

275939/2024/S & T-KVIC

To,
 The Director, Science & Technology
 Khadi and Village Industries Commission
 "Gramodaya" 3, Irla Road, Vile-Parle (W)
 Mumbai – 400056

Subject: Submission of R&D project proposal

Dear Sir/ Madam,

Attached with this cover letter is the R&D project proposal entitled 'Design and development of a portable KVIC type biogas plant for colder regions' for your kind perusal. The proposal targets to facilitate the biogas production at higher altitude areas of India. This will help overcome the problem with limited/ no biogas generation in the hilly areas, where temperature is very low.

Keeping in view our experience and expertise in the area, we ensure that the project will result in a sustainable technology based on KVIC type biodigester for this purpose.

Looking forward to your support.

With Best Regards,

*SMS
22/12/23 -*

(Dr. Shailey Singhal)

Amit Sharma
(Dr. Amit Sharma)

Project Coordinators
 Department of Chemistry
 Cluster of Applied Sciences
 School of Advanced Engineering
 UPES, Dehradun

Enclosures:

1. Project proposal
2. Endorsement letter
3. Required annexures

Cc: State Office, KVIC, Dehradun, Uttarakhand

विशाल एवं प्रौद्योगिकी निदेशालय
 Directorate of S&T
 आमदार-जनकरण रु./
 Inward-Outward No. 2KU
 दिनांक/Date: 02-01-2024

*sri s. l. giri
02/01/2024*

*R. Patel u/s
Shri Neeraj
02-01-2024*

Annexure-II
(Ref: S.O. No.1739 Dt: 29.06.2015)

**DIRECTORATE OF SCIENCE & TECHNOLOGY
OFFICE OF THE COMMISSIONER KVI
“Gramodaya” 3, IRLA Road, VILLE-PARLE (W)
Mumbai-4000056**

Performa for submission of new R&D Project proposal (Year 2023-24)

I. Part A

1.	Name of the Institution/individual: University of Petroleum and Energy Studies	
2.	Institutional structure/Registration Details	
2a	Legal status	Statutory University
2b	Date of registration	10.07.2003 (certificate attached: Annexure-1)
2c	Registered address	Energy Acres, PO Bidholi, via Prem Nagar, Dehradun
2d	Office address/location	Energy Acres, PO Bidholi, via Prem Nagar, Dehradun Phone: 0135 2770137 Fax: - e-mail: registrar@upes.ac.in
2e	Affiliated to KVIC	YES/NO: No If Yes, Provide Certificate No. NA Validity of certificate: NA

3. Validity date of Registration (in case of NGO's): NA

4. Name & Designation of the head of the organization: Mr. Manish Madaan, Registrar (Biodata of the Project Co-coordinator should be enclosed)

5. Name, Designation & address of the Project Co-coordinators:

Dr. Shailey Singhal
Professor, Department of Chemistry, Applied Sciences Cluster, School of Advanced Engineering, UPES, Dehradun, Uttarakhand-248006

Dr. Amit Kumar Sharma
Assistant Professor, Department of Chemistry, Applied Sciences Cluster, School of Advanced Engineering, UPES, Dehardun, Uttarakhand-248006

6. Background of the organization:

(a) Past experience in R&D work in the KVI sector and micro-enterprise and entrepreneurship development need to be given on separate sheets (details of work done in other areas need not be given).

UPES has been actively engaged in the research areas related to renewable energy. It had the Biogas Development and Training Centre (BDTC) established by MNRE, New Delhi at its campus in the past, wherein the BDTC coordinators (including Dr. Shailey Singhal, Project coordinator of the present proposal also) have worked closely with KVIC, Dehradun for the spread, trainings and associated objectives with special reference to biogas.

(b) Infrastructure facilities and expertise available (give details).

UPES has well established laboratories with most of the basic facilities including gas chromatography. As a part of our earlier projects in the concerned area, we have 02 KVIC type biogas digesters at our campus of capacities 6 m³ and 85 m³.

Dr. Shailey Singhal, the project coordinator of the present proposal, has a wide experience in biogas. She has completed 02 major projects, funded by the Ministry of New & Renewable Energy, New Delhi. She has been the coordinator of Biogas Development & Training Centre, Dehradun established by MNRE. Under this umbrella, she has contributed towards the society by imparting trainings and arranging awareness camps for the residents of rural areas of Uttarakhand for the promotion and usage of biogas as a source of alternate fuel. Different types of trainings, viz. CMC (Construction cum Maintenance course) to masons, user courses to beneficiaries, trainings to turn key agents and trainings to Govt. officers working in the area of biogas were the part of this project. Under another project in the area of biogas, she has worked for the designing and installation of continuous stirred tank reactor (CSTR) for the anaerobic digestion of jatropha de-oiled cake (JDOC) of 40m³/day capacity. She has supervised 04 Ph.D. scholars in her areas of expertise.

