



Terms of Reference

for

“Investment Grade Energy Audit and Identify Retrofitting Recommendations for a Public Hospital, Chennai”

Location:	Chennai, Tamil Nadu, India
Type of Consultancy:	Independent consultants or Firms
Proposal Submission Deadline:	05 th February 2025
Indicative Starting Date:	10 th February 2025
(date when the selected consultant(s) is expected to start)	
Envisaged Duration of Contract:	2 months

1. Introduction

ICLEI – Local Governments for Sustainability is a global city network association of more than 2500 local and regional governments committed to sustainable urban development. ICLEI South Asia, the South Asian arm of ICLEI, works with regional and city governments in the South Asian region through programs and projects on climate change and urban sustainability.

In this regard, ICLEI South Asia is assisting a public department in Tamil Nadu to implement sustainable energy efficiency measures across public buildings. Under the initiative, government has proposed the retrofitting of a public hospital in Chennai through undertaking detailed energy audits of the facility and improve overall building energy and sustainability performance.

This document of Terms of References (ToR), seeks proposals from the consultant/firm to conduct a comprehensive energy audit and provide retrofit recommendation for a public hospital being owned and operated by the Department of Health, Government of Tamil Nadu.

Through a systematic energy audit and careful analysis, this request for proposal seeks to reduce the hospital's energy consumption and operational costs, enhancing environmental performance while contributing to Tamil Nadu's sustainability goals of achieving net-zero well before 2070.

2. Scope of Work

2.1. Site description

The public hospital complex covers 3 main buildings and several smaller buildings that house various medical departments, in-patient wards, diagnostic laboratories, emergency units, administrative offices, and medical research facilities. The hospital provides 24/7 healthcare services, which leads to substantial energy requirements for heating, ventilation, air conditioning (HVAC), lighting, and critical medical equipment.

Approximate area details for the 3 major hospital building blocks are provided below.

- Building 1: 1.02 ha X 7 floors
- Building 2: 0.462 ha x 6 floors
- Buildings 3: 0.464 ha X 6 floors

2.2. Objective and tasks

Task I: Energy Audit and Analysis (ASHRAE Level 2)

The project's scope will include the following tasks:

- Conduct a detailed ASHRAE Level 2 energy audit, including an extensive walk-through assessment to collect data on energy consumption patterns. This will involve physical inspections, measurements, interviews, and analysis of energy-consuming equipment, utility bills, operational hours, and building layout. Bidder may also refer to the recent

notifications/guidelines published by Government of India through Bureau of Energy Efficiency (BEE) or relevant institutions.

- Undertake equipment level physical measurements using required instruments in the identified buildings to assess the current energy consumption and performance levels and identify major issues/gaps in the system.
- Review existing documentation on the facility, including architectural plans, engineering designs, utility bills, and equipment specifications.
- Establish a baseline energy consumption profile using at least one year of historical utility data and reconcile it with end-use estimates for all major energy-consuming equipment.
- Benchmark the hospital's energy performance against similar facilities, assessing key systems such as HVAC, pumping, compressors, lighting, water heating and energy intensive processes in the hospital buildings to identify performance improvement measures. Following aspects to be considered at minimum to develop set of recommendations for the hospital facility.

1. ***Retrofit Recommendations***

- Develop specific recommendations for energy-efficient retrofits, such as HVAC system upgrades, improved building envelop performance, lighting retrofits, and renewable energy integration, where feasible. Energy/power infrastructure to be looked at such as transformers at site to identify energy efficiency and demand side management opportunities and recommendations.
- Prepare a comprehensive list of short-term, medium-term, and long-term retrofit measures, prioritizing them based on feasibility and cost-effectiveness.

2. ***Payback Analysis***

- Identify and categorize energy-saving opportunities based on potential savings, investment requirements, and payback periods, following the Investment Grade Audit (IGA) framework.
- Calculate savings in energy costs for each retrofit recommendation, determine the return on investment (ROI), and perform a detailed payback analysis to classify options as short-term, medium-term, or long-term.

