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Indo-German Energy Programme – ACCESS

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Terms of Reference for supporting Ministry of New and Renewable Energy on identifying areas and setting up guidelines/standards for large scale biogas plants

Background

1. Government of India plans to have 10 GW of installed capacity from biomass by 2022. Ministry of New and Renewable Energy is already providing central financial assistance for biogas plants to provide impetus to the industry. Besides the central assistance, the private sector and various state government departments are actively involved for developing biogas sector in India.
2. The Indian biogas sector uses various types of feed for large scale biogas plants. This includes cattle feed, municipal solid waste, agricultural waste and residue etc. The uses of the biogas generated range from thermal to electricity production to industrial and biofuel etc. However, in India, there are very few guidelines and standards that exist for operation, performance and other parameters required for large scale plants.
3. Internationally, the biogas related standards are advanced in developed countries such as Germany, Italy, Austria, UK, Sweden, France etc. Germany is outstanding in area of biogas project quantity and application technology in Europe, and its development of the industry have also benefited from standards. Germany has established standards in operation, management, engineering equipment and installation of quality (including safety testing, mechanical testing, construction, testing and equipment inspection) and project examination. Similarly, Austria has also laid down technical standards for large scale plants.
4. The Access to Energy Programme under the Indo-German Energy Programme (IGEN-Access) is a bilateral technical co-operation measure between the Federal Ministry for Economic Co-operation and Development (BMZ), Germany and the Ministry of New and Renewable Energy (MNRE), Government of India. The project aims at improving the sector environment for inclusive rural energy enterprises. The IGEN-Access programme is currently being implemented in four states of Uttarakhand, Uttar Pradesh, Bihar and West Bengal. The programme is being implemented over a period of three years (March 2015 – March 2018). BMZ has commissioned GIZ with the implementation of the project. GIZ is a federal enterprise based in Eschborn and Bonn, Germany. The programme also intends to support access to

energy through biogas in rural areas of India. The present assignment forms a part of the broader IGEN Access programme.

Context

5. Considering focus on development of the Indian biogas sector, there is a need for setting up guidelines and standard specifications for large biogas plants. This would support manufacturing, product development as well as plant performance to benefit consumers as well as entrepreneurs in India. Besides this, considering the nature of biogas, setting up specifications for health and safety of personnel apart from environmental safety is considered important. This assignment will focus on large scale biogas plants.
6. As part of this assignment, focus will be placed on organic residue based biogas plants, preferably located in rural areas. A detailed list of large scale biogas plants, which may be studied as part of this assignment (see details below) will be shared with the consultant.

Objective

7. This study aims to identify international best practices regarding existing guidelines and standards for organic waste based large scale biogas plants and scope for potential application/customization for Indian plants,
8. Secondly, the assignment will come up with India specific set of standards for large scale biogas plants on
   8.1 Plant performance
   8.2 Health and safety
   8.3 Emission standards
9. Thirdly, in consultation with MNRE, provide recommendations on which other standards/ guidelines need to be prepared for organic waste based large scale biogas plants. Detailed recommendations will be provided on what all needs to be covered in these standards (on the basis of review done under point 7 above).

Geographical location

10. The outputs from this study will be applicable pan India (especially in rural areas). In particular, visits to biogas plant sites (upto 3; list of large scale biogas plants is given in Annex 1) will need to be made for this assignment.

Scope of work

The consultant is expected to cover the following key areas. Details are as below:

11. Review of existing guidelines and standards: The consultant is expected to

11.1 Undertake secondary research on international best practices (especially review standards from Germany, UK, Denmark, Italy, Austria, European and ISO) related to existing guidelines and standards for large scale biogas scale[1];

11.2 Review existing practices and guidelines followed for large scale biogas plants in India;

11.3 Field review of plants: In addition to the secondary review above, the consultant is required to visit upto 3 large scale biogas plants (in consultation with GIZ and MNRE) for collection of primary on-field review. The study should review and analyze practices followed for

- Construction standards for the plants
- Plant performance
- Safety and health
- Environmental safety
- Others (waste, manure, water etc)

An indicative list of large size biogas plants is annexed. The consultant would need to undertake a field review of upto 3 large biogas plants. For the remaining plants, telephonic interviews may be carried out.

11.4 Provide a detailed report of review of all the plants studied. Also include recommendations for improvements in the existing plants.

11.5 Prepare a comparative and gap analysis of international and Indian practices. This will cover areas where further focus needs to be placed for setting up guidelines and standards

12. Based on the review carried out above, the consultant would need to draft following set of guidelines/standards for large scale biogas plants in India. This will be done in consultation with MNRE. The consultant would need to maintain flexibility to incorporate the inputs provided by the Ministry in this regard.

12.1 Plant performance standards

12.2 Health and safety

12.3 Emission standards

13. Prepare recommendations on the set of guidelines and standards which should be developed (for large scale biogas plants), apart from those covered above. Also provide detailed

[1] A ready reckoner of standards widely adopted internationally may also be available with the Indian/German biogas association, which the consultant may want to refer

recommendations on the elements which should be covered under the remaining set of guidelines and standards.

14. The consultant is encouraged to gather and incorporate inputs and experiences from different experts and stakeholders working in the biogas sector in India and internationally, as appropriate for various work elements under this project.

Timeline and reporting

15. The work is expected to be completed within six months of the start of the contract. The consultant is expected to work closely with MNRE and GIZ for this assignment. During this period, the partner is expected to organize fortnightly calls/meetings regarding progress on the assignment and will share information as and when required by GIZ. The partner will report to Technical Expert, IGEN ACCESS, GIZ. The partner is expected to travel to the biogas sites (upto 3 in total), as mentioned above for review exercise.