Dr. Amit Kumar Sharma is CO-PI of this project proposal, and he has been working in bioenergy sector for last 10 years. He has good experience in area of biogas production, and he completed the project entitled as "Establishment of Jatropha De-oiled cake-based Biogas plant" funded by UCOST Dehradun as SRF. During this project a floating drum type biogas plant with a capacity of 6 m³ is designed and installed in UPES, Bidholi. That can be run on non-edible -deoiled cakes e.g. jatropha de-oiled cake. He has published 90 national and international journal publications in the bioenergy sector. In addition, he has been granted four patents.

(c) Details of completed and ongoing projects during the last 3 years.

S.No.	Title of the Project	Start date-Completion Date	Name and Full address of Funding Agency	Amount Sanctioned*	Amount Received*
1.	Biogas Development and Training Centre, Dehradun	2009 – 2014	MNRE, New Delhi	Rs. 1.2 Cr	~ Rs. 1.00 Cr
2.	Integrated Research, Development and Demonstration of Biogas Generation from Leaves, Fruit-hull and De-oiled cake of Jatropha using CSTR Digester and its Purification/Upgradation for Utilization in Vehicle	2011 – 2014	MNRE, New Delhi	Rs. 46.9 Lakh	Rs. 46.9 Lakh
3.	Establishment of Jatropha Oil Cake based Biogas Plant	2009 – 2012	UCOST, Dehradun	Rs. 8.34 Lakh	Rs. 8.34 Lakh

*Enclose copies of the sanction (Annexure-2, 3, 4)

7. District / Area to be taken up for the project:

This is an R&D project proposal, which includes investigation and validation at lab scale initially. Followed by this, the actual area of implementation may be decided in consultation with KVIC officials.

8. Location of project implementation and details thereon.

Location of project implementation may be decided in consultation with the KVIC officials after the lab scale validation of the technology under lab environment.

9. If any developmental activity has been done in the proposed location prior to submission of the proposal by the Project Coordinator or the Organization, the details may be given in brief: NA**10. Details of infrastructure of the Organization in the proposed location.**

NA

II. PART-B**1) Title of the R&D proposed**

Design and development of a portable KVIC type biogas plant for colder regions

2) Objectives of the proposed study

- Investigation of mixed organic feedstock (food waste, cattle dung, agriculture waste etc.) for its conversion to biogas in a single bio digester
- Integration of solar thermal technology with biogas digester to improve biogas production efficiency under colder climatic conditions.

3) Justification for the project based on the assessment of the existing-resources and infrastructure

Anaerobic digestion (AD) is an eco-friendly technology employed for organic waste management, offering multiple advantages such as sludge reduction and the production of renewable energy in the form of biogas. It also contributes to greenhouse gas emission reduction, provides additional income for farmers, facilitates nutrient recycling, and minimizes pollution. Furthermore, the utilization of bio-slurry as a natural fertilizer in agriculture can partially replace chemical fertilizers, thereby enhancing soil quality. Among the various factors influencing the

AD process, temperature is a key determinant impacting microbial communities, process kinetics, substrate utilization rates, stability, and biogas generation. AD operations occur within four temperature ranges: psychrophilic ($10\text{--}27^{\circ}\text{C}$), low-mesophilic ($30 \pm 3^{\circ}\text{C}$), mesophilic digestion ($35 \pm 3^{\circ}\text{C}$), and thermophilic digestion ($55 \pm 3^{\circ}\text{C}$). Temperature control is crucial for optimizing AD performance and ensuring efficient organic waste conversion while reaping its environmental and economic benefits.

However, Biogas production becomes more challenging in cold region areas. For example, most of the Uttarakhand cities like Dehradun, Uttarkashi etc. face this low temperature issues in winter season which results into inactivation of methanogenic bacteria leading a sudden fall in biogas production. To mitigate this, the project employs two innovative solar techniques: heat trapping within the digester using a greenhouse during daylight hours and utilizing a solar heater with a heat exchanger to elevate digester temperatures. The present project proposes an innovative approach that combines a solar radiant heating low-cost tubular digester (LCTD) with a solar greenhouse and a solar water heating system equipped with a capillary heat exchanger. This novel system will be designed to reduce heat loss and enhance the heat exchanger's efficiency, offering dual heating modes for the tubular digester (TD): direct absorption solar heating during the day and solar water heating system (SWHS) support at night. These measures promise to address both waste management and energy production challenges in Uttarkashi. The installation of biogas plants can address a wide range of problems and challenges, making them a versatile and valuable technology in various contexts. Moreover, it offers a range of economic, environmental, and social benefits.

5)

Level of work done so far (Review of Literature of the proposed R&D).

