# MONITORING REPORT
# (Version -01 dated 01-04-2008)

## Project Ref : 0598 - RREPL – 14MW Rice Husk Power Project

## :: Monitoring Period ::

**1st February 2007 to 31st March 2008**

**(both days included)**

Project Site:

**Village-Garh Umaria,**

**Darramuda, Raigarh District**

**Chhattisgarh, India.**


**:: Project Developer ::**

**Indus Technical and Financial Consultant Ltd.**
**205, Samta Colony Raipur-492001, Chhattisgarh, India.**
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**:: Project Proponent ::**

**R.R. Energy Pvt. Limited**
**Transport Nagar, Building-65**
**Korba, Raipur-495679,**
**Chhattisgarh, India.**
**Phone: +91-7759-229374**
**Fax: +91-7759-22747**
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## CURRENT STATUS OF THE PROJECT

The 14 MW Rice Husk Power Project at R.R. Energy Private Limited, Raigarh, Chhattisgarh, India has started commercial production from 13th January 2007. The crediting period has been claimed from 1st February 2007.

The project has been completed with major equipment supplied as follows:

| Sl. No. | Equipment Description | Supplier Name & Address |
|---|---|---|
| 1. | Steam Turbo Generators | Greenesol Power System Pvt. Ltd.<br>No. 11/23, "SURYADEV" 20th Main Road, 1-R Block Rajajinagar, West of Chord Road, Bangalore – 560 010 India |
| 2. | Boilers | Thermax Babcock & Wilcox Limited<br>D-1 MIDC, R. D. AGA Road Chinchwad PUNE – 411 019 |
| 3. | Boiler Feed Water Pumps | KSB PUMPS LIMITED<br>Power Projects Division Dll Block, MIDC Chinchwad, Pune - 411 019 (NIDIA) |
| 4. | Electrostatic Precipitator's | THERMAX LIMITED<br>ENVIRO DIVISION, PMT COMPLEX BEHIND PCMC BUILDING, MUMBAI – PUNE ROAD, PIMPRI, 411 018 (INDIA) |
| 5. | Dense Phase Conveying System | OSM ENGINEERING Pneumatic Conveying (Pvt.) Ltd.<br>Sikri Village, Main Mathura Road, Ballabgarh Faridabad Haryana 121 004 |
| 6. | Cooling Water Pumps | GLOBAL Associates<br>227, 2nd Floor Arihant Complex, Station Road Raipur – 492 009 (C. G.) |
| 7. | Cooling Towers | Composite Aqua Systems & Equipments P. L.<br>39, Shahpurjat, Opp. Asian Village Complex New Delhi 110 049 |
| 8. | Air Compressors | ATLAS COPCO (INDIA) LIMITED<br>Sveanagar Depodi Pune - 411 012 |
| 9. | Water Treatment Plant | THERMAX LIMITED<br>ENVIRO DIVISION, PMT COMPLEX BEHIND PCMC BUILDING, MUMBAI – PUNE ROAD, PIMPRI, 411 018 (INDIA) |
| 10. | Rice Husk Handling Plant | Assembled from local manufacturers and in house fabrication. |
| 11. | Rice Husk Screen | International Combustion ( INDIA ) Ltd.<br>B-74 1, MIDC WALUJ, AURANGABAD, MAHARASHTRA |
| 12. | Coal Handling Plant | Assembled from local manufacturers and in house fabrication. |
| 13. | DCS System | YOKOGAWA INDIA LTD.<br>Hosur Road, Bangalore 560 100 |

| | | |
|---|---|---|
| 14. | UPS | Greenesol Power System Pvt. Ltd.<br>No. 11/23, "SURYADEV" 20th Main Road, 1-R Block Rajajinagar, West of Chord Road, Bangalore – 560 010 India |
| 15. | Distribution Transformers | EMCO LIMITED<br>N-104, MIDC Area, Vill – Mehrun, Jalgaon |
| 16. | Power Control Centre &<br>Motor Control Centre | AREVA T&D INDIA Limited<br>Naini ALLAHABAD – 211 008 |
| 17. | Air Cooled Condensers | GEI HEMON INDUSTRIES LIMITED<br>26/A INDUSTRIAL AREA GOVINDPURA BHOPAL, M.P. |

## PROJECT PARAMETERS

The Rice Husk FBC boiler and power plant is in operation since 13th January 2007. The biomass like Rice Husk is burnt in fluidized bed boiler where sand is used as inert bed to produce steam. This steam is fed in to TG for power generation. The power generated, after meeting the in – house requirement, is exported to the Grid.

