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Pamoja Cleantech AB
 Villa Bellona
 Universitetsvägen 8
 114 18 Stockholm (Sweden)
 Sweden: +46 765 829386
 Uganda: +256 775 229136
 India: +91 735 8583883

VC,
 Acceptance of project from
 as in (B) may kindly
 considered but original

F/6113
 26/11/18

Approved
 26-11-2018

Ref. Invoice for Expenses under Biomass Poly generation Project, Pamoja Cleantech AB, Villa Bellona, Universitetsvägen 8, 114 18 Stockholm (Sweden)

Invoice for INR 67700 for Study on Biochar: Experiments & Analysis

Please could you arrange immediate payment of the following for Biomass Poly generation Project in Tezpur University, India'

Head	Amount (INR)
1. Chemical analysis	40700
2. Travel	5000
3. Fields experiments	22000
Total budget for Tezpur University to be provided by: Pamoja Cleantech AB, Villa Bellona, Universitetsvägen 8, 114 18 Stockholm (Sweden)	
	67700

(B)

Bank details for payment are as follows:

Name of the account holder: REGISTRAR, TEZPUR UNIVERSITY
 Name of receiving bank: State Bank of India
 Address of receiving bank: Lake Road, Tezpur, Sonitpur-784002
 Account Number: 30448821505
 SWIFT/BIC account number: SBININBB159
 RTGS/IFS Code of the Branch: SBIN000195
 MICR Code: 784002002

Please feel free to contact me, if you need any other details.

URGENT
 Yours Sincerely,

(D C Baruah)

✓
 D.C. Baruah
 Registrar TU
 27/11/18

Pamoja Cleantech AB, one of the collaborative partners (we have MoU) has agreed to provide us ₹ 67,700/- for our ongoing research work (details attached). Requested to (A) allow us to receive the amount (B) to verify the account details.

(A)
 update form issued
 26/11/18

(D.C. Baruah) 26/11/18

Collaborative Research work : **D. Hybrid Bioenergy**
by product utilization

Smart Hybrid Energy System


Budget regarding Study on Biochar:

No. of samples 6

for heat, electricity and cup nutrition
(SEA/RTM/PC/RMG/TU collaborative)
Dated

Particulars	Rate in Rs. (per sample per element)	Amount in Rs.	Remarks
A. Chemical analysis			
1	Chemicals for sample preparation : HCL, H2SO4, HNO3, Chloroform, K2CR2O7, K2SO4, H3PO4, FAS, Titon X100	-	6500 Brand: Merek chemicals
2	AAS (K, Pb, Cu, Co, Mg, Na, Mn),	25	1050 Facility available in TU
3	ICP (Ca, S, P, Co, Cr, Zn, Ni, Cd)	25	1200
4	SEM	200	1200
5	EDX	200	1200
6	Solid NMR	3000	18000 Out source
7	Surface area	1000	6000 Facility available in TU
8	FTIR	25	150
9	Ultimate analysis (C,H,N,S,O)	900	5400 Out source
		Total (A)	40700
B. Travel			
10	Sample carrying/Handling from Tea estates, wetlands	-	5000 Transportation during sample collection
		Total (B)	5000
C. Field Experiments			
11	Preparation of Biochar conventionally	-	3000
12	GHGs estimation in both crops (N ₂ O, CH ₄ , CO ₂)		
	1) Gas trapping box (Fabrication and material charges	-	10000 Facility available at TU
	2) Laborers for field preparation, purchasing farm inputs		4000
	3) Refilling of Gas cylinders (H, N) to run GC		8000
		Total (C)	22000
		Grand Total (A+B+C)	67700

Gogoi
(Nirmali Gogoi) Guide
26/11/18


(D. C. Baruah) PI
26/11/18

Serial No... 29... 29
Date of Receipt... 24/12/18...
File No... D. Ch. by R.T.D.
Received by

MEMORANDUM OF UNDERSTANDING

Effective Date: 01st December, 2017

PARTIES

Tezpur University (hereafter "TU")
based in Tezpur, Assam India

AND

Rural Micro Generation Pvt LTD (hereafter "RMG")
based in New Delhi, India

AND

Pamoja Cleantech AB (hereafter "PC")
based in Stockholm, Sweden


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PURPOSE

- A. The Agreement is made between the Parties who are sharing a joint aim to provide clean energy technologies to replace fossil fuel driven energy technology in a cost-efficient manner.
- B. The purpose of this Agreement is to make provisions for the future collaboration between Parties to introduce clean energy technology and smart grid management system at the Tezpur University Campus, Tezpur, India.