The inadequate development of biogas technology in the cold temperate region of India has posed a significant challenge. In hilly areas of Uttarakhand, the percentage of realized biogas plants as compared to the estimated potential remains stagnant due to operational difficulties faced by existing biogas plants in these cold regions. Conversely, there has been a noticeable upward trend in biogas plant adoption across India during the same period. To facilitate the wider dissemination of biogas plants in high-altitude regions, there is a pressing need for further enhancements in design, process efficiency, and the creation of new technologies for mixing, process monitoring, and control. Various methods can be employed to increase digester temperature, such as constructing a digester with hollow insulated bricks for floating drum plants, applying straw insulation around the digester, enclosing the biogas plant within a greenhouse, and incorporating hot water into the input feedstock material during peak winter periods. However, these technologies are facing many challenges for adaptation at large scale. DRDO biofuels Lab, IIT Delhi, Sardar Swaran Singh National Institute of Bio-Energy, IARI and Madurai Kamaraj University are some institutes working actively in biogas sector.

The idea proposed in the present proposal introduces a groundbreaking approach to create a portable KVIC-model-based bio-digester capable of processing a diverse range of organic feedstocks, even in colder conditions. This innovative system involves a tubular digester seamlessly integrated with a solar greenhouse and an advanced capillary heat exchanger-equipped solar water heating system. The methodology incorporates dual heating mechanisms for the tubular digester: direct solar heating during daylight hours and solar water heating during the night. We could not find any literature employing this concept in India however, some institutes outside the India are working on this concept (1,2).

References:

1. Ouhammou, B., Mohammed, A., Sliman, S., Jamil, A., Mohammed, B., Karouach, F., El Bari, H. and Kousksou, T., 2022. Experimental conception and thermo-energetic analysis of a solar biogas production system. *Case Studies in Thermal Engineering*, 30, p.101740.
2. Su, X., Shao, X., Geng, Y., Tian, S. and Huang, Y., 2022. Optimization of feedstock and insulating strategies to enhance biogas production of solar-assisted biodigester system. *Renewable Energy*, 197, pp.59-68.

6)

Relevance, usefulness and justifications of the proposed work to KVIC sector in terms of economy, efficiency, productivity, quality, raw material utilization, etc.

In the present proposal, a novel approach will be introduced for establishing a portable KVIC-model based bio-digester, which can work on mixed variety of organic feedstock also under colder conditions also. This will involve a tubular digester integrated with a solar greenhouse and a solar water heating system with an advanced capillary heat exchanger. This methodology will be able to significantly reduce heat loss and enhance the heat exchanger's operational

lifespan. It will offer dual heating methods for the tubular digester: direct solar heating during the day and solar water heating at night. To assess its effectiveness, this novel system will be compared with a traditional setup.

The primary objective is to evaluate how this solar heating technique influenced the temperature within the low-cost tubular digester (LCTD) and the overall efficiency of biogas production in an outdoor pilot-scale setting. Furthermore, the findings will also be compared to those from similar digesters operating under standard conditions, demonstrating the potential advantages of this innovative approach.

7) Time schedule (month wise action Plan) for implementing the project.

Project activity	0-3 months	4-6 months	7-9 months	10-12 months	13-15 months	16-18 months	19-21 months	22-24 months	25-27 months	28-30 months
Recruitment project staff										
Literature review										
Physico-chemical analysis of mixed biodegradable waste used for biogas generation										
Investigation of mixed organic feedstock for biogas generation										
Design and fabrication of portable KVIC type bio digester equipped with solar energy trapping and thermal insulation facility										
Optimization and demonstration of the designed system										
Trainings of users for the operation and maintenance of the upgraded plant										
Project completion report										

8) Implementation methodology in brief (step wise).

I. **Investigation of mixed biodegradable waste for biogas generation at lab scale.**

Kitchen waste, cattle dung, agriculture waste and sewage water will be collected for biogas production. Before use in biogas plants, the biochemical composition, proximate and ultimate

analysis will be carried out of each type of waste. After that, these wastes will be grinded into small particles using a biomass grinder. The sewage water will be filtered, and solid content will be sent to the digester along with other wastes, while filtered water will be sent to the solar heater for the purpose of heating digester.

II. Design and fabrication of portable KVIC type biodigester equipped with solar energy trapping and thermal insulation facility.