The power generated within the project boundary by TG is recorded through independent energy meter installed by the project proponent on the TG set and power exported to the Grid is recorded by electrical energy meter installed at the Sub-station of CSEB, which are sealed by the Government agency i.e. CSEB. Project proponent submits the monthly power export bill based on the meter reading recorded at CSEB sub-station based on the data recorded by CSEB personnel. Export meter is at the substation of CSEB which is located about 3km away from plant premises. In the similar fashion the auxiliary meter installed at transformer for supplying auxiliary power to the Power plant is metered and recorded by the project proponent. However, these data are used for computation of net power generation by the project activity. The auxiliary power and imported power consumed by the project activity is recorded and deducted from Gross Power generation.. Net power generated by the project activity is arrived by deducting the auxiliary power consumed by the project activity from the gross power generated by the project activity. However the net power exported to the Grid which is recorded at "CSEB sub station" excludes the auxiliary power consumed within the plant as well as transmission losses incurred during wheeling of the power from project site to the substation, but does not exclude the power imported from the Grid. However the net exported power to the grid is more conservative than the net power generation calculated by deducting the auxiliary power consumption from gross power generation, therefore as a conservative approach the net exported power to the Grid is considered after deducting the power imported from the Grid, for CER calculations.

Total fossil fuel consumption in the plant is recorded separately. The project emission from fossil fuel consumption is calculated based on the total calorific value energy provided. The project emission deducted for arriving at the net emission reduction due to the Project Activity.

## MONITORING PERIOD

The monitoring period is from 1st February 2007 to 31st March 2008 (both days included)

## SUSTAINABILITY ISSUES

The project activity is to generate electricity using Biomass like rice husk for generation of power to achieve better energy efficiency, produce eco-friendly power; achieve sustainable development of the industry by reducing CO2 emission and other GHG emissions due to degeneration and uncontrolled atmospheric burning of biomass. The Air Cooled Condensers saves water. It is ensured that almost 100% of waste water is utilized.

The project proponents have obtained consent from state pollution control board under Air Act and Water Act and have applied for renewal of the same within the stipulated period.

**SOCIO-ECONOMIC WELL-BEING**:

The project activity adds income to the farmers by providing added economic value to the waste produce of farmers by procuring rice husk from the rice mills, which they would have otherwise burnt or left in open for natural decay. This will definitely help the millers to pay better price to the farmers for their paddy crop. This will lead to overall development of society in economic health; education etc.

The project proponent is regularly conducting Medical Camps in surrounding villages. Given donation to School and scholarship to the poor students of village to complete their studies. Preparing the sports ground in Garhumaria Village to promote the sports activities in village. The project proponent is providing job to the local villagers. The generation of power from Waste Biomass helps the grid to reduce the deficiency of power in the grid.

## OBTAINED PARAMETERS ACCORDING TO MONITORING PLAN

**Table 1**: As mentioned in section D.3 of the registered PDD, following project related parameters are 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 Power Generation meter at plant and DCS will measure the data. |
| 2. $E_{AUX}$ | Quantitative | Auxiliary electricity Consumption Location i) At Consumption point | MWH /month | Online measurement (m) | Continuously/ month | 100% | Electronic/ Paper | 12 | Monitoring location: Auxiliary Consumption 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. $E_{NET} = E_{GEN} - E_{AUX,}$ |
| 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. |

| 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. Qi | Consumption of fuel quantity for project activity (1) Biomass | Weight | Tonnes/day | Measured | | daily | 100% | Electronic / Paper | 12 | It will be measured and can be verified by Stock Register/incoming receipts. |
| | (2) fossil fuel i.e. Coal | | | | For calculating project emission | | | | | |
| 6. NCV | Fuel quality (1) Biomass | Calorific value | K Cal/kg | Calculated | | One sample every 15 days | 100% | Electronic/ Paper | 12 | |
| | (2) fossil fuel i.e. Coal | | | | For calculating project emission | | | | | |