3. ***Final Report and Presentation***

- Compile a final report detailing audit findings, energy-saving recommendations, cost analysis, and projected impact on operational expenses.
- Present the findings to stakeholders, outlining key actions and guiding the hospital team through implementation.

Task II: Building Envelope Simulation

Objectives

- To evaluate the existing building energy performance of the hospital buildings through 'whole building simulation approach', and assess/simulate the desired performance in

terms of the percentage improvement in energy & costs savings, and aligned with governing regulations such as the Energy Conservation Building Code (ECBC) codes.

- Whole building simulation analysis would entail energy efficiency improvement measures in existing buildings, at equipment and system level, to achieve desired energy efficiency, thermal and visual comfort.

1. *Building Envelope Simulation*

- To Undertake 'whole building simulation', using suitable proprietary software tools, incorporating available building design, equipment and specifications (including architectural and engineering designs) documents as relevant for the hospital buildings and incorporating the findings from the site visits and analysis.

2. *Retrofit recommendations and validation through simulation*

- Identify areas for improvement with regard to the comfort level of the occupants (indoor environment-thermal and visual) and energy efficiency opportunities for the selected hospital buildings. Health and well-being performance indicators to be looked at and recommendations to be added accordingly.
- The thermal and daylighting performance of the buildings will be assessed such that the geographical location of the city, temperature variations over a period of time, climatic conditions, wind patterns etc., are accounted for.

This will have a direct impact on the energy consumed by the occupants throughout the year. The possibility of integrating passive technologies/design strategies will be explored. While conducting the simulation of the existing building blocks following aspects will be covered:

- Existing equipment and fixtures (lighting and space cooling/heating) installed including the centralized and decentralized HVAC systems
- Shading features of the building envelope
- Fenestrations and associated leakages- Solar Heat Gain Coefficient (SHGC) and Visible Light Transmittance (VLT) of windows.
- Windows to wall ratio analysis
- Solar reflectance of exterior wall, roof treatment and Heat Island Effect
- Building materials to identify suitable insulation materials to achieve optimum thermal performance
- Retrofitting solutions for improving natural ventilation

3. *Assessing the potential for on-site Renewable Energy*

- On-site generation of renewable energy (RE) will make the hospital buildings more self-sustaining and energy efficient. Potential for building level RE systems like rooftop solar PV systems, solar thermal water heaters, is required to be assessed for their suitability to the project.

Building simulation is intended to help hospital administration to choose the right equipment by modelling site specific parameters and inputs and do the accurate calculations of energy as well

as monetary savings and achieve highest energy performance- which is critical in case of 24*7 operational hospitals with large HVAC load and other energy intensive loads and equipment.

Task III: Water & Waste Audits

The scope of this task would be to undertake the following activities:

1. *Water Audit*

- Provide recommendations to support water management and identify opportunities for additional water savings by tracking water consumption including metering for water usage as well as reused water and recommendations for regular monitoring and maintenance.
- Assess building's indoor plumbing fixtures and fittings performance considering usage at various services such as kitchen, public lavatory, urinal, among others and provide recommendations for retrofitting the existing fittings for optimum water consumption and to meet optimum performance as per the LEED/IGBC standards.
- Provide recommendations for rain-water harvesting and ground water recharge based on the building footprint and regional average rainfall patterns.
- Provide recommendations for the water recycle and reuse considering the wastewater being generated at the hospital building.

2. *Waste Audit*

- Waste Stream Analysis: Audit and categorize waste into general, recyclable, organic, and hazardous types using data logs available at the facility and in-person interviews/meetings.
- Segregation Review: Evaluate and recommend improvements for waste segregation practices using color-coded bins.
- Collection and Storage: Assess storage and collection systems, providing recommendations for efficient handling.
- Reduction Strategies: Suggest alternatives to reduce single-use items and improve waste reduction.
- Recycling Opportunities: Identify materials suitable for recycling or repurposing and recommend actions.
- Hazardous Waste Management: Review current disposal practices and suggest improvements to meet compliance standards.
- Monitoring and Maintenance: Recommend establishing waste tracking systems and regular monitoring processes.