BACKGROUND

Pamoja Cleantech AB (PC) has been awarded financing from the Swedish Energy Agency to increase collaboration and technology transfer between Indian and Swedish businesses and research parties with a special focus on micro-grid innovation and renewable energy technology. PC will introduce Tezpur University (TU) to Royal Institute of Technology in Stockholm (KTH), Sweden, which may open up further opportunities for international research collaboration among the Parties.

TU wishes to reduce its annual energy costs whilst still maintaining or improving the level of energy access and availability at the University Campus. TU with the leadership of the Department of Energy, is therefore seeking to accelerate the rate of introduction of renewable energy generation equipment, energy management and new equipment designed to improve the energy efficiency of TUs power distribution and grid infrastructure. TU is, however, constrained by a need to avoid staff increases and capital investment and is therefore willing to set up this Energy Savings Agreement between the Parties.

Thus, hereby Parties agree on the introduction of a holistic energy system combining solar and biomass energies in a Smart hybrid system that will use Swedish State of the Art technology for Smart Grid Management. A high level of innovation will be applied with demand response, central production of hot water, Second generation Biomass gasification system for power generation and production of biochar. The Micro-grid will also be a unique learning centre for the university students and research professionals, a training tool for power utilities, and while at the same time generating power for local loads at the University campus.

1. PRINCIPLES GOVERNING THE PARTIES

The parties have agreed to move forward together on the basis of the following guiding principles:

- (a) Commitment to sustainable approach to energy services;
- (b) Mutual respect for each other's complementary strengths;
- (c) Commitment to responsive, flexible and transparent manner of developing and carrying out joint activities.


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2. AREAS OF COLLABORATION

Through this Agreement, Parties agree to make a mutual commitment, which simultaneously aims at joint Research and Energy Saving measure for the benefit of Tezpur University. However, all provisions require a financial approval by Swedish Energy Agency and in case that cannot be achieved, then all parties can terminate the Agreement in accordance with Clause 8.3.

- (a) Collaborating on research activities that aim to collect, analyse and categorize energy data to provide input for energy management system.
- (b) Collaborating on identification of joint R&D opportunities that may benefit Renewable Energy Technology innovation.
- (c) Collaborating on research that aims to test and certify different biomass and waste feedstock that may be used in biomass gasification and pyrolysis systems for production of electricity, heat and/or biochar.
- (d) Collaborating on research that aim at understanding different use of energy crops and plantation such as agroforestry in Assam, India and how these systems can be designed to provide biomass for energy generation in a sustainable manner.
- (e) Seek joint opportunities for financing of research activities and promote joint collaborations between TU and Universities in Sweden for research collaboration.
- (f) Create a unique training facility of its kind in India for professional training to engineers in power utilities and other micro-grid developers.
- (g) Use the micro-grid in capacity building activities at TU and potentially as a demonstration plant open to the public to increase awareness of clean energy solutions.

3. ROLES AND RESPONSABILITIES

3.1. ROLE OF TEZPUR UNIVERSITY

TU has identified a number of buildings and functions at the University Campus that will off-take power and heat for the project. Provided that financial approval from Swedish Energy Agency is granted for the project. Tezpur University will:

- (a) aim to, before end of January 2018, sign a separate PPA with a solar developer for a 1000 kWp solar photovoltaic power plant that will initiate installation in 2018 and be fully installed and in operation before end of 2019; and;
- (b) aim to, before end of January 2018, sign an Energy Savings Agreement with PC/RMG according to the preliminary structure explained in Appendix 1, and;


