Revised Monitoring Plan
UN0598

RREPL - 14 MW Rice Husk Power Project

Version 1
22-07-2008

SECTION D. Application of a monitoring methodology and plan:

>>

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

>>

Applicable baseline methodology

In line with paragraph 6(c) of decision 17/CP.7 on the modalities and procedures for the CDM, and 'Appendix B' of the simplified modalities and procedures for small-scale CDM project activities; "Indicative simplified base line and monitoring methodologies for small-scale CDM project activity categories" of Annexure II to decision 21/ CP.8 . The applicable type and category is :

Type-I RENEWABLE ENERGY PROJECTS
Category I.D. Grid connected renewable electricity generation
I.D./ Version 08 Scope ## 03 March 2006

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

>>

The approved methodology

	Methodology Steps		Project Activity
1)	Limits to electricity generation from biomass to 15 MW	:	Project activity generates 14 MW from biomass mainly Rice Husk with some amount of co-firing of fossil fuel i.e. coal for consistency in electricity generation.
2)	Covers grid connected electricity generation		Project activity will sell the generated electricity to or though CSEB grid
3)	the base line is the KWh Power produced by renewable generating unit multiplied by an emission coefficient calculated in transparent and conservative manner as 3.a. the average the approximate operating margin and build margin where a1. the average emission is the weighted average of all generating sources serving the system; excluding hydro; geothermal; wind; low cost biomass; nuclear and solar generation a2 the build margin is the weighed average emissions of recent capacity additions to the system, which capacity additions are defined as greater of most recent 20% of existing plants or 5 of the most recent plants OR		We have opted for option "3 a" (para 9 a of methodology) We have considered the Western Regional Electricity Grid as baseline and grid generation The data and parameters regarding the baseline emission factor for the Western Regional Grid was obtained only once during validation and will be used for ex-ante calculations. We have also opted for ex-ante monitoring.

Deleted:

	3.b the weighted average emissions in current generation mix 3c) Approximate operating margin emission factor and the weighted average emission factor can be calculated using either of the two following data vintages for years(s) y; • Option 1: A-3 year average, based on the most recent statistics available at the time of PDD submission. • Option 2 The year in which project generation occurs, if emission factor is updated based on ex post monitoring. 3d) Build margin emission factor can be calculated using either of the following data vintages for years(s) y: • Option 1 Most recent information available on plants already built at the time of PDD submission. • Option 2 For the first crediting period, emission factor is updated based on ex-post monitoring. For subsequent crediting periods, Emission factor should be calculated ex-ante, as described in option 1 above.		
4)	Leakage is to be considered only if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity.		The project activity is green field project with new energy generating equipment bought from equipment suppliers specifically as per requirement of the project activity. Hence leakage considered as Nil.
5)	monitoring shall consist of the electricity generated by renewable technology. In the case of co fired plants; the amount of biomass and fossil fuel input shall be monitored,.		The monitoring will be inline with this concept by monitoring the electricity generated by renewable technology. This is biomass based project activity with co-firing of fossil fuel to the extent of 10%, fossil fuel will be monitored for the quantity & quality.

D.3 Data to be monitored:

ID No.	Data Type	Data Variable	Data unit	Measured, (m) calculated (c) estimated (c)	Recording Frequency	Proportion of data to be monitored	How the data will be achieved electronic / data	For how long is achieved to be kept (Year)	Comment
1. E_{GEN}	Quantitative	Total electricity generated **Location** i) At generating plant	MWH /month	Online measurement (m)	Continuously/ month	100%	Electronic /Paper	12	Monitoring location:CSEB export meter at plant and DCS will measure the data. ces
2. E_{AUX}	Quantitative	Auxiliary electricity Consumption Location i) At generating plant	MWH /month	Online measurement (m)	Continuously/ month	100%	Electronic/ Paper	12	Monitoring location: CSEB export meter at plant and DCS will measure the data. .
3. E_{NET}	Quantitative	Net electricity generated from small-scale project activity	MWH /month	Calculated	Continuously /month	100%	Electronic /Paper	12	Calculated from the above measured parameters. Algorithm for project emission calculation given in baseline methodology. E_{GEN} - $E_{AUX,}$ emission calculations as per baseline methodology.
4. E_{NET}	Quantitative	Net electricity generated from small-scale project activity	MWH /month	Online measurement (m)	Continuously /month	100%	Electronic /Paper	12	The CSEB export meter at the export terminal . The CSEB will be regularly checking the calibration of the meter.