This research proposal involves the application of two solar energy techniques to heat the slurry within the digesters. It will comprise a solar greenhouse integrated with a north wall, a solar water heating (SWH) system, a capillary heat exchanger (HE), a layer of sand for efficient heat storage, and an inner layer of cotton glass wool insulation within the greenhouse to minimize heat loss from the capillary heat exchanger during SWH system operation. Ambient temperature and solar radiation intensity will be monitored using a weather station near the experimental site throughout the experiment. Various parts of the solar integrated digester are as under: Digester: The low-cost PVC digester will be constructed/ procured and operated with a liquid capacity maintained at 70- 75%. The digester will initially be filled with a fixed amount of inoculum source and the feedstock for the digesters includes cattle manure, kitchen waste, agricultural waste, and sewage water in fixed ratio. Solar Water Heating System (SWH): The SWH system will comprise of an integrated evacuated-tube solar collector, an insulated storage tank, a circulating water pump, and a capillary heat exchanger (HE). The evacuated-tube solar collector will be installed on the ground, facing south at a 30-degree tilt to maximize solar radiation absorption. During the daytime, the water pump remains switched off, while at night, it will be activated to transfer hot water from the storage tank to the capillary heat exchanger for heating the slurry inside the digester. The capillary heat exchanger, constructed from polypropylene, could withstand temperatures up to 100°C and pressures of up to 10 bars. Greenhouse: The complete set up of digester will be kept inside a greenhouse. The greenhouse will be a semi-solar design to maximize solar radiation absorption. It will be featured with outer and inner layers constructed from green cloths' insulation, with a central layer consisting of 5 cm thick asbestos. To minimize heat loss during night and cloudy days, a north wall will be incorporated. The greenhouses will be covered with a thick polyethylene plastic and will be aligned in an East-West direction to optimize sun exposure.

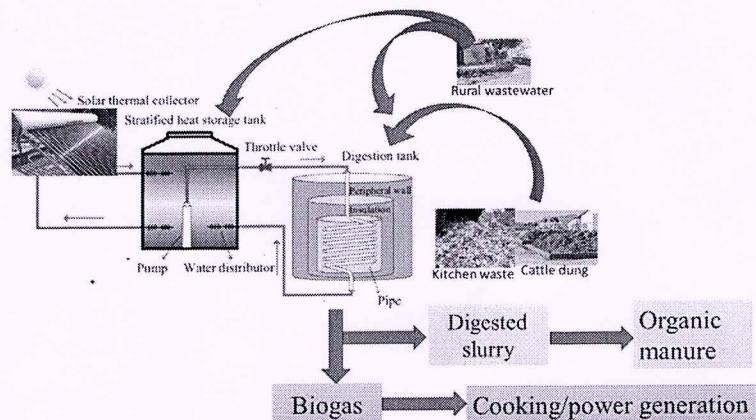


Figure 1 Proposed methodology

III. Analytical methods.

Once the digesters achieve stable performance, regular sampling will be done at intervals of every two weeks for influent and effluent characterization. The analysis will encompass Total Solids (TS), Volatile Solids (VS), and Chemical Oxygen Demand (COD), utilizing standard methods established by APHA. Furthermore, Total Nitrogen (TN) and Total Carbon (TC) levels will be determined through an elemental analyzer. pH values will be measured employing a pH meter, and the concentration of Total Ammonia Nitrogen (TAN) will be quantified using standard protocols. Volatile Fatty Acids (VFAs) will be analyzed via gas chromatography equipped with a Flame Ionization Detector (FID). To ascertain the methane content, biogas samples will be collected in Tedlar bags. The composition of biogas will be assessed using gas chromatography coupled with a Thermal Conductivity Detector (TCD). The micro and macro elements composition of organic manure will be analyzed using ICP methods. NPK values of manure will also be analyzed standard methods.

IV. Demonstration of the newly designed plant

The newly developed bio-digester based upon KVIC model (portable) will be demonstrated to the KVIC officials with all the details.

V. Trainings of users for the operation and maintenance of the upgraded plant

Trainings will be organized for the beneficiaries identified by the KVIC for the installation of the bio-digesters equipped with the thermal insulation facility.

9) Potential areas identified for promotion of micro-enterprises.

NA

10) Scientific and Technical interventions envisaged.

- **Efficient portable Biogas Digesters:** Develop advanced biogas digesters with improved temperature control, mixing systems, and gas recovery mechanisms to maximize biogas production.
- **Solar Thermal Integration:** Use solar collectors to preheat the feedstock or water used in the biogas digester, improving the overall efficiency of biogas production.
- **Co-digestion Strategies:** Research and implement co-digestion of different organic materials to improve biogas yields and optimize waste management.
- **Nutrient Recovery:** Develop processes for recovering valuable nutrients (e.g., phosphorus and nitrogen) from the digestate, which can be used as fertilizers.
- **Climate Change Mitigation and Greenhouses Reduction Strategies:** Implementing technologies and practices to reduce greenhouse gas emissions and enhance resilience to the effects of climate change.

11) Training programme envisaged.

Training programmes can be planned based on the area identified (if any) in consultation with KVIC after the demonstration of designed plants.

