MONITORING REPORT

Monitoring Period

03.04.2008 to 07.03.2009

(Both days included)

AS A PART OF FIXED CREDITING PERIOD FROM

30 NOV 2007-29 NOV 2017

Version: 06

Date: 12/08/2010

Project 1257: Power capacity expansion project at Dwarikesh Puram

Site:

Village- Bahadurpar, District - Bijnor, Uttar Pradesh

Latitude: 29^0 19'N, Longitude: 78^0 31'E

Dwarikesh Sugar Industries Limited

221, Nariman Point

511, Maker Chambers V

Mumbai

Maharashtra - 400021

Email: dsilbom@dwarikesh.com

Table of Contents

Description of the project activity

Project Status

As proposed, Dwarikesh Sugar Industries Limited (DSIL) has increased the power generation capacity at its existing sugar manufacturing facility at Dwarikesh Puram by installation of a new Bi-drum, natural circulation, balanced draft top supported water tube bagasse fired traveling grate, spreader stoker boiler suitable for steam output capacity of 120 tons per hour (tph) at 86 kg/cm^2 pressure and steam temperature of 515 +/- 5^{o}C and a 24 MW double extraction cum condensing turbine for generating power along with all other accessories and equipments. The project activity got fully commissioned on 04th February 2008.

The power getting generated from the project activity is being supplied to the Northern grid which is under severe power shortage. The technical specification of the equipments deployed in the project activity is as listed below:

Boiler specifications

Description	Bi-drum, natural circulation, balanced draft, top supported water tube, bagasse fired, traveling grate, spreader stoker
Steam generating capacity (tons per hour)	120
Steam pressure (kg/cm^2)	86
Steam temperature (^{0}C)	515 ± 5
No.	1

Turbine specifications

Description	Double extraction cum condensing turbine
Capacity (MW)	24
Steam pressure (kg/cm^2)	86
Steam temperature (^{0}C)	515 ± 5
No.	1

Electrical Generator

Description	Four pole, 3 phase Air cooled, Brushless excitation with digital automatic voltage type regulation system
Speed (RPM)	1500
Frequency (Hz)	50
Power factor (lagging)	0.8
Voltage (kV)	11
No.	1

Pre project scenario

In the pre project scenario the sugar mill of DSIL in Dwarikesh Puram was meeting its in house steam and power requirements by a set of low pressure boilers and turbo generators respectively , the specifications for which are as given below:

Boiler details

Description	**1**	**2**
Steam generating capacity (tonnes per hour)	60	60
Steam pressure (kg/cm^2)	45	45

Turbine details

Description	**1**	**2**	**3**
Power (MW)	3	3	3

The project activity got registered with the UNFCCC on 30/11/2007.

This is the second monitoring report associated with Dwarikesh Puram Project activity. The period covered in this monitoring report is from 03.04.2008 to 07.03.2009 (Both days included). This monitoring report does not cover any period of time which was the part of the previous monitoring report.

The crushing season of sugar mills depends on the availability of sugarcane which is a seasonal crop. Due to less availability of sugarcane in the year of the monitoring period

under consideration the plant (24 MW)at Dwarikesh Puram was operational only for 108 days in the entire monitoring period between 3rd April 2008 and 07th March 2009.

The first monitoring report covered the period from the date of start of crediting period as indicated in the PDD i.e. 30/11/2007 to 02/04/2008 (both days included)..

Parameters monitored

The project proponent has been monitoring the parameters as outlined in the registered PDD. The details of the monitoring parameters are as given below:

Data / Parameter:	**$EG_{project\ plant,\ y}$**
Data unit:	MWh/yr
Description:	Net quantity of electricity generated in the project plant during the year y
Source of data to be used:	Calculated and recorded hourly
Description of measurement methods and procedures to be applied:	Net quantity of electricity in the project plant generated is calculated by subtracting auxiliary consumption from gross generation of the project plant. Separate energy meters are used for continuous measurement of gross electricity generation and auxiliary consumption. The corresponding values are calculated and totalized and recorded hourly in log books.
QA/QC procedures to be applied:	The consistency of net electricity generation is crosschecked with receipts from electricity sales and the quantity of fuels fired. The power exported to UPPCL for the month of November 2008, December 2008 and January 2009, February 2009, March 2009 is 5012.64 MWh, 14612.88 MWh, 6216.48 MWh, 4288.32 MWh, 1221.6 MWh respectively. The net electricity generation from the project plant is compared with power exported and was found comparable. The ratio of net electricity generation divided by the quantity of fuels fired (on energy basis) is in the range 16.3%-19.5%

