

MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 03 and date 08/11/2011

11.3 MW Renewable Energy Project for a Grid System by K.M.Power (P) Limited
Reference No: 0750
6th Monitoring Report Period and date: 24/03/2010 to 23/03/2011 (first and last days included)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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The project activity is a bundled project comprising of three projects and generates electrical power using hydro potential available in Nippulavagu a tributary of Galeru river in Kurnool District of Andhra Pradesh state and exporting the generated electricity to the state owned power utility APTRANSCO.

The project is a run-of-the-river hydroelectric scheme that comprises a diversion structure, power canal, penstocks, powerhouse, and power evacuation system and tailrace canal. After power generation the water goes back into the river. The generated power will be exported to the grid through a 33/11 kV substations of APTRANSCO. In this process there are no greenhouse gas emissions or burning of any fossil fuels. Thus electricity is generated through sustainable means without causing any negative effect on the environment.

The details of major equipment of the project activity are furnished below:

S.No	Location of plant	Equipment details
1	Guntakandala small hydro plant	2x2000 KW Vertical Kaplan Turbine, Adjustable runner & indicating and recording instruments guidevanes, etc Synchronous generator of 3 Phase, 6.6 kV, k 15%, 50 c/s, 750 RPM, 0.8 PF and rated output 2000 KW Supplier: M/s Boving Fouress Ltd, Bangalore
2	Velpanur small hydro plant	2x1650 KW Vertical Kaplan Turbine, Adjustable runner & indicating and recording instruments guidevanes, etc Synchronous generator of 3 Phase, 6.6 kV, k 15%, 50 c/s, 750 RPM, 0.8 PF and rated output 2000 KW Supplier: M/s Boving Fouress Ltd, Bangalore
3	Madhavaram small hydro plant	2x2000 KW Vertical Kaplan Turbine, Adjustable runner & indicating and recording instruments guidevanes, etc Synchronous generator of 3 Phase, 6.6 kV, k 15%, 50 c/s, 750 RPM, 0.8 PF and rated output 2000 KW Supplier: M/s Boving Fouress Ltd, Bangalore

The Guntakandala small hydro project was commissioned in February 2002, Velpanuru small hydro project was commissioned in November 2002 and Madhavaram small hydro project was commissioned in December 2003 and units of all projects are in operation to till date.

The present monitoring report is chosen from 24/03/2010 to 23/03/2011. The net electricity exported to the State grid by the project activities is 46.579 GWh and the net emission reductions are of 34,766 tCO₂e for the present monitoring period.

A.2. Project Participants

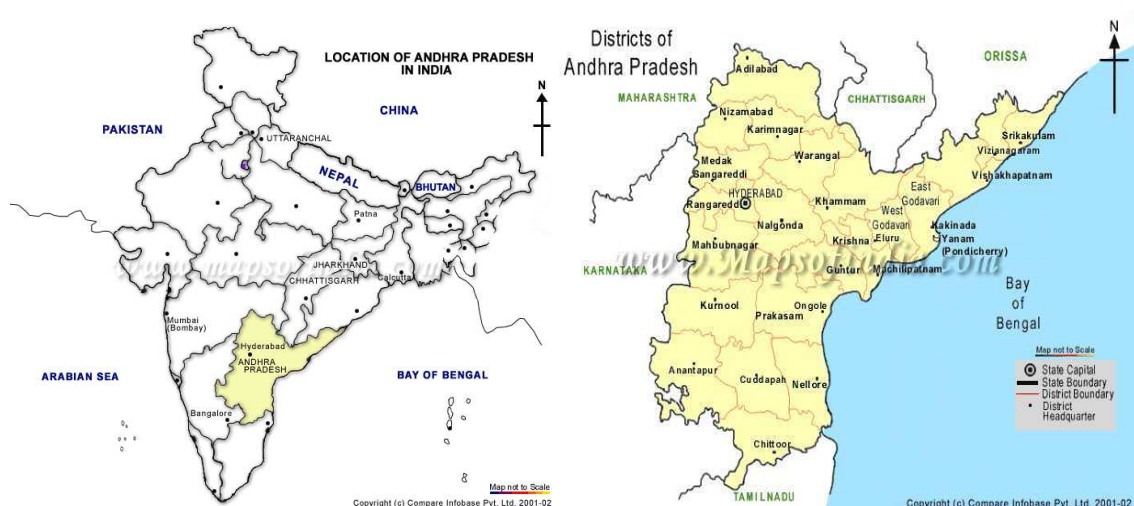
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Name of the party involved(*) (host) indicates a host party)	Private and/or public entity (ies) project participants	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Private Entity: K.M Power (P) Ltd.	No ¹
United Kingdom (U.K)	Noble Carbon Credits Limited, Deutsche Bank AG	No ²
Japan	Mitsubishi Corporation	No ³
Switzerland	CM Capital Markets Holding, S.A	No ⁴

A.3. Location of the project activity:

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All three project activities were located at a distance of about 17 km from Velgodu which is Mandal headquarter and is about 70 km from Kurnool. Kurnool is located at a distance of 200 km from Hyderabad the state capital of Andhra Pradesh, India. The geographical coordinates⁵ are 15° 50' 0" North and 78° 3' 0" East. The location is indicated in figure below:-



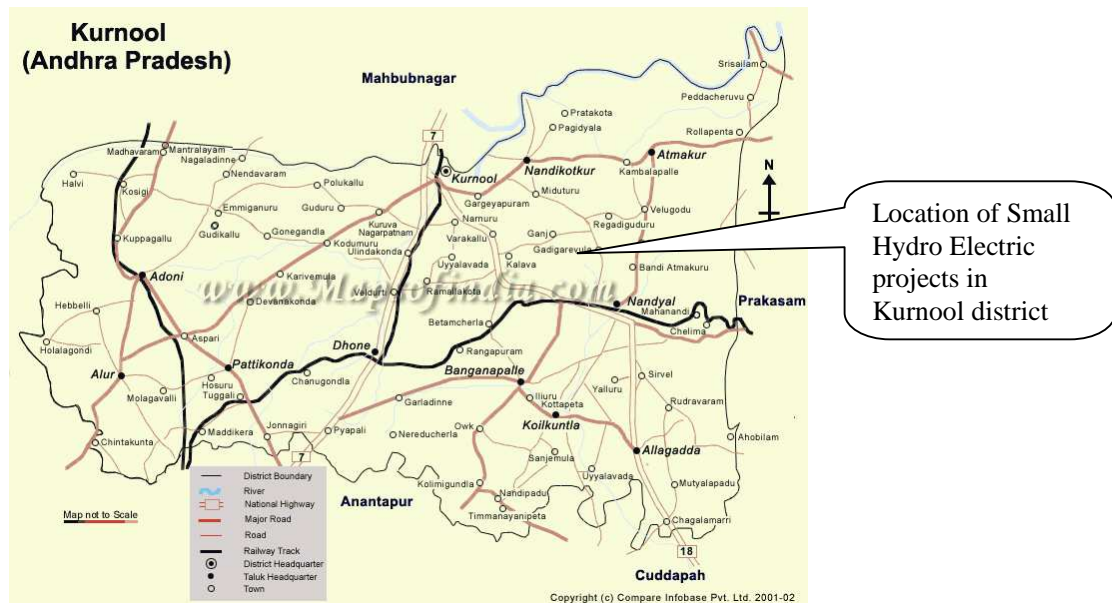
¹ <http://cdm.unfccc.int/Projects/DB/DNV-CUK1162557680.05/view>

