

MONITORING REPORT

**11.3 MW Renewable Energy project for a grid system by
K.M. Power (P) Ltd, A.P, INDIA**

UNFCCC Reference No. 0750
(Monitoring period chosen from 25th March 2006 to 23rd March, 2007)

Ver. 01, 28th September 2007

Project Locations

- Unit-I. 4.0 MW Hydro Electric Project at Guntakandala Village,
District Kurnool, A.P, India.
- Unit-II. 3.3 MW Hydro Electric Project at Velpanuru Village,
District Kurnool, A.P, India.
- Unit-III. 4.0 MW Hydro Electric Project at Madhavaram Village
District Kurnool, A.P, India.

Registered Office

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CONTENTS

1. Current Status of the projects
2. Monitoring Period
3. Details of Major Equipment of the Projects & Plant shut downs for the Monitored Period
4. Parameters being monitored according to Monitoring Plan
5. Formulae Used
6. Net Emission Reductions – Project wise
7. Measures to ensure the results/uncertainty analysis
8. Details of Monitoring team and Responsibilities

Tables

- Table - 1 Details of Plant Major Equipments and Suppliers
- Table - 2 Plant shut down details for three power projects
- Table - 3 Guntakundala Units - Details of Major Shutdown hours and Reasons
- Table - 4 Velpanur Units - Details of Major Shutdown hours and Reasons
- Table - 5 Madhavaram Units - Details of Major Shutdown hours and Reasons
- Table - 6 Guntakandala Unit - Details of Power generation, auxiliary consumption, electricity exported to grid, electricity imported from grid and net electricity exported to grid as per billing period.
- Table - 7 Velpanur Unit - Details of Power generation, auxiliary consumption, electricity exported to grid, electricity imported from grid and net electricity exported to grid as per billing period.
- Table - 8 Madhavaram Unit - Details of Power generation, auxiliary consumption, electricity exported to grid, electricity imported from grid and net electricity exported to grid as per billing period.
- Table - 9 Guntakandala Unit – Net Emission Reductions
- Table - 10 Velpanur Unit – Net Emission Reductions
- Table - 11 Madhavaram Unit – Net Emission Reductions
- Table - 12 Summary of Net Emission Reductions for the Monitored Period
- Table - 13 Monitoring Team

1. Current Status of the Projects

K.M. Power (P) Ltd (KMPL) has established 11.3 MW Small Hydro Projects bundled of 4 MW at Guntakandala Village, 3.3 MW at Velpanur and 4 MW at Madhavaram villages of Velugonda Mandal, Kurnool District, Andhra Pradesh.

The project activity is generation of electricity utilizing the drop in the bed levels of the Nippulavagu, which is a carrier canal for Kurnool – Cuddapah Canal and the discharges for the ayacut requirements and export of power to APTRANSCO grid.

The Guntakandala small hydro project commissioned in February 2002, the Velpanuru small hydro project commissioned in November 2002 and Madhavaram small hydro project commissioned in December 2003 and all projects are in continuous operation.

2. Monitoring Period

The monitoring period is chosen from 25th March 2006 to 23rd March 2007.

3. Details of Major Equipment of the Projects & Plant shut down downs for the Monitored Period

The details of major equipment of the project and suppliers are presented below:

Table 1 – Details of Major Equipment of the Project and Suppliers

S.No	Location of plant	Equipment details
1	Guntakandala small hydro plant	2x2000 KW Vertical Kaplan Turbine, Adjustable runner & indicating and recording instruments guide vanes, 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, Bangaore
2	Velpanur small hydro plant	2x1650 KW Vertical Kaplan Turbine, Adjustable runner & indicating and recording instruments guide vanes, 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, Bangaore
3	Madhavaram small hydro plant	2x2000 KW Vertical Kaplan Turbine, Adjustable runner & indicating and recording instruments guide vanes, 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, Bangaore

The details of forced shut down periods, planned shut down periods and reasons for shut down is detailed below.