Data / Parameter:	**$EG_{total,\ y}$**
Data unit:	MWh/yr
Description:	Net quantity of electricity generated in all power units at the project

	site, generated from firing the same type(s) of biomass residues as in the project plant, including the new power unit installed as part of the project activity and any previously existing units, during the year *y*
Source of data to be used:	Calculated and recorded hourly
Description of measurement methods and procedures to be applied:	Net quantity of electricity in all the power units at the project site generated is calculated by subtracting aggregated auxiliary consumption from the aggregated gross generation of all the power units at the plant site. Separate energy meters are used for measurement of gross electricity generations and auxiliary consumptions of all units at the project site and thus subsequently aggregated respectively. The corresponding values are calculated and totalized and recorded hourly in log books.
QA/QC procedures to be applied:	The consistency of net electricity generated from all power units is crosschecked with receipts from electricity sales and the quantity of fuels fired The power exported to UPPCL for the month of November 2008, December 2008 and January 2009, February 2009, March 2009 is 5012.64 MWh, 14612.88 MWh, 6216.48 MWh, 4288.32 MWh, 1221.6 MWh respectively. The power exported when compared with net electricity generated from all power units was found lower due to the fact that sugar industry use significant portion of the generated power to meet is captive requirement, only the incremental power is exported to the grid. The ratio of net electricity generation from all power units when divided by the quantity of fuels fired (on energy basis) is in the range 10.1%-14.3%

Data / Parameter:	$EG_{Gross,project\ plant,y}$
Data unit:	MWh/yr
Description:	Total quantity of electricity generated in the project plant during the year y
Source of data to be used:	Metering records
Description of measurement methods and procedures to be applied:	Electronic tri-vector meters/power monitoring system of accuracy class0.5 has been installed to permit continuous monitoring and measurement. Hourly recordings of data are taken from energy meters and logged in the daily log books by the Switch Board attendant. The shift in-charge signs off in the logbook at the end of every shift and the daily power generation are signed by the power plant manager. The meters are calibrated annually by an

	independent third party. The data will be archived on paper and electronically for 2 years beyond the crediting period.
QA/QC procedures to be applied:	The consistency of gross electricity generation is crosschecked with receipts from electricity sales and the quantity of fuels fired The power exported to UPPCL for the month of November 2008, December 2008 and January 2009, February 2009, March 2009 is 5012.64 MWh, 14612.88 MWh, 6216.48 MWh, 4288.32 MWh, 1221.6 MWh respectively. The gross electricity generation from project plant is compared with the power exported and was found reasonably comparable The ratio of gross electricity generation from project plant when divided by the quantity of fuels fired (on energy basis) is in the range 18.8%-21.4%

Data / Parameter:	**$EG_{Aux,project\ plant,\ y}$**
Data unit:	MWh/yr
Description:	Auxiliary electricity consumption by the project plant.
Source of data to be used:	Metering records
Description of measurement methods and procedures to be applied:	Electronic tri-vector meters/power monitoring system of accuracy class 0.5 is installed to permit continuous monitoring and measurement. Hourly recordings of data are taken from energy meters and logged in the daily log books by the Switch Board attendant. The shift in-charge will sign off in the logbook at the end of every shift, and the daily auxiliary consumption is also signed by the power plant manager. The meters are calibrated annually by an independent third party. The data will be archived on paper and electronically for 2 years beyond the crediting period.
QA/QC procedures to be applied:	The meter is being calibrated annually by an independent third party.

Data / Parameter:	**$EG_{Total\ Gross,\ y}$**
Data unit:	MWh/yr
Description:	Total quantity of electricity generated in all the power units , generated from firing the same type(s) of biomass residues as in the project plant, including the new power unit installed as part of the project activity and any previously existing units, during the year *y*
Source of data to be used:	Metering records
Description of measurement	Electronic tri-vector meters/power monitoring systems of accuracy class 0.5 are installed to permit continuous monitoring and

methods and procedures to be applied:	measurement for each individual power generating unit. The total is then calculated by adding the gross generation of all power generating units and recorded hourly. Hourly recordings of data will be taken from energy meters and logged in the daily log books by the Switch Board attendant. The shift in-charge signs off in the logbook at the end of every shift, and the daily power generation is signed by the power plant manager. The meters will be calibrated annually by an independent third party. The data will be archived on paper and electronically for 2 years beyond the crediting period.
QA/QC procedures to be applied:	The consistency of gross electricity generation in all power units is crosschecked with receipts from electricity sales and the quantity of fuels fired. The power exported to UPPCL for the month of November 2008, December 2008 and January 2009, February 2009, March 2009 is 5012.64 MWh, 14612.88 MWh, 6216.48 MWh, 4288.32 MWh, 1221.6 MWh respectively. The power exported when compared with gross electricity generated from all power units was found lower due to the fact that sugar industry use significant portion of the generated power to meet is captive requirement, only the incremental power is exported to the grid. The ratio of gross electricity generation from all power units is in the range 11.8%-15.9%

