

Terms of Reference (ToR) for Conducting Feasibility Studies for Waste Heat Recovery Systems in India

1. KEY DATES AND DETAILS

Event	Dates
Closing Time for Submission of Proposals	09 th April 2024 at 17:30 hrs IST.
Queries from Bidders	03 rd April 2024 at 17:30 hrs IST. Please send your queries to the following email ID only: procurement_gef6@iiec.org
Method to Submit Proposal	Proposals must be submitted to: Attention: Ms. Aungsanant Thiptaweechan Program Manager International Institute for Energy Conservation (IIEC) 1168/27 Unit B, 15th Floor, Lumpini Tower, Rama IV Road, Thungmahamek, Sathorn, Bangkok 10120, Thailand. E-mail: athipthaweecharn@iiec.org and procurement_gef6@iiec.org (PROPOSAL: For 'Conducting Feasibility Studies for WHRS in India' by the closing time specified above.) The Bidder shall submit an electronic version (in PDF format) of its detailed Technical and Financial Proposal. Proposals submitted in any manner other than as detailed in this paragraph or submitted after the deadline shall be deemed to be invalid and may be excluded from consideration.
Expected execution date of Contract	By 20 th April 2024
Completion date	The Services are required to be completed on or before 20 th July 2024.

2. BACKGROUND

According to the Bureau of Energy Efficiency (BEE), India's energy efficiency market is estimated to be worth INR 150,000 Crores. Both government policies and efforts by multilateral and bilateral organizations to conserve energy across a wide range of sectors have supported the emergence of various innovative programs for the implementation of energy efficiency and demand-side management in India. In 2009, India has also seen the emergence of Energy Efficiency Services Limited (EESL), a Super ESCO. EESL is a Joint Venture of Power Grid Corporation of India Limited (PGCIL), NTPC Limited (NTPC), Power Finance Corporation Limited (PFC) and Rural Electrification Corporation Limited (REC) to facilitate the

implementation of energy efficiency projects. EESL is also leading the market-related actions of the NMEEE. To know more about EESL, visit www.eeslindia.org

Under the GEF-6 Cycle, the Global Environment Facility (GEF) is supporting Energy Efficiency Services Limited (EESL), for the execution of ***“Creating and Sustaining Markets for Energy Efficiency”*** Project. UNEP is the implementing agency for this project and EESL is the ‘executing agency’. The objective of this GEF project is to reduce greenhouse gas (GHG) emissions through energy efficiency through scaling up and new technology applications. Since the start of 2024, the International Institute for Energy Conservation (IIEC) has been assisting EESL as a technical executing agency in the execution of the tasks under the GEF-6 project.

3. ABOUT INTERNATIONAL INSTITUTE FOR ENERGY CONSERVATION (IIEC)

The International Institute for Energy Conservation (IIEC) was established in the USA in 1984 as a non-governmental, not-for-profit organization and has regional offices in India, the Philippines and Thailand. IIEC’s mission is to accelerate the global adoption of energy efficiency and renewable energy policies, technologies, and practices to enable economic and environmentally sustainable development. IIEC pursues this mission in developing countries and countries in transition through fieldwork undertaken by its regional offices. For the last four decades, IIEC has been providing solutions to the problems posed by the rapidly increasing energy demand in developing and industrializing countries. IIEC works with governments and the private sector to develop, implement, and evaluate energy efficiency and renewable energy policies, programs, and projects.

4. STUDY OBJECTIVE

Industrial waste heat represents a significant untapped resource, often arising from industrial processes where generated energy goes unused. This includes the release of hot combustion gases, heated by-products, and heat transfer from equipment surfaces. Despite being poorly quantified, studies suggest that a substantial portion, ranging from 20 to 50% of industrial energy consumption is released as waste heat. However, industries can mitigate these losses by enhancing equipment efficiency or adopting waste heat recovery technologies.

Waste heat recovery involves capturing and repurposing this excess heat for various applications, such as electricity generation, preheating combustion air, furnace load preheating, absorption cooling, and space heating. This approach not only improves overall energy efficiency but also contributes to sustainable industrial practices. Captured and reused waste heat is an emission-free substitute for costly purchased fuels or electricity. The commonly used technologies such as recuperators, regenerators, including furnace and rotary regenerators, passive air preheaters, regenerative and recuperative burners, plate heat exchangers and economizers and units such as waste heat boilers and run around coil (RAC) are available for waste heat recovery options.

As a part of the effort to diversify its programs, EESL is assessing the various opportunities in industrial and commercial energy efficiency interventions. The GEF-6 project is supporting EESL in this endeavor. With this background, IIEC is seeking to engage a consultant/agency to conduct an exhaustive feasibility study of WHR systems in selected industrial units. The overall scope of this project will cover **Five (5)**

standalone industrial units from different sectors. One site for feasibility study may include multiple sub-options of WHR as required.

The study will be carried out in close collaboration with IIEC and EESL.

