

DEVELOPMENT OF PERMANENT CAMPUS (PHASE-I) FOR NALANDA UNIVERSITY

PACKAGE- 3B1

E-TENDER FOR INTEGRATED SOLID WASTE MANAGEMENT INSIDE NU CAMPUS, AND SUPPLY OF BIO FEED RAW MATERIAL REQUIRED FOR THE BIO GAS GENERATION AT PERMANENT CAMPUS(PHASE I)

OF

NALANDA UNIVERSITY, AT RAJGIR, BIHAR.




Specifications

NALANDA UNIVERSITY, RAJGIR, BIHAR.

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Supply of Bio Waste or Feed Raw Material- Survey, collection, Loading, Transportation, Unloading of requisite quality of the Bio Waste or Feed Raw material for the digestion and generation of the biogas through anaerobic biogas digester as per the University requirement. initially for five years at permanent campus of Nalanda University (NU), Nalanda, Rajgir, Bihar.

A. TECHNICAL SPECIFICATIONS and Understanding for the Machineries Deployment at the site

Section	Name	Specification	Quantity	Unit	Penalty in case of Non-deployment
Collection and Transportation	These equipment's are for collection of the waste which is included under gas supply cost, running expenditure, Contractor may deploy either at their own capital or may deploy on rental/hiring agreement. However, the minimum numbers have to be met.				
Electro-mechanical Equipment	Bio feed Collection Vehicle	Tractor- 45 HP or minimum 2 Ton Trolleys confirming to MSW norms.	5	Nos.	Minimum Penalty: Rs 500 per Tractor per day
Electro-mechanical Equipment		Tempo (TATA 709/ Eicher) – min. 5 Tons capacity confirming to MSW norms.	5	Nos.	Minimum Penalty: Rs 250*5Ton=1250 per Tempo/Vehicle per day
Electro-mechanical Equipment	Daily Maintenance equipment	Maintenance equipment – Compressor, Hydraulic m/c, Lubes, oil pumps	1	Set	Rs 250 per equipment per day
Calibrated Measuring Instrument – For Instant Reading	For the measurement of the Dry Content, moisture content in bio feedstock	Before deployment – to be deployed at the site for instant measurement	2 Nos	Set	Rs 250/- each per day
Door to Door, Central Kitchens/mess, gardens and horticulture solid waste collection and its management – Especially for the Campus Requirement	Door to Door Collection & Transportation of Household and Office Waste 		1 Nos 1 Nos	Each	Rs 500 per equipment per day

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The Hydraulic compatible waste bins will be provided by the University and the successful bidder has to take care the Engine with hydrolic system along with its shifting from placed location to the waste yard location and its re-placement at the marked location.

Note: In order to have confirmation on each and every stage involved, the successful contractor has to provide the IoT (Internet of things related to automation) based/integrated solution for the collection, transportations and operations as well. A single dashboard provision with hardware and software to be provided, and as an extension of the dashboard system the integration, if required, in the main SCADA for monitoring purpose will also be extended. The Main SCADA will be facilitated by the University, if required. The GIS Integration with SWM System including door to door, central mess/kitchen, garden, horticulture waste collections including software and hardware for the campus shall be developed by the successful bidder.

B. Biogas Yields and Feedstock Productivity data.

- The table below shows data on the potential biogas yields of feedstocks commonly used in anaerobic digestion.
- According to this table the Waste Collection and Transportation bidder can collect the seasonal waste as per availability in the vicinity.
- Assumed % Methane content is 60% - 65%.
- Bidder will calculate the material quantity to produce 2500m³ Biogas per day and collect the waste. Accordingly, the presentation to be prepared and submitted for the technical evaluation in confirmatively of the NIT/RFP. It will

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be waste collecting agency responsibility to get approval on the calculated material quantity to produce 2500m³ biogas. In case off the compelling circumstance or as the deemed fit for the smooth operation of the plant, the mix or suitable quantity of single and/or various type of feedstock (bio-waste) quantity will b given by the University in consultation of the other agency involved in the Operation & Maintenance of the digester plant and generation of the biogas based on the University requirement.

