

Government of India
Ministry of New and Renewable Energy

**Call for Proposals for Approval of Innovative & New Design /
Material based Small Biogas Plants size ranging from 1 to 25
m³ Biogas Generation per Day.**

The Ministry of New and Renewable Energy (MNRE) invites proposals/ applications in the prescribed proforma from the developers/ Manufactures / Organizations, Universities, R&D Institutions, Industry or any other competent group engaged in manufacturing /development of small biogas plant (1 to 25 Cubic Meter biogas generation per day capacity), of Innovative & New Design and/or significant change in existing approved designs leading towards simple efficient and cost effective domestic, community / village level small scale Biogas usage. The designs may be construction material based or made of alternative building / construction materials such as HDPE/ PVC/ LLDPE / Low-Cost Polyethylene and/or any other eco-friendly & durable but with standard and virgin quality materials. The proposed Biogas Plants should be suitable for Indian climatic conditions and which should be able to process various feedstocks/ organic wastes for anaerobic fermentation, which can be run at normal solid contents or at high concentrations for wastes such as cattle dung, biodegradable organic biomass/ wastes and waste from sanitary toilet, kitchen waste, garbage/waste at decentralized locations. **MNRE shall provide approval /recognition for such Biogas model/ design/systems for considering in the MNRE's Biogas Programme. Based on the detailed data and proposals submitted, MNRE shall analyze, evaluate and validate the proposals and based on the laboratory/ field evaluation, the promising technology/ biogas plant designs may be released in the list of approved models of Biogas Plants along with all details. Only Such approved models of Biogas Plants shall be considered for eligible for the benefits under the Biogas Programme of this Ministry.**

Submission:

Interested Parties / Developers / Manufacturers / Agencies / Industry, Universities / Autonomous Bodies, Reputed R&D Institutions of the relevant field or any Other Competent Group, who is/are seeking approval of small biogas plant's model/ design under MNRE's Biogas Programme, should send their proposals in the prescribed format which can be downloaded from the MNRE's website: <http://mnre.gov.in>. The applicants / Biogas Technology Developers should submit five hard copies of the proposal duly signed with one soft copy (MS-word file, not a PDF) through e-mail or CD to: **Shri S. R. Meena, Scientist-'D', MNRE, Room No 604, Phase-I, Atal Akshya Urja Bhawan, (AAUB) Opp. to CGO Complex, Lodi Road, New Delhi -110003. (e-mail: biogas-mnre@gov.in /meena.sr@nic.in).**

Last date for submission of proposals: 2nd April, 2024.

बायोगैस का वरदान: खुशहाल किसान, रसोई के लिए गैस और खेती के लिए खाद

Government of India / भारत सरकार
Ministry of New and Renewable Energy / नवीन और नवीकरणीय ऊर्जा मंत्रालय
(Biogas Division) / बायोगैस प्रभाग

FORMAT FOR PROVIDING INFORMATION/ DETAILS ON NEW DESIGN(S) OF BIOGAS PLANTS FOR CONSIDERATION FOR APPROVAL UNDER NNBOMP

1. Name and address of proposer/ institution :

2. a. History of evolution of the proposed design
b. specify utility/ purpose of design :

3. Capacities of plant in terms of daily gas production for which design are being submitted (m³/Day) :

4. (i) Basic design data (including assumptions on which the design has been developed) :

(ii) Name of the feed-stock/ Type of waste (give details if it is a mixture) based on which the Biogas Plant has been designed :

(iii) Gas yield (in litres or cum./kg.) of fresh feed-stock and/ or per kg. of dry matter :

(iv) Hydraulic Retention Time (HRT) or Solid Retention Time (SRT) based on average winter temperature of the country regions (In days Or Hours) :

Region	Average Temp. in winter (Degree Celsius)	HRT (Days/ Hours)
I	> 25	-----Days
II	20- 25	-----Days
III	15-20	-----Days
IV	10-15	-----Days
V	< 10	-----Days

(v) Ambient temperature or temperature at which Lab. Experiments were conducted :

(vi) Country climatic zones for which the proposed new Biogas plant will be disseminated as per the HRT and Regions as mentioned in (iv) above :

5. Design Details

(Please give following details for biogas plant of a specified capacity and enclose dimensional sketches for plants of each of the capacities)

(i) Capacity of plant in terms of daily gas production. (m³ per day) :

(ii) Digester volume (Cubic meter) :

(iii) Gas storage volume (m³) :

