

24.75 MW Ranganathaswamy Mini Hydel Project,  
Karnataka, India  
(UNFCCC Project Activity Ref. No. 1345)

## MONITORING REPORT

Ver. 01, 28 Dec 2009

[The Monitoring period is chosen from 18 Jun 2008 to 30 Jun 2009 both days included]

**Net Emission Reductions: 87308 tCO<sub>2</sub>e**

Registered Office	Project Site
<b>Pioneer Power Corporation Limited</b> P.O. Box# 156, Golf Link Road, Amarjyoti Layout, Koramangala Ring Road, Domlur, <b>Bangalore – 560071.</b>	<b>Ranganathaswamy Mini Hydel Scheme</b> Village : Sattedgala Taluk : Kollegal District : Chamrajnagar <b>Karnataka</b>

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## 1. Current Status of the Project

Pioneer Power Corporation Limited has established a 24.75 MW Ranganathaswamy Mini Hydel Scheme at Sattegala Village, Chamrajnagar District, Karnataka State, India. The project is a run of the river project that utilizes a gradient of about 120 meters available at Gaganachukki falls and is situated on the right bank of Shiva Anicut near Shivasamudram Hamlet in Kollegal Taluk of Chamrajnagar District in Karnataka. The generated electricity will be exported to a grid system of Bangalore Electricity Supply Company Limited (BESCOM) of KPTCL.

The purpose of this Monitoring Report (MR) is to calculate the Green House Gas (GHG) emission reductions occurred for the net electricity exported to grid. During the reported period the plant displaced 101.882 GWh of net electricity to the KPTCL.

## 2. Reference

The project has registered with UNFCCC on 18 Jun 2008 and the crediting period 18 Jun 08 – 17 Jun 18 (fixed). For details on the project, please refer to the following links on the UNFCCC web site:

**Project 1345: 24.75 MW Ranganathaswamy Mini Hydel Project, Karnataka, India**  
<http://cdm.unfccc.int/Projects/DB/RWTUV1190101228.6/view>

## 3. Monitoring Period

The Monitoring period is chosen 18 Jun 2008 to 30 Jun 2009 both days included.

## 4. Abbreviations in the Report

BESCOM	: Bangalore Electricity Supply Company Limited
CDM	: Clean Development Mechanism
CEA	: Central Electricity Authority, Government of India.
GHG	: Greenhouse Gases
IPCC	: Intergovernmental Panel on Climate Changes
KPTCL	: Karnataka Power Transmission Corporation Limited
MR	: Monitoring Report
PDD	: Project Design Document
PPCL	: Pioneer Power Corporation Limited
RSMHS	: Ranganathaswamy Mini Hydel Scheme

SR Grid : Southern Region Grid

## 5. General Description of the Project

Pioneer Power Corporation Limited has established a 24.75 MW Ranganathaswamy Mini Hydrel Scheme at Sattegala Village, Chamrajnagar District, Karnataka state, India. The Purpose of the Project activity is utilizing the available head at Gaganachukki falls and generates the electrical energy in a sustainable manner. The Project is expected to net export 72.653 GWh of energy for an optimum year to the state utility grid. The Units of the project activity have been synchronized with 66/11KV grid of KPTCL as mentioned below and the same are in operation till date.

- Unit – 1 : Synchronized on 29 Jul 2007
- Unit – 2 : Synchronized on 27 Jul 2007
- Unit – 3 : Synchronized on 29 Jul 2007

### Location of the Project

The project site is situated on the right bank of Shiva Anicut near Shivasamudram Hamlet of Sattegala Village, in Kollegal Taluk of Chamrajnagar District in Karnataka. The nearest town is Chamrajnagar, the district head quarters located at a distance of 60 kms. The nearest railway station is at Maddur (40 kms) and the nearest airport is at Bangalore (130 kms), the state head quarters. The geographical co-ordinates of the project site are Longitude 77°10'12" East and Latitude 12° 16' 09" North.