² <http://cdm.unfccc.int/Projects/DB/DNV-CUK1162557680.05/view>

³ <http://cdm.unfccc.int/Projects/DB/DNV-CUK1162557680.05/view>

⁴ <http://cdm.unfccc.int/Projects/DB/DNV-CUK1162557680.05/view>

⁵ <http://www.maplandia.com/india/andhra-pradesh/kurnool/kurnool/>



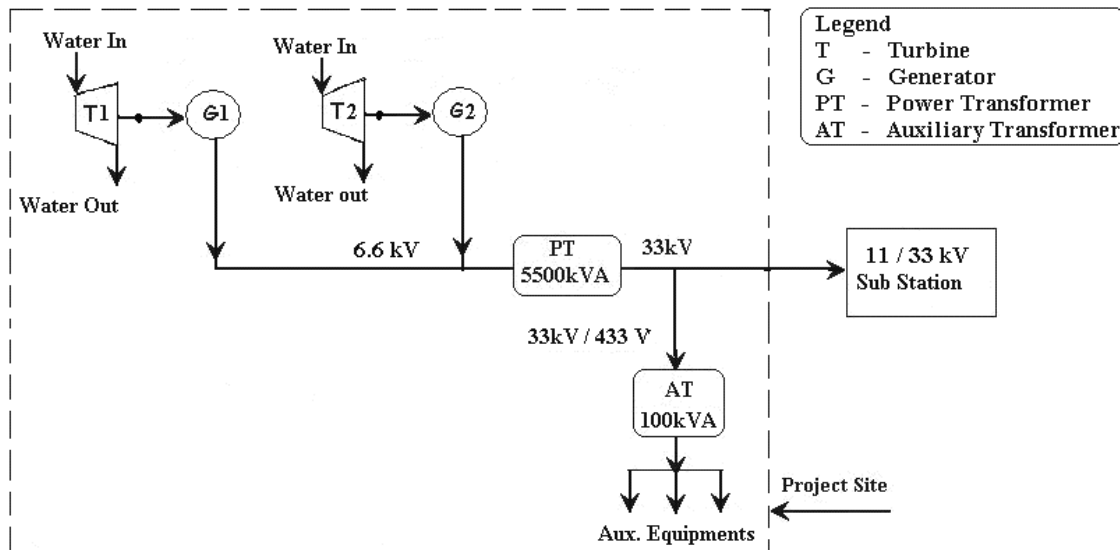
A.4. Technical description of the project

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The technology or power generation process using hydro resources is converting the potential energy available in the water flows into mechanical energy using hydro turbines and then to electrical energy using alternators. The generated power will be transformed to match the nearest grid sub-station for proper interconnection and smooth evacuation of power.

The generated power is being exported to the grid through a 33/11 kV substation located at Velugodu village at a distance of 5 km in respect of Guntakandala SHP and Velpanur SHP and Gadivamula village in respect of Madhavaram SHP located at a distance of 11 km from the plant location.

Detailed technical process diagram of the project activity is furnished below:



A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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Sectoral Scope : 1 : Energy industries (renewable - / non-renewable sources)

Methodology : AMS-I.D. Ver. 9, Grid connected renewable electricity generation.

<http://cdm.unfccc.int/Projects/DB/DNV-CUK1162557680.05/view>**A.6. Registration date of the project activity:**

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14/01/2007

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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06/02/2002 to 05/02/2012 (Fixed)

A.8. Name of responsible person(s)/entity(ies):

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Name/Entity	Project Participant (Yes/No)
Mr. G. Ramanarayan Reddy KM Power (P) Ltd. Telephone: +91- 40- 2341 4635 E-Mail : kmpowerltd@yahoo.co.in	Yes
Zenith Energy Services (P) Limited Telephone : +91- 40- 2337 6630, 2337 6631 E-Mail : zenith@zenithenergy.com	No

SECTION B. Implementation of the project activity**B.1. Implementation status of the project activity**

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The project started commercial operations from 06/02/2002. The project promoter has installed the monitoring equipments to monitor the parameters, which were described in the registered CDM-PDD.

The details of the project operations during this monitoring period are presented below:

		Total available hours (Hr:MM)	Running hours (Hr:MM)	Non-running hours (Hr:MM)
Guntakandala	Unit-1	8760:00	5169:40	3590:20
	Unit-2	8760:00	5403:30	3356:30
Velpanuru	Unit-1	8760:00	5244:55	3515:05
	Unit-2	8760:00	5400:25	3359:35
Madhavaram	Unit-1	8760:00	5143:15	3616:45
	Unit-2	8760:00	5291:10	3468:50

For major plant outages and reasons for the reported period is furnished in Annex-3. No significant events occurred during this monitoring period, which may impact the applicability of the methodology.

B.2. Revision of the monitoring plan

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Not applicable

B.3. Request for deviation applied to this monitoring period

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Not applicable

B.4. Notification or request of approval of changes

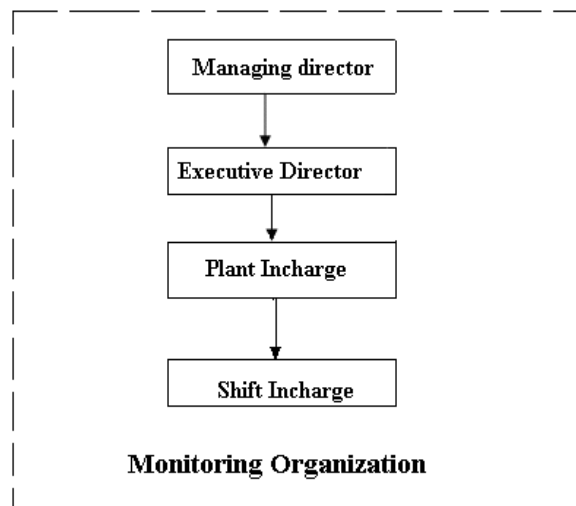
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The Project has been implemented as mentioned in the registered CDM-PDD. Hence, no notification or requests of approval of changes have been made for the project.

