

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY AND MANAGEMENT – KERALA
(An Autonomous Institution Established by the Govt. of Kerala)

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**LEED FACILITATION TO ACHIEVE GREEN BUILDING RATING FOR THE
PROPOSED DEVELOPMENT OF CAMPUS OF IIITM-K AT TECHNOCITY,
PALLIPPURAM, THIRUVANANTHAPURAM**

**Detailed Scope of Services to be rendered by
Green Building Consultant**

A. FEASIBILITY STUDY

I. Overall Scope of Work

The scope of feasibility activity will be as follows:

1. Evaluate realistic rating (certified Silver/Gold/Platinum) that can be aimed for the project.
2. Evaluate the project for all the prerequisites as required under the LEED India CS program
3. Identify improvements required over and above what have already been considered
4. Estimate financial implications for Client to implement the improvements suggested and achieve the LEED India rating.
5. Estimate tangible benefits to Client over the life cycle of the Building.
6. Prepare time frame required for LEED India implementation.
7. Suggestions on the usage of materials for the construction of the building.
8. Submission of final documents and obtaining LEED certificate to project implementation team.

II Methodology

The Feasibility study will be carried out as follows:

1. Discussion with concerned operational team to understand the functional requirements of the building
2. Evaluate broadly the likely points that can be achieved under the LEED India CS rating programme.

3. Presentation to top management on the likely points, improvements to be made to achieve the projected points and benefits
4. Detailed point-wise report on the findings of the feasibility study

B. FACILITATING GREEN BUILDING RATING

1 Overall scope of work

1. The facilitating team will handhold the project team in its Green Building activities and help achieve the LEED India rating of IGBC.
2. **The scope of facilitation services would include the following:**
 - Overall facilitation to obtain LEED-India Core and Shell (LEED India –CS) rating from IGBC under their LEED India programme
 - Creating awareness on Green Building concepts and LEED India rating system for the project team
 - Facilitate the project design team to select materials/equipment to meet the LEED India requirement. Support in identifying vendors for the project to meet LEED India requirement
 - Vet the tender document for the ‘Construction of New Campus at Technocity –Phase I: Academic Block & Hostel Building’ to ensure the tender technical specification meets the LEED India requirement
 - Co-ordinate with the energy and lighting consultant on energy simulation and support project team in selecting energy efficient and eco-friendly technologies based on life cycle analysis.
 - Co-ordinate with the design team to prepare drawings & documents required to submit to IGBC for LEED rating.
 - Filter, cross validate, verify consistency, add value and consolidate to make the document suitable for submission to IGBC.
 - Scrutinize the LEED documents before submission to IGBC. Provide inputs on previous credit interpretation requests.
 - Prepare review document in consultation with the design team for second submission to IGBC for award of LEED certification for the project.