(iv) Gas pressure in centimetre of water column (give maximum working pressure in case of a fixed dome/ roof plant). :

(v) Height/ Dia. ratio of Digester :

(vi) Type and name of Feeding Waste

(vi) Feed-stock loading rate per/day :

a) Quantity in kg. per day or per hour :

b) Frequency of feeding incase of batch feeding :

(vii) Biogas Storage capacity (Cubic Metre) for 24 Hours. :

6. Special design features of the proposed design in contrast to the approved designs, viz, a. KVIC, b. Janata, c. Pragati and d. Deenbandhu e. Flexi :

7. Whether the design has been analyzed by an expert design engineer for its structural strength? If Yes, give the details. : Yes/ No

8. List and quantity of material along with prices of materials and cost of plants of different capacities. Give the labour cost involved per unit of a specific size of the Plant along with the labour/ material cost ration. :

S. No.	Material	Rate	Quantity for cum.	Total Cost (Rs.) per unit Plant size of Biogas Plant
I				
II				
III				
IV				

9. Specify strengths of materials recommended For construction/ fabrication with reference to the tested data. Whether ISI approved BIS marked or any other standard of materials have been followed for the proposed biogas plant material. :

10. (i) In case of fiberglass, plastics, low or high density polyethylene or rubber, give information as per **Annexure – I**. Also indicate whether these materials are available indigenously or imported or will be imported. In case of fiber glass, glass fiber percentage and layer structure should be specified. In case of plastics, their durability after exposure to sun may be specified. :

(ii) In case of any special membrane. Its durability

and exposure test results in high temperature and colder conditions below 10°C and Sub- Zero conditions to be specified :

11. Constructional methodology (Details construction /fabrication method with working drawings may be enclosed. Suggestion for different topography/ soil type/ water tables may also be indicated) :

12. Maintenance schedule and cost (give details of maintenance schedule to be followed on daily/ weekly/ monthly/ yearly basis) :

13. Whether the design has been tested at full rated capacity of biogas generation under field condition (if yes, please indicate addresses of a few sites along -with date, if available. If no, please indicate the capacity fraction at which it has been tested. Performance data may be furnished as per proforma (**Annexure-II**) :

14. Quality control aspects (for materials use, finished plant and leak proofness of biogas storage) :

15. Whether special training, etc. for personal different levels is required for promotion proposed model (If yes, indicate has been prepared) :

16. Justifications for technology approval of this Design/Material based plant over the existing & Proven technology biogas plants ALREADY Approved by the MNRE. :

17. Justifications for Technology Transfer and promotion for wider application AND cost considerations :

18. Status & ownership of original I.P.R. License/ working IPR :

19. Any other relevant information considered important for Technical Appraisal of the proposed design of Biogas plants. :

20. Standard documentations, comprising of Test reports/ results and certificates pertaining to the strength of virgin material, durability/ life & **useful life of proposed biogas plant in years etc. with the address of the recognized material testing institution/ certifying organizations are to be enclosed along with this.** :

21. Whether the design of Biogas Plant is indigenous or foreign. If foreign design, give full details of origin and technology and justifications for its suitability in various Indian Climatic Conditions and Zones . :

22. Submit additional information about how the quality of biogas plants(s) and materials are being ensured/to be ensured to comply with the ISI standards formulated by the BIS Delhi, for Biogas Plants. :

23. Whether the proponent/biogas developer/manufacturer, who have already installed (minimum 50 number) biogas plants (size ranging from 1 to 25 Cubic Meter capacity only) during the recent years, if so, the details may be provided in the proforma (**Annexure-III**) :

24. Ministry may ask any other information during the process of design evaluation/ technical appraisal of the any proposal and the same will have to be provided by the proponent. :

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I. SPECIFICATIONS OF RAW MATERIALS USED IN MANUFACTURING WITH RESPECT TO PARA 10 OF THE APPLICATION PROFORMA.

a. Properties of Resin

- i. Viscosity (Brookfield Viscosity) :
- ii. Volatile content :
- iii. Acit Value :
- iv. Generation time with 1.5/ catalyst :
1.5 accellrator at 25 0C :
- v. Tensile strength of Cast Resin :
- vi. Barcol Hardness of Cured Resin :
- vii. Cross Breaking Strength :
- viii. Modulus of Elasticity :
- ix. Water Absorption (24hrs.) :
- x. Heat Deflection temperature :
- xi. Chemical Resistance :

b. Properties of Glass Polyster Laminate

- i. Specific Gravity :
- ii. Fibre content :
- iii. Barcol Hardness :
- iv. Tensile strength :
- v. Tensile Modulus :
- vi. Cross Breaking Strength :
- vii. Flexural Modulus :
- viii. Izod impact Strength :

c. Properties of HDPE/ PVC/ Flexi Plant, etc. :