SECTION C. Description of the monitoring system

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A CDM team has been formed in KM Power (P) Limited (KMPPL) for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management of KMPPL. Qualified and trained people monitor the parameters and emission reduction calculations. KMPPL is the sole agency responsible for implementation and monitoring of the project activity. The monitoring organisation structure is shown below:



Roles and Responsibilities

Managing Director

Managing Director is responsible for the total monitoring plan. The Managing Director will examine the reports generated by the ED. He also examines the internal audit reports prepared by internal auditor and also suggest/modify the structure of report and data recording formats as and when required.

Executive Director (ED)

The Executive Director will examine the reports generated by the Plant Incharge with respect to the monthly electricity generated, exported and annual emission reduction calculations as per the monitoring plan.

Plant Incharge

The General Manager is responsible for the electricity generations at project site. He will review the monitored parameters for correctness and take corrective measures in case of minor errors in the monitored data. He also prepares a daily summary on project operation & electricity generations and report to Managing Director for any abnormality. The calibration of the meters installed will be taken care by him as per the monitoring plan.

Shift Incharge

Shift Incharge is responsible for recording the total electricity generation, auxiliary consumption, electricity export, electricity import, plant shut down times, etc. The monthly reports will be generated and submitted to the General Manager for verification and emission reduction calculations.

Training procedures for KM Power personnel:

Plant Incharge will prepare Annual training program calendar in consultation with the Managing Director (MD). MD will identify the faculties & arrange for the training as per training schedule. The training details of all the employs will be maintaining in the training record registry.

Calibration

Main and Check meters are being tested and certified at least once in year against an accepted laboratory standard meter in accordance with electricity standards. The calibration of the meters is carried out by ETDC (Electronics Test & Development Centre). The meters are deemed to be working satisfactorily if the errors are within the meter specifications of 0.2 accuracy class.

The energy meters of Gross electricity generation and Auxiliary consumption of respective power houses are being tested once in year by reputed third party agency. All the calibration test of reports of the energy meters used during the monitored period have been provided to DOE for verification.

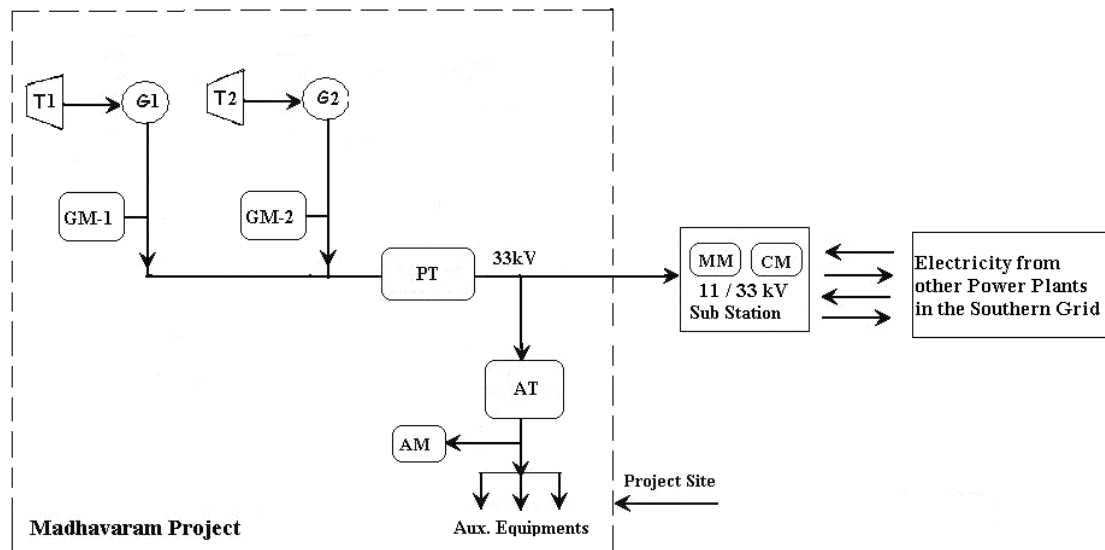
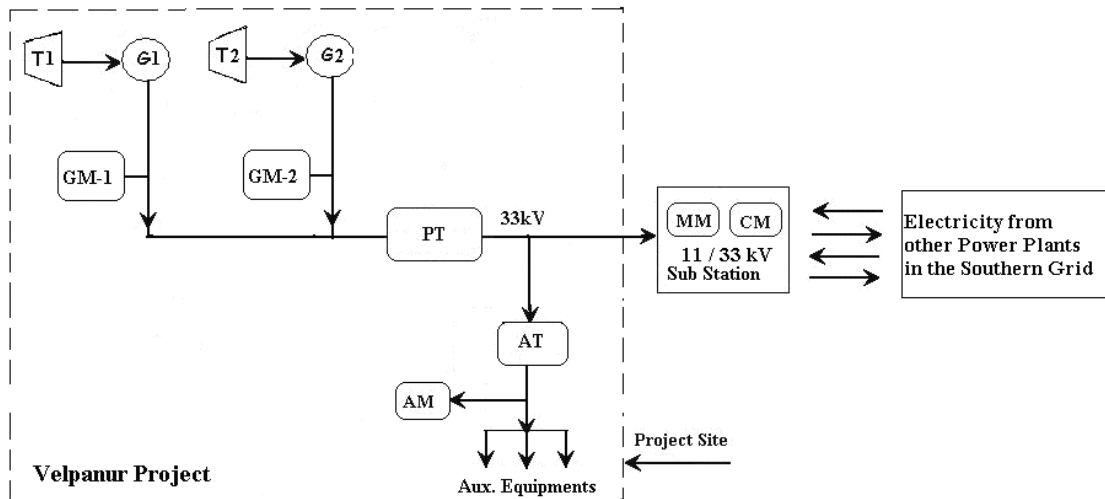
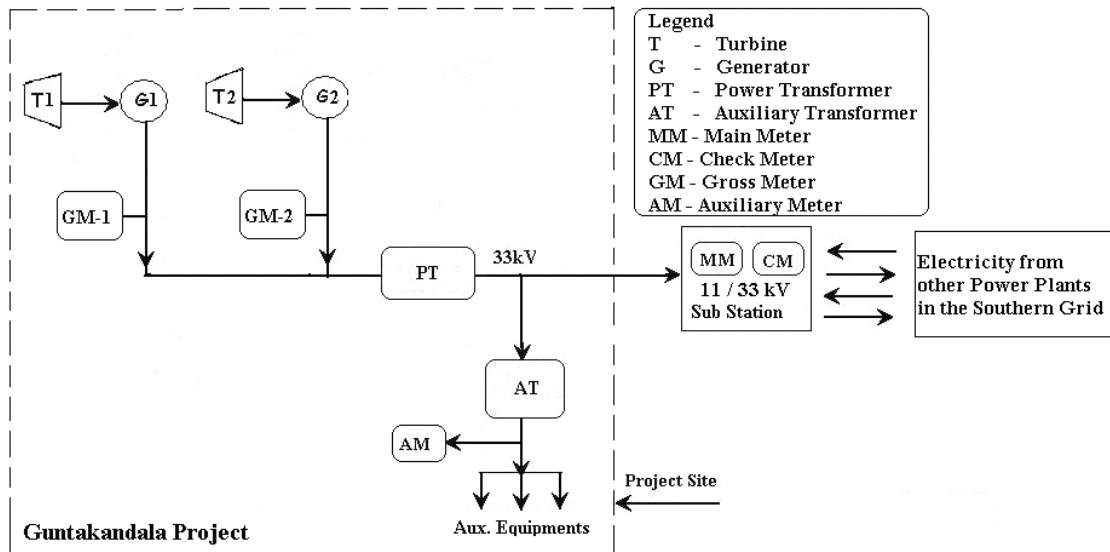
Methods of data transfer and archiving policy