Table -2: Plant shut down details for three power projects

S. No.	Particulars	Guntakundala Project		Velpanur Project		Madhavaram Project	
		Unit-1	Unit-II	Unit-1	Unit-II	Unit-1	Unit-II
1	Total No. of hours during monitored period	8736	8736	8736	8736	8736	8736
2	Planned Shut down hours	4080	3936	2492	4920	2500	5040
3	Forced Shut down hours	1197	898	2186	305	579	70
4	Total shut down hours	5277	4834	4678	5225	3079	5110
5	Total No. of hours available for power generation	3459	3902	4058	3511	5657	3626

Table - 3: Guntakundala Units - Details of Major Shutdown hours and Reasons – Forced & Planned

S.No.	Period	Shut down, in Hours		Reasons
		Planned	Forced	
	Guntakundala : Unit - I			
1	25.03.06 to 27.03.06		50	Low water level
2	03.04.06 to 21.07.06	2640		Low water discharge
3	27.07.06 to 28.07.06		28	Gear box checking
4	31.07.06 to 07.09.06		920	Gear box failure
5	08.09.06 to 09.09.06		33	Line problem
6	26.12.06		24	Low water level
7	29.12.06		24	Low water level
8	31.12.06 to 10.01.07	264		Low water discharge
9	20.01.07 to 10.03.07	1176		Low water discharge
10	15.03.07 to 18.03.07		96	Low water level
11	21.03.07		22	Low water level
	Total	4080	1197	
	Guntakundala : Unit - II			
1	25.03.06 to 27.03.06	2712		Low water discharge
2	23.08.06 to 05.09.06		336	Gear box bearing failure
3	10.11.06 to 20.11.06		254	Gear box high speed bearing failure
4	14.12.06 to 18.12.06		51	Low water discharge
5	24.12.06 to 25.12.06		42	Low water discharge
6	27.12.06 to 28.12.06		39	Low water discharge
7	11.01.07 to 19.01.07		176	Low water discharge
8	01.02.07 to 23.03.07	1224		Low water discharge
	Total	3936	898	

Table - 4: Velpanur Units - Details of Major Shutdown hours and Reasons – Forced & Planned

S.No.	Period	Shut down, in Hours		Reasons
		Planned	Forced	
	Velpanur : Unit - I			
1	25.03.06 to 27.03.06		45	Low water discharge
2	03.04.06 to 15.07.06	2492		Low water discharge
3	18.07.06 to 21.07.06		93	Low water discharge
4	25.08.06 to 19.10.06		1344	Gear box problem
5	01.02.07		16	Low water discharge
6	03.02.07 to 11.02.07		208	Low water discharge
7	28.02.07 to 19.03.07		480	Low water discharge
	Total	2492	2186	
	Velpanur : Unit - II			
1	25.03.06 to 17.07.06	2760		Low water level
2	03.09.06 to 12.09.06		240	Gear box bearing problem
3	24.11.06		21	Gear box bearing problem
4	15.12.06		24	Low water level
5	18.12.06		20	Low water level
6	24.12.06 to 23.03.07	2160		Low water level
	Total	4920	305	

Table - 5: Madhavaram Units - Details of Major Shutdown hours and Reasons – Forced & Planned

S.No.	Period	Shut down, in Hours		Reasons
		Planned	Forced	
	Madhavaram : Unit - I			
1	25.03.06	-	19	Low discharge of water
2	03.04.06 to 16.07.06	2500	-	Low water discharge
3	11.10.06 to 12.10.06	-	20	Line problem
4	15.12.06	-	16	Low discharge of water
5	03.02.07 to 11.02.07	-	207	Low water discharge
6	28.02.07 to 09.03.07	-	217	Low discharge of water

7	15.03.07 to 19.03.07	-	100	Low water discharge
	Total	2500	579	
	Madhavaram : Unit - II			
1	25.03.06 to 22.07.06	2880	-	Low water level
2	26.11.06	-	24	Gear box low speed bearing problem
3	16.12.06 to 18.12.06	-	46	Low water discharge
4	24.12.06 to 23.03.07	2160	-	Low water level
	Total	5040	70	

4. Parameters being monitored according to monitoring plan

The following parameters were monitored on continuous basis

- Electronic energy meters were installed for the energy exported to the State grid and the energy imported from the State grid. Monthly energy meter readings have recorded and jointly certified by the representatives of APTRANSCO & KMPL.
- Energy meters were installed for the total power generated and auxiliary power consumption. Energy meter readings are recorded daily.
- Daily readings were aggregated to monthly readings.
- Baseline emission factor for Southern regional grid from CO₂ Baseline Database Version 2, dated 21.06.2007 published by CEA, India.

As per the billing data, the Monthwise data on electricity generation, auxiliary consumption, net electricity export for three projects is presented in the tables given below:

Table -6: Guntakandala Unit – Details of power generation, Aux. Power Consumption and Electricity exported to grid, Electricity imported from grid and Net electricity exported to Grid as per billing period.

