MONITORING REPORT

BIOMASS ENERGY PLANT-SEO

UNFCCC Ref.No: 0402

Prepared For :
SEO ENERGY SDN.BHD

Prepared By :
LFGC CORPORATION

Reporting period: 10 June 2006 – 30 September 2006

Version 3, 6 August 2007

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1.0 Introduction

This monitoring report has been prepared for ñSEO Biomass Steam and Power Plant in Malaysiaò, UNFCCC Ref. No.:0402. The project is located at Sandakan,, in the state of Sabah, Malaysia. The project has been registered with UNFCCC on 10th June 2006 as a CDM project activity under article 12 of the Kyoto protocol. Submission of this monitoring report and subsequent verification is mandatory by UNFCCC for issuance of Certified Emission Reduction (CER) credits.

1.1 Project Description

This project uses Empty Fruit Bunches (EFB), which are a waste product of the palm oil milling process, as the fuel for a modern, highly efficient 35 tonnes per hour capacity, 29 Barg Biomass - fired cogeneration system to supply steam and electricity to the Sandakan Edible Oils (SEO) Sdn.Bhd. palm oil refinery in Sabah, Malaysia. The project will be implemented in two stages. At the first stage, up to 35 t/h of steam will be generated for palm oil refinery process consumption. The second stage of the project will be optimizing the steam energy by installing a steam turbine generator to supply up to 6 MW of electricity for the refineryôs own use.

The project activity will be able to reduce emissions in three ways. First is by displacing fuel oil, which is used to generate 35 t/h of steam. Second is by displacing electricity from the local grid and diesel fired plant generators. Third is by reducing methane emissions from the rotting EFB waste piles.

1.2 Project Location

The project site has the following physical postal address;

SEO Energy Sdn.Bhd.,
Km 8, Jalan Batu Sapi,
Karamunting, P.O.Box 2605,
90729, Sandakan, Sabah
MALAYSIA

1.3 Methodology Applied

The project is a small scale project activity and falls under the category I.C and category III.E according to the Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities.

Type I.C includes the baseline methodology for the thermal energy for the user; i.e., the biomass based steam supply to the refinery to displace oil-fired based steam and electricity. The baseline for the grid electricity displacement has been determined according to the methodology for category I.D paragraph 7 (I.D. Renewable electricity generation for a grid).

Type III.E includes the baseline methodology for methane avoidance. There is only one method available in Appendix B. The baseline is the amount of methane from the decay of biomass treated in the Project activity, calculated using the IPCC default emission factors.

2.0 Status Of Project

The first stage of the project of installing a biomass boiler with a 35 t/h capacity to supply steam for palm oil refinery process consumption is constructed and operating in good condition.

The second stage of the project to supply electricity using steam turbine has not been installed during this crediting period.

Below is the technical specification and status of each component in the project activity;

a) Biomass Boiler
The testing and commissioning for the 35t/h, 29 barg, biomass boiler was completed in June 2006 and the boiler is in operation since 1/06/2006. The old oil-fired boilers were on stand by since 01/06/2006 and occasionally operated for maintenance and during break down of biomass boiler.

b) Steam Turbine
The installation of 1,200 kW steam turbine is in progress and the second stage 6MW turbine of the project is ongoing.

3.0 Parameters Monitored

ID Number	Data Type	Data Variable	Data unit	Measured (m), calculated (c), or estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	Thermal Energy	Steam Supplied to the refinery	TJ	m and c	Monthly	100%	Electronic	Minimum 2 years after last CER issuance	Mandatory under methodology I.C
2	Electrical Energy	Electricity Supplied to the refinery	kWh	m	Monthly	100%	Electronic	Minimum 2 years after last CER issuance	Mandatory under methodology I.C
3	Electrical Energy	Electricity Consumed by the bio-energy plant	kWh	m	Monthly	100%	Electronic	Minimum 2 years after last CER issuance	Meter provided by the electricity company, SESB and is existing
4	Tonnes of biomass	Biomass consumed by the steam boiler	Tonnes	m	Monthly (aggregate)	100%	Electronic	Minimum 2 years after last CER issuance	Mandatory under methodology III.E

5	Emission factors	CH_4 and N_2O IPCC default emission factors	$kgCH_4$/ TJ kgN_2O/ TJ	IPCC	Annually	-	Electronic	Minimum 2 years after last CER issuance	Mandatory under methodology III.E. Current default values are 300 and 4, respectively.
6	Energy	Energy Content of Biomass	TJ/t	m	Annually	100%	Electronic	Minimum 2 years after last CER issuance	Measured by Third Party Laboratory

*Data will be kept for 2 years after the crediting period.

4.0 Monitoring Period

The monitoring period is from 10.06.2006 to 30.09.2006. (Both days included)

5.0 Obtained Parameters

All the data presented here were obtained from plant maintenance log sheets and production reports.

Year 2006 (10th June -30th September)

Baseline data during the monitoring period mainly consists of tonnes of steam consumed by the refinery and biomass consumed (by type) by the biomass boiler. Second stage of the project which is to install a steam turbine was not in place during the said monitoring period.

Baseline Emission Data 2006						
Month	Process Steam Consumption		Electricity Generation -Steam Turbine Power Meter		Consumption	EFB Biomass Fed to Boiler
	t/month	TJ/month	Opening	Closing	MWh	Tonnes/month
June	6,847.00	16.17	N/A	N/A	0	730.88
July	9,678.00	22.86	N/A	N/A	0	2,248.27
August	13,231.00	31.25	N/A	N/A	0	3,557.44
September	14,619.00	34.53	N/A	N/A	0	3,699.23
Total	44,375.00	104.81			0	10,235.82

**N/A= Not Available*

The project emission data is from power meters recording the electricity drawn from the national grid and biomass fed to boiler during the monitoring period.

