



Swiss Agency for Development and Cooperation SDC

Engaging National Technical Expert for Assessing Feasibility and Preparing Technical Design for Municipal Solid Waste based Bio-CNG Plant (200 TPD) in Coimbatore, Tamil Nadu, India

Title	National Technical Expert for Assessing Feasibility and Preparing Technical Design for Municipal Solid Waste based Bio-CNG (200 TPD) in Coimbatore, Tamil Nadu, India
Location	Coimbatore, Tamil Nadu, India
Timelines	 TOR published on ICLEI South Asia/ CapaCITIES website: 26 May 2021 Last date of acceptance of proposals: 11 June 2021 Identification of winning proposal and selection of National Technical Expert: 22 June 2021 Initial information, data collection, review of existing conditions, and analysis: 1 August 2021 Output of study: Technical Design Document for 200 TPD of Bio-CNG plant: 31 August 2021 Technical specifications and O&M conditions for inclusion in tender documents: 31 August 2021 Handholding, monitoring and supervision of construction: Starting 1 November 2021 (tentatively)

Terms of Reference











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1. Background

The second phase of the CapaCITIES project is being implemented in 8 Indian cities including Coimbatore and is supported by the Swiss Agency for Development and Cooperation (SDC). The overall goal of the CapaCITIES project in Phase II is to mainstream climate action in select Indian cities and states by enhancing capacities to adopt integrated climate resilient planning, design innovative finance mechanisms and develop climate resilient infrastructure. The project directly responds to the Government of India's objective of developing "Climate Smart Cities", with an aim to ensure green, sustainable and resilient urban habitats. It is in line with the thinking around enabling climate sensitive urban development, espoused in the draft National Urban Policy Framework of the Government of India. The project is being implemented jointly by three organizations, ICLEI – Local Governments for Sustainability, South Asia (ICLEI – South Asia), South Pole and econcept.

During Phase I of the CapaCITIES project, a GHG emissions inventory of Coimbatore was prepared which indicated that inadequate waste management practices are leading to 363,000 tCO₂e emissions annually, out of which 80% of emissions can be mitigated by improving waste management services.

As of July 2020, Coimbatore city generated 900 tons of solid waste per day (TPD), on an average. The primary collection is handled completely by Coimbatore City Municipal Corporation (CCMC) either through its own employees or through contract labour. The waste is primarily collected from households by CCMC through containerized push carts by the sanitary workers and thereafter temporarily stored along the roadside in bins/containers. These bins/containers are emptied and transferred to the transfer stations by CCMC's dumper placer vehicles / refuse collector compactors. In all, CCMC has four transfer stations at Peelamedu, Sathy Road, Ukkadam and Ondipudur, out of which the one at Sathy Road is not operational anymore.

CCMC processes the waste through own plants and through engaging private sector as follows:

- i. UPL: Responsible for secondary transport, treatment and processing of waste at Vellalore processing plant (400 TPD)
- ii. Vermi-composting and bio-methanation plant operated by CCMC is responsible for processing 70 TPD bio-degradable waste, on an average





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iii. Mixed waste is dumped in the open at Vellalore site (almost 490 TPD)

The mixed waste which is dumped in the open is responsible for a majority of the GHG emissions from the waste sector. Open dumping also ground leads to water contamination health and hazards with prolonged the natural exposure to elements. CCMC is looking for a



long term self-sustainable solution for processing bio-degradable waste, embracing the concept of circular economy.

Considering the above scenario, ICLEI Local Governments for Sustainability, South Asia (ICLEI South Asia) along with South Pole Group (SPG) on behalf of Coimbatore City Municipal Corporation (CCMC) and CapaCITIES project implementation agency, invites proposals from technical experts for the 'Assessing Feasibility and Preparing Technical Design for a 200 TPD of Bio-CNG Plant in Coimbatore, Tamil Nadu, India'.