II. FULL SPECIFICATIONS OF THE FINISHED PRODUCTS/ BIOGAS UNIT :

- a) Capacity of the plant , m³ :
- b) Height/ Length (metre) :
- c) Thickness of wall / layers (mm) :
- d) Tare Weight (Kg.) :
- e) Cost of each capacity of the Biogas Plant (INR) :

III. DETAILS OF FILLER MATERIAL, IF ANY USED :

IV. FABRICATION DETAILS :

V. PRODUCT TESTING

- a) Visual Inspection :
- b) Overall Dimension :
- c) Thickness :
- d) Weight :
- e) Test for leakages :
- f) Test on randomly selected products. :
- g) Copies of Test Reports and address of testing/ certifying organizations:

- VI. DO'S AND DONT'S DURING FABRICATION, TRANSPORTATION, INSTALLATION AND OPERATION AND MAINTENANCE :**
- VII. BIOGAS PLANT INSTALLATION PROCEDURES :**
- VIII. REPAIR PROCEDURE INCASE OF FAILURE :**
- IX WHAT ARE THE ADVANTAGES OF USING THE NEW MATERIAL OR METHOD?**
- X WHAT ARE THE LIMITATIONS KNOWN FOR THEN NEW MATERIAL OR METHOD? :**
- IX. ANY OTHER RELEVANT INFORMATION :**

PERFORMANCE EVALUATION DATA SHEET FOR DOMESTIC BIOGAS PLANTS 1 Cubic Meter to 25 Cubic Meter capacity.

TYPE OF BIOGAS PLANT :

BIOGAS PLANT CAPACITY

Sl. No.	Particulars	Date of	Month
		1 2 3 4 30 31	

1. Type of feeding material /Waste for which the proposed biogas plant has been designed :
2. Quantity of feeding (kg./day) :
3. Moisture content of feeding material (%) :
4. Quantity of water added (kg. /day) with the designed ration of feeding material/ water :
5. Total Solids Contents (%) :
6. Total Volatile Solids (%) :
7. Feeding time (Hrs.) and type of feeding i.e. Batch, Continuous Or Semi-continuous :
8. Ambient Temperature during winter (degree Celsius) :

At 30 cm. depth :
 At 60 cm . depth :
 At 90 cm . depth :

9. Digester Slurry Temperature (degree Celsius) :

At 30 cm . depth :
 At 60 cm. depth :
 At 90 cm. depth :

10. Slurry pH (weekly)

At inlet :
 At outlet :
 Inside digester :

11. Gas production

Initial gas flow meter reading :
 Final gas flow meter reading :
 Total gas production: M³/day or M³/hr. :

12. Gas flow pressure for cooking / heating or engine operation :

- a. At full/ rated capacity of biogas plant in cms of water column or mm of Hg or Kgf/cm² :
- b. Static Presume excreted upward at full/rated capacity filled in the gas holder/ dome in cm of water column or mm of Hg or Kgf/cm² :

Annexure-III

Details of the biogas developer/manufacturer, who have installed biogas plants (1 Cubic Meter to 25 Cubic Meter capacity only) during the recent previous years, if any

- (i) What is the experience of Biogas plant manufacturing capacity :
- (ii) Whether the technology is having TRL is > 4 and above :
- (iii) Whether your technology is already validated /recognised by any national body such as BIS etc :
- (iv) Describe about the Innovation in your proposed design/ technology :
- (v) How does your Biogas design lead towards simple and cost effective domestic, community / village level small scale Biogas usage :
- (vi) Whether your technology is suitable for processing various feedstocks/organic wastes for anaerobic fermentation diverse feedstocks if so, the details thereof :
- (vii) Whether your proposed technology is suitable for Indian Climatic conditions specifically for NER & Hilly and colder regions of the country :
- (viii) Whether your design robust for use of kitchen / food wastes and waste from sanitary toilet :
- (ix) Please provide the details of already installed small biogas plants in the table given below :

S N	Year of installation	Name of State	Name of District	Number of Biogas plant installed	Size of biogas plant (biogas generation in cubic meter /day)	Current operational status	Remarks, i.e. Type of users (individual/ ULB/ Govt Bodies etc)/ Feedstock using