5. SCOPE OF WORK

Aim of the Assessment

- To conduct an exhaustive feasibility study for the implementation of WHR systems in identified industries.
- To develop a comprehensive plan for M&V and continuous data monitoring to feed into the planning of developing a national program on WHR systems in India.

The list of broad activities is mentioned below to be carried out under this project.

A. Identification of sites

- List of potential sites (industrial units) for the feasibility study to be provided by EESL. The shortlisted agency will develop a standard EoI format and selection criteria for shortlisting the sites/ units for study.

B. Feasibility Assessment Study

- Prepare a plan for the detailed study in consultation with GEF-6 project team.
- Conduct a meeting with the industrial unit head to understand the operations and existing processes of the unit. Review and discussion for collection of data regarding operational and design parameters of the process/ system.
- Develop equipment inventory of the unit and map the available waste heat options for detailed assessment.
- Define key parameters and measurement strategies related to each process for estimating the quality and quantum of the waste heat.
- Log the operational data of the target equipment using audit equipment, collect the logs maintained at the facility and develop the baseline of the equipment operation and available waste heat.
- Assess and define the areas of utilization of the waste heat and designing of the heat recovery solution.
- The agency is expected to utilize the energy measurement tools or instruments mentioned in Annexure. Proper calibration certificates shall be provided by the agency to ascertain the quality and measurement accuracy of the devices.

C. Feasibility Study Report

- Once the survey is completed in the industry, the agency shall prepare the study report in consultation with the GEF-6 team and each of the surveyed industrial units. *The draft report is to be submitted for further comments and observations.*

- The feasibility report should cover the following points:
 1. Key parameters and performance of equipment and all auxiliary units/ processes.
 2. Waste energy potential, operating characteristics, and variations including industry operating pattern, internal and external factors affecting the industry operation and availability of Waste heat.
 3. WHR system selection criteria and application in the unit
 4. Cost of proposed interventions (quotation from at least 3 solution providers).
 5. Financial modelling for installation of WHR system (including but not limited to IRR & NPV).
 6. MRV approach including parameters for measurement/assessment to undertake verification of the energy savings.
 7. Action plan for the installation of WHR system in the industry including WHR system installation duration and steps involved.
 8. Potential financial mechanism for financing the installation of the WHR system.
- Detailed project report for heat recovery solutions shall include detailed design, specifications, the material of construction, the impact of heat recovery system on the existing processes, equipment, project costing and relevant solution providers etc.

D. Opportunity for deploying other technologies.

The consultant/ agency shall also assess the opportunity or potential for deployment of the following technologies/ solutions during the feasibility studies. This assessment could be a basic walkthrough and consultation with the concerned department.

- Compressed air system, Turbo blower, Microturbine
- Industrial Heating and cooling solutions from WHR
- Cooling/heating options for EE improvement (Pre-cooling using VAM and improving efficiency)
- Industrial automation (VFD, PLC controller feedback system to improve EE)

E. Report Presentation

Conduct consultations along with EESL with the respective industrial units to present the final feasibility study report and the next steps.

6. DELIVERABLES

The selected organization/agency will be responsible for producing or carrying out the following:

- Inception & Interim Report.
- A PowerPoint presentation summarizing the details of all five studies separately.
- Comprehensive, professional, and design-ready publishable report, including the necessary and high-quality graphics. The organization/agency will be responsible for ensuring the report is nicely drafted and professionally edited. (word and pdf format)
- Data collected in a suitable format (excel sheets, word files or any other format as used by the selected agency)

- A design-ready and stand-alone executive summary report.
- Submission of proceedings of the consultations held with all the industrial units in the form of a report (word and pdf format).
- Data collected in a suitable format (excel sheets, word files or any other format as used by the selected agency)

7. SUBMITTAL & REPORTING

Interested organizations/agencies must provide information indicating that it is qualified to perform the services, along with budgetary quotes, by submitting separate proposals as described above via email to athipthaweecharn@iiec.org and procurement_gef6@iiec.org with 'RFP – Conducting Feasibility Studies for WHRS in India' in the subject line by **09th April 2024**.

Proposals should include the following information.

- Brief background about your organization
- Organisational & team's relevant experience
- A narrative outlining the vision for the work along with the suggested methodology, work plan, and/or other technical inputs for the assignment.
- Team composition and individual qualifications & experience.
- References of similar projects or assignments with contact details (email and telephone)
- Budget information. The Organization/Agency should submit a detailed cost proposal in USD only.

8. TIMELINES

The shortlisted Organization/Agency is expected to complete the deliverables as per the timelines listed below-

Deliverables (as per the scope of work)	Timeline
Inception Report	Within 7 days of the inception meeting
Data Collection & measurement	Within 45 days from the date of award of the work order
Draft Study Report	Within 60 days from the date of award of the work order
Final Report submission & presentations	Within 90 days from the date of award of the work order

9. SCHEDULE OF PAYMENTS

- 20% Upon receipt and approval of the inception report.
- 20% Upon completion of data collection and measurement of all sites.
- 30% Upon receipt and approval of the final report in consultation with the industrial unit and GEF-6 team.
- 30% post-stakeholder consultations with all the units and submission of proceedings.