Feedstock	Biogas Yield (m ³ /t)
Cattle slurry	25-35 (10% DM)
Pig slurry	15-25 (8% DM)
Poultry	30-100 (20% DM)
Grass silage	160-200 (28% DM)
Whole wheat crop	185 (33% DM)
Maize silage	200-220 (33% DM)
Maize grain	560 (80% DM)
Crude glycerine	580-1000 (80% DM)
Wheat grain	610 (85% DM)
Rape meal	620 (90% DM)
Fats	up to 1200
Nettle	120-420
Sunflower	154-400
Miscanthus	179-218
Flax	212
Sudan grass	213-303
Sugar beet	236-381
Kale	240-334
Straw	242-324
Oats grain	250-295
Chaff	270-316
Potatoes	276-400
Rye grain	283-492
Clover grass	290-390
Sorghum	295-372
Grass	298-467
Red clover	300-350
Jerusalem artichoke	300-370
Turnip	314
Rhubarb	320-490
Triticale	337-555
Oilseed rape	340-340

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Canary grass	340-430
Alfalfa	340-500
Clover	345-350
Barley	353-658
Hemp	355-409
Wheat grain	384-426
Peas	390
Ryegrass	390-410
Leaves	417-453
Fodder beet	160-180
Food Market Waste	500-600 (50% DM)
Canteen Waste	650-700 (50% DM)

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- DM - Dry Material
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- Collection of required feed for the Bio methanation plant like cow dung, Poultry waste, kitchen waste, Agriculture waste or any other waste capable of generating the required quality of Bio Gas, to be collected from the nearby villages, vegetable markets, agricultural lands, dairy's, etc in the radius of 150 Kms around the campus.

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The Intending bidders are requested to attend the scheduled pre-bid meeting to understand the tender scope. The intending bidder may also give their presentation regarding their technology are being used and how successfully the plant is being managed by them, for such presentation kindly inform at least in one day advance.

In order to discover the price of the bio waste as feed required for the plant, the prospective bidders are requested to kindly present the followings:

Sl	Bio Feed category	Quantity per day in M3/Ton (Forecasted by NU)	Quantity per day in M3/Ton (As per bidder suggestions)	Rate per unit (Rs per M3 or Ton)	Remarks Like Tax component and others suggestions
01	Cattle Dung Slurry (8-10%DM)	25			
02	Grass silage/whole wheat crop/Maize silage / fodder beet(28-33%DM)	160			
03	Maize grain, Crude glycerine, Wheat grain, Rape meal (80-90%DM)	550			
04	Sudan grass, Sugar beet, Kale, Straw, Oats grain, Chaff, Potatoes, Rye grain, Clover grass, Sorghum, Grass, Red clover, Jerusalem artichoke, Vegetable and others grain waste	250			
05	Turnip, Rhubarb, Triticale, Oilseed	350			

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	rape, Canary grass, Alfalfa, Clover, Barley, Hemp, Wheat grain, Peas, Ryegrass, Leaves, Fodder beet, Fodder beet, Food Market Waste,				
06	Cooked Food waste from kitchen /restaurant	20			