Data / Parameter:	$EG_{Total\ Aux\ y}$
Data unit:	MWh/yr
Description:	Total quantity of auxiliary electricity consumption in all the power units at the project site, generated from firing the same type(s) of biomass residues as in the project plant, including the new power unit installed as part of the project activity and any previously existing units, during the year y
Source of data to be used:	Metering records
Description of measurement methods and procedures to be applied:	Electronic tri-vector meters/power monitoring systems of accuracy class 0.5 are installed to permit continuous monitoring and measurement for auxiliary consumption at each individual power generating unit. The total then is calculated by adding the auxiliary consumption of all power generating units and recorded hourly. Hourly recordings of data is taken from energy meters and logged in the daily log books by the Switch Board attendant. The shift in-charge signs off in the logbook at the end of every shift and the daily auxiliary consumption are then signed by the power plant manager. The meters are calibrated annually by an independent

	third party. The data will be archived on paper and electronically for 2 years beyond the crediting period.
QA/QC procedures to be applied:	The meter is being calibrated annually by an independent third party.

Data / Parameter:	**$BF_{k, y}$**
Data unit:	Tonnes
Description:	Quantity of bagasse combusted in the project plant during the year y
Source of data to be used:	On-site measurements
Description of measurement methods and procedures to be applied:	Weight or volume meters are used and adjustment for the moisture content is carried out in order to determine the quantity of dry biomass. The quantity shall be cross-checked with the quantity of electricity (and heat) generated and any fuel purchase receipts (if available). The direct measurement of bagasse would be monitored by monitoring the speed of the rotary feeder. This monitoring instrument would be calibrated to give the amount of bagasse being combusted in the project activity. Also annual mass and energy balance would be carried out to cross check the biomass quantity used in the project activity. The mass balance would be on the basis of the measured quantity of sugarcane crushed, water added, mixed juice and excess bagasse and the energy balance would on the basis of steam quality and quantity generated.
QA/QC procedures to be applied:	The direct measurement of bagasse is monitored by monitoring the speed of the rotary feeder. The feeders are calibrated annually to maintain the accuracy of the entire bagasse monitoing system. The actual bagasse consumption (dry basis) in the project activity is 38901.18 MT (calculated through actual wet bagasse consumption and the moisture content). The ratio of net electricity generation divided by the quantity of fuels fired (on energy basis) is in the range 16.3-19.5 The entire bagasse(fuel) consumed in the project activity is generated from the cane crushed in the sugar manufacturing facility at Dwarikesh Puram same can be verified from RT 8C and there is no bagasse purchased from outside. The bagasse is not stored in the sugar manufacturing facility for more than 6-7 months i.e the time period in between the two sugar seasons. The mass balance (on the basis of the measured quantity of sugarcane crushed, water added, mixed juice and excess bagasse) is conducted for the entire cane crushed in the sugar manufacturing facility. Monthly

figures of the same are as given below:

Month	Cane Crushed	Added Water	Sum	Gross Mixed	Bagasse	Sum
	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes
November-08	74350	31166.24	105516.2	82429.5	23086.7	105516.2
December-08	182910	75645.08	258555.1	199442.5	59112.6	258555.1
January-09	95410	41747.34	137157.3	106582.1	30575.2	137157.3
February-09	98970	45314.64	144284.6	112032.2	32252.4	144284.6
March-09	5922.2	3070.095	8992.309	6814.634	2177.7	8992.3
Total	**457562.2**	**196943.4**	**654505.6**	**507300.9**	**147204.7**	**654505.6**

The mass balance confirms that the sum of cane crushed and the added water is equal to the sum of the quantity of gross mixed and the bagasse produced.

Further,the bagasse combusted in all the boilers in the monitoring period as determined and RT 7c/8c is approximately (dry basis) 73847.37 MT and the consumption in the project boiler is 38901.18 MT on dry basis (calculated through actual wet bagasse consumption and the moisture content).The energy balance is conducted for project boiler for the entire monitoring period taking into account the steam fuel ratio provided by the boiler manufacturer

The energy balance as shown below establishes that 34392 MT of bagasse could be consumed based on the design parameters of the boiler ; however the boiler efficiency may vary in actual project scenario. The bagasse consumption thus calculated is comparable to the actual consumption

			Reference
Steam Flow at MS line at MCR	120000	Kg/hr	As per the boilers manufacturers specification
Fuel Flow rate	47940	Kg/hr	As per the boilers manufacturers specification.(On wet bagasse basis)
Steam -Fuel Ratio	=120000/47940 = 2.50		
Steam Produced in the season by the project boiler	171754190	Kg/hr	
Approximate wet bagasse consumption	=171754190/2.50 =68615798.91	kg	On wet basis

	Approximate dry bagasse consumption	3439233.7	kg	On dry basis considering 49.88 % of moisture content of bagasse
		34392	tonnes	