12) Linkages envisaged.

The R&D activities planned under this proposal will be targeting the upgradation of KVIC type portable biodigester. The portable plant will be upgraded with respect to mixed feedstock and thermal insulation. It will be demonstrated and popularized among users for its implementation. The technology will be extended to the conventional model of KVIC type biodigesters. This will facilitate the generation of biogas in winters and in colder regions also.

13) Follow-up Mechanism envisaged to tap fullest benefit of R&D.

Follow-up mechanism will include the monitoring of the upgraded plants installed through KVIC at the identified locations. UPES team will support in proper operation of the plants and provide the technical support required.

14) Expected outcome of the project:

- **Biogas and nutrient rich organic manure generated by the anaerobic digestion of kitchen waste, cattle dung, agriculture waste (Fruit-vegetable waste).**
This project will explore the feasibility of utilization of food waste, cattle dung, agriculture waste and sewage water in a single type of digester for improving biogas yield and quality. Furthermore, it will utilize all the wet waste for bioconversion and will support national mission-WASTE to WEALTH.
- **Novel technology for converting waste to wealth specifically for colder regions.**
The project will help to develop a solar integrated portable biogas digester which will be able to produce biogas even in cold climate areas of Uttarakhand and other mountainous states of the country.
- **Minimization of LPG requirement for rural areas by its replacement with biogas.**
Production of biogas will be able to reduce dependence on LPG cylinder and also result in a valuable byproduct, i.e., organic manure.
- **Upliftment in the socio-economic status of the residents of Uttarkashi.**
The local community will be able to produce cooking fuel themselves and will support ATMNIRBHAR BHARAT. Furthermore, they will be able to improve their economy by selling organic manure.
- **Support to Swatch Bharat Abhiyaan and Gobardhan yojana.**

15) Exit Strategy (Plan after completion of the project)

After the completion of the project, UPES team will provide support to KVIC for providing technical support for the proper maintenance and operation of the plants installed through them, as and when required.

16) Any other information/remarks: Nil

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17) Budget:

s.no.	Item of expenditure	I st year	II nd year	III rd year	Total
1	Man power	2,40,000	2,40,000	1,20,000	6,00,000
2	Travel	25,000	50,000	25,000	1,00,000
3	Training programs	-	25,000	50,000	75,000
4	Contingencies	35,000	50,000	40,000	1,25,000
5	Equipment and consumables	6,00,000		-	6,00,000
	Total	9,00,000	3,65,000	2,35,000	15,00,000

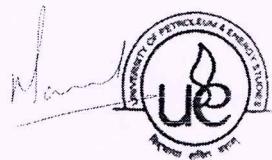
*Budget break-up of manpower and training programmes along with budget justification to be given on a separate sheet.

Manpower: Project Assistant (01) @Rs. 20,000/month

Training programmes: Will be decided as per the recommendation of KVIC after successful validation of the plant at lab scale and demonstration to the KVIC team.

Equipment: Portable pH-meter, portable floating dome biodigester, solar geyser, insulating facility, coiling facility, green house, camera, chemicals, accessories, etc.

- 18) Certificate of Endorsement from the head of the institution should be in the prescribed format. (Annexure III).
- 19) Submission of Progress Report: A write up on various activities carried out under this project is required to be submitted quarterly and also annually along with the data, summary etc... in the prescribed formats (Annexure-IV).



Name & Signature of the Head of the Institution / Agency

(Dr. Shailey Singhal) (Dr. Amit.Sharma)

Name & Signature of the Project Coordinator

Date: 11.12.2023

Place: Dehradun

Recommendation of
State Director/Divisional Director:

SANJIB SANTI
RANJAN ROY

Digitally signed by SANJIB SANTI
RANJAN ROY
Date: 2023.12.21 15:23:21 +05'30'

**Signature
State Director/Divisional Director**

Annexure-III

(Ref: S.O. No. 1739, Dt: 29.06.2015)

ENDORSEMENT FROM THE HEAD OF THE INSTITUTION

1. We have gone through the terms and conditions of the S&T grant agreed to abide by and enter into an Agreement/MOU with OCKVI for implementing the S&Tscheme.
2. We have neither obtained nor intended to obtain financial assistance from any other agencies, amounting to doublefunding.
3. We undertake to submit progress reports, statement(s) of accounts, utilization certificates, etc. as required.
4. Certified that Dr/ Shri/ Smt/ Kum. Shailey Singhal and Amit Kumar Sharma are the Project Coordinators of the proposed S&T Project. The Project Coordinators will assume the responsibility of completion of the project.
 - Certified that the hardware, other basic facilities and such other administrative support required as per terms and conditions of the grant, will be extended the Coordinator(s) throughout the duration of the project.
 - Our agency assumes to undertake the complete financial and other management responsibilities of the project, and will ensure compliance with the terms and conditions laid down.
5. Certified that the Society/Organization will extend benefits of the said S&T projects to the targeted beneficiaries of KVI activities only.
6. If any of the above statements is found to be incorrect by the OCKVI at any point of time, the organization takes the responsibility to refund the entire amount released by OC KVI along with 10 % interest as per GFR norms.