SEQUENCE OF QUANTITY FOR UNDESTATING

SL	ITEM DESCRIPTION/PARTICULARS	-			
A	SOLID WASTE MANAGEMENT FOR NU CAMPUS AT THE CAPITAL OF NU	Qty	Unit	Unit Rate (Rs)	Total Cost(RS)
1	For NU Campus - Waste container dustbins 12 ltr with handle and lid confirming IS: 12402, HDPE, Bin Capacity (Volume) (Ltrs) 10 Litres, Weight of Dustbin (Complete unit) (Grams) 414 per container, Colour green/YELLOW/RED, Load carrying Capacity (Kgs) 12, No. of Compartments in the Bin- single, Lid removable, UV Resistant yes,	100.000	Set		
2	For NU Campus -Office Twin bins twin bins foot pedal operated, CM/L No (ISI Marked- Yes) confirming IS: 12402, HDPE, Bin Capacity (Volume) (Ltrs) 10 Litres, Weight of Dustbin (Complete unit) (Grams) 9500 per container, Colour green/YELLOW/RED, Load carrying Capacity (Kgs) 20, No. of Compartments in the Bin- twin, Lid removable, UV Resistant yes, Wall Non- Perforated, Lid foot pedal operated, with Handle, For Ref - https://mkp.gem.gov.in/waste-containers-rigid-liners-dust-bin-garbage-bin/twin-bins-twin-bins/p-5116877-40135621349-cat.html#variant_id=5116877-40135621349 OR https://mkp.gem.gov.in/waste-containers-rigid-liners-dust-bin-garbage-bin/dry-waste-wet-waste-dustbin-dry-waste-wet/p-5116877-92212111681-cat.html#variant_id=5116877-92212111681	100.000	Set		

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3	For NU Campus-Office Waste Bins- WASTE BIN TWIN TYPE , Material LLDPE, Bin capacity (in Litres) 30, Container shall be supply with Lid Foot Pedal Operated, Weight of Dustbin (Complete unit)(in Grams)- Must be declare" 7500 Color of the container Other than Green/Blue Wheel Lock No Load carrying Capacity (Kgs) - Must be declare 60 Wall Non-Gripping provision Frontal . No. of compartments in the Bin Twin Bin Dust Bin Stand With stand UV Resistant.	50.000	Set		
4	Canteen Waste Bins - Four Bin Waste Segregation System SS 60 Ltr, Public (Mobile containers confirming IS: 12402), C (For Public Dustbins) Type B (with 4 pivoting castors), Bin Capacity (Volume) (Ltrs) 60 Litres, Wheel Dimension in (mm) (Diameter x Thickness) (mm x mm)- 310X410X190, Weight of Dustbin (Complete unit)(Grams) 1280, Wall Non-Perforated, Lid foot pedal operated, with handle and wheel. Towage Provision yes, Gripping Provision Both Frontal & Ventral, UV Resistant yes, IOT/QR/sensor based GIS Integrated system for auto tracking system	50.000	Set		
5	Canteen Waste Bins- Four Bin Set Waste Segregation System with Stainless Steel Trolley Capacity 22 Ltr. Each Four Bin Set, Public (Mobile containers confirming IS: 12402), C (For Public Dustbins) Type B (with 4 pivoting castors), Bin Capacity (Volume) (Ltrs) 20 Litres, Wheel Dimension in (mm) (Diameter x Thickness) (mm x mm)- 280X390X170, Weight of Dustbin (Complete unit)(Grams) 37000, Wall Non-Perforated, Lid foot pedal operated, with handle and wheel. Towage Provision yes, Gripping Provision Both Frontal & Ventral, UV Resistant yes, IOT/QR/sensor based GIS Integrated system for auto tracking system . Material Stainless steel, Lid removable.	50.000	Set		
6	Out-Door Waste Bins- OUTDOOR DUST BIN 50 LTR TWIN BIN DUST BIN 50 LTR TWIN BIN, Material LLDPE, Weight of Dustbin (Complete unit)(Grams) 16000, Colour green, Wheel Lock, Load carrying Capacity (Kgs) 100 Wall Non- Perforated, Lid Swing type, Gripping Provision Both Frontal & Ventral, UV Resistant yes Dust Bin stand, No. of Compartments in the Bin Twin Bin, IOT/QR/sensor based GIS Integrated system for auto tracking system . Material Stainless steel, Lid removable.	100.000	Set		