3. Deliverables

- 1. Task I: Investment grade energy audit and report with detailed energy conservation measures and techno economic feasibility analysis and cost estimates**

2. **Task II: Building energy modelling and simulation report including analysis on current building energy performance and recommendations to improve and achieve relevant national building codes criteria**
3. **Task III: Water and waste audit and identify opportunities for improvement in the process at site and provide recommendations. Task III recommendations and report to be combined with Task I report.**
4. The consultant is expected to present findings and recommendations of the full scope of work to ICLEI South Asia and Tamil Nadu state government. Final reports and documents shall be submitted after addressal of comments and inputs provided by ICLEI South Asia and Tamil Nadu state government to the draft reports.

4. Project timeline, payment and assignment execution

4.1. Timeline of Project

TASK	DURATION	EXPECTED COMPLETION DATE
Data collection and secondary research	2 weeks	T+ 2 weeks
On site energy audit & analysis	1 weeks	T+ 3 weeks
Draft reports for all tasks: Analysis and retrofit recommendations	3 weeks	T+ 6 weeks
Final Report & presentation	1 week	T+7 weeks

‘T’ indicates the start of project signing.

Total Project Duration: *Approximately 7 weeks*

4.2. Payment Schedule

The fee is payable upon satisfactory completion and acceptance of the deliverables by ICLEI South Asia. Breakdown of deliverables and payment disbursement is as follows:

- 40% of total work value on signing of work order.
- 30% of total work value on submission of final documents and deliverables for Task 1 from Scope of Work
- Remaining 30% of total work value upon satisfactory completion of remaining tasks and submission of final documents/reports related to Tasks I, II and III after addressing all comments/inputs raised by ICLEI South Asia and Tamil Nadu state government.

4.3. Execution approach

The consultant(s) will report to ICLEI South Asia and will work closely with ICLEI South Asia personnel and Tamil Nadu state government representatives involved in the project. Project relevant communication with the consultant(s) will be done through ICLEI South Asia. The consultant(s) will perform the assignment through a combination of desk/remote-based work and site visits, while engaging with ICLEI South Asia and concerned state government officials through virtual and in-person meetings.

The methodology proposed by the consultant(s) for the assignment's scope of work should have a clear focus to meet the primary objectives outlined in this ToR. This will be achieved through coordination with ICLEI South Asia; site visits and audit, document and literature review; technical analysis; meetings; and report writing.

ICLEI South Asia and associated Tamil Nadu government departments will not provide any equipment or technical support in executing the assignment. Steering support and strategic inputs will be provided as necessary. It is expected that the consultant(s) will sufficiently resource himself/herself to carry out the assignment.

5. Bidders Eligibility Criteria and List of Required Documents

5.1. Bidder Eligibility Criteria

Both independent consultants and firms are welcome to apply. The consultants should ideally have the following expertise and experience:

5.1.1. Technical Requirements

- Minimum 10 years of relevant combined professional experience in investment grade energy audits at health centres, hospitals, municipal and industrial facilities. Experience in design of mechanical & electrical installations in energy retrofit procedures is desirable.
- Minimum 10 years of relevant combined professional experience in building energy modelling and simulation projects design of green, low-carbon and/or net-zero building projects.
- Experience in designing low carbon hospital buildings and relevant health-focused infrastructure projects for different climatic zones with understanding and experience in energy retrofit procedures is desirable.
- Minimum 5 completed assignments involving energy audits in hospital and related infrastructure.
- Demonstrated experience in providing consultancy for energy auditing, energy efficient/green building projects having proficiency in all major green building certifications and rating systems in government and private sector. Provision of technical support to Government institutions in Tamil Nadu and working with government officials will be considered an advantage.
- Understanding of relevant business models for financing the energy retrofits capturing energy analysis and audits, maintenance and operation, cost-benefit analysis is required.
- Demonstrated experience in working with development/multi-lateral organizations, government institutions, and implementing projects and technical assistance delivery related to energy audits, green and energy efficient buildings in India. Demonstrated experience of working in Andhra Pradesh will be advantageous.