Contd.. D..3

ID No.	Data Type	Data Variable	Data unit	Measured, (m) calculated (c) estimated (e)	For which baseline method(s) must this element be included.	Recording Frequency	Proportion of data to be monitored	How the data will be archived electronic / paper	For how long is archived to be kept (Years)	Comment
5 EF_y	Emission factor	CO_2 emission factor of the grid	tCO_2eq/ MWH	*Calculated (c)*	*Ex-ante* *Weighted average of generation mix.*	Once during validation (Ex-ante)	100%	Electronic /Paper	12	calculated once during validation Ex-ante
6 $EF_{OM,y}$ simple	Emission factor	CO_2 operating margin emission factor of the grid	tCO_2eq / MWH	Calculated (c)	Simple OM	Once during validation (Ex-ante)	100%	Electronic / Paper	12	calculated once during validation Ex-ante
7. F i,j,y	Fuel Qty.	Amount of each fossile fuel Consumed by grid and by importing plants/ sources	Tonnes	Estimated/Calculated	Simple OM, BM	Once during validation (Ex-ante)	100%	Electronic / Paper	12	Obtained from Western Region Grid report / CEA documents once during validation ex-ante
8. COEF i,k	Emission factor Coefficient	CO2 emission Coefficient for each by grid and by importing plants/ sources	tCO_2eq / t of fuel	Calculated based on CEA data/Estimated based on IPCC values	Simple OM, BM	Once during validation (Ex-ante)	100%	Electronic / Paper	12	Obtained from Western Region Grid report / CEA / IPCC once during validation ex-ante.
9. GEN j,y	Electricity Qty.	Electricity generation / import of CSEB grid	MWH /yr	Estimated	Simple OM	Once during validation (Ex-ante)	100%	Electronic / Paper	12	Obtained from Western Region Grid report documents. Once during validation (Ex-ante)

Formatted: Font: Italic

Deleted: Yearly

Formatted: Font: Italic

Deleted: *current*

Deleted: weighted average of current generation mix.

Deleted: Calculated as indicated in the relevant OM baseline method above for each fuel used in the grid

Deleted: Yearly

Deleted: Yearly

Deleted: .

Deleted: .

Deleted: Yearly

Deleted: Yearly

Contd.. D..3

ID No.	Data Type	Data Variable	Data unit	Measured, (m) calculated (c) estimated (e)	For which baseline method(s) must this element be included.	Recording Frequency	Proportion of data to be monitored	How the data will be archived electronic / paper	For how long is archived to be kept (Years)	Comment
10. Qi	Consumption of fuel quantity for project activity (1) Biomass (2) fossil fuel i.e. Coal	weight	Tonnes/day	Measured	For calculating project emission	Daily	100%	Electronic / Paper	12	It will be measured and can verified by Stock Register/incoming receipts.
11. NCV	Fuel quality (1) Biomass (2) fossil fuel i.e. Coal	Calorific value	K Cal/kg	Calculated	For calculating project emission	monthly	100%	Electronic/ Paper	12	By govt. Recognised / or external laboratory.

Formatted Table

Formatted: Left

Deleted: One sample every 15 days

Deleted: .

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

>>

Data	Uncertainty level of data High/medium / low	Are QA/QC procedures planned	Outline explanation why QA/QC are or are not being planned.
D..3 (1to3)	Low	No	This data will be used for calculation of electricity generated by project activity.
D..3 (4 to 8)	Low	No	This data is collected hence no need QA procedures.
D..3 (9) to (11)	Low	No	This data will be required for calculation of project emission.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

>>

Operation and Management Structure for Monitoring

(A) Purpose

To define the procedures and responsibilities for GHG Performance monitoring, measurement and reporting of data and dealing with uncertainties.

(B) Scope

This procedure is applicable to 14 MW biomass based power project of RREPL, India.

(C) Responsibilities

Shift Engineer (Operations): Responsible for reporting hourly and eight hourly data of the biomass and coal consumption, steam generation. The report is then sent to Manager (O&M)

Manager (O&M) : Responsible for reviewing the monitored parameters on hourly and eight hourly based and presenting through a daily executive summary report, duly signed by himself, to the General Manager (Plant).

Shift Engineer (Electrical): Responsible for taking shift wise meter reading for electricity generation, Auxiliary consumption Export to the Grid and pre-operation of the Shift Report. The report is then sent to the Manager (E&I) for his review on daily basis.

Manager (E&I): Responsible for reviewing the monitored parameters shift-wise and presenting through a daily executive summary report, duly signed by himself, to the General Manager (Plant).

