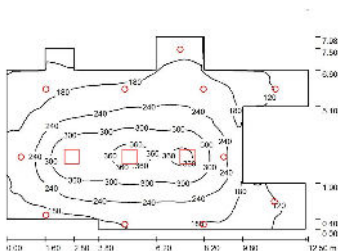
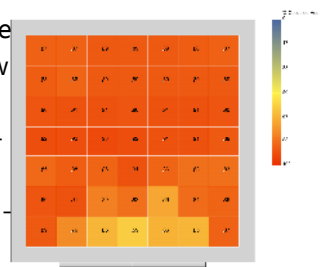
Daylight inside a building depends entirely upon the design of the building, orientation, opening design, shading, internal arrangements etc. The session will cover definitions and concepts for daylight integration, calculations for Daylight Factor (DF), useful daylight illuminance (UDI), Daylight Autonomy (DA) and hand holding exercises. Various green building certifications in India have requirement for daylight integration, these will be explained along with handholding exercises.

## Session IV:

### Use of software to predict daylight availability

Faculty: Ar. Vini Halve

Introduction on software capabilities in predicting the daylight availability in buildings, the session will show case creation of geometries for daylight simulations, use of climate files, sky models, use of materials, rendering and accuracy of simulated results, along with comparison of simulation results with manual calculations.



## DAY 3

### Session V:

#### Efficient Cooling Technologies and Whole Building Energy Performance Simulation

Faculty: Mr Siva Rama Krishna Evani

The session will showcase impact of building envelope and selection of optimized building materials to enhance the thermal comfort and annual energy consumption of buildings. Concepts of integrated approach of optimized envelope, efficient lighting and efficient cooling systems will be covered, followed by hand holding of use of tools available in the market to quantify the performance of building design and expected resource consumption post construction and operation.

### Session VI :

#### Life Cycle Thinking

Faculty: Mr Harish Borah, ADW Developments, UK

Detailed methodology to calculate life cycle analysis for efficient measures will be taught, along with calculation of simple payback.





## Faculty

Ar. Minni Sastry  
Ar. Kiriti Sahoo  
Ar. Vini Halve  
Mr. Siva Rama Krishna E.  
Mr Harish Borah

## Who should participate

Architects, MEP Engineers, Contractors , PMC Consultants, PHE Engineers, Civil engineers, Structural Engineers, Technical Heads, Researchers, Academicians, Graduate Students, Government Officers, ULB officials etc.

## Registration Fee\*

INR 14,500 (Early bird offer until 20<sup>th</sup> July 2019)

INR 16,500( 21<sup>st</sup> July 2019 onwards)

\*The fee is non-refundable and inclusive of GST.

- 1 Certificate will be provided upon successful completion of the training program
- 2 Limited to 35 participants per training program.
- 3 The registration fee includes cost towards course material, lunch and refreshment.
- 4 Accommodation shall be arranged upon request on payment basis.
- 5 Those opting for online registration can visit the website ([click here](#)) and click **Register now**.
- 6 For offline registration, please send us the duly filled registration form along with a cheque/DD using the details below:

### Payment details

Name of Beneficiary	The Energy & Resources Institute
Name of Bank/Code	HDFC Bank/0184
Account No.	01841000050017
IFSC/RTGS/NEFT	HDFC0000184



## About TERI's Building Science Training Centre in Bangalore

The Sustainable Habitat Division, Bangalore carries out research, consultancy, facilitation for certification and outreach to mainstream sustainable buildings in India. The group consists of Architects & Engineers who have worked with corporates & PSUs like ITC, Ingersoll Rand, SATTVA, Zuari, HUDCO, HAL, ISRO, BARC, to help them build green campuses and green buildings. The group has been carrying out research for sustainable built environment covering wide spectrum of areas such as urban heat island, climate resilient designs, sustainability index of building materials, passive and low energy design. The knowledge gained through research & consultancy is disseminated through various training programs, hand holding workshops to various stake holders in the building industry. TERI's Building Science Training Centre in Bangalore has been the hub of activities for all training programs.

**Applied Research** has been carried out by the centre to mainstream sustainable building materials and energy efficiency measures by partnering with Wienerberger, Saint Gobain Research India, Sharp, Jepeva, BPS, Ishaan Industries to carry out efficiency performance analysis of their products. At neighbourhood level, research is being carried out to establish relationship between urban planning, building designs and climate change due to higher air temperatures and Urban Heat Island Effect and to mitigate climate change due to buildings. The group is currently carrying out research projects under the funding of DST and DBT, Government of India.

**Policy Interventions** has been carried out by the group's work with Urban Local Bodies to integrate Sustainability measures in the building bye laws and sanction processes. Such activities have been carried out for Bangalore, Hyderabad and Chennai.

**Green Building Consultancy:** The group has been providing research based green building consultancy as well as facilitation for green building certifications for a wide range of corporates and PSUs.

**Climate resilient low cost building designs** has been carried in various geographical location, the built environment is exposed to various climate vulnerabilities, in order to provide safe and comfortable indoor environment. projects have been carried out in Nepal and Bangladesh, project with HUDCO to quantify sustainability, affordability and replicability of various efficiency measures, for their integration in affordable housing sector

**Outreach** The group has been organizing training programs for Architects, Engineers and Students to enhance capacities in designing sustainable buildings and to disseminate the benefits of sustainable buildings. The group also organizes an annual event in South India to disseminate the outcomes of various research activities carried out.