Deliverables

16. The partner should submit a detailed timeline with milestones for the project within first week after signing of the contract.
17. Detailed deliverables to be submitted are as below:
    17.1 Detailed report on Indian and international best practices on guidance and standards adopted for large sized biogas plants.
    - This report also needs to have a comparative and gap analysis of international and Indian practices
    - Detailed report of field review of all the Indian plants studies under this assignment. Also provide recommendations for improvements in the existing plants
    - recommendations on guidelines and standards which should be developed

    17.2 Draft standards/guidelines, as mentioned under point 12

    17.3 Detailed recommendations on elements which should be covered under the remaining set of guidelines and standards

    17.4 Brief overall summary report of the project

    17.5 presentation of findings of review and standards with MNRE
18. The consultant is expected to provide flexibility to incorporate feedback from important stakeholders in the sector, including MNRE.
19. GIZ honors intellectual copyrights and strictly prohibits any copyright violations and plagiarism. The consultant should certify that the produced report does not contain any

copyright violations. GIZ will hold the copyrights for all the documents/data collected in the process of assignment as well as the electronic media (photographs, videos etc.).The assignment should be considered complete only after mutual agreement over the quality of produced outputs. The output and deliverables should be in accordance with GIZ quality and design standards, discussed explicitly with the consultant during the course of assignment

Skills requirements

20. The assignment requires specialised skill set, experience and the bidder needs to ensure and prove that they have all the relevant skills needed for completing the assignment successfully
21. The firm (or consortium) needs to demonstrate its expertise and knowledge of the biogas sector. The following skills are required
    - 21.1 The team should have a mix of subject matter experts with experience and exposure to the Indian as well as international biogas sector;
    - 21.2 Team structure:
        - 21.2.1 Team leader should have at least 12 years of relevant experience, especially in biogas sector. S/he should have exposure to/worked in the Indian as well as international biogas space. S/he needs to have good management skills for managing the team. Total expected number of days for team leader are 10.
        - 21.2.2 In addition team should also have one middle level technical expert with demonstrated experience of working in the biogas sector i.e. with biogas plants for more than 5 years. Upto 55 human days may be used by this expert.
        - 21.2.3 The partner may also appoint a junior expert or administrative person (for upto 7 days) for coordination and other assistance required for project purposes.
        - 21.2.4 The firm may also propose to have a pool of experts who would provide inputs to/peer review the drafted standards/guidelines. Cumulatively, upto 10 days may be used by these experts.
    - 21.3 Demonstrate experience for setting up or recommending guidelines and standards. Experience on biogas plants standards is desirable;
    - 21.4 Excellent relationship/ liaison with government organizations, industry and stakeholders in the clean cooking energy sector

Technical proposal

22. A detailed proposal needs to be submitted by 7th December 2016 to GIZ for this assignment. The proposal will also be assessed on

    22.1 Detailed methodology, including timelines for carrying out the assignment capturing details on gathering international experience, key stakeholders (government and industry) to be involved in the process, anticipated risks and mitigation measures,

    22.2 Experience in terms of similar assignments carried out in the past, specifically highlighting impacts of the support provided to governmental policy and planning (biogas is desirable); experience of working with industry is also desired

    22.3 CVs of experts highlighting relevant experience and their roles and responsibilities in the assignment; relevant knowledge and experience of working in India is desirable. In addition, adequate knowledge of biogas sector internationally is also required.

23. Overall, the firms will also be assessed on the below criteria and details need to be included in the technical proposal:

    23.1 Demonstrated experience of (>3-4 years) working with the Indian government and industry on policy and other facilitative processes (biogas desirable)

    23.2 Experience of getting relevant international experience for application in India (biogas desirable) (> 3-4 years)

    23.3 Evidence of experience of getting key government departments, think tanks, private sector and other important stakeholders involved in the project

Financial proposal

23. The consultant also needs to submit a detailed budget for this assignment, in the template prescribed by GIZ.

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Annexure 1

LARGE BIOGAS PLANT DATA

Sr.No.		M/s Sarovar Agro Farms & Biogas Pvt. Ltd	M/s Shri Dayoday Urja Evam Jaivik Khaad	M/s Naini Papers Ltd	M/s. Clarus Bioenergy Pvt. Ltd.	M/s Everest Starch India Pvt. Ltd.	M/s. Green Elephant India Pvt. Ltd
1	Plant size (Preferably above 100 m3 up to 4,000 m3 in increments of 500 m3)						
2	Plant technology	CSTR	CSTR	ECSB	M-UASB and CSTR	UASB	CSTR
3	Type of Waste	Poultry litter/cattle dung/Industrial waste	Urban Waste (Cow dung)	Paper industry waste	Cowdung/ Poultry Waste/Industrial Waste	Maize Effluent	Spent Wash
4	Quantity (Ton/day or m3/day)	25MT (20MT from poultry & 05MT from cow dung)	75MT/day	4000 m3/day	97MT/day (14 MT from elephant grass, 75 MT from Press mud & 8 MT from other waste)	300MT/day	600 m3/day
5	Location (Hills - above 1,000 m, plains)	Panchkula, Haryana	Bhopal(M.P.)	Uttarakhand	Kolhapur	Rajkot, Gujarat	Satara, Maharashtra
6	Daily biogas production (is 100% of it utilized or there are some losses, if yes then what is the % of losses)(m3/day)	1500	3000	4000	7200	12000	19200