**ELECTRICAL PARAMETERS FOR CER CALCULATION**

| Month | As per Data Recorded by the Project Proponent (In MWh) | | | CSEB substation export meter reading ($E_{NET}$) | Import from Grid | Net power considered for CER calculation (Considered $E_{NET}$) | Gross Emission Reduction |
|---|---|---|---|---|---|---|---|
| | Gross Gen ($E_{GEN}$) | Auxiliary consumption ($E_{AUX}$) | Calculation of net generation ($E_{NET}$) | | | | |
| Feb.07 | 7742.38 | 595.61 | 7146.77 | 6993.95 | 15.20 | 6978.75 | 6744.26 |
| March07 | 10241.58 | 750.38 | 9491.20 | 9311.40 | 7.23 | 9304.17 | 8991.55 |
| April07 | 10042.05 | 782.91 | 9259.14 | 9081.45 | 8.95 | 9072.50 | 8767.66 |
| May07 | 9893.14 | 835.07 | 9058.07 | 8882.25 | 17.86 | 8864.39 | 8566.55 |
| June07 | 8507.57 | 693.94 | 7813.63 | 7661.85 | 47.30 | 7614.55 | 7358.70 |
| July07 | 8905.20 | 695.34 | 8209.86 | 8055.45 | 56.37 | 7999.08 | 7730.31 |
| Aug.07 | 9194.10 | 746.28 | 8447.82 | 8292.75 | 41.90 | 8250.85 | 7973.62 |
| Sep.07 | 10157.21 | 797.74 | 9359.46 | 9185.40 | 3.75 | 9181.65 | 8873.15 |
| Oct.07 | 10735.39 | 797.82 | 9937.57 | 9755.70 | 8.40 | 9747.30 | 9419.79 |
| Nov.07 | 10033.80 | 733.41 | 9300.39 | 9129.30 | 13.40 | 9115.90 | 8809.61 |
| Dec.07 | 10981.44 | 800.14 | 10181.30 | 10005.45 | 8.83 | 9996.62 | 9660.73 |
| Jan.08 | 10585.87 | 742.13 | 9843.74 | 9672.30 | 13.06 | 9659.24 | 9334.69 |
| Feb.08 | 8405.25 | 605.02 | 7800.23 | 7666.65 | 22.35 | 7644.30 | 7387.45 |
| March.08 | 10242.82 | 791.17 | 9451.65 | 9285.01 | 9.58 | 9275.43 | 8963.77 |
| | **135667.77** | **10366.96** | **125300.81** | **122978.90** | **274.18** | **122704.72** | **118581.85** |

**Fuel Consumption and Project Emission Parameters**

| Month | Quantity of Biomass Used (in MT) | Total NCV of Biomass (In TJ) | Quantity of Coal used (In MT) | Total NCV of Coal (In TJ) | Project Emission (during the month) In $tCO_2$ | Net Emission Reduction (Gross Emission Reduction – Project Emission) in $tCO_2$ |
|---|---|---|---|---|---|---|
| Feb.07 | 8684.25 | 116130.74 | 152.36 | 2075.14 | 195.37 | 6548.89 |
| March07 | 11284.04 | 143521.36 | 151.31 | 2030.58 | 191.18 | 8800.37 |
| April07 | 11067.08 | 139527.48 | 1776.15 | 21840.87 | 2056.29 | 6711.38 |
| May07 | 10942.06 | 136455.97 | 1780.16 | 22323.66 | 2101.74 | 6464.81 |
| June07 | 10308.10 | 121418.93 | 1668.30 | 29289.30 | 2757.55 | 4601.16 |
| July07 | 10799.95 | 120503.62 | 1760.35 | 31185.71 | 2936.09 | 4794.22 |
| Aug.07 | 11198.09 | 126633.57 | 1819.21 | 32697.21 | 3078.40 | 4895.23 |
| Sep.07 | 13898.77 | 159281.15 | 2262.13 | 39449.00 | 3714.07 | 5159.08 |
| Oct.07 | 13456.79 | 177006.41 | 2397.56 | 41508.90 | 3908.01 | 5511.79 |
| Nov.07 | 13666.93 | 185332.51 | 2229.65 | 39181.97 | 3688.93 | 5120.68 |
| Dec.07 | 12545.87 | 174640.72 | 2034.55 | 35951.01 | 3384.74 | 6275.99 |
| Jan.08 | 11013.53 | 153103.42 | 1927.50 | 34622.22 | 3259.63 | 6075.06 |
| Feb.08 | 8880.36 | 121849.36 | 1355.64 | 24593.71 | 2315.46 | 5071.99 |
| March.08 | 10407.87 | 153350.46 | 1947.00 | 35533.66 | 3345.44 | 5618.33 |
| | **158153.69** | **2028755.71** | **23261.87** | **392282.95** | **36932.89** | **81648.95** |