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- (c) aim to, before May 2018, sign a research collaboration with PC in the field of sustainable biomass production and organic agriculture, and;
- (d) aim to, before end of October 2018, sign a research collaboration with KTH, Sweden for the development of educational modules on design, construction, and maintenance of micro-grids and on operation and monitoring of micro-grids, and;
- (e) provide facilities or land for the installation of renewable energy technologies on peppercorn rent lease term for the term of this Agreement, and;
- (f) provide energy data or make available historical data or possibilities to install metering technology to measure and monitor energy usage at the Tezpur University Campus, and;
- (g) facilitate and co-ordinate the project implementation and allow for training and capacity building activities within its premises on a case by case basis which shall be agreed upon among Parties.

3.2. ROLE OF PAMOJA CLEANTECH AB

Reference to "Operative Partners" and/or "Contractor" in this Agreement refers to a Special Purpose Vehicle (SPV) that is jointly owned and operated by RMG and PC, or if such company has not been setup, the reference shall refer to both RMG and PC jointly. PC will be in charge of technology integration of Swedish and Indian renewable energy technology and implementation of monitoring and management systems. Provided that financial approval from Swedish Energy Agency is granted for the project, PC will:

- (a) design, procure, install, commission and secure operations for the Energy Management System for the local grid and the Renewable Energy Generation Equipment including all technology listed in Appendix 2, and;
- (b) provide Technical training and Capacity building for TU on the biomass gasification system operation & maintenance and the Grid Management System, and;
- (c) support on the development of a supply chain of feedstock for the biomass gasification systems to be installed at TU.
- (d) develop educational modules based on the installed Micro Grid equipment in collaboration with TU and KTH, Sweden.

3.3. ROLE OF RURAL MICRO GENERATION Pvt Ltd

Provided that financial approval from Swedish Energy Agency is granted for the project, RMG will:

- (a) Contributing with technical expertise and will act as the local facilitator in India, and;
- (b) Support PC with its activities to ensure a successful implementation of the planned activities and installation of technology listed in Appendix 2, and;


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- (c) Design, implement and operate a local feed-back supply for biomass gasification and biogas based power generation at TU, and;
- (d) Share with Parties periodically about the operational & other challenges, and any lessons learned while facing those challenges.

4. SAVINGS TARGET AND PAY-BACK OF INVESTMENT

- 4.1 A detailed list of energy savings measures and equipment that shall be installed in order to obtain ongoing cost and energy savings is provided in Appendix 2. The Parties have detailed workout on the technical concept that aim to reduce the use of four 500kVA Diesel gensets used as a backup power source on the campus. For the finalization of the technical plan, TU has supplied and in case of any missing data TU will supply all available information in regard to - hours of operation, energy consumption and costs, service levels, building descriptions and building usage, existing energy equipment, or any other information that may still be needed for ensuring accurate planning efforts towards the implementation of the following equipment at the University Campus. The proposals detailed out in Appendix 2 are the result of the Initial Energy Audit.
- 4.2 A Preliminary Energy Audit has established the preliminary understanding of the opportunities for cost effective improvements at the project site. The Parties have agreed on preliminary saving targets on the specific energy tariffs provided by TU. TU wishes to take advantage of the fundamental principle of energy shared savings contracting, namely, that Contractor invests in new equipment in order to achieve energy savings sufficient to repay the equipment investment, reward the contractor for his risk-taking and the use of his facilities and allow TU a significant energy cost reduction right from the time of installation of the new equipment. The energy savings shall benefit the TU so that it can cut cost of its energy expenditure with a certain percentage of the baseline data which shall be established for the Two-year period i.e. January 2016 - December 2017. The exact savings target shall be defined in the Energy Savings Agreement in January 2018. The Operative Partners consisting of PC and RMG will operate the project jointly. A separate investment teaming agreement has been signed among the Operative Partners that stipulates the investment and profit sharing among the Operative Partners in order to recover and payback the initial capital expenditure investment.
- 4.3 The Energy Savings are calculated as per Appendix 1 and shall be based on input figures gained from TU and energy audits that have been made at the Campus.
- 4.4 Parties will remain owners of the assets that they contribute with towards the installation until at least the end of the SEA funded project (June 2020).