Data / Parameter:	**NCV_k**
Data unit:	GJ/ton
Description:	Net Calorific value of bagasse
Source of data to be used:	Calculations and laboratory reports
Description of measurement methods and procedures to be applied:	The net calorific value of bagasse is fairly constant. Every six months external laboratory tests for NCV at reputed laboratories and according to relevant international standards is carried out taking at least three samples for each measurement The NCV is determined based on dry biomass.
QA/QC procedures to be applied:	IPCC Default value for other primary solid biomass is 11.6 GJ/tonne.The range defined for other primary solid biomass in the IPCC is from 5.90 to 23 GJ/tonne. The NCVk obtained for the bagasse in the present monitoring period is 15.95 GJ/tonne is well with the range. Moreover NCV test is conducted every six months by external reputed laboratories and was found consistent.

Data / Parameter:	**Moisture content of bagasse**
Data unit:	% Water content
Description:	Moisture content of bagasse
Source of data to be used:	On-site laboratory measurements
Description of measurement methods and procedures to be applied:	Measured in laboratories on a monthly basis by drying a measured sample of bagasse in an oven and then measuring the dried sample . The same procedure is repeated till consecutive readings are obtained.
QA/QC procedures to be applied:	Procedure for monitoring is repeated with multiples samples till consecutive readings are obtained.

Monitored data

Parameters related to Power generation

S.No.	Month	Total quantity of electricity generated in the project plant (24 MW)	Auxiliary electricity consumption by the project plant (24 MW)	Total quantity of electricity generated in all the power units at the project site	Total quantity of auxiliary electricity consumption in all the power units at the project site	Net quantity of electricity generated in the project plant	Net quantity of electricity generated in all power units at the project site
		($EG_{Gross,project\ plant,y}$)	($EG_{Aux,project\ plant,y}$)	($EG_{Total\ Gross,y}$)	($EG_{Total\ Aux\ y}$)	($EG_{projectplant,y}$)	($EG_{total,y}$)
		MWh	MWh	MWh	MWh	MWh	MWh
1	03 Apr 08-31 Oct 08	0	0	0	0	0	0
2	1 Nov 08 - 30 Nov 08	5437.84	485.95	7227.98	759.44	4951.89	6518.54
3	1 Dec 08-31 Dec 08	16323.7	1425.72	20851.98	2061.92	14897.98	18790.06
4	1 Jan 09- 31 Jan 09	7173.4	810.85	9873.71	1307.91	6362.55	8565.80
5	1 Feb 09-28 Feb 09	5065.30	627.01	7879.2	1133.98	4438.29	6745.22
6	1 Mar 09-07 Mar 09	1535.7	209.22	1756.23	257.86	1326.48	1498.37
Total		**35535.94**	**3558.75**	**47639.1**	**5521.11**	**31977.19**	**42117.99**

Note: All figures are reported in MWh

Parameters related to bagasse

Month	Quantity of wet bagasse combusted in project plant (tonnes)	Moisture Content (%)	Quantity of dry bagasse combusted in project boiler (tonnes)
			($BF_{k,y}$)
03/04/08-31/10/08	0	0	0
01/11/08-30/11/08	11698.68	49.80	5873.09
01/12/08-31/12/08	34222.65	49.79	17183.41
01/01/09-31/01/09	15996.73	49.87	8019.52
01/02/09-28/02/09	11941.73	49.85	5988.42
01/03/09-07/03/09	3674.72	50.02	1836.73
Total	**77354.51**	**49.86**	**38901.18**

Energy Content of Fuel (Bagasse)[1]

Net Calorific Value (Cal/g) of Bagasse on dry basis–

Test conducted on 29/12/2008

Units	Cal/gm	GJ/ton	MWh/ton
Sample 1	3600	15.07	4.19
Sample 2	3620	15.16	4.21
Sample 3	3640	15.24	4.23
Average	3620	15.15	4.21

Test conducted on 31/01/2009

Units	Cal/gm	GJ/ton	MWh/ton
Sample 1	3800	15.91	4.42
Sample 2	3760	15.74	4.37
Sample 3	3870	16.20	4.50
Average	**3810**	15.95	4.43

[1] The higher value of NCV 3810 Cal/gm has been used to calculate the emission reductions on the conservative basis.

Calculations of emission reduction

Estimation of emission reductions:

Formula used for estimation of the total net emission reductions due to the project activity during a given year *y* is as under.

$$ER_y = ER_{heat,y} + ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y$$

Where

ER_y are the emissions reductions of the project activity during the year *y* in tons of CO_2,

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

$ER_{heat,y}$ are the emission reductions due to displacement of heat during the year *y* in tons of CO_2,

$BE_{biomass,y}$ are the baseline emissions due to natural decay or burning of anthropogenic sources of biomass during the year *y* in tons of CO_2 equivalents,

PE_y are the project emissions during the year *y* in tons of CO_2, and

L_y are the leakage emissions during the year *y* in tons of CO_2.