5.1.2. Financial requirements

- The bidder (if a firm) should possess valid. relevant legal documents for taxation and financial accounting purposes issued by authorized agencies (such as GST, TIN registration as relevant).
- The bidder must be registered with relevant Income tax department and should produce Latest Income Tax clearance certificate/income tax return details for last 3 financial years.

5.1.3. Education Requirement

The consultant/ Team lead (if a firm) should have a minimum of Bachelor's/Master's degree in Architecture or Engineering with minimum combined experience of 10 years in energy audits and building retrofits

5.1.4. Language Requirement

Proficient in English.

5.2. Documents to be Submitted by Participating Bidders

Interested individuals/firms must submit the following documents/information to demonstrate their qualifications:

5.2.1. Technical Proposal

The Technical proposal should provide the following information/ documents:

- a) Consultancy/ company profile (both independent consultants and firms are encouraged to apply)
- b) Bidder's experience on assignments of similar nature, the outline should indicate, inter alia, the profiles and names of the staff provided (if in case of a firm), duration of the assignment, contract amount, and firm's involvement.
- c) The bidder must possess written evidence in the form of Work order issued by the client (any city/ state/ national/ international agency) for related consultancy work. Documentary proof of working experience with development organizations and South Asian multi-lateral government institutions is encouraged.
- d) Detailed Approach and Methodology for undertaking the assignment.
- e) Project Schedule with activity and duration to accomplish the task within the scheduled project duration along with detailed work plan.
- f) Personnel plan reflecting expert names, position/role, and specific tasks assigned. Responsibilities and tasks assigned to each expert as per his / her experience shall influence the evaluation
- g) All relevant CVs shall be provided in full detail. If the CV of a proposed staff is found incorrect, the award of the consultancy to the bidder may also be liable to cancellation in light of such an event.
- h) CVs must be signed in original by the authorized representative together with original or electronic signature of the key team member at the proposal stage. However, at the time of contract signing, original signatures of both authorized representative and the Key Personnel shall be required.
- i) The consultant shall assess required support personnel both technical and administrative to undertake the assignment. Additional support and administrative staff shall be provided as needed for the timely completion of the Assignment within the total estimated cost.

Consultant should provide breakup of time estimates of key personnel as well as support staff in the staffing schedule. It is stressed that the time for the assignment indicated in the TOR should be strictly adhered.

- j) The Proposal/ bid documents must be duly signed by the authorized representative/ signatory and stamped. This shall not contain any alternative items or suggestions, comments, or conditions:
- k) By the partner holding the Power of Attorney in case of a partnership firm / limited liability partnership (A certified copy of the Power of Attorney shall accompany the proposal)
 - i. By the proprietor in case of a proprietary firm; by a duly authorized person holding the Power of Attorney or by a Board Resolution in case of a Limited Company or a corporation (A certified copy of the Power of Attorney/Board Resolution shall accompany the proposal)
 - ii. By the authorized representative of the Member in Charge in case of Joint Venture / consortium (a certified copy of Board Resolution/Power of Attorney indicating the representative shall accompany the Proposal).

Note: Bidders shall also indicate how they will execute the project within the stipulated timelines and are welcome to include any previous experience on the same.