Physical Location address of the project activity:

Ranganathaswamy Mini Hydrel Power Project

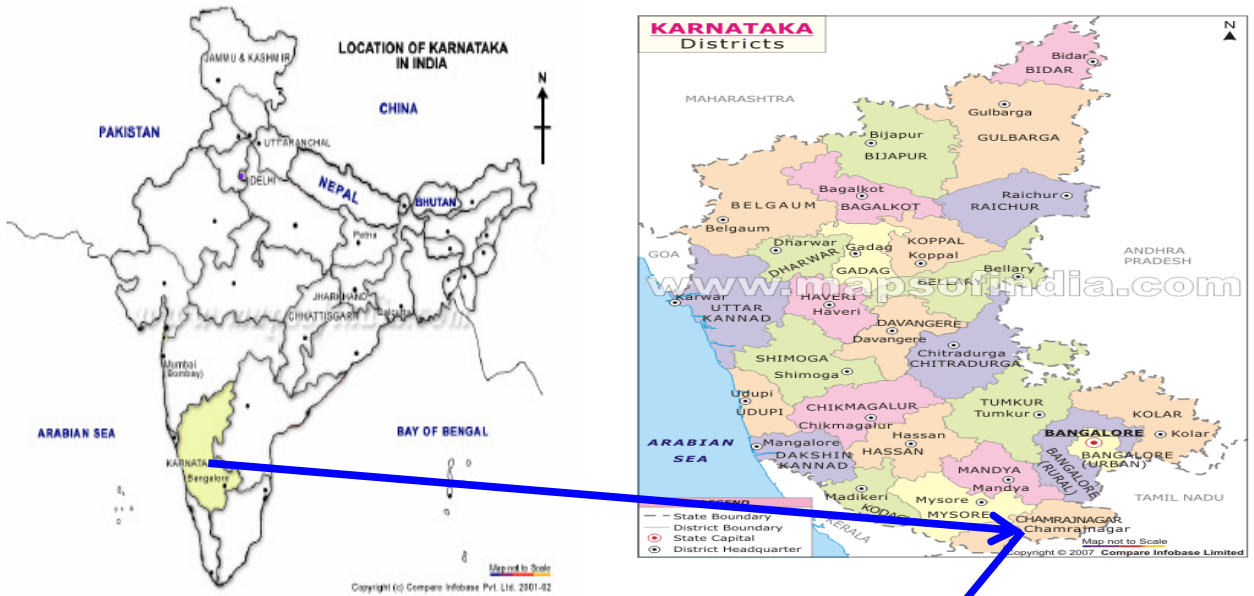
Across Cauvery River

Survey Nos. 01,1692,06, 7/2, 59, 104/3, 105/1 and 112 of government land

Survey Nos.120,118,111,104,105,103,101,100,97,99,95,75,64,63 and 62 of private land

Sattegala village, Kollegal taluk,

Chamarajnagar District, Karnataka



Map.1 : Location of Karnataka in India

Map.2 : Location of Chamrajnagar District in the Karnataka



Map.3: Location of 24.75 MW Ranganathaswamy Mini Hydel Power Project in Chamrajnagar District of Karnataka State.

## 6. Details of Major Equipments of the Project

The details of major equipments of the project are presented below:

**Table 1 – Details of Plant Major Equipments of the Project activity**

S.No	Name of the Equipment	Specifications
1	Turbine	Make : M/S Boving Fouress Limited Type: Horizontal shaft Francis type, Design discharge per Unit : 8 cumecs Design Head : 120 m Capacity of Rated power: 8250 kW No. of Units : 3 Nos.
2	Generator	Make: UCM RECITA, Romania, Model :IEC 60034-1, Sr.Nos.: 60433 - U1, 60435 – U2 & 60437 – U3 Rated Power : 8.25 MW, Rated Speed : 600 RPM, P.F. 0.85, No. of Units : 3 Nos.
3	Transformer	Make : kanochar , Sr.Nos. KT-600/4 and KT-600/5 Rated Power : 25000 / 35000 KVA

## 7. Statement to what extent the Project has been Implemented as planned

The Project has been completed as planned and the monitoring equipments were installed to monitor the parameters as described in the CDM Project Design Document (CDM PDD). The Units are in operation continuously (with outages – forced & planned) since its commercial operations.

The details of forced shut down periods, planned shut down periods and reasons for shut down are mentioned in the Annex-1.