2. Objective of the project

This project will result in assessing the feasibility of and providing suitable designs and technical specifications for a 200 TPD of Bio-CNG plant, including detailed technical details of the proposed technology and of each unit process within the plant (including effective primary waste segregation lines), requisite infrastructure and associated environmental pollution control measures. Detailed cost estimates are to be provided. An operation, monitoring and maintenance guideline is also to be prepared. All recommendations should consider the local waste management context, existing institutional capacity and overall financial and environmental sustainability of the plant.





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3. Outputs of the project

Listed below are envisaged outputs of the engagement:

- Feasibility assessment of the 200 TPD of Bio-CNG based municipal organic waste processing treatment system and proposal of an appropriate end-to-end system two or three appropriate technologies to be suggested
- The Consultant should also suggest the minimum quality of organic waste that Coimbatore Municipal Corporation has to provide to the Bio-CNG plant operator. The quality of waste has to be part of contract conditions
- Conceptual technical design of the selected systems-including information on the various unit processes of the facility, including effective primary waste segregation lines and requisite infrastructure for the same. Costs for Bio-CNG off-take and related infrastructure are to be included. The consultant should undertake cost-benefit analysis for offtake of Bio-CNG i.e. via bottling plant or via gas grid. Associated environmental pollution control measures to be provided. Conceptual designs based on two or three appropriate technologies are to be provided and the rationale for selection of technologies to be made clear.
- An operation, monitoring and maintenance guideline is also to be prepared. Plant life is to be suggested.
- Conceptual design drawings for the entire system to be provided.
- Detailed component wise cost estimates and costs for detailed periodic and routine maintenance are to be provided
- Provide technical specifications to be included in a potential tender package

In a second phase, based on the execution of the bidding process, further technical assistance is expected on the evaluation of the bids and compliance monitoring during construction of the plant (depending on timelines of execution).

4. Scope of Work

The detailed scope of work will include two phases. The first phase includes the conceptual designs and costing for the proposed plant and provision of technical specifications to be included in the tender. The second phase, should Coimbatore city agree to proceed with the tender, will include services for evaluation of bids and subsequent compliance monitoring dring construction.





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Phase I: Design and Costing

- Conduct a preliminary analysis of the project area and existing waste management system. Assess feasibility of the Bio-CNG based municipal waste processing system and identification/selection of most suitable system ideal for local context, existing institutional capacity, financial and environmental sustainability;
- Assess the suitability of feedstock-availability and quality, based on lab testing results provided; conduct additional tests, if needed. Also explore and assess the availability of alternatives for feedstock;
- Assessing suitability/appropriateness of the proposed technology for processing municipal solid waste in terms of organic loading rate, conversion efficiency, expected biogas production rate per tonne of waste/ m³ of effluent, Hydraulic Retention Time (HRT), reactor operating temperatures and other conditions, feed preparation requirements, possibility of recycling of effluent / waste water, land and manpower requirements, leachate treatment system, flaring system, energy and mass balance to be provided;
- Complete sizing to ensure operational and economic viability, design, standards and norms, and other specifications of the suggested technology processes appropriate to the feedstock, temperature of the surrounding environment, pH values, and other operating parameters to be defined;
- Conceptual technical design of the plant to be established at the site identified by CCMC to be provided, including pre-sorting and segregation lines should be provided;
- The specifications and guidelines in terms of storage and utilization of the biogas to be provided. Specification for any civil work requirements per identified/selected site;
- Digestate assessment and intended use options (on-site/off-site disposal/further value addition) to be provided;
- Suggest measures and appropriate technology for biogas purification. The purified and compressed biogas should have calorific values equivalent to natural gas and termed as CBG. The commercial use of CBG shall meet IS 16087:2016 specifications of BIS standards;



