

# **MONITORING REPORT**

Monitoring period  
23.07.2002 to 24.06.2006  
(both days included).

**Project 0374: KMS Power 6 MW  
Renewable Sources Biomass Power project.**

**Project Site:**  
Lakkaraju Garlapadu village,  
Sattenapalli Mandal, Guntur district,  
Andhra Pradesh, India

**KMS POWER PRIVATE LIMITED**  
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## Current Status of the Project

**Project 0374: KMS Power 6 MW Renewable Sources Biomass Power Project** Plant at Lakkaraju Garlapadu, Sattenapalli Mandal, Guntur Dist., Andhra Pradesh, India, has been commissioned and is operational since 22.07.2002.

First synchronization of the Project with 33 KV sub station at Sattenapalli, (AP TRANSCO grid) was performed on 22.07.2002 after trial operations and after obtaining permission for commercial operations. The export crediting commenced on 23.07.2002. Plant exported 143.925 MU to APTRANSCO grid and consumed 2,35,426 MT of biomass fuel and 24,299 MT of coal since beginning of the operations till 24.6.2006.

The list of vendors who supplied major equipments in the Plant is given below.

<u>S.No</u>	<u>Equipment</u>	<u>Supplier</u>
1	Boiler	Cithar Vessels Limited, Bangalore, Karnataka, India.
2	Turbo-Generator Set	Triveni Engineering & Industries Limited, Bangalore, Karnataka, India. BHEL, Hyderabad.
3	Plant Auxiliaries	Various Indigenous Suppliers like Shriram Tower Tech Ltd., Atlas Copco, Kirloskar Pmps, ABB Ltd., Doshi Ion Exchange Ltd., Etc.
4	Fuel Handling System	Hyquip Limited, Hyderabad, Andhrapradesh, India.

Plant obtained term loan from financial institutions namely Indian Renewable Energy Development Agency Limited, New Delhi. and Promoters Equity.

**Statement to what extent the Project has been implemented as planned**

The Project has been completed as planned and described in the Project Design Document (PDD).

The Plant is in operation continuously (with outages – forced & planned) from commencement. The Plant is using renewable Biomass fuels like Rice Husk, Cotton & Chilli Stalks, Prosopis Juliflora, and other biomass fuels and supplementary fuel like coal (less than the permitted quantity). In addition, plant also uses small quantity of diesel very occasionally for power generation using DG set to meet emergency power requirement during complete black out and factory also for internal vehicles for fuel transfer.

The Plant had suffered major outages as detailed below:

Year	Running hours	Planned outages		Forced Outages	
		Hrs	Weeks	Hrs.	Weeks
02-03	3800.27	437.85	3	1569.88	9
03-04	7902.03	352.19	2	529.78	3
04-05	7763.83	687.90	4	308.27	2
05-06	7317.25	821.10	5	621.65	4
06-07(3 months)	1864.54	160.17	1	176.33	1

Evidences for the Plant in operation are enclosed.

### **Monitoring Period**

The Monitoring period is chosen from 23.07.2002 to 24.06.2006 (both days included).

### **Sustainability - Economic and Social well being**

The Company has spent around Rs. 288.35 million (USD 6.26 million @ IUS\$ = Rs 46/-) during the monitoring period towards fuel usage in the Plant. Procurement of biomass fuel from local farmers and biomass suppliers has generated additional income and improved economic condition of the community.

This has also resulted in local employment generation. Plant has generated employment opportunities directly / indirectly to more than 500 people.

As a part of social responsibility, Plant has been contributing to social infrastructure by way of employing local people for the Plant operations and also paying significant amount as tax for Sales Tax, water charges to Irrigation Department, and for the local Panchayat.