2. Methodology & Scope of Work

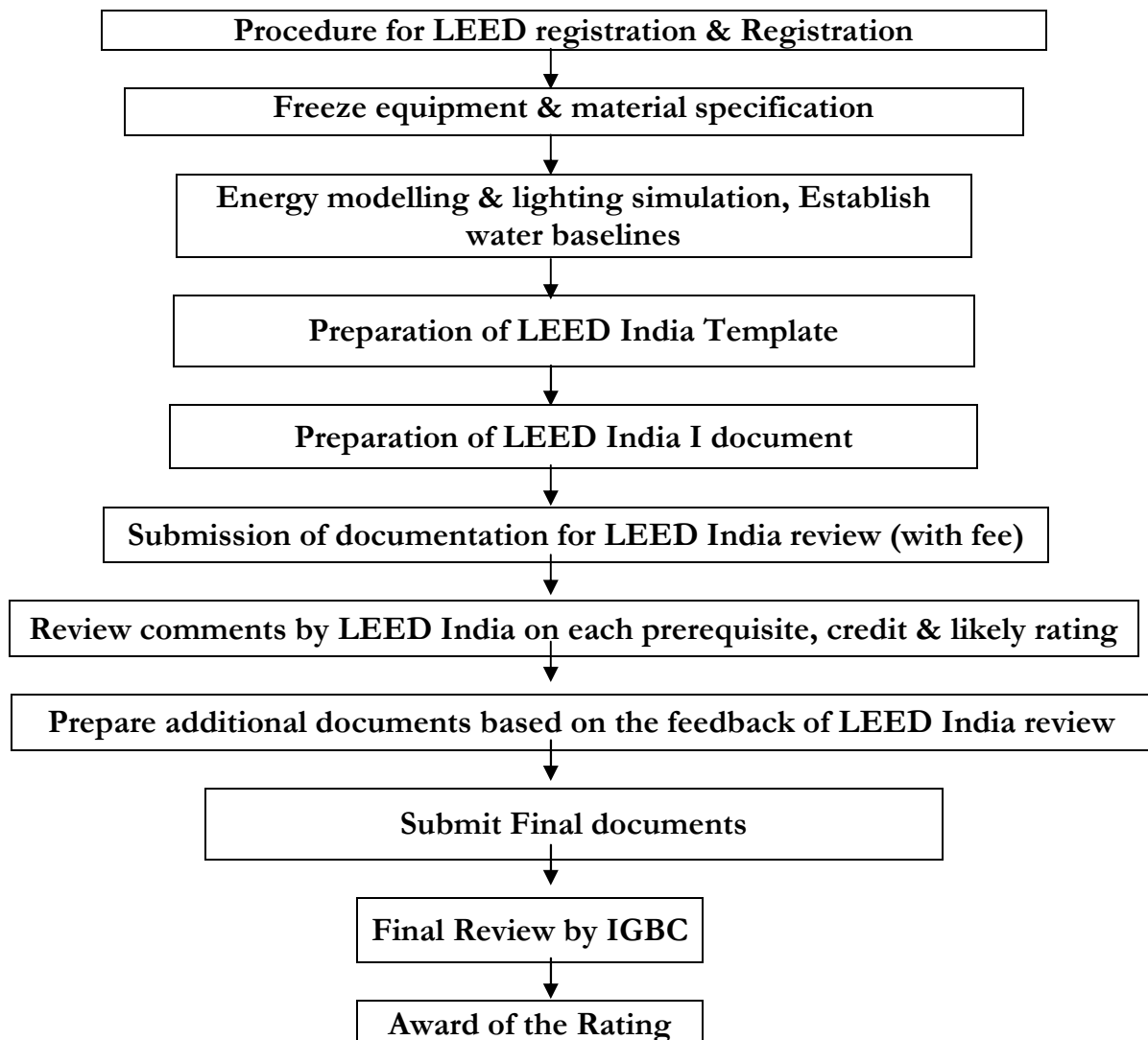
- The facilitation team will be responsible for achieving the Green Building Rating of IGBC.

The scope of work would be as follows:

Overall facilitation for LEED India Registration

- As a first step towards LEED India rating system, it is essential to register the project with IGBC for LEED India rating.
- The project registration during the early stage of the project is ideal, since this will entail establishing primary contact with IGBC on the project. This will also help in receiving latest updates from IGBC.
- The facilitation team will help the project team in registering the project and facilitate preparation of documentation.
- The road map, clearly indicating the different stages of LEED India rating to complete the process is shown in the flow chart.

Roadmap to achieve Green Building rating for the Project



- Prepare and provide all necessary templates for the design team, so as to meet LEED India requirements
- Facilitate project team in preparing the documentation as stipulated by LEED India.
- Define the scope of work for the commissioning agent
- Scrutinize the LEED India documents before submission to IGBC. Provide inputs on previous credit interpretation requests

III. Training Programme on LEED India Rating System

1. The entire project team should first be acquainted with the LEED India rating system and expectations.
2. During the initial phase, there will be a one-day training programme on LEED India rating system. Training would continue through the implementation of the project.
3. The training programme will facilitate the project team to understand:
 - LEED India rating system
 - Prerequisites to be met
 - Different credits available
 - How to contend for each of the 61 points
 - Understand the documentation process and
 - Strategies to achieve the points & related benefits.