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7	For NU Campus -Outdoor 1100Ltr DUSTBIN, Utility Public (Mobile containers confirming IS: 12402), Class confirming to IS: 12402 (For Public Dustbins) Type B (with 4 pivoting castors), Material HDPE, CAPACITY Bin Capacity (Volume) (Ltrs) 1100 Litres, DIMENSIONS Wheel Dimension in (mm) (Diameter x Thickness) (mm x mm) 200X60, Weight of Dustbin (Complete unit) Grams) 50000, CONSTRUCTIONAL Colour green & OTHERS AS PER DESIGN, Load carrying Capacity (Kgs) 1100, Wall-Non-Perforated, Lid-hinged, with handle & wheel, Wheel Material- PVC, Towage Provision-yes Gripping Provision Both Frontal & Ventral UV Resistant-yes, No. of Compartments in the Bin single, IOT/QR/sensor based GIS Integrated system for auto tracking system. Material Stainless steel, Lid removable.	50.000	Set		
8	For NU Campus -Garbage container 2 cubic meters (Pragati Engineering /equivalent, (container for tipper) Material- Corrosion free sheet metal, CAPACITY Bin Capacity (Volume) (Ltrs)-500 Litres (as per IS: 12402 Pt 1 and 2), Weight of Dustbin (Complete unit) (Grams)- 20000, CONSTRUCTIONAL Colour as per design approval, Load carrying Capacity -Kgs)- 2000, Wall-Non-Perforated, Lid-removable, Gripping Provision-Frontal, Plugged outlet for washing & draining-Without, No. of Compartments in the Bin- Twin Bin, Vehicle /tipper for its carriage from waste collection point inside campus to waste disposal and segregation station will be in the scope of the contractor as a part of gas supply including loading unloading all. This job is conditional and part of the system without any additional charge for carriage of the waste container from various part of the campus to /for waste disposal & segregation station. IOT/QR/sensor based GIS Integrated system for auto tracking system. Material Stainless steel, Lid removable.	25.000	Set		