The data will be recorded both at the project site as well as at the grid substation, which is under the control of APTRANSCO. The energy will be measured using calibrated meters and recorded at the APTRANSCO sub-station. Records of measurements will be used for verification of emission reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid.

The responsibility of storage and archiving of information in good condition also lies with the designated person in charge. The person in charge will undertake periodic verifications and onsite inspections to ensure the quality of the data collected by the team and initiate steps in case of any abnormal conditions.

As part of emergency preparedness, the project activities have been provided necessary provisions include standby meters, fire fighting system, etc.

The project had been provided the monitoring equipments which were described in the registered CDM-PDD and the line diagram for the monitoring parameters for three units are furnished below:



SECTION D. Data and parameters**D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors**

Not applicable as there are no parameters determined at registration.

D.2. Data and parameters monitored

Data / Parameter:	EG_{gross,y}
Data unit:	kWh
Description:	Gross Generation
Measured /Calculated /Default:	On-site measurement
Source of data:	Daily generation log sheets
Value(s) of monitored parameter:	Please see Annex-1 for monthly values
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This value is not used in the emission reduction calculation & to cross check for electricity export to grid by the project activity.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Details are furnished in Table-2
Measuring/ Reading/ Recording frequency:	Measured hourly and aggregated for daily.
Calculation method (if applicable):	-----
QA/QC procedures applied:	Meters are recalibrated periodically conform to national standard at third party reputed testing lab

Data / Parameter:	EG_{Auxiliary,y}
Data unit:	kWh
Description:	Auxiliary consumption
Measured /Calculated /Default:	On-site measurement
Source of data:	Daily generation log sheets
Value(s) of monitored parameter:	Please see Annex-1 for monthly values
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This value is not used in the emission reduction calculation. The same is used to cross check for electricity export to grid by the project activity.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Details are furnished in Table-2
Measuring/ Reading/ Recording frequency:	Measured hourly and aggregated for daily.
Calculation method (if applicable):	-----
QA/QC procedures applied:	Meters are recalibrated periodically conform to national standard at third party reputed testing lab.

Data / Parameter:	EG_{Import,y}
Data unit:	kWh
Description:	Power Import

Measured /Calculated /Default:	Measured at Grid interconnection point
Source of data:	Monthly Joint Meter Readings Reports certified by APTRANSCO officials
Value(s) of monitored parameter:	Please see Annex-1 for monthly values
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Details are furnished in Table-1
Measuring/ Reading/ Recording frequency:	Monthly recording
Calculation method (if applicable):	-----
QA/QC procedures applied:	Meters are recalibrated & inspected periodically by APTRANSCO. Records of measurements are used for verification of emissions reductions. Sales bills / receipts are used for cross verification.

Data / Parameter:	EG_{Export,v}
Data unit:	kWh
Description:	Power Export
Measured /Calculated /Default:	Measured at Grid interconnection point
Source of data:	Monthly Joint Meter Readings Reports certified by APTRANSCO officials
Value(s) of monitored parameter:	Please see Annex-1 for monthly values
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Details are furnished in Table-1
Measuring/ Reading/ Recording frequency:	Monthly recording
Calculation method (if applicable):	-----
QA/QC procedures applied:	Meters are recalibrated & inspected periodically by APTRANSCO. Records of measurements are used for verification of emissions reductions. Sales bills / receipts are used for cross verification.

Data / Parameter:	EF_y
Data unit:	tCO ₂ /GWh
Description:	Grid Emission Factor (EF)
Measured /Calculated /Default:	Calculated
Source of data:	Central Electricity Authority (CEA), is a government body which calculates the grid emission factors. http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
Value(s) of monitored parameter:	746.83 (Version-06 & March-2011) (Details are provided in Annex-3)

	Weighted Average Emissions Rate (Excl. Imports) for the most recent year (2009-2010) available for Southern Region grid. The same has been considered based on the clarification given on approved methodologies (AM_CLA_0038).
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N.A
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	N.A
QA/QC procedures applied:	This data item is required for estimating the baseline emissions and emission reductions.

Table- 1: Main Meter & Check Meter Recalibration Test Details

Guntakandala Power House				
Description	Main Meter		Check Meter	
Period for which meters were used	24.03.10 to 28.10.10	28.10.10 to 23.03.11	24.03.10 to 28.10.10	28.10.10 to 23.03.11
Serial No.	01988419	01988399	01988431	06607932
Type	Tri-vector meter	Tri-vector meter	Tri-vector meter	Tri-vector meter
Accuracy class	0.2	0.2	0.2	0.2
Calibration frequency	Annual	Annual	Annual	Annual
Date of calibration	19.10.09	12.10.10	19.10.09	12.10.10
Validity	18.10.10	11.10.11	18.10.10	11.10.11
Testing Agency	Electronics Test & Development Centre (ETDC), Govt. of India			

Velpanur Power House				
Description	Main Meter		Check Meter	
Period for which meters were used	24.03.10 to 21.01.11	21.01.11 to 23.03.11	24.03.10 to 21.01.11	21.01.11 to 23.03.11
Serial No.	01988435	01988419	01988436	01988431
Type	Tri-vector meter	Tri-vector meter	Tri-vector meter	Tri-vector meter
Accuracy class	0.2	0.2	0.2	0.2
Calibration frequency	Annual	Annual	Annual	Annual
Date of calibration	13.11.09	09.11.10	13.11.09	09.11.10
Validity	12.11.10	08.11.11	12.11.10	08.11.11
Testing Agency	Electronics Test & Development Centre (ETDC), Govt. of India			

<u>Madhavaram Power House</u>				
Description	Main Meter		Check Meter	
Period for which meters were used	24.03.10 to 23.04.10	23.04.10 to 23.03.11	24.03.10 to 23.04.10	23.04.10 to 23.03.11
Serial No.	6607932	7033700	01988399	7033710
Type	Tri-vector meter	Tri-vector meter	Tri-vector meter	Tri-vector meter
Accuracy class	0.2	0.2	0.2	0.2
Calibration frequency	Annual	Annual	Annual	Annual
Date of calibration	01.04.09	07.04.10	01.04.09	07.04.10
Validity	31.03.10	06.04.11	31.03.10	06.04.11
Testing Agency	Electronics Test & Development Centre (ETDC), Govt. of India			

During the monitored period, the energy meters (both Main meter & Check meter) were removed and installed other calibrated meters for periodic recalibration test for reliability & improve accuracy of the electricity metering. The meters are being tested by Electronics Test & Development Centre (ETDC), Govt. of India under the supervision of state utility testing agency. Copies of calibration test reports are being provided to DOE for verification.