The Details of Running & Non-Running Hrs of Each unit is tabulated in the given below

**Table 2: Running & Non –Running Hours of Each Unit**

S.No.	Description	18 Jun 08 to 30 Jun 09		
		Unit-I	Unit-II	Unit-III
1	Total No. of Hours available (Hrs:Min)	9072:00	9072:00	9072:00
2	Non-availability of water (Hrs:Min)	5004:50	5023:05	4993:35

3	Planned Shut downs (Hrs:Min)	244:35	201:55	226:35
4	Forced Shut downs (Hrs:Min)	50:45	49:55	60:35
5	Total Non Running hours (Hrs:Min)	5300:10	5274:55	5280:45
6	Total Running hours (Hrs:Min)	3771:50	3797:05	3791:15

## 8. Sustainability – Economic and Social Well Being

The project activity has resulted in sustainable development in the region as follows:

- Alleviation of poverty by generating direct and indirect employment in the area. The project generated indirect employment during the construction of the project activity and also permanent employment during operation of the project.
- The power generation from the project activity stabilizes the local grid and helped in providing uninterrupted power for farmers.
- The project activity contributed to the development of infrastructure in and around the project like roads, buildings and communication systems in the rural area.
- The project activity reduced the migration of the rural populace to urban areas, as the project activity generated employment opportunities.
- The project does not lead to any GHG emissions. So, the project doesn't have its influence on the microclimate of the region by non-polluting, entails no wastes or production of toxic gases; environmentally benign and reduce global warming impacts.

## 9. Parameters being monitored according to Monitoring plan

As described in registered PDD, the project activity uses the approved ACM0002 - Consolidated methodology for grid-connected electricity generation from renewable sources --- Version 6, Sectoral scope: 1.

The following parameters were monitored on continuous basis

<b>Data / Parameter:</b>	EG <sub>y</sub>
Data unit:	GWh
Description:	Net electricity export to the grid by the project
Source of data to be used:	On-site measurements
Value of data applied for the	



purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	<p>The energy delivery to the grid system will be metered using electronic trivector meters of accuracy class 0.2% (both main and check meters).</p> <p>The monthly meter reading (both Main and Check meters) shall be taken jointly by both company and BESCOM representatives on the first day of the following month at 12.00 Noon, both the parties will sign a document indicating the number of kilowatt-hours indicated by the meter in the form of digital output. The project activity may import electricity from the grid system. The electricity imports will be deducted from the electricity export to the grid system during each year of the crediting period to get metered net export figures.</p>
QA/QC procedures to be applied:	The Main meter and Check meter shall be tested for accuracy every calendar quarter with reference to a portable standard meter which shall be of an accuracy class of 0.1%. The portable standard meter shall be owned by BESCOM at its own cost and expenses and tested and certified atleast once every year against accepted laboratory standard meter in accordance with the Electricity Standards. The consumption registered by the main meters alone will hold good for the purpose of billing as long as the error in the main meter is within the permissible limits of 0.2% accuracy class.
Any comment:	--

<b>Data / Parameter:</b>	$F_{i,y}$
Data unit:	Tonnes / liters
Description:	Quantity of fossil fuel type i combusted in the project plant during year y
Source of data to be used:	On-site measurements / store issues
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	The total number of operating hours of DG set and the corresponding quantity of diesel consumed for the purpose will be recorded in the log book maintained at the DG set room. The operating hours and the quantity of diesel consumption will be recorded.
QA/QC procedures to be applied:	The weigh bridge meter will under go calibration/maintenance subject to appropriate industrial standards. The data recorded can be cross checked against the fuel purchase receipts.
Any comment:	The data on quantity of fossil fuel procured will be collected separately for all types of fossil fuels (if any).

### **Information Used for Emission Reduction Calculations**

Sr. No.	Key information/data used for baseline	Source of data/information
1.	Electricity Exported to grid	Monthly Meter Readings recorded and certified by KPTCL & plant personnel.
2.	Baseline Emission Factor	The project has considered the ex-ante emission factor for the combined margin of the Southern regional grid from Regd. PDD (UNFCCC Project Activity Ref. No.1345) wherein the validated Baseline emission factor is <b>857.00 tCO<sub>2</sub>/GWh</b> .
3.	HSD consumption	Diesel consumption records maintained by plant personnel.

### **Methods of data transfer and archiving policy**

The data have been recorded both at the project site as well as at the grid sub-station, which is under the control of KPTCL. The electricity export / import readings have been measured using calibrated tri-vector meters and recorded manually by the representatives of KPTCL and PPCL as a proof of export and import of electricity by the project activities. Those meter readings are the basis for the invoices raised by PPCL. These readings are also considered for emission estimations. Sales bills / receipts may be compared as an alternative proof of the electricity exported to the grid. And the data will be stored for a period of 2 years after the crediting period.