10. EVALUATION CRITERIA

The evaluation of bids shall be done on Quality Based Selection with 75% (seventy five percent) weightage to technical score and 25% (Twenty five percent) weightage to financial bid. The following are the qualification criteria for the selection of organization/agency.

- **Pre-screening:** All applications meeting the minimum eligibility criteria and conformance to the application content requirements will be evaluated by the Evaluation Committee (EC).
- **Final Evaluation:** The proposals will be evaluated based on the marks obtained as per the criteria provided below against each category by the EC.

Parameters	Marks	Maximum Marks
Quality of Technical Proposal Sub-Criteria: a. Adequacy of the proposed methodology in responding to the Terms of Reference. b. Technical approach and work plan. c. Specific experience of the proposed team members.	20 20 15	55
Specific experience of the Organization/Agency relevant to the assignment	20	20
Bid cost competitiveness	25	25
TOTAL		100

11. QUALIFYING REQUIREMENTS

- The organization/ agency must have legal status in India enabling the firm to carry out the assignment.
- The organisation/ agency must have a minimum of Five (5) years of business existence in India.
- Experience in successfully carrying out at least 2 similar feasibility studies, particularly in the industrial energy efficiency domain.
- The organization/ agency should have prior experience working on the WHRS in India.

- Prior work experience in energy efficiency programs with bi-lateral or multi-lateral organizations and the Government of India is desirable.
- Excellent planning and organizational skills with the ability to deliver services even on tight deadlines.
- A team comprising of at least the following:
 - **Team Leader** – Should be an Accredited Energy Auditor (BEE) with a minimum experience of 12 years in the field of energy efficiency, industrial/building energy, feasibility studies, business model development, energy management, preparation of Detailed Project Reports etc.
 - **Technical Expert** – Should be a Certified Energy Auditor with a minimum of 8 years of experience. He/she should have experience of a minimum of 4 similar assignments in energy audit in industries, energy efficiency project implementation, feasibility studies, preparation of Detailed Project Reports, etc.
 - **Project Engineer** – B.E. / B. Tech in Electrical Engineering with a minimum of 4 years of experience in energy efficiency/engineering services, data collection, M&V, data analysis, etc.
 - **Financial Expert** – Postgraduate in the field of finance with a minimum experience of 7 years in the areas such as financial modeling & analysis, quantitative assessments, etc.

Note: Bidders shall submit all the supporting documents showcasing their qualifications and experience relevant to the qualifying criteria mentioned above. However, IIEC holds the right to seek any additional documents during the evaluation process as deemed necessary.

12. INSTRUCTIONS FOR BIDDERS

- Bidders are requested to submit the Technical & financial proposals in a single file (in pdf format), in a single mail along with all supporting documents in a separate file or folder.
- Files/ Folders greater than 20 MB in size will not be delivered in the above-mentioned email ID resulting in non-submission of the bids.
- The bidders can submit the proposal and documents in a maximum of two separate emails due to the size limitations of email as mentioned above.
- Submission of bids through any open source or links to shared drives such as Google Drive, OneDrive, WeTransfer, Dropbox etc. shall not be entertained and will stand disqualified.
- Project references and the associated documentary evidence should be easily identifiable for ease of evaluation.

13. TERMS AND CONDITIONS

- JV/consortium is allowed for this study. However, any kind of sub-contracting will not be allowed.
- The maximum cumulative liability of the Consultant/ agency entering a contract with the Client shall be limited to the Contract Value.
- IIEC is under no obligation to accept any proposal or part thereof received in response to this project.
- IIEC reserves the right to seek clarification or request any additional documents as deemed necessary. Furthermore, the IIEC reserves the right to modify or cancel the RFP (including extending the deadline for the receipt of proposals) without justification or compensation payable to the bidder.
- IIEC will not reimburse bidders' expenses, including those related to responding to this RFP. In case any additional tasks are required, the consultant should seek prior approval in writing from IIEC.

- Confidentiality: All data and information received from IIEC and partner organizations, provided to the agency for this assignment is to be treated confidentially and are only to be used in connection with the execution of these Terms of Reference (a specific separate confidentiality agreement may be agreed between the Consultancy and IIEC, if needed to provide information more freely). All intellectual property rights arising from the execution of these Terms of Reference are assigned to IIEC. The contents of written materials obtained and used in this assignment may not be disclosed to any third parties without the expressed advance written authorization of IIEC and its partner organizations.

14. ANNEXURE

List of Instruments required along with calibration certificates:

S. No.	Name
1	Flue Gas Analyser
2	Three-phase power analyzer
3	Thermal Imager or Pyrometer
4	Distance meter
5	Anemometer
6	Data loggers