General Manager (Plant): Responsible for summarizing data of Electrical, Mechanical, Process (/operation) Departments and report the same to the Vice President (Power) and CMD (RREPL) on daily basis.

CSEB Personnel: Responsible for monitoring the total power generated by RREPL and certifying the same jointly with RREPL on a monthly basis, for making the payment electricity received by the CSEB grid.

Serial No.	Activity
1.0	**GHG Performance Parameter**
1.1	The monitoring protocol requires RREPL to monitor the following GHG Performance parameters for estimating the emissions reductions from Biomass based power plant: • Gross generation of electricity • Auxiliary consumption of electricity. • Net electricity generation • Fuel consumption (1) for biomass (2) for Fossil Fuel (Coal)
2.0	**Metering System**
2.1	The metering system for the Power plant consist of • External Metering System of CSEB for metering the net export of power (Main meter). • External metering system of CSEB for metering total generation. • In house metering system of RREPL (for metering the generation of power, auxiliary consumption, export to or through CSEB grid) • Flow meter for steam inlet to turbine. • Temperature gauge for fluidised bed boiler steam. • Pressure gauge for Fluidised bed boiler steam. • Biomass consumption in the boiler to be tallied with the store issuance of the biomass and purchase invoices. • Fossil fuel consumption in the boiler to be tallied with the store issuance of the fossil fuel and purchase invoices.
2.2	**In house Metering System of RREPL** RREPL will have an in-house metering system, to monitor the overall performance of the plant. The metering system mainly comprises of three meters. • One in-house generation meters • In-house Auxiliary consumption meter. • In-house export meter (Check meter) The in-house generation meters (or the Energy Meter) will be micro-processor based metering device monitor, the total power generation as well as the net unit of auxiliary electricity consumed by RREPL. The reading of this meter will be used to cross-check the reading of the External Metering System of CSEB. The Shift Engineer (Electrical) shall monitor hourly and eight hourly data on total generation, auxiliary consumption, net electricity available for export. The hourly data will be recorded in the generation log book and the eight hourly data will be recorded in the plant log book. The complete and accurate records in the plant log book will be signed by the Shift Engineer (Electrical). Both of these reports will be sent to the Manager (Electrical & Instrumentation) for his review on a daily basis. A daily report of 24 hours will be made based on the three shift reports. On the basis of the reported parameters, a complete and accurate executive daily summary report will be prepared and signed by the Manager (Electrical &

	Instrumentation) and sent to the General Manager (Plant) for proper administration and accounting.
3.0	**Calibration of the Metering System**
3.1	All the metering devices will be calibrated at regular intervals so that the accuracy of measurement is ensured all the time. The meters recording total generation will be calibrated by CSEB with a pre-calibrated meter. The other meters will be calibrated internally as per supplier's calibration schedule following the standard procedures for calibration. Calibration of meters are done once in a year.
4.0	**Reporting of the Monitored Parameters/ Authority and Responsibility of monitoring and reporting**
4.1	**Metering System of CSEB** The CSEB personnel and RREPL personnel will jointly read the CSEB export meter and generation metering system, for recording the net electricity exported to or through CSEB Grid and the total generation from the Power Plant on the last day of every month and keep the complete and accurate records for proper administration and accounting. The accuracy of the main meter reading will be substantiated by the check meter reading. In the event that the main metering is not in service, then the check meter shall be used. A monthly report will be prepared based on these joint meter reading, which will be sent to the Vice President (Power) of RREPL. The monthly invoice against the electricity exports to or through CSEB grid will be based on the monthly reports raised by RREPL/ CSEB jointly. The Shift Engineer (Electrical) shall take daily reading (at 6.00 AM) of the Main and Check meters of the external metering system and shall keep the complete and accurate records in the CSEB reading book (maintained at the plant) for proper administration. The reading will be verified by the Manager (Electrical and Instrumentation) on daily basis and sent to the General Manager (Plant) at the Administrative Building in the plant for his review and for preparing the daily report.
4.2	**In-house Metering System of RREPL** The Shift Engineer (Electrical) shall monitor hourly and eight hourly data on total generation, auxiliary consumption, net electricity available for export. The hourly data will be recorded in the generation log book and the eight hourly data will be recorded in the plant log book. The complete and accurate records in the plant log book will be signed by the Shift Engineer (Electrical). Both of these reports are sent to the Manager (Electrical & Instrumentation) for his review on a daily basis. A daily report for 24 hours will be made based on three shift reports. On the basis of the reported parameters, a complete and accurate executive daily summary report will be prepared and signed by the Manager (Electrical & Instrumentation) and sent to the General Manager (Plant) for proper administration and accounting.
5	**Fuel quantity monitoring**
5.1	**Biomass :** The quantity of Biomass will be monitored by (1) Issue records from stores (2) Consumption record of Shift Engineer.