Emission reductions due to the displacement of electricity ($ER_{electricity,y}$)

$$\boldsymbol{ER_{electricity,y} = EG_y \, x \, EF_{electricity}}$$

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

EG_y is the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year *y* in MWh,

$EF_{electricity}$ is the CO_2 emission factor for the electricity displaced due to the project activity in tons CO_2/MWh

The emission factor for the displacement of electricity corresponds to the grid emission factor ($EF_{electricity} = EF_{grid}$).

Emission Factor of the Grid (EF_{Grid})

The emission factor of Northern grid ($EF_{electricity}$) is 0.80 tCO_2/MWh

Determination of electricity generation (EG_y)

EG_y is determined as follows:

$$EG_y = MIN\left\{\begin{array}{c} EG_{project\ plant,y} - \varepsilon_{el,other\ plant(s)} \cdot \frac{1}{3.6} \cdot \sum_k BF_{k,y} \cdot NCV_k \\ \\ EG_{total,y} - \frac{EG_{historic,3yr}}{3} \end{array}\right\}$$

where:

EG_y = Net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year y (MWh)

$EG_{project\ plant,y}$ Net quantity of electricity generated in the project plant during the year y (MWh)

$\varepsilon_{el,other\ plant(s)}$ Average net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass residues fired in the project plant in the absence of the project activity ($MWh_{el}/MWh_{biomass}$)

$EG_{total,y}$ Net quantity of electricity generated in all power plants at the project site, generated from firing the same type(s) of biomass residues as in the project plant, including the new power plant installed as part of the project activity and any previously existing plants, during the year y (MWh/yr)

$EG_{historic,3yr}$ Net quantity of electricity generated during the most recent three years in all power plants at the project site, generated from firing the same type(s) of biomass residues as in the project plant[14] (MWh)

$BF_{k,y}$ Quantity of biomass residue type k combusted in the project plant during the year y (tons of dry matter or liter)

NCV_k Net calorific value of the biomass residue type k (GJ/ton of dry matter or GJ/litre)

With respect to Scenario 13, $\varepsilon_{el,other\ plant(s)}$ corresponds to the average net efficiency of electricity generation in the "reference plant" ($\varepsilon_{el,reference\ plant}$) that would be installed in the absence of the CDM project activity.

Calculation of EG_y for the present Monitoring period

As per the formula for EG_y given above, EG_y is lower amongst the following options:

1. $EG_{project\ plant,y} - \varepsilon_{el,other\ plant(s)} \cdot \frac{1}{3.6} \cdot \sum_k BF_{k,y}\ NCV_k$

2. $EG_{total,y} - \frac{EG_{historic,3yr}}{3}$

The following table provides the values of the various parameters obtained during the present monitoring period for the calculation of EG_y

Description	Value	Units
$EG_{project\ plant,y}$	31977.19	MWh
$\varepsilon_{el,\ other\ plant}$	9.450	%
$EG_{total,y}$	42117.99	MWh
$EG_{historic}$	22200	MWh
$BF_{k,y}$	38901.18	Tonnes
NCV_k	15952	kJ/kg
	15.952	GJ/tonne
	4.43	MWh/t
$EG_{project\ plant,y} - \varepsilon_{el,other\ plant(s)} \cdot \frac{1}{3.6} \cdot \sum_k BFk,y\ NCVk$	15687.23	MWh
$EG_{total,y} - EG_{historic}$	19911.99	MWh
$EG_y \quad MIN \left\{ EG_{project\ plant,y} - \varepsilon_{el,other\ plant(s)} \cdot \frac{1}{3.6} \cdot \sum_k BF_{k,y} \cdot NCV_k \right\}$ $EG_{total,y} \quad \frac{EG_{historic,3yr}}{3}$	15687.23	MWh

$ER_{electricity,y} = EG_y \text{ X } EF_{electricity}$

$= 15687.23 \text{ MWh X } 0.8 \text{ tCO}_2/\text{MWh}$

$= \mathbf{12549\ tCO_2}$

Emission reductions or increases due to displacement of heat ($ER_{heat, y}$)

As demonstrated in the PDD, $ER_{heat, y} = 0$.

Baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass

As per ACM0006 (version 05), for scenario 13, baseline emissions due to uncontrolled burning or decay of the biomass residues are zero i.e $BE_{Biomass} = 0$

Project emissions (PE_y)

According to the methodology ACM0006, Project emissions include CO_2 emissions from transportation of biomass to the project site (PET_y), CO_2 emissions from on-site consumption of fossil fuels due to the project activity ($PE_{FF,y}$) and CH_4 emissions from the storage of biomass.