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The Operative Partners will create a Specific Purpose Vehicle (SPV) for the project.

5. MONITORING OF ENERGY CONSUMPTION & ESTABLISHING BASELINE FOR THE ENERGY SHARED SAVINGS CONTRACT

TU anticipates that the installation of the new equipment that will provide means of improving its monitoring of energy consumption and costs and invites the Contractor to provide monthly reports on energy consumption and saving in relation to Baseline Consumption figures established by the end of January 2018.

6. DISPUTE RESOLUTION

6.1 This agreement shall be governed by and construed in accordance with Indian Law.

6.2 Disputes that arise out of or in relation to this Agreement shall be sought resolved amicably between the disputing parties. If the parties being in dispute fail to resolve the dispute, the dispute shall be referred to arbitration at the Indian Chamber of Commerce, in New Delhi, India.

7. CONFIDENTIALITY

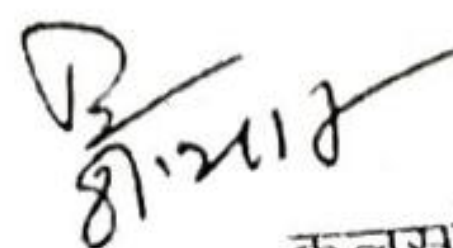
The Parties agree that they shall take reasonable measures to protect the confidentiality of each of the Parties and avoid disclosure or use of either party's confidential information in order to prevent it from falling into the public domain or the possession of persons other than those persons authorized under this MoU to have any such Confidential Information. Confidential Information should be clearly marked as Confidential.

8. DURATION OF AGREEMENT

8.1 This Agreement commences on the date of its ratification by signature by representatives of the three parties and shall remain in force for Twenty years.

8.2 Any alteration of the Memorandum shall be agreed upon jointly by the three parties and submitted in accordance with the same procedure as the original Agreement and shall be expressed in writing.

8.3 This agreement can be terminated by either Party with One month written notice, if the Swedish Energy Agency does not grant financial approval for the implementation of any of the technologies or activities mentioned in this Agreement. In case of termination of this agreement, all Parties shall bear their own costs and expenses for preparation and/or implementation of this Agreement and no party shall have any liability whatsoever for the loss of business, for occurred cost or expenses in regard to this Agreement in any



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other capacity in relation to proposed collaboration.

8.4 PC shall keep all Parties reasonably informed of the communication with the Swedish Energy Agency in regard to financial approval of planned activities.

9. COMMUNICATION AND EXCHANGE OF INFORMATION

There will be regular communications between the Parties. The contact persons are, unless otherwise agreed:

From Tezpur University:

Prof D C Baruah

+91-3712-275307

baruahd@tezu.ernet.in

From Rural Micro Generation Pvt Ltd:

Mr Subroto Chatterjee

+44 79 2121 3033

subroto.chatterjee@ruralmicrogeneration.com

From Pamoja Cleantech AB, Sweden:

Mr Olof Hallström

+46 720338895

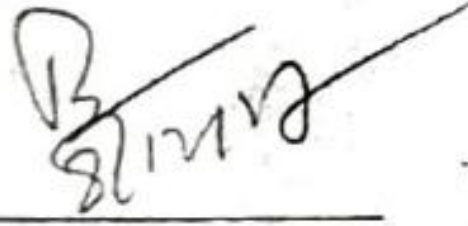
olof@pamojacleantech.com

Any communication between the parties to this agreement shall be in the English language.

SIGNED: by the duly authorized representatives of the three Parties

Signed for and on behalf
of Tezpur University

Signed for and on behalf of Rural
Micro Generation Pvt Ltd.