**Technical details of monitoring instruments like type, make, accuracy class, etc.**

Description	Main meter	Check meter
Type	Trivector Meter	Trivector Meter
Make	L&T	L&T
Accuracy class	0.2	0.2
Multiplying Constant	240000	240000
Connected CTR	400/1A	400/1A
Connected PTR	66kV/110V	66kV/110V
Serial No.	Sl.No. 05462962	S.I.No.05462968
Year of manufacturing	2004	2004
Calibration tested on		

### **Management system and quality assurance:**

Electricity: (Quality check & assurance is as per Article 7 of PPA signed between Pioneer Power Corporation Limited (PPCL) & Bangalore Electricity Supply Company Limited (BESCOM). Both Main Meter and Check Meters (export & import) installed by PPCL are of 0.2% accuracy class. Each meter is jointly inspected and sealed on behalf of the parties.

Both Main and Check meters are tested and certified at least once every year against an accepted laboratory standard meter in accordance with electricity standards. The meters are deemed to be working satisfactorily if the errors are within specifications for meters of 0.2% accuracy class.

As per the billing period, the Month wise data on electricity generation, auxiliary power consumption, electricity exported to grid and electricity imported from grid are presented in the table given below.

**Table – 3: Details of Electricity exported to grid, Electricity imported from grid and Net electricity displaced**

S.no.	Monitoring Period	Year	Electricity Exported to Grid	Electricity Imported from Grid	Net Electricity Displaced	
			kWh	kWh	kWh	GWh
1	18 to 30 June	2008	132000 (See Note-1)	9600 (See Note-2)	122400	0.122
2	July	2008	11016000	7200	11008800	11.009
3	August	2008	18441600	2400	18439200	18.439
4	September	2008	17942400	2400	17940000	17.940
5	October	2008	18931200	0	18931200	18.931
6	November	2008	17865600	2400	17863200	17.863
7	December	2008	15741600	2400	15739200	15.739
8	January	2009	2400	21600	-19200	-0.019
9	February	2009	9600	4800	4800	0.005
10	March	2009	571200	4800	566400	0.566
11	April	2009	266400	19200	247200	0.247
12	May	2009	1029600	9600	1020000	1.020
13	June	2009	43200	24000	19200	0.019
<b>Total</b>			<b>101992800</b>	<b>110400</b>	<b>101882400</b>	<b>101.882</b>

**Note-1:** As the crediting period started from the date of project registration with UNFCCC i.e. 18 Jun 2008, PPCL considered the figures of electricity exported to grid from the log sheets maintained at project site for the period from 18 to 30 Jun 2008. Copies of log sheets are being provided to the DOE for verification.

**Note-2:** As conservative estimates, PPCL considered the monthly Import figure from Form B, which was recorded & certified by KPTCL personnel.

The plant has been operated with excess electricity generation on rated capacity for the following months to utilize the available water flows for electricity generation. The details are furnished below:

Period	TG Installed Rated Cap. Generation, KWh	Actual electricity generation, KWh		Percentage of Excess electricity generation on rated capacity	
		Gross Generation	Export to grid	Gross Generation	Export to grid
	Calculation	Recorded at Project site	Recorded & certified by KPTCL representative	Calculation	Calculation
Aug-08	18414000	19145000	18441600	4.0%	0.1%
Sep-08	17820000	18130550	17942400	1.7%	0.7%
Oct-08	18414000	19129100	18931200	3.9%	2.8%
Nov-08	17820000	18053600	17865600	1.3%	0.3%

The project activity has been utilized the available water flows in the river for electricity generation by utilizing the TG inbuilt capacity which has capable to operated at 20% continuous overloading on rated capacity i.e. 8250 KW at generator terminals. A copy of Technical specification of Turbo generator Purchase Order placed on M/s Boving Fouress Limited is being provided to DOE for verification. As there is no restriction on the monthly plant load factor from the state electricity board authorities, the excess electricity generation is deemed acceptable.