### **Parameters being monitored according to Monitoring Plan**

For the Project, the following parameters are being monitored on continuous basis:

- 1 ***Power Generation:*** Power generation from the plant is measured continuously using the generation meter installed in the control room of the plant. The total generated power will also be used to compare the auxiliary consumption of the plant after deducting power exported to the grid with the consumption measured from the auxiliary energy meters.
- 2 ***Power Export and import:*** Power exported to the grid and imported from the grid is monitored from energy meters installed at APTRANSCO sub station on 23<sup>rd</sup> or 24<sup>th</sup> day of every month. A joint meter reading for the energy exported to the Grid will be recorded by representatives of APTRANSCO and Company and the readings will be jointly signed by both the parties as a proof of export of Power to the grid from power plant and import of Power from grid by the power plant. These meter readings are the basis for the invoices raised by **KMS POWER PRIVATE LIMITED**.
- 3 ***Biomass Fuel:*** The Biomass fuel on receipt in the Plant is weighed in the Electronic Weigh Bridge installed at the entry of the Plant and unloaded in the fuel storage yard. The biomass fuel after necessary preparation is fed to the Boiler as per the requirement and consumption will be recorded on daily basis.
- 4 ***Calorific value of the Biomass fuel:*** The calorific value of the Biomass fuel used is being measured in the out side Govt. approved laboratory at regular intervals, as per the arrivals and average value will be considered on monthly basis.
- 5 ***Coal/Diesel:*** Coal on receipt in the Plant is weighed in the Electronic Weigh Bridge installed in the Plant and unloaded

in the fuel storage yard. Coal is fed to the Boiler as and when required and consumption will be recorded accordingly. Diesel consumption will be monitored on regular basis using level gauge/measurement on store issues.

- 6 ***Carbon content in Coal:*** Carbon content in the coal received is being considered as per the analysis reports of government-approved laboratory, which are being obtained at regular intervals.
  
- 7 ***Calorific value (CV) of coal:*** CV of coal is being analysed at government approved outside laboratory at regular intervals.

## Power Generation, Export & Fuel Consumption

Month-wise data on Power Generation, export, import, fuel consumption and diesel consumption is given below for the monitoring period:

Month	Year	Electricity Generated, Million Units	Export to APTRANSCO grid (Million Units)	Electricity Imported, Million Units	Total Biomass used MT	Coal Used, MT	Diesel Consumption liters
August (From 23rd July)	2002	0.788	0.648	0.039	1226	0	10855
September	2002	2.038	1.802	0.032	2314	642	7775
October	2002	3.568	3.174	0.012	4285	936	4972
November	2002	3.936	3.513	0.011	4527	1150	4477
December	2002	2.588	2.291	0.026	2225	1300	3314
January	2003	3.418	3.088	0.015	3892	980	4224
February	2003	1.897	1.696	0.025	1929	655	5097
March	2003	3.748	3.320	0.004	4126	1210	3373
April	2003	3.776	3.337	0.010	4348	940	3257
May	2003	3.417	3.019	0.016	4030	810	4866
June	2003	3.157	2.801	0.014	3942	505	10178
July	2003	2.855	2.519	0.012	3257	660	9751
August	2003	3.717	3.199	0.015	4372	875	5252
September	2003	3.980	3.518	0.007	5151	475	4247
October	2003	3.850	3.469	0.011	5121	454	6050
November	2003	3.868	3.485	0.008	5182	318	6982
December	2003	3.901	3.515	0.001	5022	423	3369
January	2004	3.655	3.293	0.010	4751	343	6528
February	2004	4.183	3.803	0.004	5343	498	3862
March	2004	3.995	3.599	0.002	5357	361	7122
April	2004	2.943	2.628	0.020	4367	312	3698
May	2004	3.238	2.917	0.025	4846	326	4045
June	2004	3.855	3.504	0.014	6005	293	5242
July	2004	3.867	3.398	0.003	6087	240	8507
August	2004	3.427	2.989	0.015	5751	100	8334
September	2004	3.921	3.453	0.010	6572	105	3920