Seal of Signature

University/ Institute/Organization/

Date: 15/12/2023



Mr. Manish Madaan

Registrar of University

Manish Madaan.

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उत्तराञ्चल असाधारण गजट, 10 जुलाई, 2003 ई० (आषाढ़ 19, 1925 शक सम्वत्)

In pursuance of the provision of Clause (3) of Article 348 of the Constitution of India, the Governor is pleased to order the publication of the following English translation of the University of Petroleum & Energy Studies Act, 2003 (Uttaranchal Adhiniyam Sankhya 15 of 2003).

As passed by the Uttaranchal Legislative Assembly and assented to by the Governor on July 08, 2003.

No. 272/Vidhayee and Sansadiya Karya/2003

Dated Dehradun, July 10, 2003

NOTIFICATION

Miscellaneous

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES ACT, 2003 (Act No. 15 of 2003)

AN

ACT

to establish and incorporate an University in the name of University of Petroleum and Energy Studies with facilities for education, training and research in the areas of Petroleum and Energy Studies and related areas sponsored by Hydrocarbons Education & Research Society, registered under Societies Registration Act, 1860 at New Delhi.

It is hereby enacted in the fifty fourth year of the Republic of India as follows:

CHAPTER-I

Preliminary

- | | |
|------------------------------------|---|
| Short title and 1.
Commencement | (1) This Act may be called the University of Petroleum and Energy Studies Act, 2003. |
| | (2) It shall be deemed to have come into force on the date, the Notification is issued by the State Government. |
| Definitions 2. | <p>(1) In this Act, unless the context otherwise requires: --</p> <p>(a) "Academic Council" means the Academic Council of the University;</p> |

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first intimation P Annexure-2

FCC NO. : 101141730154
Kiran Attri
 Date: 19.10.2009 03:12:31 P1

No. 10-16/2009-BE
 Government of India
 Ministry of Non-Conventional Energy Sources
 (Biogas Division)

1 - Sh. G.C.Tiwari (PVC)
 Sh. G. Sanjiv Kumar
 Mr. Shailesh Singh
Kindly circulate as also
Defunct
 (Dr. A.K.Tiwari
 Principal)

Block No. 14, CGO Complex
 Lodi Road, New Delhi - 110 003.
 Dated: 14-10-2009

To
 The Pay & Accounts Officer
 Ministry of New and Renewable Energy
 New Delhi.

Subject:- National Biogas & Manure Management Programme (NBMMP) - Release of First Installment of Biogas Development and Training Centre (BDTC) at Centre for Alternate Energy Research, University of Petroleum and Energy Studies Campus at Dehradun, Uttarakhand.

Sir,

I am directed to convey the approval of President to sanction a Biogas Development and Training Centre at Centre for Alternate Energy Research (CAER), University of Petroleum and Energy Studies Campus at Dehradun, Uttarakhand with a total outlay of Rs.15.30/- lakhs per year and one time grant of Rs. 8.00/- lakhs for equipment during the year 2009-10. The details of objectives, staff pattern, one time non-recurring grant and recurring contingency, etc. approved for the Centre are given below:-

2. Sanction of the President is also conveyed for the release of Rs.15,00,000/- (Rupees fifteen lakh only) including one time non-recurring grant of Rs. 8,00,000/- (Rupees Eight lakh only) for equipment as first installment to Centre for Alternate Energy Research, University of Petroleum and Energy Studies Campus at Dehradun, Uttarakhand for the implementation of the above project for the year 2009-10.

3. The details of objectives, staff pattern, one time non-recurring grant and recurring contingency etc. approved for the Centre are given below:-

4. Objectives

- To provide technical support for National Biogas & Manure Management Programme (NBMMP) on decided areas with MNRE.
- To organize training courses for developing entrepreneurs and for staff of the State nodal departments and implementing agencies, Banks, representatives of Panchayats, women's organizations, masons and users, etc.
- To identify, develop and establish Biogas Extension Centres (BECs), organize training of their personnel and oversee their functioning.
- To carry out field inspections of at least 500 biogas plants in a year for performance monitoring in association with the State nodal departments and agencies and suggest measures for improving quality of programme implementation.
- To carry out field testing/adaptive trials on new models of biogas systems and demonstration of new models of biogas plants and diversified uses of biogas plant effluents and determine users' response.