Project Emission Data 2006				
Month	Grid Electricity Consumption - Biomass Energy Plant		Consumption	EFB Biomass Fed to Boiler
	Opening	Closing	MWh	Tonnes/month
June	42120	180930	138.81	730.88
July	180930	417290	236.36	2,248.27
August	417290	688770	271.48	3,557.44
September	688770	942420	253.65	3,699.23
Total Electricity Drawn From Grid and Biomass Fed to Boiler			900.3	10,235.82

Some of the constants used in the calculation of CERôs are given in the table below.

Constants and Fixed Parameters		Value	Unit	Source
1	Average Oil Fired Boiler Efficiency	85	%	PDD- 3rd party testing , SIRIM
2	Steam Entahlphy (From 105 °C to operating pressure 23 Barg)	2362.18	kJ/kg	Standard Steam Table
3	Emission Coefficient of Fuel Displaced (residual fuel oil)	74.07	tCO_{2eqv}/TJ	IPCC
4	Emission coefficient for Grid	0.531	tCO_{2eqv}/MWh	PDD- based on ACM0002

6. 0 Emission Reductions

STEP 1					
Period	A	B	C*	D**	E = C x D
	Total Steam Demand t/period	Steam Production TJ/period	Baseline Fuel Consumption TJ/period	Emission Coefficient of Fuel Displaced tCO_{2e}/TJ	Baseline Emissions tCO_{2e}/period
10 June 2006- 30 Sep 2006	44,375	105	124	74.07	9,134

STEP 2			
Period	F	G***	H = F x G
	Electricity Displaced by Project MWh	Emission coefficient for Grid tCO_{2e}/MWh	Baseline Emissions tCO_{2e}/ period
10 June 2006- 30 Sep 2006	0	0.531	0

	STEP 3		
Period	I	J***	K = I x J
	EFB Biomass Fed to Boiler t/period	Emission coefficient for Biomass Decay tCO_{2e}/t	Baseline Emissions tCO_{2e}/ period
10 June 2006- 30 Sep 2006	10,235	1.294	13,245

	STEP4		
Period	L	M	N = L*M
	Electricity Drawn from Grid MWh/period	Emission Coefficient for Grid tCO2e/mwh	Project Emissions tCO2e/period
10 June 2006- 30 Sep 2006	900	0.531	479

	STEP 5			
	O	**P**	**Q**	**R= O*P*Q**
Period	**Biomass to Boiler** t/period	**Emission Coefficient for CH_4,N_2O** tCO2e/TJ	**Heat Value of Biomass** TJ/t	**Project Emissions** tCO2e/period
10 June 2006- 30 Sep 2006	10,235	7.54	0.012125	936

	STEP 6
	S=E+H+K-N-R
Period	**Total Project Emission Reduction** tCO2e/period
10 June 2006- 30 Sep 2006	20,966

7. 0 Annexes

Annex 1

Steam Enthalpy Calculations
From 105 deg C At 25 Barg

			Enthalpy (kj/kg)
Water	**1 Bar**	**105 deg C**	**440.17**
Steam	**23 Bar**	**226.03 deg C**	**2802.35**
Difference of Enthalpy (△ h) =			**2362.18**

Annex 2

Details of person/entity made the monitoring report.

Name and contact of person / entity made the monitoring report is given below.

Mr.Gerald Hamaliuk
Landfill Gas Canada Ltd.
200 N. Service Road W.,
Unit 1, Ste. 410,
Oakville, ON, Canada
L6M 2Y1
Tel: +905 334 6127
Fax: +905 827 6177
E-mail: projectnet@cogeco.ca

Annex 3

Heat Content of Biomass Fed to the Boiler

LOTUS LABORATORY SERVICES (M) SDN. BHD.
Associate of LOTUS TECHNICAL SERVICES
5 & 7, Jalan Bakawali 36, Taman Johor Jaya, 81100 Johor Bahru, Johor, Malaysia.
Tel: 07-3554063, 3556869, 3548060, 3559127 Fax: 07-3546691
Company No. : 437254-M
Specialised in analysis of Edible Oils and its products, Drinking Water and Waste Water, Foods, Animal Feeds, Chemicals, Fuel Oils, etc...

REPORT

OUR REF : **LS/OST/3181/06**

DATE : **4th September, 2006**

COMPANY : **SEO ENERGY SDN BHD**
KM 8, JALAN BATU SAPI,
KARAMUNTING,
90729 SANDAKAN SABAH.

DATE SAMPLE RECEIVED : **29th August, 2006**

SAMPLE DESCRIPTION : Four (4) plastic bags containing samples were received with the following markings:-

A) Empty Fruit Bunch (EFB)
B) Mesocarp Fibre (MF)
C) Palm Kernel Shell (PKS)
D) Palm Kernel Expeller (PKE)

PARAMETER	TEST METHOD	RESULTS			
		A	B	C	D
Calorific Value, kcal/kg	Oxygen Bomb Calorimeter	2887	3869	4161	4532
Calorific Value, KJ/kg	Oxygen Bomb Calorimeter	12125	16250	17476	19034

LOTUS LABORATORY SERVICES (M) SDN BHD

CHIN SYEK YUN, Quality Manager/Chemist
B. App. Sc.(Hons.), AMIC