S.No.	Month	Year	Gross Power Generation	Aux. Power Consumption	Electricity Exported to Grid	Electricity Imported from Grid	Net Electricity Exported to Grid
			KWh	KWh	KWh	KWh	GWh
1	April	2006	197191	1491	195700	800	0.1949
2	May	2006	100		100	100	0.0000
3	June	2006	0	0	0	300	-0.0003
4	July	2006	347895	3695	344200	600	0.3436
5	August	2006	1604020	18520	1585500	600	1.5849
6	September	2006	1426852	20352	1406500	4100	1.4024
7	October	2006	2931891	44791	2887100	100	2.8870
8	November	2006	2608160	37760	2570400	200	2.5702
9	December	2006	2329039	31739	2297300	100	2.2972
10	January	2007	1237707	12507	1225200	200	1.2250
11	February	2007	121414	814	120600	1300	0.1193
12	March	2007	113948	848	113100	2100	0.1110
	Total		12918217	172517	12745700	10500	12.7352

Table -7: Velpalur Unit – Details of power generation, Aux. Power Consumption and Electricity exported to grid, Electricity imported from grid and Net electricity exported to Grid as per billing period

S.No.	Month	Year	Gross Power Generation	Aux. Power Consumption	Electricity Exported to Grid	Electricity Imported from Grid	Net Electricity Exported to Grid
			KWh	KWh	KWh	KWh	GWh
1	April	2006	149361	861	148500	900	0.1476
2	May	2006	100		100	1100	-0.0010
3	June	2006	0	0	0	1100	-0.0011

4	July	2006	247077	1777	245300	1100	0.2442
5	August	2006	1656421	17221	1639200	200	1.6390
6	September	2006	610141	4241	605900	900	0.6050
7	October	2006	1048402	8402	1040000	200	1.0398
8	November	2006	1975776	22876	1952900	0	1.9529
9	December	2006	1641959	17159	1624800	100	1.6247
10	January	2007	1003170	7770	995400	100	0.9953
11	February	2007	211593	1093	210500	1100	0.2094
12	March	2007	128084	784	127300	1500	0.1258
Total			8672084	82184	8589900	8300	8.5816

Table -8: Madhavaram Unit – Details of power generation, Aux. Power Consumption and Electricity exported to grid, Electricity imported from grid and Net electricity exported to Grid as per billing period

S.No.	Month	Year	Gross Power Generation	Aux. Power Consumption	Electricity Exported to Grid	Electricity Imported from Grid	Net Electricity Exported to Grid
			KWh	KWh	KWh	KWh	GWh
1	April	2006	188021	1121	186900	1400	0.1855
2	May	2006	0	0	0	1100	-0.0011
3	June	2006	0	0	0	1300	-0.0013
4	July	2006	275363	1863	273500	1800	0.2717
5	August	2006	2098357	23857	2074500	200	2.0743
6	September	2006	2000072	22872	1977200	300	1.9769
7	October	2006	2070724	25424	2045300	100	2.0452
8	November	2006	2504944	32744	2472200	0	2.4722
9	December	2006	1941122	24522	1916600	100	1.9165
10	January	2007	1206134	10334	1195800	100	1.1957
11	February	2007	271715	1515	270200	1200	0.2690
12	March	2007	167150	7150	160000	1800	0.1582
Total			12723602	151402	12572200	9400	12.5628

5. Formulae Used

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

Since the project emissions (PE_y) as well as the leakage (L_y) are zero, the emission reductions are equal to baseline emissions.

Baseline Emissions

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 (tCO_2/GWh)

The energy statistics for the chosen year i.e. 2006-07 are not yet publicly available in India. It is difficult to collect & use data for the year in which project emissions occur during the said period.

As per Response form for request for clarification on Approved Methodologies (F-CDM-AM-Clar_Respon_ver 01.1 - AM_CLA_0038 form UNFCCC web site¹), The project is considered the data of the previous year to the year in which project generation occur.

¹ <http://cdm.unfccc.int/methodologies/PAmethodologies/Clarifications/index.html>

The emission factor is 735.29 tCO_2/GWh for Southern regional grid, which is taken from CO_2 Baseline Database Version 2, dated 21.06.2007 published by CEA, India².

² <http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>

Using the above formulas, the Emission reductions from the project activity are shown below.