During the monitored period, some of the energy meters were positioned beyond calibration due date (one year from the date of calibration test). The emissions due to delayed calibration period are estimated as per guideline i.e. Annex 60 of EB 52 and the details are furnished below:

Guntakandala Power House			
Meter used Period -->		24.03.10 to 28.10.10	
		Main meter	Check meter
Installed meter S.Nos. during this period		01988419	01988431
Date of calibration		19.10.09	
Validity		18.10.10	
% of error indicated in the test report		Observed % of error is within the specified limits	
Max. permissible error of the energy meter		0.2%	
Delayed calibration period		19.10.10 to 28.10.10	
Adjusted the Monthly Joint Energy Meter Readings for the period		21.09.10 to 24.11.10	
		Export	Import
Electricity <small>Measured</small>	kWh	5757000	300
Adjusted on account of delayed calibration	kWh	5745486	301
Net electricity displaced <small>Measured</small>	kWh	5756700	
Net electricity displaced <small>Adjusted</small>	kWh	5745185	
Difference in Net electricity displaced	kWh	11515	
Baseline emission factor	tCO ₂ /GWh	746.83	
Emissions - Calculated	tCO ₂ e	8.60	

Considered	tCO ₂ e	9
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Velpanur Power House			
Meter used Period --→		24.03.10 to 21.01.11	
		Main meter	Check meter
Installed meter S.Nos. during this period		01988435	01988436
Date of calibration		13.11.09	
Validity		12.11.10	
% of error indicated in the test report		Observed % of error is within the specified limits	
Max. permissible error of the energy meter		0.20%	
Delayed calibration period		13.11.10 to 21.01.11	
Adjusted the Monthly Joint Energy Meter Readings for the period.		23.10.10 to 21.01.11	
		Export	Import
Electricity <small>Measured</small>	kWh	5648700	700
Adjusted on account of delayed calibration	kWh	5637403	702
Net electricity displaced <small>Measured</small>	kWh	5648000	
Net electricity displaced <small>Adjusted</small>	kWh	5636701	
Difference in Net electricity displaced	kWh	11299	
Baseline emission factor	tCO ₂ /GWh	746.83	
Emissions - Calculated	tCO ₂ e	8.44	
Considered	tCO ₂ e	9	

Madhavaram Power House			
Meter used Period --→		24.03.10 to 23.04.10	
		Main meter	Check meter
Installed meter S.Nos. during this period		06607932	01988399
Date of calibration		01.04.09	
Validity		31.03.10	
% of error indicated in the test report		Observed % of error is within the specified limits	
Max. permissible error of the energy meter		0.20%	
Delayed calibration period		01.04.10 to 23.04.10	
Adjusted the Monthly Joint Energy Meter Readings for the period		24.03.10 to 23.04.10	
		Export	Import
Electricity <small>Measured</small>	kWh	37200	1000
Adjusted on account of delayed calibration	kWh	37126	1002
Net electricity displaced <small>Measured</small>	kWh	36200	
Net electricity displaced <small>Adjusted</small>	kWh	36124	
Difference in Net electricity displaced	kWh	76	
Baseline emission factor	tCO ₂ /GWh	746.83	

Emissions - Calculated	tCO ₂ e	0.056759
Considered	tCO ₂ e	1

Table- 2: Gross Energy Generation Meter & Auxiliary Power Consumption Meter Recalibration Test Details

Guntakandala Power House			
Description	Gross Energy Meter		Aux. Power
	Unit -1	Unit -2	
Serial No.	A3211033	<u>A3211032</u>	<u>F40/853-502</u>
Type	Energy meter		Energy meter
Accuracy class	0.2		1.0
Calibration frequency	Annual		
Date of last calibration	15/07/2009 & 13/07/2010		
Validity	14/07/2010 & 12/07/2011		
Testing Agency	SRI SAI RAM ENGINEERING WORKS KURNOOL and TRANSERECT Testing and Commissioning Engineers Pvt Ltd.,		

Velpanur Power House			
Description	Gross Energy Meter		Aux. Power
	Unit -1	Unit -2	
Serial No.	A3220424	<u>A3220426</u>	<u>F40/853-502/1</u>
Type	Energy meter		Energy meter
Accuracy class	0.2		1.0
Calibration frequency	Annual		
Date of last calibration	16/07/2009 & 14/07/2010		
Validity	15/07/2010 & 13/07/2011		
Testing Agency	SRI SAI RAM ENGINEERING WORKS KURNOOL and TRANSERECT Testing and Commissioning Engineers Pvt Ltd.,		

Madhavaram Power House			
Description	Gross Energy Meter		Aux. Power
	Unit -1	Unit -2	
Serial No.	B3281357	B3281359	191747/104806-4909
Type	Energy meter		Energy meter
Accuracy class	0.2		1.0
Calibration frequency	Annual		
Date of last calibration	07/02/2009 & 15/07/2010		
Validity	06/02/2010 & 14/07/2011		
Testing Agency	SRI SAI RAM ENGINEERING WORKS KURNOOL and TRANSERECT Testing and Commissioning Engineers Pvt Ltd.,		

During the monitored period, the energy meters of Gross generation and Auxiliary consumption were removed and installed other calibrated meters for periodic recalibration test for reliability & improve accuracy of the electricity metering.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

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The baseline emissions are calculated as follows:

$$BE_y = EG_y \cdot EF_y$$

Where EG_y is the net electricity export to grid in a given year (GWh)

EF_y is the emission factor for a given year (tCO₂/GWh)

E.2. Project emissions calculation

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The project emissions from the project activity are considered as zero.

E.3. Leakage calculation

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Leakage is not considered from the project activity.

E.4. Emission reductions calculation / table

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A. Emissions reductions for the monitored period

The following formula is adopted for calculating emission reductions generated by the project activity:

$$ER_y = BE_y - PE_y - L_y$$

Where ER_y is emission reductions in a given year

BE_y is baseline emissions in a given year

PE_y is project emissions in a given year

L_y is leakage in a given year

B. Emissions due to delayed calibration period

Emissions reduction due to delay calibration period are already furnished under Table – 1 of Sec D.2.

