Response to Request for Review for

Sesa-Waste Heat Recovery Based Power Generation

(Ref. No.: UNFCCC 00000535)

Response to Comment-1

The monitoring plan (annex 4 of the PDD) stated that "The waste gas input and output will also be monitored. This is because they give an estimation of generation of power. Measurement of quantity of waste gas used, its temperature and its composition will also provide evidence that the electrical energy is being generated with no additional CO_2 emissions." However, neither monitoring report nor verification report contains this information. Further clarification is required.

In accordance with the guidance of 'Annex-4: Monitoring Plan' of the Registered Project Design Document, the project proponent has monitored the following parameters:

- Blast Furnace Gas (BFG) Consumption
- Calorific Value of Blast Furnace Gas (BFG)
- Coke Oven Flue Gas (COFG) Consumption
- Temperature of Coke Oven Flue Gas (COFG)
- Thermal Energy Consumption in the Power Plant
- Temperature of Waste Gas at Boiler Outlet

Please refer to the following tables for details on monitoring of these parameters.

Parameter 1: Blast Furnace Gas (BFG) Consumption	
Parameter	Description
Measured, Calculated, Estimated	Measured
Source of Data	Plant Log Book
Monitoring Equipment	Flow Meter
Specification of Monitoring Equipment	Venturi Details Make: Minco Type: Venturi Sl. No: 0101 Range: 0-45000 Nm^3/hr Transmitter Details Make: Rosemount Model: 1151 SMART Type: DP Transmitter Sl. No.: 00275115 11/06 Range: 0-250mmWC
Calibration of Monitoring Equipment	The Venturi and the Transmitter are calibrated once in a year.
Accuracy of Monitoring Equipment	Class - ± 0.075% (for the Transmitter)
Uncertainty of Data	Low
Justification	The uncertainty of the data is considered to be low as the monitoring equipment is of reputed make and of high accuracy level. Furthermore the following practices followed in the plant will ensure the reliability of the data: 1. The parameter is monitored continuously and recorded daily in the Plant Log Book by the Operation Department of GEPL and Operation Department of Sesa-Pig Iron Plant (PIP). The same is compiled on a monthly basis and verified by the General Manager (Power Plant), GEPL and Associate General Manager (Sesa-PIP). Discrepancies, if identified, are addressed immediately. 2. Furthermore, the parameter is verified during the Internal Audit conducted every six months. Discrepancies, if identified, are included in the audit findings and appropriate measures are undertaken immediately.

Parameter 2: Calorific Value of Blast Furnace Gas (BFG)	
Parameter	Description
Measured, Calculated, Estimated	Measured
Source of Data	PLC/Plant Log Book
Monitoring Equipment	Gas Analyzer
Specification of Monitoring Equipment	Make: ABB Model: Advance Optima Analyzer Sl. No.: A020 Range: CO- 0 to 40.59 VOL% CO_2- 0 to 39.92 VOL% H_2- 0 to 7.86 VOL%
Calibration of Monitoring Equipment	The Gas Analyzer is calibrated once in every month.
Accuracy of Monitoring Equipment	Class: CO- $\pm$ 2% CO_2- $\pm$ 2% H_2- $\pm$ 1%
Uncertainty of Data	Low
Justification	The uncertainty of the data is considered to be low as the monitoring equipment is of reputed make and of high accuracy levels. Furthermore the following practices followed in the plant will ensure the reliability of the data: 1. The parameter is monitored and recorded daily in the Plant Log Book by the Operation Department of Sesa-Pig Iron Plant (PIP). The same is compiled on a monthly basis and verified by the Associate General Manager (Sesa-PIP). Discrepancies, if identified, are addressed immediately. 2. Furthermore, the parameter is verified during the Internal Audit conducted every six months. Discrepancies, if identified, are included in the audit findings and appropriate measures are undertaken immediately.