6. Net Emission Reductions

The emission reductions for the chosen monitored period i.e. from 25th March 2006 to 23rd March 2007 are as given below:

Table - 9: Guntakandala Unit – Net Emission Reductions

S.No.	Month	Year	Net Electricity Exported to Grid	Emission Factor	Baseline Emissions	Project Emissions	Net Emission Reductions
			GWh				
1	April	2006	0.1949	735.29	143	0	143
2	May	2006	0.0000	735.29	0	0	0
3	June	2006	-0.0003	735.29	0	0	0
4	July	2006	0.3436	735.29	253	0	253
5	August	2006	1.5849	735.29	1165	0	1165
6	September	2006	1.4024	735.29	1031	0	1031
7	October	2006	2.8870	735.29	2123	0	2123
8	November	2006	2.5702	735.29	1890	0	1890
9	December	2006	2.2972	735.29	1689	0	1689
10	January	2007	1.2250	735.29	901	0	901
11	February	2007	0.1193	735.29	88	0	88
12	March	2007	0.1110	735.29	82	0	82
Total			12.7352		9364	0	9364

Table - 10: Velpanur Unit – Net Emission Reductions

S.No.	Month	Year	Net Electricity Exported to Grid	Emission Factor	Baseline Emissions	Project Emissions	Net Emission Reductions
			GWh				
1	April	2006	0.1476	735.29	109	0	109
2	May	2006	-0.0010	735.29	-1	0	-1

3	June	2006	-0.0011	735.29	-1	0	-1
4	July	2006	0.2442	735.29	180	0	180
5	August	2006	1.6390	735.29	1205	0	1205
6	September	2006	0.6050	735.29	445	0	445
7	October	2006	1.0398	735.29	765	0	765
8	November	2006	1.9529	735.29	1436	0	1436
9	December	2006	1.6247	735.29	1195	0	1195
10	January	2007	0.9953	735.29	732	0	732
11	February	2007	0.2094	735.29	154	0	154
12	March	2007	0.1258	735.29	92	0	92
Total			8.5816		6310	0	6310

Table - 11: Madhavaram Unit – Net Emission Reductions

S.No.	Month	Year	Net Electricity Exported to Grid	Emission Factor	Baseline Emissions	Project Emissions	Net Emission Reductions
			GWh	tCO ₂ /GWh	tCO ₂	tCO ₂	tCO ₂
1	April	2006	0.1855	735.29	136	0	136
2	May	2006	-0.0011	735.29	-1	0	-1
3	June	2006	-0.0013	735.29	-1	0	-1
4	July	2006	0.2717	735.29	200	0	200
5	August	2006	2.0743	735.29	1525	0	1525
6	September	2006	1.9769	735.29	1454	0	1454
7	October	2006	2.0452	735.29	1504	0	1504
8	November	2006	2.4722	735.29	1818	0	1818
9	December	2006	1.9165	735.29	1409	0	1409
10	January	2007	1.1957	735.29	879	0	879
11	February	2007	0.2690	735.29	198	0	198
12	March	2007	0.1582	735.29	116	0	116
Total			12.5628		9237	0	9237

Table - 12: Summary of Net Emission Reductions for the Monitored Period

Description		UNIT - I	UNIT - II	UNIT - III	Total
		Guntakandala	Velpanuru	Madhavaram	
Electricity Exported to Grid	KWh	12745700	8589900	12572200	33907800
Electricity Imported from Grid	KWh	10500	8300	9400	28200
Net Electricity Exported to Grid	KWh	12735200	8581600	12562800	33879600
Emission Factor	t CO ₂ /GWh	735.29	735.29	735.29	
Baseline Emissions	t CO ₂	9364	6310	9237	24911
Project Emissions	t CO ₂	0	0	0	0
Net Emission Reductions	t CO₂	9364	6310	9237	24911

The details of calculation of emission reductions month wise is presented as Annexure (Excel Sheet)

7. Measures to ensure the results/uncertainty analysis

The energy exported by each projects of K.M. Power (P) Ltd. is recorded from independent main meter installed at the switch yard area of the respective project. In the event, the main meter is not in operation, and the reading from check meter is used for billing.

The calibration of monitoring equipment is being maintained as per the requirement of Electricity Board and the same is being done regularly. Power generation, export and energy import are being recorded daily and the same is being verified by the respective plant incharge.

8. Details of Monitoring team and Responsibilities

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

Table 13 - Monitoring Team

Project	Shift Incharge	Plant Incharge	Executive Director	Managing Director
Guntakandala	Mr.Prabhakar Reddy	Mr.Madan Mohan	Mr.Y Thimmaya	Mr.G Ramanarayan Reddy
Velpanur	Mr.Dhanunjaya	Mr.Madan Mohan	Mr.Y Thimmaya	Mr.G Ramanarayan Reddy
Madhavaram	Mr.Madan Mohan	Mr.Madan Mohan	Mr.Y Thimmaya	Mr.G Ramanarayan Reddy