C. Net Emission Reductions for the reported period

S.No	Parameter	Unit	Guntakandala	Velpanuru	Madhavaram	Total	Variation
1	Electricity Exported to Grid	kWh	18892100	14208800	13498500	46,599,400	
2	Electricity Imported from Grid	kWh	7200	6600	6200	20,000	
3	Net Electricity Exported to Grid	kWh	18884900	14202200	13492300	46,579,400	
		GWh	18.8849	14.2022	13.4923	46.579	
4	Emission Factor	t CO ₂ /GWh	746.83				
5	Baseline Emissions	t CO ₂ e	14103	10606	10076	34785	
6	Project Emissions	t CO ₂ e	0	0	0	0	
7	Emission Reductions	t CO ₂ e	14103	10606	10076	34785	
8	Emissions due to Delayed calibration period	t CO ₂ e	9	9	1	19	
9	Net Emission Reductions	t CO ₂ e	14094	10597	10075	34766	36.28%
10	As per Registered CDM-PDD	t CO ₂ e	25,511				

The detailed calculation of emission reductions are presented in excel spread sheet.

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

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Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO ₂ e)	25,511	34,766

E.6. Remarks on difference from estimated value in the PDD

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The net emission reductions calculated for the present monitoring period are 36.28% higher than estimated in the registered CDM-PDD. It has been one of the contentions in the registered PDD about uncertainty with respect to the availability of water in natural stream. The following extract is furnished from registered PDD given under Sec.B.3 which is very relevant for assessing the reasons for higher generation.

“Uncertainty with respect to the availability of water in natural stream on which the proposed project activity is established is a major concern. The three small-scale hydroelectric schemes are located on Nippulavagu, a natural stream in Kurnool District. The proposed project activity depends for its water discharges from its own catchment area of Nallmala Forest as well as the surplus discharges of K.C.Canal which are drained into Nippulavagu. K.C.Canal gets its water from reservoirs of Tungabadra and Srisailam. It has been witnessed during the last few years that releases have been considerably reduced into this canal due to lack of sufficient water flows into the reservoirs which is the effect of irregular monsoons. Though these projects are expected to export 34.51 GWh of power every year, the actual electricity export was only at 5.35 GWh in 2002-03 and 12.59 GWh in 2003-04 and 29.32 in the

year 2004-05. This shows considerable variance in the energy export, which is directly related to irregular monsoons. The past experience confirms that power exported is highly variable and cannot be predicted with certainty. This was and is a major barrier for investment in hydro plants, unlike investment in a fossil fuel based power plants where the availability of resources is assured.”

The electricity export achieved during the 1st monitoring period to the present monitoring period is furnished below which provide sufficient evidence that the discharges in to the Nippulavagu stream is more related to the monsoons and not under the control of the PP:

MR	Monitoring period	Net electricity export (GWh)	%variation to the value of registered PDD	Actual Achieved PLF
1 st	06 Feb 2002 to Mar 2006	78.78	-45%	19.26%
2 nd	Mar 2006 to Mar 2007	33.87	-2%	34.22%
3 rd	Mar 2007 to Mar 2008	37.48	9%	37.86%
4 th	Mar 2008 to Mar 2009	28.04	-19%	28.33%
5 th	Mar 2009 to Mar 2010	16.64	-52%	16.81%
6 th	Mar 2010 to Mar 2011	46.58	35%	47.06%

From the above table it is observed that PLF is not constant from first verification to last verification (i.e 5th verification) and the PLF achieved during this monitoring period is 47.06% which is maximum PLF achieved among all verifications. This is because of excessive rain fall observed during this monitoring period and moreover the PLF obtained which is not in control of PP. the seasonal wise rain fall data is tabulated below

Further to this it could be observed that the variance in power export is ranging from -52% to +36%. There was excess rainfall in the catchment area (N.I.Karnataka and Rayalaseema) during the monitoring period compared to the previous years. The rainfall data during the year 2010-11 is furnished below:

Period	N.I Karnataka			Rayalaseema		
	Normal	Actual	Variation	Normal	Actual	Variation
	mm	mm	%	mm	mm	%
Pre Monsoon (March – May 2010) ⁶	64.8	88.0	(-26%)	78.3	102.7	(+31.1%)
Monsoon (June – Sept 2010) ⁷	491.0	615.2	(+25.2%)	380.8	519.5	(+36.4%)
Post Monsoon (Oct – Dec 2010) ⁸	136.8	165.3	(+21%)	212.2	275.1	(+30%)
Winter-Monsoon (Jan - Feb 2011) ⁹	3.9	4.1	(+6%)	6.6	6.9	(+4%)

⁶ <http://www.imd.gov.in/section/hydro/dynamic/rfmaps/seasonal/premon2010.jpg>

⁷ <http://www.imd.gov.in/section/hydro/dynamic/rfmaps/seasonal/mon2010.jpg>

⁸ <http://www.imd.gov.in/section/hydro/dynamic/rfmaps/seasonal/postmon2010.jpg>

Pre-Monsoon						
Total	694.8	868.7	+25.02%	674.3	897.4	+33.08%

From the rain fall data it could be observed that rain fall is excessive in the monitoring period which is as high as 36%. Keeping in view of the above, it can be concluded that the higher or lower electricity generation from the project activity is not in the control of the project proponent and the generation in the monitoring period is influenced by the excessive rainfall.

History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory Document Type: Guideline, Form Business Function: Issuance		

⁹ <http://www.imd.gov.in/section/hydro/dynamic/rfmaps/seasonal/winter2011.jpg>

Annex -1

Consolidated Report for Monitored Parameters During the Monitored Period

Monitored Period	Gross Electricity Generated, kWh			Aux. Power Consumption, kWh		Electricity Exported to Grid	Electricity Imported from Grid	Net Electricity Exported to Grid
	UNIT-1	UNIT-2	TOTAL	Measured at Project site (See Note-1)	Calculated (See Note-2)	kWh	kWh	kWh
GUNTAKANDALA POWER HOUSE								
24.03.10 to 23.04.10	0	50490	50490	1762	3190	48700	1400	47300
23.04.10 to 21.05.10	0	0	0	530	1100	0	1100	-1100
21.05.10 to 23.06.10	0	0	0	450	1100	0	1100	-1100
23.06.10 to 23.07.10	0	0	0	696	1400	0	1400	-1400
23.07.10 to 23.08.10	529910	651640	1181550	5640	24850	1157700	1000	1156700
23.08.10 to 21.09.10	1129770	1243370	2373140	8734	52040	2321300	200	2321100
21.09.10 to 23.10.10	1377680	1551000	2928680	9491	64280	2864600	200	2864400
23.10.10 to 24.11.10	1400140	1557610	2957750	8773	65450	2892400	100	2892300
24.11.10 to 24.12.10	1151930	1324450	2476380	7140	53580	2423200	400	2422800
24.12.10 to 21.01.11	1079390	1224430	2303820	6261	46320	2257600	100	2257500
21.01.11 to 24.02.11	1384640	1603320	2987960	8291	62860	2925200	100	2925100
24.02.11 to 23.03.11	982360	1063240	2045600	7312	44300	2001400	100	2001300
Total	9035820	10269550	19305370	65080	420470	18892100	7200	18884900