5.2.2. Financial Proposal

The Financial proposal should provide the following information/ documents:

- a) The consultant to provide all relevant documents including company's valid registration in India/outside India issued by concerned authorities. Documents shall prove the entity's legal ability and authorization to conduct the activities described in this ToR.
- b) A Financial proposal including all manpower, equipment, software, travel, lodging and boarding, incidental costs as may be required, adequately addressing the manpower stated available for the project, as given in the technical proposal and to complete all the tasks mentioned in this ToR. A breakup of the budget items indicated above and by tasks listed in the ToR is required. For travel and on-site support, number of round-trips and pax along with approximate duration of stay to be added.
- c) The Financial proposal shall be inclusive of all the costs including taxes associated with the assignment. For the purposes of evaluation, the financial proposal should be prepared in INR.
- d) The total amount indicated in the financial proposal shall be without any condition attached or subject to any assumption and shall be final and binding. In case any assumption or condition is indicated in the financial bid, it shall be considered non-responsive and liable to be rejected.
- e) In case of any discrepancy between the amount quoted in figures and words, the amount quoted in words will be considered for evaluation purposes.
- f) A copy of valid PAN Number and particulars of registration with GST in case of Indian consultant/firm. For entities outside India, relevant legal documents to be submitted for taxation and accounting purposes.
- g) Last 3 Financial Year's balance sheet (or as applicable), audited by certified Chartered Accountant.

Please note:

- The bidder shall acquaint with the work and working conditions at site and locality. No claim shall be entertained on this issue after the bid has been submitted.
- All or any accessories/consumables/items required for satisfactory commissioning of the study/work shall be deemed to be included in the contract and shall be provided by the bidder without extra charges
- All Technical and Financial proposals should be in English. Bidders are encouraged to visit the weblink with the ToR before submission of proposals.

Failure to comply with or provide the above listed items in the Technical Proposal may result in disqualification. The bidder shall produce, original documents for cross verification as and when requested by ICLEI South Asia. Bidders shall ensure that the technical and price bid documents shall have a sign of the authorized representative/signatory, on the first and last pages at a minimum.

5.2.3. Proposal Submission

- The Terms of Reference (ToR) can be downloaded free of cost from the ICLEI South Asia website.
- The proposal document shall be submitted by bidders through email to the below mentioned email IDs on or before **05/02/2025**:
nikhil.kolsepatil@iclei.org
Nikhil Kolsepatil, Program Coordinator - Energy & Climate, ICLEI South Asia
shardul.venegurkar@iclei.org
Shardul Venegurkar, Manager - Energy & Climate, ICLEI South Asia
- Contact for queries:
Shardul Venegurkar, Manager - Energy & Climate, ICLEI South Asia
shardul.venegurkar@iclei.org; +91 –72762 93919
- The proposal shall be submitted in two documents, viz.
 - Part I: Technical Proposal
 - Part II: Financial Proposal
- The proposals shall be valid for a period of 60 days from the date of submission of proposal document.
- A bidder shall submit the proposal documents that satisfy every condition laid down in this ToR, failing which, the proposal will be liable to be rejected by ICLEI South Asia.
- In case the bidder wishes to sub-contract part of the deliverables, the final responsibility of delivery and performance solely lies with the bidder.

6. Contract Terms

6.1. Specific conditions of contract

Consultant to study conditions:

- The bidder shall be deemed to have carefully examined the work and site conditions. In this regard, he/she will be given necessary information to the best of knowledge of ICLEI South Asia in consultation with but without any guarantee to it.
- If he/she shall have any doubt as to the meaning of any portions of these general contract terms, or the scope of the work, or any other matter concerning the contract, he/she shall in good time, before submitting his tender, set forth the particulars thereof and submit them to the point of contact, as given in this TOR, by email in order that such doubts may be clarified authoritatively before tendering. ICLEI South Asia will respond to queries until September 19, 2024. Once a proposal is submitted, the matter will be decided according to the ToR conditions in the absence of such authentic pre clarification.