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- The Consultant should suggest the site requirements for 200 ton Bio-CNG plant and also detail the onsite infrastructure requirements (boundary wall, water connection, power connection etc.);
- Project timelines indicating key stages of project implementation (planning, installation, construction & commissioning);
- Operation and Maintenance requirements and parameters. Manpower and infrastructure for the same to be provided. The consultant should detail the route and periodic maintenance taking into consideration the life of the plant. Detailed breakup of expenses (power, water, manpower, materials (please specify), Annual Maintenance contract, periodic maintenance (including duration), others etc. is to be provided;
- Provide key parameters to evaluate the feasibility of various alternatives to distribute/sell Bio-CNG output from the proposed plant i.e., bottling into cylinders/ feeding to the city gas distribution grid/ selling directly to OMCs. The cost parameters for each alternative along with pre-feasibility considering the plant location and market demand should also be undertaken by the consultant;
- Conduct and provide detailed project risk analysis economic and environmental;
- Guidance regarding the permits and licensing requirements including legalities involved in the installation of Bio-CNG plant e.g., Social and Environmental Impact Assessment (SEIAs), Power Purchase Agreements, Net-metering agreements, permits, contracts, offtake agreements. The Consultant should provide matrix of statutory approvals, permits and license requirements including the government authority responsible for granting approvals;
- Project evaluation and impact assessment. Develop project monitoring and evaluation (M&E) plan, suggest parameters for monitoring and support in implementation of the same;

Phase II: Bid assessment and compliance monitoring of construction

- Assist ICLEI South Asia/South Pole and CCMC in evaluation of technical and financial bids to be received against tender for engagement of contractor.
- Assess submitted bids and detailed assessment of BOQ as per the Schedule of Rates (SOR) applicable to Coimbatore City Municipal Corporation.

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- Assist and support in approving design calculations, drawings and specifications submitted by the contractor in respect of all electrical, mechanical, instrumentation &control, civil works and ancillaries under the scope of contract.
- Ensuring the selected bid considers the life-cycle costs of the proposed systems, financial and technical capacities of the city to operate and maintain the proposed system. Design of the proposed technology should be in accordance with the standards set by Municipal Solid Waste Rules, 2016.
- Provide suggestions on selection of bidder. Prepare bid evaluation reports and provide inputs to contract agreements.
- Provide handholding and guidance to selected Contractor(s) to ensure successful construction and implementation of the plant, support during tendering, construction supervision and any other requirements that may arise to ensure successful execution of the project.

5. Qualification and Experience

The following criterion for eligibility would be considered:

- Minimum experience of 15 years in waste sector and/or allied sectors;
- Track-record of project planning for similar Bio-CNG based processing of municipal solid waste based projects and experience with conducting of feasibility studies is important;
- At least five (5) years of proven experience in designing and developing Biomethanation/Bio-CNG plants. Experience with ensuring commercial use of bio-gas will be an additional advantage;
- At least five (5) years of proven experience in bio-methanation/Bio-CNG projects especially conducting economic and financial analysis;
- Demonstrated experience in working on technical, financial and managerial aspects of project implementation or execution, in municipal solid waste sector in developing countries (at least 3 relevant references in the past 5 years);
- Institutions as well as individual consultants can apply. For institutions, minimum 5 years of relevant proven experience is required;

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- Consultant should be able to undertake travel to Coimbatore City;
- Consultants involved in this phase will not be eligible to be part of the bidding consortium for the construction of the plant.

6. Proposal submission

- The selection of Expert(s) would be on the basis of Technical and Financial bid submitted by the Expert(s).
- 70% weightage would be given to the technical proposal and 30% to the financial bid.

6.1 Technical Bid should cover the following aspects:

- Detailed Approach and Methodology for undertaking the current assignment, project Schedule with activity and duration to accomplish the task within the scheduled project duration along with detailed work plan.
- Details of organization/institute (Only in case of Institutes). In case of institutions, CVs of key personnel along with time distribution and title assigned to the project should be given.
- 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.
- CV of key personnel (World Bank format, Max 4 pages).
- Indicative timelines.

6.2 Financial bid should include two parts, one for Phase I and one for Phase II. Each part should include the following elements:

- Cost of man-days (including unit rate).
- Minimum and maximum number of days that can be committed by the Expert(s).
- Any additional costs/overheads/administrative charges.
- Travel, per diems (where applicable) and accommodation expenses should be quoted separately as part of the bid, as applicable.