In the project scenario, since the project activity uses bagasse as the fuel, the project leads to no GHG on-site emissions. The GHG emission of the combustion process, mainly CO_2, is sequestered during the growth of sugarcane.

[a] Project Emissions associated with fossil fuel combustion
As there is no fossil fuel combustion associated with the project activity, hence there are no project emissions associated to fossil fuel combustion due to project activity implementation.

[b] Project Emissions associated with transport of bagasse fuel
The bagasse to be used as the feedstock for project activity is supplied by the sugar mill itself; no transportation of bagasse is involved. Hence there are no emissions due to transportation of bagasse.

[c] Project Emissions associated with the storage of bagasse fuel
The net increase of methane emissions associated with the storage of bagasse fuel is regarded as negligible if the bagasse is not stored for more than one year. The bagasse utilized for the project activity is stored in open piles for not more than one year. Therefore there would be no project emissions associated with the storage of bagasse fuel.

Thus $PE_y = 0$.

Leakage (L_y)

In case of scenario 13, according to ACM0006 (version 05), the diversion of biomass residues to the project activity is already considered in the calculation of baseline reductions. Thus, the leakage effects do not need to be addressed i.e. $L_y = 0$.

Emission reductions

$ER_{heat,y}$	$ER_{electricity,y}$	$BE_{biomass,y}$	PE_y	L_y	ER_y
0	12549	0	0	0	**12549**

Thus net emission reductions by the project activity during the current monitoring period is $ER_y = 12549\ tCO_2$

Comparison of ER claimed in the present monitoring period with that in the PDD:

Calculation of Estimated Emission reductions

The estimated ER's for the present Monitoring period i.e. 03.04.2008 to 07.03.2009 based on the PDD assumptions are as given below

Emission reductions as estimated in the validation opinion(page 10) of the Revised Monitoring plan	41207 tCO_2
Number of operational days as per the PDD	200
Number of operational days in the monitoring period	108
Adjusted (for reduced number of operational days) estimated emission reduction for the present monitoring period	= 41207*108/200 = 22251 tCO_2

The table below provides the information about the emissions reductions for the present monitoring period based on as estimated in the revised monitoring plan assumptions as well as what has been reported during the present monitoring period 03.04.2008 to 07.03.2009.

Emission Reductions (ER's) as estimated in validation opinion (pg 10) of the revised monitoring plan	Adjusted (for reduced number of operational days) estimated ER's (yearly) as per the Registered PDD	Actual ER's claimed for the present monitoring period
41207 tCO_2	22251 tCO_2	12549 tCO_2

With regard to comparison of CER claimed in the monitoring period and that estimated for the present monitoring period the explanation has been cited as under

- The ERs for the present monitoring period consist of only 108 operational days in contrast to the quantum claimed in the PDD which is representative of 200 operational days.

Measures to ensure the Results / uncertainty analysis

The project-monitoring plan consists of metering the electricity generated by the project activity, total electricity generated by all the units at site, quantity of bagasse fired in project activity, calorific value of bagasse, net quantity of heat generated by project plant and average net energy efficiency of heat generation in the boilers operated next to the project plant.

Energy meters are being used for monitoring the energy generated by all the units. All energy meters used are electronic tri-vector meters of accuracy class 0.5 %. The energy meters are maintained in accordance with electricity standards in India. Each meter is inspected and sealed ensuring no interference by anyone. All the energy meters are tested for accuracy annually by an independent agency, which is accredited with National Accreditation Board for Testing & Calibration Laboratories (NABL), Department of Science & Technology, Government of India. If during the yearly test check, any meter is found to be beyond permissible limits of error, it would be calibrated immediately. Net Calorific Value of bagasse is established every six months based on the test conducted by an independent agency taking at least three samples for each measurement.

Total quantity of bagasse fired in the project plant is measured as per the procedure documented in the PDD and the related equipments such as the weigh bridge and rotary feeder are calibrated annually by an independent agency.

Any observations (like inconsistencies in reported parameters) and/or discrepancies in the operation of the power plant observed by any of the team member are informed to the concerned personnel for necessary action. These measures are undertaken in order to detect and minimize the uncertainty levels in data monitoring. Furthermore, as a safety measure, the total power generating system is equipped with an 'Automatic Alarming System' which gives a prior indication of any fluctuations in the operating parameters of the power plant thereby enabling the operators to take necessary preventive measures.
The following tables indicate the details of various meters including their accuracy levels and calibration dates:

1. Gross Generation – 24 MW.-(M1)

Description	
S. No.	ELI 10810
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	HT4,1A
Voltage	3X63.5 Vp-n (3 Phase 4 Wire)
Current	1 A
Voltage Ratio	11000/rt3/110/rt3
Current Ratio	2000/1A
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