Parameter 3: Coke Oven Flue Gas (COFG) Consumption		
Parameter	Description	
Measured, Calculated, Estimated	Measured	
Source of Data	PLC[1]/Plant Log Book	
Monitoring Equipment	Codel Flow Meters	
Specification of Monitoring Equipment	Location: Stack-1A Make: CODEL International Model: 502 Flow Meter Sl. No.: 502-438-502-SP Range: 0-50 m/s	Location: Stack-1B Make: CODEL International Model: 502 Flow Meter Sl. No.: 502-439-502-SP Range: 0-50 m/s
	Location: Stack-2A Make: CODEL International Model: 502 Flow Meter Sl. No.: 502-406 Range: 0-50 m/s	Location: Stack-2B Make: CODEL International Model: 502 Flow Meter Sl. No.: 502-449-SP Range: 0-50 m/s
Calibration of Monitoring Equipment	The Flow Meters are calibrated once in every month.	
Accuracy of Monitoring Equipment	Class: $\pm$ 2% (for all the Flow Meters)	
Uncertainty of Data	Low	
Justification	The uncertainty of the data is considered to be low as the monitoring equipments are of reputed make and of high accuracy levels. Furthermore the following practices followed in the plant will ensure the reliability of the data: 1. The parameter is monitored continuously and recorded daily in the Plant Log Book by the Operation Department of GEPL and Operation Department of Sesa-Met Coke Division (MCD). The same is compiled on a monthly basis and verified by the General Manager (Power Plant), GEPL and Associate General Manager (Sesa-MCD). Discrepancies, if identified, are addressed immediately. 2. Furthermore, the parameter is verified during the Internal Audit conducted every six months. Discrepancies, if identified, are included in the audit findings and appropriate measures are undertaken immediately.	

[1] Programmable Logic Control- S7 300 PLC
Make: Siemens
Specifications: CPU: 312C, 32 KB. Sr no 6ES7 312 5BE03 0AB0,
MMC 64KB,
DI: 32 Channel, DO: 16 Channel, AI: 8 Channel.

Parameter 4: Temperature of Coke Oven Flue Gas (COFG)		
Parameter	Description	
Measured, Calculated, Estimated	Measured	
Source of Data	PLC[2]/Plant Log Book	
Monitoring Equipment	Thermocouples	
Specification of Monitoring Equipment	Location: Stack-1A Make: Eureka Engineering Enterprises Model: R-type Tag. No.: 0101 Range: 0-1700^{0}C	Location: Stack-1B Make: Eureka Engineering Enterprises Model: R-type Tag. No.: 0103 Range: 0-1700^{0}C
	Location: Stack-2A Make: Eureka Engineering Enterprises Model: R-type Tag. No.: 0107 Range: 0-1700^{0}C	Location: Stack-2B Make: Eureka Engineering Enterprise Model: R-type Tag. No.: 0106 Range: 0-1700^{0}C
Calibration of Monitoring Equipment	The Thermocouples are calibrated once in a year.	
Accuracy of Monitoring Equipment	Class: $\pm$ 5^{0}C (for all the Thermocouples)	
Uncertainty of Data	Low	
Justification	The uncertainty of the data is considered to be low as the monitoring equipments are of reputed make and of high accuracy levels. Furthermore the following practices followed in the plant will ensure the reliability of the data: 1. The parameter is monitored continuously and recorded daily in the Plant Log Book by the Operation Department of GEPL and Operation Department of Sesa-Met Coke Division (MCD). The same is compiled on a monthly basis and verified by the General Manager (Power Plant), GEPL and Associate General Manager (Sesa-MCD). Discrepancies, if identified, are addressed immediately. 2. Furthermore, the parameter is verified during the Internal Audit conducted every six months. Discrepancies, if identified, are included in the audit findings and appropriate measures are undertaken immediately.	

[2] Details of PLC have been provided under Parameter 3.

Parameter 5: Thermal Energy Consumption in the Power Plant	
Parameter	Description
Measured, Calculated, Estimated	Calculated based on: ▪ Blast Furnace Gas (BFG) Consumption ▪ Calorific Value of Blast Furnace Gas (BFG) ▪ Coke Oven Flue Gas (COFG) Consumption ▪ Temperature of Coke Oven Flue Gas (COFG)
Source of Data	Plant Log Book-For thermal energy consumption in the Power Plant from BFG. The same is calculated based on the 'Blast Furnace Gas (BFG) Consumption' and the 'Calorific Value of Blast Furnace Gas (BFG)'. PLC[3]- For thermal energy consumption in the Power Plant from COFG. The same is determined based on 'Coke Oven Flue Gas (COFG) Consumption' and the 'Temperature of Coke Oven Flue Gas (COFG)'.
Monitoring Equipment	-
Specification of Monitoring Equipment	-
Calibration of Monitoring Equipment	-
Accuracy of Monitoring Equipment	-
Uncertainty of Data	Low
Justification	The uncertainty of the data is considered to be low since the same is calculated with parameters of lower uncertainty levels. Furthermore the following practices followed in the plant will ensure the reliability of the data: 1. The parameter is recorded daily in the Plant Log Book by the Operation Department of GEPL, Operation Department of Sesa-Pig Iron Plant (PIP) and Operation Department of Sesa-Met Coke Division (MCD). The same is compiled on a monthly basis and verified by the General Manager (Power Plant), GEPL, Associate General Manager (Sesa-PIP) and Associate General Manager (Sesa-MCD). Discrepancies, if identified, are addressed immediately. 2. Furthermore, the parameter is verified during the Internal Audit conducted every six months. Discrepancies, if identified, are included in the audit findings and appropriate measures are undertaken immediately.