2021.11.14 13:57

275939/2024/S & T-KVIC

FROM : TURFD
415 - Y

FRX NO. : 01141730154 Oct. 19 2009 03:12PM P2

To evaluate and screen publicity material and act as a clearing house for information dissemination.

b. To provide consultancy services to manufacturers, NGOs, etc. for developing and testing of new systems.

b. Any other activity assigned by MNRE or State nodal departments/ implementing agencies.

5. Financial break-up

Sl. No.	Recurring Grant Item	Amount (in Rupees)
1.	Munpower (Consolidated)	
a.	Project Officer - 1 post @ Rs. 25,000/- PM	25,000/-
b.	STA - 1 post @ Rs. 18,000/- PM	18,000/-
c.	SRF - 1 post @ Rs. 15,000/- PM	15,000/-
d.	JRF/Meson - 1 post @ Rs. 12,000/- PM	12,000/-
e.	MTA Multitasking Asstt. - 1 post @ Rs. 10,000/- PM	10,000/-
	Rs. 80,000/-PM	
2.	Consumables - Stationery, glassware, publicity materials, chemicals etc.	2,00,000/-
3.	Travel	40,000/-
4.	Training/ field demonstration	2,00,000/-
5.	Sub-Total	15,30,000/-
6.	Overhead charges	
	Total	15,30,000/-
7. Non Recurring (One Time Grant) for Equipment		
a.	Cut Sections and Models	1,00,000/-
b.	Biogas Laboratory Instruments (Gas Flow Meters, Burner and lamps, Samplers, PII meters, Hand held gas detectors CO ₂ and CH ₄ , Venturi flow/Anaerobic Hood, Oven, Incubators, autoclaves, Weighing balance, Calorie meters, refrigerator etc.)	4,00,000/-
c.	Office Equipments (Table, Chair etc.)	1,00,000/-
d.	Training Facilities (Multi media Projection systems, including computer)	2,00,000/-
	Total	8,00,000/-

Fact Sheets and Progress reports for the above training courses are attached.

The other terms and conditions governing this sanction are attached in Annexure I.

6. The grantees institution for Alternate Energy Research, University of Petroleum and Energy Studies, Campus at Dehradoon, Uttarakhand has exempted from executing a "BOND" as required under Govt. of India decision No.(2) under G.R.-149(4).

7. The Drawing & Disbursing Officer may please prepare a bill of Rs. 15,30,000/- (Rupees Fifteen Lakh only) and send the same to P.M.G. MNRE.

8. P.M.G. MNRE is requested to take the P.M.G. of Alternate Energy Research, University of Petroleum and Energy Studies, Campus at Dehradoon, Uttarakhand in account. Head of Development and Finance Cell ofAlternate Energy Research, University of Petroleum and Energy Studies, Campus at Dehradoon, Uttarakhand.

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Annexure-3

File No. 2017/2014/D/N.R.O.
Government of India
Ministry of New and Renewable Energy
New Energy Technology Development Group

Block No.14, U.G.O. Complex,
Lodhi Road, New Delhi-110093
Dated: 01-03-2011

To,
The Pay & Accounts Officer,
Ministry of New and Renewable Energy,
New Delhi-110 003

Subject: Sanction for implementation of a project entitled "Integrated Research, Development and Demonstration of Biogas Generation from Leaves, Fruit Hull & De-oiled cake of Jatropha using CSTB Digester and its Purification/Upgradation for Utilization in Vehicles" submitted by Shri. Mr. G. Sanjay Kumar, Assistant Professor, College of Engineering, University of Petroleum & Energy Studies, Energy Acce, Bidholi, Prem Nagar, Dehradun-248007.

Sir, I am directed to convey the sanction of the President of India for the undertaking of the above mentioned project at University of Petroleum & Energy Studies, Energy Acce, Bidholi, Prem Nagar, Dehradun-248007 at a total estimated outlay of ₹ 46.67 lakh (rupees forty six lakh and sixty seven thousand only) with MNRE share of ₹ 35,00,250 (rupees thirty five lakh two hundred and fifty only) for a duration of 18 months. The project shall be implemented in accordance with details of the project, project objectives and terms & conditions given in Annexure - I and Annexure - II.