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## CALCULATION OF POWER GENERATION

| S.No. | Particulars | Unit | |
|---|---|---|---|
| **A** | **Power Generation** | **Unit** | |
| 1 | Gross Power Generation recorded at the plant | MWh | 135667.77 |
| 2 | Auxiliary Power Consumption recorded at the plant | MWh | 10366.96 |
| 3 | Power imported from the Grid | MWh | 274.18 |
| 4 | Net Power exported to the grid from the plant as per CSEB meter reading. | MWh | 122978.90 |
| 5 | Net power considered for CER calculation after deducting the power imported from the grid from net power received by the grid. | MWh | 122704.72 |
| **B** | Fuel Consumption and Calorific Value consumed during the period | | |
| 1 | Biomass Fuel Consumed | MT | 158153.69 |
| 2 | Coal Consumed | MT | 23261.87 |
| 3 | Total Net Calorific Value of Biomass | TJ | 2028755.71 |
| 4 | Total Net Calorific Value of Coal fossil fuel consumed | TJ | 392282.95 |

**EX-ANTE CALCULATION OF BASELINE EMISSION FACTOR**

$EF_{electricity, y}$ is the weighted average emission factor in current generation mix for the electricity displaced due to the project activity during the year y in tons $CO_2$ / MWh. (refer to page No. 57 of registered PDD)

= 0.9664 t CO2/ MWh

**BASELINE EMISSION:**

$ER_{electricity, y}$ = $EG_y$ X $EF_y$

Where:

$ER_{electricity, y}$: are the emission reductions due to displacement of electricity during the year y tons of $CO_2$.

$EF_y$: is the weighted average emission factor in current generation mix for the electricity displacement due to the project activity during the year y in tons $CO_2$ / MWh.
= 0.9664 t CO2/ MWh

$EG_y$: is the net electricity supplied to or through CSEB grid.
= 122704.72 MWh

$ER_{electricity, y}$ = 122704.72 MWH x 0.9664 tCO2/MWh
= 118581.85 t $CO_2$/Annum

**$PEFF_Y$ (PROJECT EMISSION)**

= $Q_i$ x NCV (of coal) x $EF_{CO2}$ x $OXID_i$

Where

Qi : Quantity of Coal consumed during the period. (in Tonnes) = 23261.87 t

NCV : Average NCV of Coal consumed during the period (in TJ) based on actual analysis done by the PP= 16.86 TJ

$EFCO_2$ : Emission Factor for Coal in terms of $CO_2$ (in Tonnes) per TJ as per IPCC default value = 96.07 t/TJ

OXIDi : Oxidation factor of Coal as per IPCC default value = 0.98

Hence,

= 23261.87 (tonnes coal) X (16.86 ( Average NCV in TJ) $X10^{-3}$) Tj/year X 96.07 ($CO_2$ per TJ) x 0.98 (Oxidation factor)

= 36932.89 $tCO_2$

**EMISSION REDUCTIONS:**

$ER_y$ = $ER_{electricity, y}$ – $PEFF_y$

Where:

$ER_y$: are the emissions reductions of the project activity during the year y in tons of $CO_2$.

$PEFF_y$: Emission arising out of combustion of fossil fuel (Coal) due to co-firing.

$ER_y$ = 118581.84 $tCO_2$ – 36932.89 $tCO_2$
= 81648.95 t $CO_2$ e

## ROLES & RESPONSIBILITIES

A CDM team has been working in RREPL for monitoring and verification of all the monitoring parameters as per the guidelines formulated by management of RREPL .Qualified and trained people monitor the parameters and emission reduction calculations .In the complete implementation and monitoring plan, RREPL is the sole agency responsible for implementation and monitoring.

**For Electrical Parameters**:

1) Gross Generation and Auxiliary Consumption is metered continuously and recorded by Shift Operator from meters provided at TG on daily basis, this records is submitted to Manager (Elec.), Manage (QA and QC), and CDM officer, which is verified on daily basis. (Generation Meter No.031648084 make - SOCOMEC , Auxiliary Meter ID 112491/3534-0107 make- CONZERV)
2) Export & Import of Power is metered continuously and reading is taken by CSEB personnel's on monthly basis. (Meter ID SEMS/CSE/18233, make Microplast Pvt. Ltd.)

**For Fuel Parameters**:

1) Biomass and Fossil Fuel received at the plant is weighed at the inward section of the plant, and daily receipt is compiled by the stores in-charge.
2) Biomass and Fossil Fuel issued and consumed at the plant is weighed., and daily consumption is compiled by the stores in-charge.
3) NCV of Biomass and Coal (Fossil Fuel) is analyzed by the lab in-charge on daily basis and on change of source.