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- The Financial Proposal shall be inclusive of all the costs including taxes associated with the assignment.
- It is clarified that, the financial Proposal should be prepared in INR and should include the final price, post consideration of all applicable taxes.
- 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 Proposal, it shall be considered non-responsive and liable to be rejected.
- The final amount should be quoted in both figures and words.
- A copy of valid Pan Number, registration with GST, last 3 financial year's balance sheet (or as applicable), audited by certified Chartered Accountant need to be submitted.

7. Date of Submission and Notification

Expert(s) and/or institutions are requested to submit their bids by 11 June 2021. The selected Expert(s) and/or institutions would be notified through email latest by 22 June 2021.

8. Release of Payment

Professional Costs:

Phase I:

- First installment (30%): At the time of signing the contract
- Second installment: (50%)
 - Submission of feasibility assessment of the 200 TPD of Bio-CNG based waste processing treatment system and proposal of an appropriate end-to-end system
 - Submission of detailed technical design of two or three selected systems including information on the various units of the facility along with detailed monitoring parameters an requisite infrastructure for the same
 - Submission of detailed conceptual design drawings for the entire system, for each technology





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- Submission of detailed execution and financial plan for operational feasibility of the system
- Third Installment: (20%)
 - Inputs to the tender package and selection of bidder

Phase II:

- **First installment (20%):** Post selection of the contractor for implementation
- Second to fifth installment (20% each): During the construction and commissioning phase in equal installments across the agreed duration of the construction period, with the last installment paid after commissioning

Travel Costs:

• Travel and perdiem costs (which also include local travel costs, accommodation and food costs) will be reimbursed at the end of every two months, upon submission of all relevant documentation, subject to the maximum cost indicated in the financial bid.

9. Other Terms and conditions:

- The Terms of Reference (ToR) can be downloaded from the ICLEI South Asia website (<u>http://southasia.iclei.org</u>).
- The financial & technical proposals should be submitted as separate documents.
- The Proposal should be submitted with title 'National Technical Expert for Assessing Feasibility and Preparing Technical Design of 200 TPD of Bio-CNG Plant in Coimbatore, Tamil Nadu, India' under CapaCITIES Project
- The Proposal can be submitted by applicant through email to <u>soumya.chaturvedula@iclei.org</u> and <u>ritu.thakur@iclei.org</u> on or before 11 June 2021.
- In case of any doubt/query regarding any portions of ToR, the applicant should send it by mail to the contact person mentioned above.
- ICLEI South Asia reserves the right to reject any proposal, and to annul the selection process and reject all proposals at any time, without thereby incurring any liability to the affected applicant or any obligation to inform the affected applicants of the grounds for such decision.

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- It should be noted that the project is being implemented in CCMC jurisdiction area and hence instructions to bidders will be given by ICLEI South Asia in consultation with CCMC officials. ICLEI South Asia will be overall in-charge for all the works that would be executed under the present scope of work.
- The applicant shall also obtain necessary permissions from concerned government departments related to the work/data collection if deemed necessary and in coordination with CCMC and ICLEI South Asia.
- All data and information received from ICLEI South Asia for the purpose of this assignment are to be treated confidentially and are only to be used in connection with the execution of these Terms of Reference. The contents of written materials obtained and used in this assignment may not be disclosed to any third parties without written approval from ICLEI South Asia and CCMC.
- The decision of ICLEI South Asia will be final and binding.
- The proposals received will be scrutinized & evaluated by the CapaCITIES Implementing Agency in consultation with senior officials of CCMC involved in the execution of CapaCITIES project. The decision shall be informed to the winning applicant.
- Detailed Work Order will be issued to winning applicant within 7 days of announcing the results.
- The selected applicant is to forward the signed and sealed work order to ICLEI at the earliest or not more than 3 (three) working days of issue of work order.

Contact Information

For Further information, please contact: Ms. Soumya Chaturvedula Deputy Director ICLEI - Local Governments for Sustainability, South Asia C-3, Lower Ground Floor, Green Park Extension, New Delhi-110016, India Tel: +91 11 49747200; +91-9866168713 Fax: +91 11 49747201 Email: <u>soumya.chaturvedula@iclei.org</u>





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