The overall objective of the training programme is to facilitate the project team so as to implement the LEED India rating requirements.

The training programme will broadly cover the following topics:

- Green building concept
- LEED India rating system
- Benefits of green buildings
- Sustainable sites
- Water efficiency & management

- Energy and atmosphere
- Materials & resources
- Indoor air quality
- Innovation and design process
- Case studies on Green buildings

This training programme will be conducted for the project team at IIITM-K Buildings, Technopark Campus, Thiruvananthapuram

IV. Facilitation of Documentation

The Green Building Consultant shall prepare the documentation in accordance with the LEED India requirements including **the documentation, designs, drawings, calculations and basic data**. Documentation would be supported by drawings, test results, equipment catalogues and calculations.

V Selection of Equipment and Materials

1. The Green Building Consultant will help the project team in selecting appropriate energy efficient & eco-friendly technologies, equipment & materials for the building, which include air-conditioning, lighting system, white goods, water treatment technologies, renewable energy, non-toxic paints, certified woods, rapidly renewable materials, recycled materials, eco-friendly materials, etc.
2. The Green Building Consultant will also help in drawing out the specifications of these equipment and materials to suit the LEED India requirement.
3. The Green Building Consultant will support the project team at different stages in selecting suitable vendors and suppliers for the project. The facilitation team would also interact with various vendors and suppliers, so as to meet the LEED India specifications.

VI Develop Templates for LEED India calculations

1. In order to achieve certain points, it is essential to build the data collection in well-designed format.
2. The Green Building Consultant will develop such templates, which calls for a detailed understanding of the calculation requirements of LEED India.

3. Typical templates include material related credits, construction waste management at site etc.

VIII. Review Meetings

1. The project execution needs to be reviewed at different stages of construction at different levels, so as to ensure smooth implementation of the LEED India requirements.
2. The facilitation team will hold periodical site meetings to facilitate review of implementation of LEED India rating systems. These meetings will be organised, periodically with the participation of all concerned personnel involved in the project (representatives from the project team, consultants, contractors, and commissioning agent).
3. The review meetings will help in negotiating and devising new plans and strategies to achieve the ultimate goal.

C. ENERGY & LIGHTING SIMULATION

1 Overall scope of work

The energy modeling & lighting simulation consultant of the LEED Team will perform the following activities:

- Energy simulation
- Lighting simulation for Light Pollution Reduction
- Daylighting Simulations

The consultant will prepare the necessary drawings and documents to achieve the following LEED India credits:

1. Minimum Energy performance (Prerequisite)
2. Optimize energy performance (1-10 Credit Points)
3. Light pollution reduction (1 credit point)
4. Daylights & Views (2 credit points)

The broad scope of energy simulation is as follows:

- Develop ASHRAE 90.1 2004 base-case assumptions for LEED India certification
- Modeling assumptions and schedules for the project
- Base case simulation including validation and debugging

- Identification of improvements and alternatives (Energy Conservation Measures - ECMs)
- Analysis of individual ECM results
- Prioritizing and evaluation of combined ECMs
- Lighting simulation using “Lumen Micro or equivalent lighting simulation package” to meet the LEED India requirement
- Support in LEED India documentation
- Incorporating changes required in the modeling subsequent to the 1st LEED India review.