Month	Year	Electricity Generated, Million Units	Export to APTRANSCO grid (Million Units)	Electricity Imported, Million Units	Total Biomass used MT	Coal Used, MT	Diesel Consumption liters
October	2004	3.207	2.869	0.020	5132	56	4491
November	2004	4.026	3.572	0.009	6441	58	4228
December	2004	3.897	3.457	0.011	5220	860	3032
January	2005	4.021	3.573	0.012	5881	474	3606
February	2005	4.040	3.572	0.011	5787	552	3964
March	2005	3.319	2.936	0.014	5910	429	3579
April	2005	3.461	3.058	0.016	5488	487	4075
May	2005	3.557	3.146	0.014	5587	524	4142
June	2005	3.678	3.251	0.014	6033	512	3982
July	2005	3.565	3.147	0.009	5785	579	5655
August	2005	3.718	3.250	0.009	6110	598	3970
September	2005	3.370	2.931	0.022	5624	564	3485
October	2005	3.632	3.158	0.007	5892	460	3221
November	2005	3.432	3.005	0.029	5568	426	3586
December	2005	3.572	3.146	0.017	5498	674	3112
January	2006	3.484	3.076	0.016	6025	165	2724
February	2006	2.906	2.570	0.021	4927	200	2313
March	2006	3.342	2.936	0.007	8098	465	2883
April	2006	3.671	3.250	0.015	5659	460	2858
May	2006	3.545	3.122	0.021	5526	395	3913
June	2006	3.346	2.925	0.025	5207	450	3266
<b>TOTAL</b>		<b>162.374</b>	<b>143.925</b>	<b>0.679</b>	<b>347693</b>	<b>24299</b>	<b>225382</b>

## Emission Reductions

The emission reductions per year during the chosen monitoring period (2002-2006) are as given below:

Emission reductions are calculated based on the power exported to the grid, power imported from the grid during shut down and start up, coal and diesel consumed in the plant from [start date 23.7.2002] to [end of monitoring period date 24.6.2006] .

Month	Year	Electricity Generated, Million Units	Export to APTRANSCO grid (Million Units)	Electricity Imported, Million Units	Total Biomass used MT	Coal Used, MT	Diesel Consumption liters	Net Emission Reductions
August (From 23rd July)	2002	0.788	0.648	0.039	1226	0	10855	477
September	2002	2.038	1.802	0.032	2314	642	7775	642
October	2002	3.568	3.174	0.012	4285	936	4972	1384
November	2002	3.936	3.513	0.011	4527	1150	4477	1305
December	2002	2.588	2.291	0.026	2225	1300	3314	84
January	2003	3.418	3.088	0.015	3892	980	4224	1253
February	2003	1.897	1.696	0.025	1929	655	5097	566
March	2003	3.748	3.320	0.004	4126	1210	3373	1221
<b>Total</b>		<b>21.981</b>	<b>19.532</b>	<b>0.164</b>	<b>24524</b>	<b>6873</b>	<b>44087</b>	<b>6932</b>
April	2003	3.776	3.337	0.010	4348	940	3257	1632
May	2003	3.417	3.019	0.016	4030	810	4866	1512
June	2003	3.157	2.801	0.014	3942	505	10178	1639
July	2003	2.855	2.519	0.012	3257	660	9751	1225
August	2003	3.717	3.199	0.015	4372	875	5252	1650
September	2003	3.980	3.518	0.007	5151	475	4247	2259
October	2003	3.850	3.469	0.011	5121	454	6050	2241
November	2003	3.868	3.485	0.008	5182	318	6982	2445
December	2003	3.901	3.515	0.001	5022	423	3369	2367
January	2004	3.655	3.293	0.010	4751	343	6528	2282
February	2004	4.183	3.803	0.004	5343	498	3862	2501
March	2004	3.995	3.599	0.002	5357	361	7122	2510
<b>Total</b>		<b>44.354</b>	<b>39.555</b>	<b>0.110</b>	<b>55876</b>	<b>6662</b>	<b>71464</b>	<b>24263</b>

