

Terms of Reference (TOR)

for

Energy and Environmental Monitoring of Brick Kiln

Background

MinErgy Pvt. Ltd. (MinErgy) is a service-oriented company, registered in 2008 A.D. under Company Act 2021 B.S. with the Company Registers Office. MinErgy has been dedicating its service towards energy-efficient, environmentally sound, cost-effective and socially responsible technologies and approaches that would generate livelihoods. Renewable energy, climate change, occupational and preventive health, brick and built environment, empowerment, ethical labour management practices and WASH are key working sectors.

Purpose and Objective

Bricks are one of the most preferred building materials in Nepal. About 110 brick kilns within Kathmandu Valley produces estimated 890 million bricks annually, a major building material for construction activities. The brick industries in the Kathmandu Valley are considered as the third largest source of PM and PM10 emissions. Also, brick kilns are considered as one of the largest sources of SO₂ emission within the Kathmandu Valley. The major pollutants from brick industry are black carbon (BC), particulate matter (PM), sulphur dioxide (SO₂) and carbon dioxide (CO₂).

In terms of air pollution, Mobile Chimney Kiln (MCK) and Fixed Chimney Kiln (FCK) are the most polluting technologies. Hybrid Hoffman Kiln (HHK) and Tunnel Kiln (TK) are considered the cleanest, whereas the Zigzag Kiln (ZZK) falls in between. Within Kathmandu Valley all brick kilns have adopted ZZK technology. Shifting towards HHK and TK is challenging for most brick kiln entrepreneurs due to high upfront cost for those technologies. Hence, there is utmost need to explore solutions applicable within ZZK to reduce pollutions from brick industries.

The contractual agreement between UNDP Nepal and MinErgy aims to test and demonstrate Internal Fuel (IF) Brick Firing in a selected ZZK to reduce the level of emission, coal consumption and control pollutions. The project will demonstrate application of 50% coal as IF for firing bricks. The project aims to demonstrate reduction of suspended particulate matter (SPM) emission by 40% compared to baseline conditions. Also, the project aims to reduce fuel consumption by 10% compared to the baseline condition.

The overall objective of this assignment to monitor energy and environmental performance of a brick kiln with and without internal fuel application. The specific objectives are:

- Measure stack emissions (SPM, SO_x, NO_x, CO, CO₂) of the brick kiln under baseline conditions and with IF usage.
- Determine specific energy consumption (SEC) of the brick kiln under baseline conditions and with IF usage.

Scope of Work

- Prepare an inception report with review of literature, task methodology and outline of the tasks and timeline.
- Develop necessary forms and tools for monitoring and data collection.
- Arrange necessary equipment and deploy necessary staffs for measurement and data acquisition.

- Coordinate with MinErgy and selected brick entrepreneur to coordinate for the monitoring.
- Carry out stack emission measurement, one under baseline condition and one with IF usage, following the standard testing protocols.
- Conduct lab analysis of fuel samples to determine the carbon content, sulfur content, volatile and heating value.
- Measure fuel consumption and brick production for at least 3 chambers of brick firing, one under baseline condition and one with IF usage.
- Analyze environmental performances and energy consumption based on lab results and field measurements.
- Prepare a report with detailed methodology, results and comparative analysis, including recommendations.

Inputs from MinErgy

- MinErgy will provide instruments (thermocouples, scanners and weighing machines) for energy monitoring.
- Coordination and technical assistance for energy and environmental monitoring.

Deliverables & Timeline

The assignment shall be completed within 1.5 months from signing the contract. Deliverables with the proposed timeline for the assignment is as below:

Deliverables	Timeline
Signing of contract	25 th March 2024
Inception report	1 st April 2024
Draft report with primary data	1 st May 2024
Presentation of findings to the team	3 rd May 2024
Final report	8 th May 2024

Required Qualification and Experience of Proposed Professionals

The team shall comprise with at least following members:

- **Team Leader/ Energy Expert (1):** At least Master’s Degree in the engineering or related field and at least 7 years of related professional experience. S/he should have good experience of leading team and very good skill in analyzing and synthesizing the study report.
- **Environmental Expert (1):** At least Bachelor’s Degree in Environment Engineering/Science or related field and at least 7 years of related professional experience. The Environmental Expert should have knowledge on environmental monitoring of brick industries.
- **Research Assistant (1):** At least Bachelor Degree in engineering, environment or related field and 2 years’ professional experience.
- **Field Assistant (2):** Basic education preferably with prior working experience in brick industries. This is primarily for energy monitoring and can be identified during the inception phase.

Instruction for Submission of proposals

- RFP application should contain following documents:
 - i. Technical Proposal

ii. Financial Proposal

- RFP documents shall be submitted via mail by 5:00 PM on 17th March 2024 attaching all the documents and writing a mail to info@minergynepal.com with subject line “Proposal for energy and environmental monitoring of brick kiln”.
- Document received after the closing time for submission of proposals shall not be considered for evaluation.
- Technical Proposal must comprise of cover letter, a detail description of the methodology and approach, list of equipment with the proposer, team composition with brief CV.
- Financial proposal must comprise of application letter, estimated budget with detailed breakdown comprising human resources, travel, accommodation, per-diem, communication cost, consultation meeting cost and stationeries. Proposed cost must be inclusive of all applicable taxes in Nepalese currency.

Evaluation of proposal

Each proposal shall be given a technical score on the following criteria.

SN	Criteria	Score
1	Relevant experience of the firm	25
2	Methodology & approach	25
3	Equipment proposed for environmental monitoring	20
4	Team composition and experience	30

- The proposals shall then be ranked according to their combined technical and financial scores.
- Weight given to technical proposal is 80% and Weight given to the financial proposal 20%
- Cumulative Score = Technical Score * 80%+ Financial Score * 20%

Acceptance of Proposal:

All rights are reserved with MinErgy either to approve or disapprove any proposal without giving any reasons whatsoever. If needed, the consultant will be asked for modifications and presentations of the proposal before approval.