	(3) Stock records from stores. (4) Purchase records (5) Entry records
5.2	**Coal:** The quantity of coal will be monitored by (1) Issue records from stores (2) Consumption record of Shift Engineer. (3) Stock records from stores. (4) Purchase records (5) Entry records
5.3	The quantities of biomass and fossil fuel will be monitored before blending, and feeding into the boiler.
5.4	**Lab Analysis:** (1) Sample will be drawn from each new source on regular basis of Biomass or Fossil fuel received and sent to laboratory for analysis of the following: (a) Chemical composition (b) Calorific value. (2) The records of all analysis reports will be maintained in paper. (3) The testing will be normally carried out in-house laboratory. However for cross checking purposes, analysis is carried out of the sample by Govt. approved laboratory, once in three months. (4) Sample analysis will be done at least once in every week in the first years of operation; subsequently will be done at least every month.
6.	**Uncertainties and Adjustments:**
6.1	The hourly, eight hourly, daily and monthly data will be recorded at various points as stated above. Any observations (like inconsistencies of report parameters) and/or discrepancies in the operation of the power plant will be documented as "History" in the daily report prepared by the General Manager (Plant) along with its time of occurrence, duration and possible reasons behind such operational disruptions. Necessary corrective actions will be undertaken at the earliest. Any discrepancies in the Main reading (for example, difference between main meter and check meter reading or extreme deviation in the net generation figure from that reported by the In-house Meter of RREPL), if identified, will immediately be brought to the notice of CSEB. Corrective actions will be undertaken at the earliest after identification of reason of such discrepancy. Furthermore, as a safety measure, the total power generating system will be equipped with an Automatic Alarming System which shall give a prior indication of any fluctuations in the operating parameters of the power plant thereby enabling the operators to take necessary preventive measures. These measures will be undertaken in order to detect and minimize the uncertainty levels in data monitoring.
7.0	**Experience and Training**
7.1	All the Shift Engineers (Electrical and Instrumentation, Operations) are qualified engineers/ technologists. All the operators of the power plant will be IBR certified and NPTI certified engineers, and they also undergo an exhaustive on-the-job training program including plant operations, data monitoring and report preparation.

	A training schedule has been planned and same is attached as Annexure-4.
7.2	**Emergency Preparedness Plan** The total power generating system of power plant will be equipped with an "Automatic Alarming System" which helps the operators to take necessary preventive actions before any kind of non-functioning of the power plant results. RREPL will be having fire fighting system in place. In addition RREPL shall have standard procedures for tackling emergencies arising from • Blackout • Low boiler drum level/ low feed water level • Load throw off • Boiler Tube leakage. • Boiler tripping at alarm systems.
	Records 1. Generation Log Book, maintained by Electrical & Instrumentation Department at site, containing hourly data from all the In-house Metering System. 2. Plant Log Book, maintained by Electrical & Instrumentation Department at site, containing eight hourly data from all the In-house Metering System. 3. Daily Executive Summary (submitted to the General Manger (Plant), prepared by Electrical & Instrumentation Department at site containing daily data for all the in-house metering system and record of any History with details. 4. CSEB Reading Book, maintained by Electrical & Instrumentations Department at site, consisting of daily export of power to or through CSEB grid. 5. Daily report containing the performance parameters of the power plant and record of any history with details, maintained at site with a copy being sent to the Head Office. 6. Monthly Report on net quantity of electricity generated at RREPL's Plant and invoice raised by RREPL on CSEB as maintained at the plant with a copy being sent to the Head Office of RREPL. 7. Biomass consumption in the boiler to be tallied with the store issuance of the biomass and purchase invoices. 8. Co-fired fossil fuel consumption in the boiler to be tallied with the store issuance of the fossil fuel and purchase invoices.

D.6. Name of person/entity determining the monitoring methodology:

>>

Preparation of this documents has been done by Indus Technical and Financial Consultants Ltd., whose address is

Shri Lalit Kumar Singhania
Indus Technical and Financial Consultants Ltd.

205, Samta Colony,
In front of Shikapuri Panchayat Bhawan.
Raipur city , Chhattisgarh State 492001 INDIA
Telephone : +91-771-2255186
Mobile : +91-93011 93400/ +91 94252 08189
Fax : +91-771-2254188
Email : indusryp@satyam.net.in
Website: www.itfcenv.com