VELPANUR POWER HOUSE								
24.03.10 to 23.04.10	0	30760	30760	1466	2060	29900	1200	28700
23.04.10 to 21.05.10	0	0	0	0	600	0	600	-600
21.05.10 to 23.06.10	0	0	0	0	1000	0	1000	-1000
23.06.10 to 23.07.10	960	8060	9020	813	1320	8800	1100	7700
23.07.10 to 23.08.10	548060	420730	968790	6077	19990	949900	1100	948800
23.08.10 to 21.09.10	804850	976300	1781150	8067	34650	1746800	300	1746500
21.09.10 to 23.10.10	1016300	1090990	2107290	9987	41690	2065900	300	2065600
23.10.10 to	1006280	1075080	2081360	9504	41160	2040500	300	2040200

24.11.10								
24.11.10 to 24.12.10	891750	1012190	1903940	8094	33640	1870500	200	1870300
24.12.10 to 21.01.11	773250	997080	1770330	7006	32830	1737700	200	1737500
21.01.11 to 24.02.11	1116920	1127080	2244000	9080	40500	2203700	200	2203500
24.02.11 to 23.03.11	865600	719560	1585160	8052	30160	1555100	100	1555000
Total	7023970	7457830	14481800	68146	279600	14208800	6600	14202200

MADHAVARAM POWER HOUSE								
24.03.10 to 23.04.10	0	37965	37965	1216	1765	37200	1000	36200
23.04.10 to 21.05.10	0	0	0	533	900	0	900	-900
21.05.10 to 23.06.10	0	0	0	628	900	0	900	-900
23.06.10 to 23.07.10	13000	0	13000	591	1400	12800	1200	11600
23.07.10 to 23.08.10	551490	468035	1019515	5978	27115	993300	900	992400
23.08.10 to 21.09.10	727140	885600	1612740	7484	25540	1587500	300	1587200
21.09.10 to 23.10.10	974120	1079350	2053470	8690	34570	2019100	200	2018900
23.10.10 to 24.11.10	880400	1050520	1930920	6971	29620	1901500	200	1901300
24.11.10 to 24.12.10	624420	966420	1590840	5464	21140	1569900	200	1569700
24.12.10 to 21.01.11	764230	965880	1730110	5541	25010	1705300	200	1705100
21.01.11 to 24.02.11	1071150	1100170	2171320	6940	33220	2138200	100	2138100
24.02.11 to 23.03.11	843070	714020	1557090	6502	23490	1533700	100	1533600
Total	6449020	7267960	13716970	56538	224670	13498500	6200	13492300
Grand Total			47504150	189764	924740	46599400	20000	46579400

Note-1: Measured aux. consumption includes part of electricity generated by the project activity and electricity imported from grid taken through energy meter located on LT panel at project site. The losses on account of power transformer & transmission

Note-2: Computed based on the gross electricity generation recorded in the plant and electricity exported to the grid & electricity imported from grid readings certified by APTRANSCO & Plant personnel.

Annex -2

Baseline Information

From Carbon Dioxide Baseline Data base, Version 6, March 2011 published by Government of India, Ministry of Power Central Electricity Authority, Government of India. (http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm)

Appendix B Grid Emission Factors

Table A: Values for all regional grids for FY 2004-05 until FY 2009-10, Excluding inter regional and cross-border electricity transfers. Note: values are rounded off to two decimals see the web link given above for additional decimals places (Database – Excel worksheet)

Weighted Average Emission Rate (tCO₂/MWh) (excl. Imports)						
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
NEWNE	0.86	0.84	0.83	0.82	0.84	0.83
South	0.78	0.73	0.72	0.72	0.75	0.74683
India	0.84	0.82	0.80	0.80	0.82	0.81
Simple Operating Margin (tCO₂/MWh) (excl. Imports) (1)						
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
NEWNE	1.03	1.02	1.02	1.01	1.02	0.99
South	1.00	1.01	1.00	0.99	0.97	0.94
India	1.02	1.02	1.01	1.01	1.01	0.98
Build Margin (tCO₂/MWh) (excl. Imports)						
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
NEWNE	0.70	0.67	0.63	0.60	0.68	0.81
South	0.70	0.71	0.70	0.71	0.82	0.76
India	0.70	0.68	0.65	0.63	0.71	0.80
Combined Margin (tCO₂/MWh) (excl. Imports) (1)						
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
NEWNE	0.87	0.85	0.82	0.81	0.85	0.90
South	0.85	0.86	0.85	0.85	0.89	0.85
India	0.86	0.85	0.83	0.82	0.86	0.89

Annex -3

Details of major shut downs and reasons for the monitored period

Guntakandala Power House- Unit I:

Period	Type of Shut down (Hr:Mn)		Reason
	Planned	Forced	
23.03.2010 to 03.08.2010		3144:00	Water problem and stopped manually due to low discharge of water
4.08.2010		9:25	Supply Failed & Trash Cleaning
12.08.2010 to 13.08.2010		23:45	manually stopped due to low discharge of water
19.08.2010 to 20.08.2010		19:30	manually stopped due to low discharge of water
26.08.2010 to 28.08.2010		50:15	manually stopped due to low discharge of water
08.12.2010 to 09.12.2010		42:15	33Kv Line break down & SF6 Breaker Problem
22.01.2011 to 23.01.2011		29:55	Generator NDE Bearing Pipe line oil leakage low discharge of water level
26.02.2011		24:00	
04.03.2011		24:00	
12.08.2010 to 13.08.2010		42:15	manually stopped due to low discharge of water
Short Interruptions *	151:15		Miscellaneous includes over current trip, trash cleaning, over voltage trip, supply failed & low discharge of water etc.,
Total		3518:20	

* Short interruptions includes the both grid failures and transmission line problems and non- availability of water.

Guntakandala Power House- Unit II :

Period	Type of Shut down (Hr:Mn)		Reason
	Planned	Forced	
23.03.2010 to 03.08.2010		3134:00	water problem and manually stopped due to low discharge of water
12.08.2010		5:40	Manually stopped due to low discharge of water
23.08.2010 to 24.08.2010		34:40	Supply Failed, SF6 Breaker Problem & grid failure
13.08.2010 to 14.08.2010		11:30	Manually stopped due to low discharge of water
08.12.2010 to 09.12.2010		42:15	33Kv Line break down & SF6 Breaker Problem
11.12.2010		4:00	33Kv Line break down & SF6 Breaker Problem

Short Interruptions *	124:25	Miscellaneous includes over current trip, trash cleaning, over voltage trip, supply failed & low discharge of water etc.,
Total	3356:30	

* Short interruptions includes the both grid failures and transmission line problems and non- availability of water.