2. Cogen Convertor Transformer (Auxiliary Consumption-24 MW)-(M3)

Description	
S. No.	ELI09053
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	HT4, 1A
Voltage	3 X 63.5 V p-n (3 Phase 4 wire)
Current	1A
Voltage Ratio	11000/rt3/110/rt3
Current Ratio	200/1A
Class	0.5s
Previous date of Calibration	04/12/2007
Date of Calibration	10/11/2008

3. Cogen Distribution Transformer Auxiliary Consumption-24 MW)-(M4)

Description	
S. No.	ELI10812
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	HT4, 1A
Voltage	63.5 V
Current	1A
Voltage Ratio	11000/rt3/110/rt3
Current Ratio	200/1A
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	11/11/2008

4. Gross Generation Turbine No.01-03 MW-(M12)

Description	
S. No.	ELI11869
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	LT, 5A
Voltage	240 V
Current	5 A
Current Ratio	5200/5A
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008.

5. Gross Generation Turbine No.02-03 MW-(M13)

Description	
S. No.	ELI10857
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	HT4, 5A
Voltage	240 V
Current	5 A
Current Ratio	5200/5
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

6. Gross Generation Turbine No.03-03 MW-(M14)

Description	
S. No.	ELI10856
Make	Secure Meters Ltd
Model	SWIFT ELITE
Type	LT
Voltage	240 V
Current	5 A
Current Ratio	5200/5A
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

07. Bolier No. 01 MCC – Auxiliary of 09 MW-(M10)

Description	
S. No.	ELI11872
Make	Secure Meters Ltd
Model	SWIFT ELITE
Type	LT, 5 A
Voltage	240 V
Current	5 A
Current Ratio	1600/5
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

08. Bolier No. 02 MCC – Auxiliary of 09 MW-(M11)

Description	
S. No.	ELI10858
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	LT, 5A
Voltage	240 V
Current	5 A
Current Ratio	1600/5 A
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

09. MCC for Feed Pump 1&2 – Auxiliary of 09 MW-(M8)

Description	
S. No.	ELI11868
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	LT, 5A
Voltage	240 V
Current	5 A
Current Ratio	2500/5A
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

10. MCC for Feed Pump No.03- Auxiliary of 09 MW-(M09)

Description	
S. No.	ELI11870
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	LT, 5 A
Voltage	240 V
Current	5 A
Current Ratio	1600/ 5A
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

11. Bagasse Handling MCC-Auxiliary of 09 MW-(M07)

Description	
S. No.	ELI11871
Make	Secure Meters Ltd.
Model	SWIFT ELITE
Type	LT
Voltage	240 V
Current	5 A
Current Ratio	1600/5
Class	0.5s
Previous date of Calibration	24/11/2007
Date of Calibration	10/11/2008

12. Feed water flow

Name	FlowTransmitter
Make	Rosemount
Sr. No.	286123
Range	0-2500 mm wc
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Feed water flow Transmitter

13. Boiler Steam flow

Name	Flow Transmitter
Make	Rosemount
Sr. No.	286124
Range	0-8000 mm wc
Date of Calibration	01-10-2007
Next Calibration Proposed on	30-09-2009
Location	Boiler Steam flow Transmitter

14. Attemp. Spray Water Flow

Name	Flow Transmitter
Make	Rosemount
Sr. No.	286125
Range	0-1000 mm wc
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Attemp. Spray Water Flow Transmitter

15. Feed water Temp Eco Inlet

Name	RTD Sensor
Make	Tempsens Instrument
Sr. No.	---------
Range	0-300^{O}C
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Feed water Temp Eco Inlet

16. Feed water Temp Eco Outlet

Name	Thermocouple
Make	Pyro electric Instrument
Sr. No.	---------
Range	0-800^{O}C
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Feed water Temp Eco Outlet

17 Main Steam Temp (Element)

Name	Thermocouple

Make	Pyro electric Instrument
Sr. No.	---------
Range	0-800^{O}C
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Main Steam Temp. Element

18. Main Steam Temp (Transmitter)

Name	Temperature Transmitter
Make	Rosemount
Sr. No.	286155
Range	0-800^{O}C
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Main Steam

19. Boiler Drum Pressure

Name	Pressure Transmitter
Make	Rosemount
Sr. No.	286144
Range	0-160 kg/cm^2
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Drum Pressure

20. Steam Pressure

Name	Pressure Transmitter
Make	Rosemount
Sr. No.	286145

Range	0-160 kg/cm^2
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Steam Pressure Transmitter

21. Feed Pump Discharge Pressure

Name	Pressure Transmitter
Make	Rosemount
Sr. No.	286146
Range	0-160 kg/cm^2
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Feed Pump Discharge Press Transmitter