Name: Dr. Biren Das
Position: Registrar, Tezpur University
Date:

Name: Subroto Chatterjee
Position: CEO
Date:

Signed for and on behalf of Pamoja Cleantech



Director, Peik Stenlund
Date: 4 December 2017

Appendix 1

The preliminary proposal is to base the tariffs in the Energy Savings Agreement on the costs of alternative energy sources (reference rates). The reference rates are based on a campus with 2MW grid connection, 1MWp grid-tie, roof-top solar PV plant, 4x500kVA diesel back-up generators, and LPG for cooking and partial use of solar hot water systems for hot water generation. The production costs for solar power, grid power, diesel power, and LPG are inherently different. The reference rates will be re-negotiated every year based on the average alternative rates during the previous year. By measuring the instantaneous transfer of power at the transformers in real time, three distinctly different scenarios are possible:

- A. National grid is intact, and power is imported from the national grid
- B. National grid is intact, and power is exported to the national grid
- C. National grid is disconnected

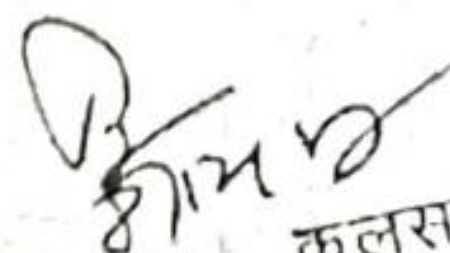
The corresponding alternative costs for each scenario are:

- A. Current rate for grid power (Present Rate of DISCOM: Rs. 7.05/kWh)
- B. Current rate for solar power (PPA Rate with Solar Developer: Rs. 2.42/kWh)
- C. Current rate for diesel power (roughly 60Rs/L)

The reference rate for LPG is the same for all scenarios, and will be based on the current rate of LPG bottles. The proposed rates for sales of power from the E4T Micro Grid platform for each scenario are:

- A. 95% of grid rate
- B. 100% of solar rate (Rate at which Tezpur University signed the PPA with solar developer)
- C. 80% of diesel rate (calculated from actual price of diesel and actual diesel consumption)

In addition, two types of energy savings systems will also be included on the platform: the first being a thermal grid for providing hot water, heating and producer gas from the CHP systems and gasifiers, and the second being a wireless demand response system called LuminGo using Load Management Units (LMU) that can toggle secondary priority loads on and off depending on the availability of grid/solar power. The heat from the CHP will be used for water heating. The hot water will be supplied to both toilets/bathrooms of the hostels and kitchens. The hot water supplied to the toilets/bathrooms will supplement the existing solar hot water system and supplied to the hostels where there is no solar hot water provisions. The amount of heat provided will be measured at the point of delivery to each hostel. Producer gas from the biomass gasifiers can be used in the kitchens in specially designed producer gas cookers to replace LPG cookers. Since measuring the flow of hot producer gas is difficult, the sale of producer gas will instead be based on a daily tariff per number of cookers, which will be further negotiated and agreed upon in the


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Energy Savings Agreement. The LMUs will initially only shut off deferrable loads to save diesel, and will thus use the diesel rate as reference. Each individual LMU measures voltage and current in real time, and will calculate the saved power by multiplying the time that the load is off by the product of the average voltage and current in the hour before being shut off. The savings from the LuminGo system will be verified with the actual consumption of diesel at the end of each quarter year. Our proposed rates for energy savings are:

- (a) 50% of diesel rate for power saved by the LMUs.
- (b) The rate of heat will be negotiated and defined in the Energy Savings Agreement
- (c) The rate for producer gas will be based on a daily tariff per number of cookers, which will be defined in the Energy Savings Agreement

Appendix 2

The equipment included in the proposed E4T Micro Grid platform to be installed at Tezpur University campus in two separate phases are:

First phase (2018)

- 14 x 5kVA biomass fired Stirling CHP engines
- 140kVA multimode inverter system
- 90kWh advanced Li-ion battery system
- LuminGo demand response system with minimum 50 LMUs
- 200kWh biomass gasifier for co-production of biochar
- Two-way online power meter to measure import/export of power to micro grid

Second phase (2019)

- 14 x 5kVA biomass fired Stirling CHP engines (possibly upgrade to 10kVA engine generators)
- 140-240kVA multimode inverter system
- 90kWh advanced Li-ion battery system
- LuminGo demand response system with minimum 50 LMUs
- 200-400kWh biomass gasifier for co-production of biochar
- Two-way online power meter to measure import/export of power to micro grid



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