Velpanur Power House- Unit I :

Period	Type of Shut down (Hr:Mn)		Reason
	Planned	Forced	
23.03.2010 to 03.08.2010		3214:00	water problem and manually stopped due to low discharge of water
19.08.10 to 20.08.10		27:40	Generator Breaker CT Failed
25.08.10		10:40	Low discharge of water Level ,Supply Failed & Trash Cleaning
27.08.10 to 28.08.10		31:40	Low discharge of water Level ,Supply Failed & Trash Cleaning
04.03.11 to 05.03.11		43:30	Supply Failed & Trash Cleaning
Short Interruptions *	187:35		Miscellaneous includes over current trip, trash cleaning, over voltage trip, supply failed & low discharge of water etc.,
Total		3515:05	

* Short interruptions includes the both grid failures and transmission line problems and non- availability of water.

Velpanur Power House- Unit II :

Period	Type of Shut down (Hr:Mn)		Reason
	Planned	Forced	
23.03.2010 to 03.08.2010		3099:40	water problem and manually stopped due to low discharge of water
04.08.2010	14:50		Trash Cleaning
12.08.2010 to 13.08.2010		25:40	Low discharge of water Level
19.08.2010		9:05	Low discharge of water Level
21.01.2011	3:40		T.V.M.Meter replacement
Short Interruptions *	206:40		Miscellaneous includes over current trip, trash cleaning, over voltage trip, supply failed & low discharge of water etc.,
Total		3359:35	

* Short interruptions includes the both grid failures and transmission line problems and non- availability of water.

Madhavaram Power House- Unit I :

Period	Type of Shut down (Hr:Mn)		Reason
	Planned	Forced	
23.03.10 to 04.08.10		3057:55	water problem and manually stopped due to low discharge of water
25.10.10 to 27.10.10		51:05	Supply Failed at 33kv Gadivemula S.S and generator NDE bearing oil mixing with cooling water, hence unit will stopped
16.12.10 to 23.12.10		187:45	Grid Bearing and Runner Blade Problem
16.01.11		6:00	Supply failed and Control tub Problem
16.02.11		7:50	L.C declared at NDL S.S due to line checking and Maintenance work
04.03.11 to 05.03.11		47:45	Low discharge of water level
Short Interruptions *		258:25	Miscellaneous includes over current trip, trash cleaning, over voltage trip, supply failed & low discharge of water etc.,
Total		3616:45	

* Short interruptions includes the both grid failures and transmission line problems and non- availability of water.

Madhavaram Power House- Unit II :

Period	Type of Shut down (Hr:Mn)		Reason
	Planned	Forced	
23.03.10 to 04.08.10		3174:00	water problem and manually stopped due to low discharge of water
12.08.10 to 13.08.10		27:10	Supply Failed at 33kv Gadivemula S.S & Low water level
19.08.10 to 20.08.10		22:35	Main Supply Failure at NANDYAL S.S Due to P.T Jumper Changed.
26.08.10		8:55	low discharge of water & Trash Cleaning
06.10.10		4:35	Supply Failed at 33kv Gadivemula S.S and 6.6 kv breaker trip circuit supervision relay problem
14.11.10	4:40		L.C declared at NDL S.S due to maintenance work
21.02.11	8:10		L.C declared at NDL S.S due to line checking and Maintenance work
05.03.11	11:50		L.C declared at NDL S.S due to CT's are burned
Short Interruptions *		206:55	Miscellaneous includes over current trip, trash cleaning, over voltage trip, supply failed & low discharge of water etc.,
Total		3468:50	

* Short interruptions includes the both grid failures and transmission line problems and non- availability of water.

Annex - 4**PLF calculated during the Monitored Period****Guntakandala Power House**

Monitoring Period	Unit -1	Unit – 2	Total	PLF
24.03.10 to 23.04.10	0	50490	50490	1.70%
23.04.10 to 21.05.10	0	0	0	0.00%
21.05.10 to 23.06.10	0	0	0	0.00%
23.06.10 to 23.07.10	0	0	0	0.00%
23.07.10 to 23.08.10	529910	651640	1181550	39.70%
23.08.10 to 21.09.10	1129770	1243370	2373140	85.24%
21.09.10 to 23.10.10	1377680	1551000	2928680	95.33%
23.10.10 to 24.11.10	1400140	1557610	2957750	96.28%
24.11.10 to 24.12.10	1151930	1324450	2476380	85.99%
24.12.10 to 21.01.11	1079390	1224430	2303820	85.71%
21.01.11 to 24.02.11	1384640	1603320	2987960	91.54%
24.02.11 to 23.03.11	982360	1063240	2045600	78.92%
Total	9035820	10269550	19305370	55.10%

Velpanur Power House

Monitoring Period	Unit -1	Unit – 2	Total	PLF
24.03.10 to 23.04.10	0	30760	30760	1.25%
23.04.10 to 21.05.10	0	0	0	0.00%
21.05.10 to 23.06.10	0	0	0	0.00%
23.06.10 to 23.07.10	960	8060	9020	0.38%
23.07.10 to 23.08.10	548060	420730	968790	39.46%
23.08.10 to 21.09.10	804850	976300	1781150	77.55%
21.09.10 to 23.10.10	1016300	1090990	2107290	83.15%
23.10.10 to 24.11.10	1006280	1075080	2081360	82.12%
24.11.10 to 24.12.10	891750	1012190	1903940	80.13%
24.12.10 to 21.01.11	773250	997080	1770330	79.83%
21.01.11 to 24.02.11	1116920	1127080	2244000	83.33%
24.02.11 to 23.03.11	865600	719560	1585160	74.13%
Total	7023970	7457830	14481800	50.10%

Madhavaram Power House

Monitoring Period	Unit -1	Unit – 2	Total	PLF
24.03.10 to 23.04.10	0	37965	37965	1.28%
23.04.10 to 21.05.10	0	0	0	0.00%
21.05.10 to 23.06.10	0	0	0	0.00%
23.06.10 to 23.07.10	13000	0	13000	0.45%
23.07.10 to 23.08.10	551490	468035	1019525	34.26%

23.08.10 to 21.09.10	727140	885600	1612740	57.93%
21.09.10 to 23.10.10	974120	1079350	2053470	66.84%
23.10.10 to 24.11.10	880400	1050520	1930920	62.86%
24.11.10 to 24.12.10	624420	966420	1590840	55.24%
24.12.10 to 21.01.11	764230	965880	1730110	64.36%
21.01.11 to 24.02.11	1071150	1100170	2171320	66.52%
24.02.11 to 23.03.11	843070	714020	1557090	60.07%
Total	6449020	7267960	13716980	39.15%