22. Bagasse Rotary Feeder No.5 Speed.

Name	Speed Transmitter
Make	P & F
Sr. No.	10569
Model No.	KFU8-FSSP-1D
Range	0-3 RPM
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Bagasse Rotary Feeder No.5

23. Bagasse Rotary Feeder No.4 Speed.

Name	Speed Transmitter
Make	P & F
Sr. No.	10568
Model No.	KFU8-FSSP-1D

Range	0-3 RPM
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Bagasse Rotary Feeder No.4

24. Bagasse Rotary Feeder No3 Speed.

Name	Speed Transmitter
Make	P & F
Sr. No.	10567
Model No.	KFU8-FSSP-1D
Range	0-3 RPM
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Bagasse Rotary Feeder No.3

25. Bagasse Rotary Feeder No. 2 Speed.

Name	Speed Transmitter
Make	P & F
Sr. No.	10566
Model No.	KFU8-FSSP-1D
Range	0-3 RPM
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Bagasse Rotary Feeder No.2.

26. Bagasse Rotary Feeder No.1 Speed.

Name	Speed Transmitter
Make	P & F
Sr. No.	10565
Model No.	KFU8-FSSP-1D
Range	0-3 RPM
Date of Calibration	01-10-2008
Next Calibration Proposed on	30-09-2009
Location	Bagasse Rotary Feeder No1

27. Weigh Bridge Calibration details

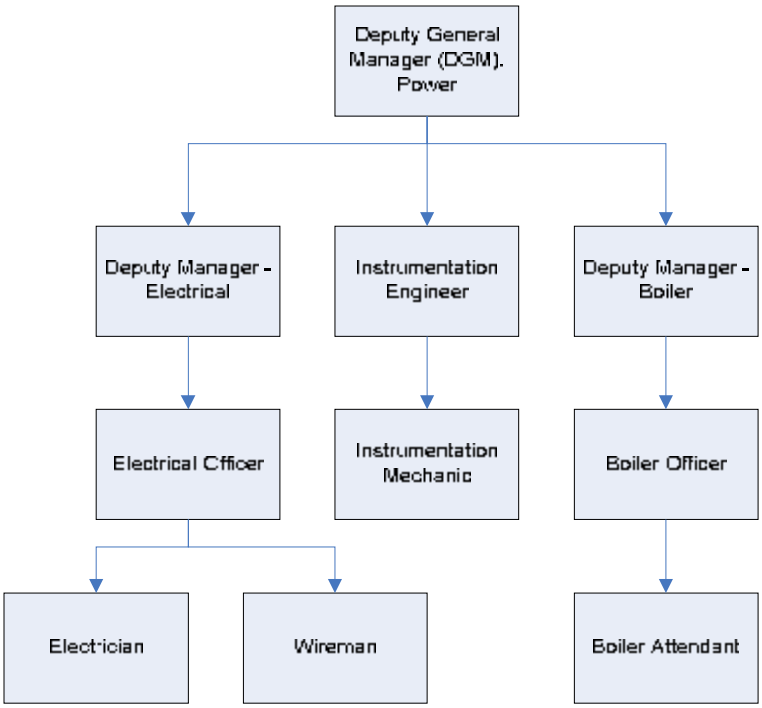
Serial No.	Capacity of Weigh bridge	Date Of Calibration
1	80000 kg	02/10/08
2	10000 kg	10/10/08
3	10000 kg	05/10/08
4	10000 kg	10/10/08
5	50000 kg	10/10/07
6	50000 kg	10/10/08

Roles and responsibilities

In accordance with the monitoring plan of the PDD, The following operational and management structure has been implemented for the project activity:

- The shift in-charge is assigned with the responsibility of monitoring and recording of parameters as per the monitoring plan.
- On a monthly basis, the monitoring records are checked and discussed with project manager.
- In case of any irregularity observed, necessary action is taken immediately.
- On monthly basis, the reports are prepared and forwarded to the management.

The following organisation structure is present to operate the project activity:



Sustainability – Economic and Social Well-being

Socio-economic well being

The project activity helps the Indian national policy on promotion of clean power. Generation of direct and indirect employment has occurred due to the project activity. This employment generation has been during the construction stage and subsequently during operational stage i.e., after project commissioning. In the absence of the project activity, no such employment generation would have occurred either during the retrofitting phase or during the operational phase.

Environmental well being

The project activity has replaced the grid based power generation thereby resulting in reduction of Greenhouse Gas (GHG) emissions associated with the fossil fuel dominated grid power. The project apart from reducing the CO_2 emissions has also helped in conservation of the conventional non renewable fuels. Therefore, the project activity has good environment benefits in terms of reduction in GHG emissions and also conservation of fossil fuels.

Technological well being

The project activity is a shift of the sugar industry from the existing practice of low efficiency, medium pressure, dumping grate boilers to high efficiency, high pressure and temperature, traveling grate boiler leading to technological up-gradation and well being.