2. Detailed scope of simulation

2.1 Modeling Assumptions

Carryout the simulation in accordance with ASHRAE 90.1-2004 / ECBC performance rating method. The simulation would consider appropriate modeling assumptions, schedules for the project for various occupancies, defining equipment power densities, air changes per hour, lighting density, occupant density, determining window-wall-ratio, floor-to-floor heights, plenum height, SHGC and U-factors for fenestration, etc.,

2.2 Base Case Model

The base case would be developed considering the following:

- Layout of the existing design, defining thermal zones within the building, reviewing the mechanical & electrical plans and selecting an appropriate weather file.
- Importing the above information to Visual DOE or any other equivalent energy simulation tool and setting up the base case with appropriate information for each zone.
- Applying modeling assumptions to various zones according to their occupancies.
- Carryout the simulation and check generated reports for validity.
- Carryout several iterations so as to ensure that the model accurately represents the thermal behavior of the designed case and it runs smoothly without running into errors.

2.3 LEED India Version 1.0 requirements

LEED India version 1.0 requires simulation in line with ASHRAE 90.1-2004 / ECBC specifications. All documentation and reports required for the LEED India submission would be compiled.

2.4 Energy Conservation Measures

Evolve alternate energy conservation measures in consultation with the owner & other consultants and incorporate in the modeling to define the 'proposed case'. Under this task, various ECMs will be identified, detailed and incorporated into the base case.

Several cases (Base Case + ECM1, Base Case + ECM2, base Case + ... ECMn) will be defined and simulated.

2.5 Analysis

Carrying out detailed analysis of individual ECM results. The results from the previous task will be scanned for suitability in each case.

2.6 Combining ECMs

Combined ECMs based on the resultant savings from each ECM would be evaluated. Eventually, all ECMs that yield satisfactory results will be combined into a single case. Several configurations of Base Case + ECMs need to be defined and simulated before arriving at the best or optimum combination of ECMs. At the end of the simulation, detailed specifications will be prepared for selection of materials and equipment like Glass, facade material, use of on-site renewable energy, Air-conditioning equipment, insulating materials, light fixtures, etc.

2.7 Lighting simulation

The consultants will carryout lighting simulation using **Lumen Micro or equivalent lighting simulation package**. The consultant would also suggest the type of lamps & luminaires for eliminating the light pollution.

2.8 Indoor Environmental Quality

The agency shall address the day lighting & Views aspects of the indoor Environmental Quality.

Scope would include fenestration analysis and design with the help of software Tools (Lumen Micro 2000 and Sun TOOL 2000, etc.,) to

achieve diffuse sunlight penetration and provide direct line of sight to occupied spaces. **The agency** shall provide documentation (Drawing and a Narrative) to Demonstrate Compliance with Daylight & Views for regularly occupied areas as per LEED India requirements.

D. FUNDAMENTAL BUILDING SYSTEMS COMMISSIONING

The overall intent of fundamental building systems commissioning is to ensure that all building elements and systems are designed, installed and calibrated to operate as intended.

1 Qualification of Commissioning Authority

The commissioning authority (CA) of the LEED Team must be well qualified for managerial and technical aspects of the project. The CA should have experience in construction management, design, engineering, hands-on field experience with equipment and trouble shooting, energy efficiency and operations & maintenance.

2 Overall scope of fundamental building systems commissioning

The overall scope of fundamental building systems commissioning is as follows:

- Develop a commissioning plan for all equipment and systems (like HVAC, Pumps, Cooling tower, Heating systems, BMS, Lighting, etc.,
- Review design intent and basis of design documentation for each of the equipment and systems
- Verify inclusion of commissioning requirements in the tender, installation and commissioning documents in accordance with the commissioning plan
- Verify installation, functional performance, training and documentation for each of the equipment/system
- Prepare commissioning report

The detailed scope of work is as follows:

2.1 Responsibility of commissioning authority

The commissioning authority is responsible for implementation of all fundamental commissioning procedures.