Month	Year	Electricity Generated, Million Units	Export to APTRANSCO grid (Million Units)	Electricity Imported, Million Units	Total Biomass used MT	Coal Used, MT	Diesel Consumption liters	Net Emission Reductions
April	2004	2.943	2.628	0.020	4367	312	3698	1825
May	2004	3.238	2.917	0.025	4846	326	4045	2050
June	2004	3.855	3.504	0.014	6005	293	5242	2584
July	2004	3.867	3.398	0.003	6087	240	8507	2550
August	2004	3.427	2.989	0.015	5751	100	8334	2340
September	2004	3.921	3.453	0.010	6572	105	3920	2736
October	2004	3.207	2.869	0.020	5132	56	4491	2285
November	2004	4.026	3.572	0.009	6441	58	4228	2893
December	2004	3.897	3.457	0.011	5220	860	3032	2033
January	2005	4.021	3.573	0.012	5881	474	3606	2518
February	2005	4.040	3.572	0.011	5787	552	3964	2435
March	2005	3.319	2.936	0.014	5910	429	3579	1970
<b>Total</b>		<b>43.760</b>	<b>38.868</b>	<b>0.163</b>	<b>67999</b>	<b>3805</b>	<b>56646</b>	<b>28218</b>
April	2005	3.461	3.058	0.016	5488	487	4075	2007
May	2005	3.557	3.146	0.014	5587	524	4142	2052
June	2005	3.678	3.251	0.014	6033	512	3982	2160
July	2005	3.565	3.147	0.009	5785	579	5655	2002
August	2005	3.718	3.250	0.009	6110	598	3970	2086
September	2005	3.370	2.931	0.022	5624	564	3485	1837
October	2005	3.632	3.158	0.007	5892	460	3221	2132
November	2005	3.432	3.005	0.029	5568	426	3586	2015
December	2005	3.572	3.146	0.017	5498	674	3112	1928
January	2006	3.484	3.076	0.016	6025	165	2724	2361
February	2006	2.906	2.570	0.021	4927	200	2313	1927
March	2006	3.342	2.936	0.007	8098	465	2883	2209
<b>Total</b>		<b>41.716</b>	<b>36.674</b>	<b>0.181</b>	<b>70635</b>	<b>5654</b>	<b>43148</b>	<b>24466</b>
April	2006	3.671	3.250	0.015	5659	460	2858	2227
May	2006	3.545	3.122	0.021	5526	395	3913	2156
June	2006	3.346	2.925	0.025	5207	450	3266	1936
<b>Total</b>		<b>10.562</b>	<b>9.297</b>	<b>0.061</b>	<b>16392</b>	<b>1305</b>	<b>10037</b>	<b>6318</b>
<b>GRAND TOTAL</b>		<b>162.374</b>	<b>143.925</b>	<b>0.679</b>	<b>235426</b>	<b>24299</b>	<b>225382</b>	<b>90197</b>

Emissions due to usage of diesel are calculated considering IPCC's oxidation factor of diesel as 0.99 tCO<sub>2</sub>/TJ.

Emissions due to usage of coal are calculated as per the formula given below:

Emissions due to coal = (Coal used in Mt X (Carbon content in % / 100)) x 44/12

**Yearly Summary**

Sl. No	Particular	Year 1 (2002-03)	Year 2	Year 3	Year 4	Year 5 (3 months)
1	CEF, kgCO <sub>2</sub> /kWh	0.83	0.83	0.83	0.83	0.83
2	Power export to the grid, Million Units (MU)	19.532	39.555	38.868	36.674	9.297
3	Emission Reductions, tons of CO <sub>2</sub>	6932	24263	28218	24466	6318
<b>GRAND TOTAL</b>		90197 TCO <sub>2</sub>				

**Measures to ensure the Results / uncertainty analysis**

As per the Power Purchase Agreement (PPA), the energy exported to the AP Grid is recorded from two independent meters viz., Main Meter and Check Meter and reading of main meter is used for billing. In the event of main meter not in operation / fails, the reading of the check meter shall be used for Billing.

The calibration of monitoring equipment is being maintained as per the requirement of APTRANSCO. Power Generation, Export & Auxiliary Consumption, fuel consumption are being recorded daily and the same is being verified by Manager (O&M) and approved by General Manager (Operation).

### **Roles & Responsibilities**

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

### **CDM team member names :**

1. Mr.P.M.Madhan Mohan, Director - Technical
2. Mr. N..Seshagiri Rao, General Manager
3. Mr. K.Ramakrishnama Raju, General Manager
4. Mr.V.Durga Prasad, Manager - Biomass Fuel
5. Mr.B.Venugopala Krsihna, Manager - O&M