[3] Details of PLC have been provided under Parameter 3.

Parameter 6: Temperature of Waste Gas at Boiler Outlet		
Parameter	Description	
Measured, Calculated, Estimated	Measured	
Source of Data	PLC[4]/Plant Log Book	
Monitoring Equipment	Thermocouple	
Specification of Monitoring Equipment	For Boiler 1 Location: ID Fan Inlet at the Flue Gas Duct at Boiler 1 Make: Pyrotek Model: K-type Tag. No.: ITE_218 Range: 0-650^{0}C	For Boiler 2 Location: ID Fan Inlet at the Flue Gas Duct at Boiler 2 Make: Pyrotek Model: K-type Tag. No.: 2TE_218 Range: 0-650^{0}C
Calibration of Monitoring Equipment	The Thermocouples are calibrated once in a year.	
Accuracy of Monitoring Equipment	Class: $\pm$ 1^{0}C (for both the Thermocouples)	
Uncertainty of Data	Low	
Justification	The uncertainty of the data is considered to be low since the same is calculated with parameters of lower uncertainty levels. Furthermore the following practices followed in the plant will ensure the reliability of the data: 1. The parameter is recorded daily in the Plant Log Book by the Operation Department of GEPL.The same is compiled on a monthly basis and verified by the General Manager (Power Plant), GEPL. Discrepancies, if identified, are addressed immediately. 2. Furthermore, the parameter is verified during the Internal Audit conducted every six months. Discrepancies, if identified, are included in the audit findings and appropriate measures are undertaken immediately.	

The monitored data for all the above mentioned parameters for the verification period under consideration (*i.e.* 1st June 2007-31st March 2008) have been provided to the Verifier during site verification. The same has also been enclosed herewith. Please refer to "CER Calculation Spreadsheet/ Version 02" (Annex 1) for details.

[4] Details of PLC have been provided under Parameter 3.

Response to Comment-2

The monitoring report stated that meter for net electricity exported to grid was changed during the monitoring period. Further information is required on why the meter was changed.

As per the Contractual Agreement between Goa Energy Private Limited (GEPL, one of the project proponents) and the Goa Electricity Department (GED *i.e.* Grid Authority), two identical meters (one acting as Main Meter and the other as Check Meter of 0.2 class ABT compatibility) are to be installed by Goa Energy Private Limited (GEPL) to monitor the parameter *i.e.* monitor 'Net Electricity Exported to Grid (E_{EXP})' (Annex 2: extracts of the Contractual Agreement has been provided to the verifier). However for the period from 1st June 2007 to 30th June 2007 these meters were not ready to monitor 'Net Electricity Exported to Grid (E_{EXP})'. Therefore, as decided and agreed upon by both GED and GEPL the initial Energy Meter (Make: L&T, Serial No.: 00034033) installed by GED was used to monitor the Net Electricity Exported to Grid (E_{EXP}) from 1st June 2007 to 30th June 2007. An undertaking in support of the same signed by both GEPL and GED has been provided to the verifier (Annex 3). Subsequently in accordance with the Contractual Agreement, the initial Energy Meter was replaced with one Main Meter (Make: Apex, Sl. No.: APM56715) and one Check Meter (Make: Apex, Sl. No.: APM56714). The Main Meter reading is used to monitor the parameter 'Net Electricity Exported to Grid (E_{EXP})' from 1st July 2007 onwards.

The project proponent further wishes to clarify that the parameter-'Net Electricity Exported to Grid (E_{EXP})' is not required for emission reduction computation. The emission reduction resulting from the project activity is determined based on the 'Net electricity supplied by the project activity during the year y (EG_y)' which is determined in accordance with the guidance of Section D.2.1.3 of the Registered Project Design Document (parameter 7a in Pg/-28) as the difference between the 'Total Electricity Generated (EG_{GEN})' and '{Auxiliary Electricity (EG_{AUX}) + the electricity that would have been generated in the 3MW BFG fired power plant of SIL in absence of the project activity}'. Therefore replacement of the meter monitoring the 'Net Electricity Exported to Grid (E_{EXP})' will not alter the accuracy of emission reduction computation resulting from the project activity under consideration.

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List of Annexes:

Annex 1: CER Calculation Spreadsheet/ Version 02

Annex 2: Extracts of the Contractual Agreement signed between GED and GEPL

Annex 3: Undertaking signed by both GEPL and GED