The commissioning authority would carryout the following:

- Overall supervision of commissioning process of equipment/systems
- Report to the owner regarding the performance of the building system/equipment
- Introduce standard procedures and strategies to ensure implementation of owner's requirement

2.2 Document the owner's requirements and basis of design

The commissioning authority would carryout the following:

- Document and vet owner's requirements and basis of design for all building systems/equipment to meet LEED India specifications.

Typically the systems include the following:

HVAC system, Lighting system, energy efficiency, water efficiency, Indoor air quality and overall environmental responsive of the facility, etc.

The basis of design should consider occupancy, climatic assumptions, load fluctuations, space requirements, codes & standards.

2.3 Include commissioning requirements in the construction documents

The CA will ensure incorporating the commissioning requirements in each of the contract documents and should clearly describe the following:

- The scope of commissioning
- Feature and systems to be commissioned
- Requirements of **inspection, start-up, testing, training, O&M documentation and warranty period activities, commissioning documentation requirements, schedule and rigor & scope of testing.**

2.4 Create a commissioning plan

A detailed commissioning plan should be prepared at the design stage. **In case, decision to go for the LEED India rating has been made after the designed phase, the commissioning plan can be completed prior to installation of equipment / systems.**

To satisfy the LEED prerequisite the commissioning plan should capture the following:

- A list of all commissioned features and system in the project
- A brief overview of the commissioning process

- List of parties involved the commissioning process and their responsibilities
- A description of how commissioning plan has been communicated and managed
- Commissioning procedure of each of equipment / system and briefly outline how this would be achieved. This should capture procedures for startup, testing, training, O & M documentation and warranty period activities.
- Activity schedule
- Description of rigor and scope of testing for each of the system

2.5 Verify installation, functional performance, training and documentation

The commissioning authority must complete the following on each commissioned component, equipment, systems or feature:

- **Installation observation:** The commissioning authority must verify all equipment/system/component to ensure that they are properly installed as per the direction of manufacturer.
- **Start-up & checkout:** Ensure that the contractor completes the startup and initial checkup of all items. The results must be clearly documented according to manufacturers written instructions.
- **Sampling:** The commissioning authority by appropriate sampling techniques will verify that all control systems, actuators are functioning as intended.
- **Functional testing:** Functional testing should be documented either by the Contractor's Test Engineer with review and approval by commissioning authority.

After initial check, test sequences and control strategies such as startup, shutdown, unoccupied and manual modes, modulation up and down the unit's range of capacity, power failure, alarms, response of the backup equipment and interlocking of other equipment. **All large equipments should be individually tested.** Small units can be tested based on a specific sampling strategy.

Heating equipment to be tested during winter and air-conditioning equipment during summer to demonstrate performance close to design conditions.

- **Training:** The commissioning authority should ensure that proper training was conducted on all commissioned equipment / system.

The training should cover the following:

- Design intent of the system,
- Use of O&M manual
- Review of control drawings and schematics
- Startup, handling seasonal variations, trouble shooting and alarms

- Optimizing energy performance
- Health and safety issues
- Special maintenance and replacement sources
- Training on how the systems is environmentally responsive
- **O&M Manual:** Commissioning authority must review the O&M manuals provided by the suppliers. The O&M data sheets must be bound, labeled with section breaks for easy access. The manual should contain vendor name, address, telephone number, installation contractor details, O&M procedure, etc. The manual should include instructions for maintenance and operation, as built controls drawings and narratives for various modes of operation.

2.6 Commissioning report

A comprehensive commissioning report must be prepared and presented to the owner by the commissioning authority after completion of all functional tests.

The following are the typical component of commissioning report:

- Design intent
- Meeting of specification
- Ensuring proper installation
- Functional performance and efficiency
- O & M documentation
- Operator training

The commissioning report must also contain list of outstanding commissioning issues and schedule of any testing that has been scheduled for a later date. All completed functional tests should be listed in an appendix to the commissioning report.

The CA would engage a representative and position at site to oversee all commissioning related jobs.

**Director
IIITM-K**