2. The head wise break-up of the cost is as follows:

i) Total Cost:

S.No	Item	Amount (₹)		
		First Year (12 months)	Second Year (6 months)	Total (18 months)
1.	Equipment	29,85,000		29,85,000
2.	Man power	3,28,000	2,64,000	7,92,000
3.	Consumables	1,55,000	85,000	2,40,000
4.	Contingencies/ Other Costs	50,000	25,000	75,000
5.	Travel	50,000	25,000	75,000
6.	Overhead Charges	-	5,00,000	5,00,000
Total		37,68,000	8,99,000	46,67,000
		UPES, Dehradun share (25%)	11,66,750	
		MNRE Share (75%)	35,00,250	
		Total cost of the project	46,67,000	

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UNIVERSITY OF PETROLEUM & ENERGY STUDIES
ISO 9001:2008 & ISO 14001:2004 Certified

FORM GER 19A
(See Rule 212 (1))
FOURTH UTILIZATION CERTIFICATE
FY - 2012-13

Integrated Research, Development and Demonstration of Biogas Generation from Leaves, Fruit hull & De-oiled cake of Jatropha using CSTR Digester
University of Petroleum & Energy Studies, Dehradun

Sr. No.	Letter No. and Date	Amount	Certified that out of Rs. 18,00,000 of grants-in-aids sanctioned during the year 2011-12 & Nil in the year 2012-2013 favour of "Integrated Research, Development and Demonstration of Biogas Generation from Leaves, Fruit hull & De-oiled cake of Jatropha using CSTR Digester" Center for Alternate Energy Research, University of Petroleum & Energy Studies, Dehradun under Ministry Department Letter No. given in the margin a sum of Rs. 18,00,000 has been utilized for the purpose for which it was sanctioned.
1	19-1-2011-BE 01.08.2011	Rs. 18,00,000 (amount received)	Certified that out of Rs. 18,00,000 of grants-in-aids sanctioned during the year 2011-12 & Nil in the year 2012-2013 favour of "Integrated Research, Development and Demonstration of Biogas Generation from Leaves, Fruit hull & De-oiled cake of Jatropha using CSTR Digester" Center for Alternate Energy Research, University of Petroleum & Energy Studies, Dehradun under Ministry Department Letter No. given in the margin a sum of Rs. 18,00,000 has been utilized for the purpose for which it was sanctioned.

2. Certified that I have satisfied myself that the conditions on which the grants-in-aid was sanctioned have been duly fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

Kinds of Checks exercised

- 1. All bills and receipts
- 2. Pay & allowances included

Signature
Designation: *[Signature]*
Date: *[Signature]*

Certified by

<i>[Signature]</i> Principal Investigator	<i>[Signature]</i> Accounts/Financial Officer	<i>[Signature]</i> Head of Institution
--	--	---

2021-11-14

Corporate Office : Hydrocarbons Education & Research Society
3rd Floor, PHD House, 472 Siri Institutional Area, August Kranti Marg
New Delhi 110 016 India Ph. +91 11 41730151-53 Fax. +91 11 41730154

Campus : Energy Acres, P.O. Bidholi Via Prem Nagar,
Dehradun 248007 (Uttarakhand) India
Ph. +91 135 2776201, 2776061, 2776091 Fax. +91 135 2776090/95

URL : www.upes.ac.in

R.H. → Chancellor
Uttarakhand State Council for Science and Technology
 Department of Science & Technology
 (Government of Uttarakhand)
 33, Vasant Vihar, Phase-II, Dehradun (UK)

Dated: 25-03-2009

ORDER

File No. UCS&T/R&D/ENG-08/08-09/ 201,

Subject: Financial support for Project entitled "Establishment of Jatropha Oil Cake based Biogas Plant"

Sanction and release for the grant of Rs 4,34,700.00 (Rs Four Lac Thirty Four Thousand Seven Hundred only) is hereby accorded to The Chancellor, University of Petroleum & Energy Studies, PO- Bidholi, Via Premnagar, Dehradun (UK) towards First year of the above cited project. The tenure of the project will be of 1½ years.

The items of expenditure for which the total allocation has been approved for One Year are given below.

SINo	Account Head	Amount (in Rs)
1.	Equipments/ Accessories	150000
2.	Manpower i- SRF (01 No @Rs 9000.00 per month) ii- Project Assistant (01 No @Rs 5000.00 per month)	102000 60000
3.	Consumables	20000
4.	Travel	20000
5.	Contingency	20000
6.	Overhead (15%)	56700
	Total	434700

Above grant is subject to the conditions annexed.

(Dr. Rajendra Dobhal)
Director

Copy for information and necessary action to:-

1. Dr Pradeep Kumar Sahoo, Senior Lecturer, College of Engineering studies, University of Petroleum & Energy Studies, Energy Acre, Bidholi, Prem Nagar, Dehradun (UK) [PI of the project]
2. Accounts Section for release of above amount, debitable under R&D.
3. Dr. (Mrs.) Kusum Arunachalam, Senior Scientific Officer & In-Charge R&D.
4. Sanction folder (Sh Sushil Kumar).
5. Master file.

[Signature]

(Dr. Kusum Arunachalam)
 Senior Scientific Officer
Dr. Kusum Arunachalam
 Sr. Scie... Officer (R&D, Ext. Pro.
 Uttarakhand State Council for Science & Technol.
 Dehradun - 248006