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9	<p>For NU Campus -Support for the campus waste collection - Colour of E Cart GREEN and BLUE as per the University approval. The E Cart Must Fabricated From Good Quality Steel properly Painted to avoid Rusting for more than 5 Years, YES, Name and Grade of Steel from which E Cart Body Framed MS, Kerb Weight of E- Cart (kg) 342 kilogram or equivalent, Garbage Carrying Capacity (kg) 309 kilogram, minimum - 300KG, Run Distance (for a Full Charge of Battery , to be tested with full load at maximum AIS-040)) (km) 80, Number of Bins 2, Capacity of Individual Bins in litres (Ltrs) 750 liter, Type of Chassis for E cart MT, Ground Clearance as per IS : 9435 (mm) 2100, Wheel Base (mm) & Turning Radius (mm) 2.88 millimeter or standard as per design, Power Transmission from Motor Shaft to Wheels Other Mechanical Mechanisms, Type of Battery as per AIS-048 Lead Acid , EV Grade , Tubular Deep Discharge, Capacity of the Battery approved by ICAT/ARAI (Ah) 100, Battery Voltage , Nominal (Volts) 48V, Average Dimensions of the Battery (L x W x H) mm 3) 410*176*234, Nominal Filled Weight of the Battery (kg) 118 kilogram, Motor Controller (Must Suitable for starting, accelerating, decelerating, driving , and stopping of E Cart AVAILABLE, Battery Charger-220/230 V Nominal Input Voltage , High Efficiency Type, Charging Current (A)-12, Type of Motor- Brushless DC Motor, Motor Output Power , 48V/60V at Full Load (watt)-1660, Overall Efficiency of the E Cart (to be tested at Full Load with maximum speed as per Concerned AIS standards (%) - 88, Gradeability of E-cart , (to be tested at full procedure as per AIS -003 Load (Degree)-75, Certification: Vehicle Certification ICAT, If Vehicle Certification from Others Agency , Name of the Agency otherwise put NA ICAT, Constructional Seating Facility-For Driver only, Length of E -cart as per Gazette Notification by Ministry of Road and Transport Oct , 2014 (meters)-2.8, Width of E -Cart as per Gazette Notification by Ministry of Road and Transport Oct, 2014 (meters)-1, Height of E -Cart as per Gazette Notification by Ministry of Road and Transport Oct , 2014 (meters)-1.8, Dimensions of the cabin Provided for Bins (mm x mm x mm) (mm 3)-1300*900*900, Size of Front Tyre (mm)-3.00-12, Size of Rear Tyre-3.00-12, Brake Type (Front)-DRUM, Brake Type (Rear)-DRUM, Suspension System (Front)-HYDRULIC SHOCK ABSORBER, Suspension System (Rear)-LEAF SPRING, Reverse Gear Facility-Yes The Mounting of Batteries- Yes, Vehicle lighting System-Filament Type, Instrument Panel Containing Speedometer and Battery Charging Indicator-Yes, Glass Windshield with wiper motor as approved by ICAT/ARAI-Yes, Equipped with Start and Stop</p>	1.000	Set		
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	<p>Button, parking Lights , Back lights with Reverse Gear Facility-Yes, Equipped with Fire ExtinguisherYes, Equipped with First Aid Box- Yes, Yellow Color reflective tape on Front and Rear Side of the E Cart-Yes, E Cart Integration - Yes, Performance Parameters: Speed of the E-Rickshaw as per CMVR -2014 with latest amndmt (to be tested with Full Load)(kmph)- 20, Battery Warranty-1 year, No. Of Free Service- 5, Compliance of Centre of Gravity of E Cart as Compulsory Norms for Safety-Yes, Confirming to Applicable Environmental Test-Yes, Noise level must be Low during Operation-Yes, Including vehicle registration act as per applicable rule. The driver and labor support will be extended by the contractor. IOT/QR/sensor based GIS Integrated system for a auto tracking system . Material Stainless steel, Lid removable.</p>				
10	<p>Development and Implementation of Solid Waste Management System along with 1 year Hosting and 1 year free support.</p> <ul style="list-style-type: none"> •Administrative Web Portal •Garbage Collector Mobile App •Resident Mobile App 	1.000	Job		
11	<p>QR Code Tagging for equipment installed inside campus and as per the University instructions:</p> <ul style="list-style-type: none"> •Metal Tag with Thickness of 0.9 mm •Tax Fixing per Asset 	550.000	Nos		
12	<p>Hosting of Solid Waste Management System after 1 year (Automation Part)</p>	1.000	Job		
13	<p>Disposal & Segregations Stations, 3D Innovative waste collection Stations at various locations (25 Nos- 10ftx 7ft), decompositions chambers</p>	25.000	Nos		
	<p>COLLECTION FROM NEAR VICINITY AND SUPPLY RATE CONTRCAT FOR THE SUPPLY OF BIO WASTE AS A FEED FOR THE BIOGAS PLANT CAPACITY 2500 SCUM PER DAY AT NU CAMPUS</p>				

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B	BIO WASTE/FEED DESCRIPTION/PARTICULARS FOR RATE CONTRACT: (ANY ONE OR COMBINATION AS PER THE BIOGAS PLANT CAPACITY 2500 CUM REQUIREMENT)	Qty	Unit	Unit Rate (Rs)	Total Cost(RS)
14	Bio Feed :Cattle Dung Slurry (8-10%DM)	25	TON PER DAY		
15	Bio Feed :Grass silage/wholewheat crop/Maize silage / fodder beet(28-33%DM)	160	TON PER DAY		
16	Bio Feed :Maize grain, Crude glycerine, Wheat grain, Rape meal(80-90%DM)	550	TON PER DAY		
17	Bio Feed :Sudan grass, Sugar beet, Kale, Straw, Oats grain, Chaff, Potatoes, Rye grain, Clover grass, Sorghum, Grass, Red clover, Jerusalem artichoke, Vegetable and others grain waste	250	TON PER DAY		
18	Bio Feed :Turnip, Rhubarb, Triticale, Oilseed rape, Canary grass, Alfalfa, Clover, Barley, Hemp, Wheat grain, Peas, Ryegrass, Leaves, Fodder beet, Fodder beet, Food Market Waste,	350	TON PER DAY		
19	Bio Feed :Cooked Food waste from kitchen /restaurant	20	TON PER DAY		
20					