6.2. General conditions of contract

- The contractor/ consultant shall address all aspects of the proposed outputs and deliverables mentioned in this TOR.
- The comments and suggestions provided by the bidder on the TOR are not binding and shall not affect the financial proposal.
- It should be noted that the project is being implemented in the state of Tamil Nadu, and hence instructions to bidders will be given by ICLEI South Asia in consultation with respective state level officials. ICLEI South Asia will be overall in-charge for all the works that would be executed under the present scope of work.

6.3. Tender Evaluation & Bid Assessment

- The proposals received will be scrutinized & evaluated by ICLEI South Asia in consultation with relevant project partners. The decision shall be informed to the winning bidder.
- Bidders whose technical proposals are found to be responsive shall be informed and shall be invited for seeking any further clarification/s, either individually or through a meeting, if desired. In both the cases, the bidders shall be informed accordingly, and bidders are expected to be present at given date and time.

6.4. Award of contract

- Detailed Work Order will be issued to the winning bidder within 5 days of announcing the winning bidder.
- The winning bidder is required to submit 1 hard copy of the technical and financial proposal and the signed and sealed work order to ICLEI South Asia at the earliest or not more than 5 (five) days of issue of work order. ICLEI South Asia will provide the correspondence details as required.
- In case the winning bidder fails to indicate his/her intent to undertake the said work within the stipulated time of 5 (five) days and observe the formalities as above, the Letter of Intent will be cancelled, and the next shortlisted bidder will be finalized by ICLEI South Asia in consultation with project partners.

6.5. Compensation for delay

- Time is the essence of the contract and as such all works shall be completed within the time stipulated in the contract/ work order
- If the bidder, without reasonable cause or valid reasons, commits default in commencing

the work within the aforesaid time limit, ICLEI South Asia shall without prejudice to any other right or remedy, be at liberty, by giving 15 days' notice in writing to the consultant/contractor to commence the work, to forfeit the balance payment depending on the status of work, and to cancel the Work Order.

6.6. Extension of date of completion

On occurrences of any events causing delay as stated hereunder, the bidder shall intimate immediately in writing to ICLEI South Asia-

Force Majeure:

- Natural phenomena, including but not limited to abnormally bad weather, unprecedented flood and draught, earthquakes & epidemics.
- Political upheaval, strikes, lockouts, acts of any Government (domestic/foreign) including but not limited to war, properties, and quarantine embargoes.

***Please note** that this clause will only account if event occurs during data collection/ site visit period.*

6.7. Materials/Appliance at site

- Neither ICLEI South Asia nor Tamil Nadu state government undertake any responsibility for supply of any materials/ equipment/ Appliance/ tool for site analysis to the bidder.
- All materials/ equipment/ tools brought to site by the bidder shall be the responsibility of the bidder. ICLEI South Asia shall extend help as and when approached by the bidder to keep any materials/ equipment/appliance/ tool, however not liable for any loss, theft, or damage due to fire or other cause, the responsibility for which shall lie entirely on the bidder.

6.8. Final Inspection of Work

- ICLEI South Asia team and respective Tamil Nadu state government department shall jointly make final assessment of all work included in the contract/work order, or any portion thereof as soon as practicable after notification by the bidder that the work is completed and ready for acceptance.

6.9. Ownership of Materials and Confidentiality

All material will acknowledge ICLEI South Asia, and Tamil Nadu state government by featuring its logo, together with the logos of the project partners, the beginning and at the end of the documents. ICLEI South Asia will provide necessary credentials to the bidder.

The Consultant understands that as part of the Consultancy, they might be asked to create, modify, or contribute to the creation of architectural designs, drawings, documentation, and other copyrightable works. The Consultant agrees that all designs, drawings, assignment outputs, including design formats for infrastructure, forms, text, photographs and videos, computer programs, work-up files, documentation, and other copyrightable materials that have been prepared as part of this contract shall be "works made for hire" and that ICLEI South Asia, and Tamil Nadu state government shall own all the copyright rights in such works.