## 10. GHG Calculations

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

The emission reductions for a given year are baseline emissions minus the project emissions and leakage.

$$ER_y = BE_y - PE_y - L_y$$

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

### 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<sub>2</sub>/GWh)

As mentioned under sec. B.2 of registered PDD<sup>1</sup> (UNFCCC Project Activity Ref. No.1345), the project has considered the ex-ante emission factor for the combined margin of the Southern regional grid and the details are furnished below:

Operating Margin (OM) in t CO <sub>2</sub> / GWh	1003.79
Build Margin (BM), in t CO <sub>2</sub> / GWh	711.34
Combined Margin (CM) Simple average of OM and BM in t CO <sub>2</sub> / GWh	857.00

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<sup>1</sup> <http://cdm.unfccc.int/Projects/DB/RWTUV1190101228.6/view>

**Project emissions (PEy) for using Diesel:**

$$PEFF_y = \sum F_{i,y} \cdot COEF_i$$

Where,

PEFF<sub>y</sub> = Project emissions from combustion of fossil fuel in the project activity during the year y

F<sub>i,y</sub> = Quantity of fuel consumption of fuel type i during the year y (in Tonnes)

COEF<sub>i</sub> = Carbon Dioxide emission factor coefficient of the fuel type i (tCO<sub>2</sub>/TJ)

As per "Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion", EB 41, Annex 11, Version 2, the COEF<sub>i</sub> is evaluated as follows:

COEF<sub>i</sub> = NCV × EF<sub>CO2</sub>

NCV = Net Calorific value of the Diesel (43 TJ/Gg<sup>2</sup> as per IPCC 2006 default value)

EF<sub>CO2</sub> = CO<sub>2</sub> emission factor of Diesel (74.1 t CO<sub>2</sub>/TJ<sup>3</sup> as per IPCC 2006 default value)

Therefore, PEFF<sub>y</sub> = F<sub>i,y</sub> × ρ<sub>i</sub> × (NCV × EF<sub>CO2</sub>) × OXID / 10<sup>6</sup>

Where

F<sub>i,y</sub> = Quantity of diesel used during the year (Ltrs)

ρ<sub>i</sub> = Density of diesel (0.845 kg/Ltr. as per Society of Indian Automobile Mfgs. <http://www.siamindia.com/scripts/Diesel.aspx>)

OXID = Oxidation factor (1 as per IPCC 2006 default value)

**Leakage**

As specified in ACM 0002, project participants do not need to consider these emission sources as leakage in applying this methodology. Hence the leakage emissions are considered zero.

Using the above formulas, the Emission reductions from the project activity are shown in Chapter 11.

<sup>2</sup> Page No. 18 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories vide web link [http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2\\_Volume2/V2\\_1\\_Ch1\\_Introduction.pdf](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)

<sup>3</sup> Page No. 16 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories vide web link [http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2\\_Volume2/V2\\_2\\_Ch2\\_Stationary\\_Combustion.pdf](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf)

## 11. Net Emission Reductions

The emission reductions for the chosen monitored period i.e. from 2007/07/27 to 2008/06/17 are presented below:

**Table – 4: Net Emission Reductions for reported period**

Monitored Period	Year	Total Electricity Displaced	Diesel Consumption	Emission Factor	Baseline Emissions	Project Emissions	Net Emission Reductions
		(GWh)	Ltr	tCO <sub>2</sub> /GWh	tCO <sub>2</sub> e	tCO <sub>2</sub> e	tCO <sub>2</sub> e
18 to 30 June	2008	0.122	0	857	104.9	0.00	104.9
July	2008	11.009	53	857	9434.5	0.14	9434.4
August	2008	18.439	4	857	15802.4	0.01	15802.4
September	2008	17.940	0	857	15374.6	0.00	15374.6
October	2008	18.931	55	857	16224.0	0.15	16223.9
November	2008	17.863	0	857	15308.8	0.00	15308.8
December	2008	15.739	0	857	13488.5	0.00	13488.5
January	2009	-0.019	0	857	-16.5	0.00	-16.5
February	2009	0.005	709	857	4.1	1.91	2.2
March	2009	0.566	8	857	485.4	0.02	485.4
April	2009	0.247	8	857	211.9	0.02	211.8
May	2009	1.020	845	857	874.1	2.28	871.9
June	2009	0.019	0	857	16.5	0.00	16.5
<b>Total</b>		<b>101.882</b>	<b>1682</b>		<b>87313.2</b>	<b>4.5</b>	<b>87308.7</b>
<b>Project Considered</b>					<b>87313</b>	<b>5</b>	<b>87308</b>

The net emission reductions occurred during the reported period are more than the estimated net emission reductions in the registered PDD and the details are furnished below:

Parameters	Units	18 Jun 08 to 30 Jun 09		
		As per Regd. PDD	Actual	Variation
Gross electricity generation	GWh	74.900		
Aux.consumption & Non-availability exigencies of grid	GWh	2.247		
Export to grid	GWh	72.653	101.993	
Import from grid	GWh	0.000	0.110	
<b>Electricity displaced</b>	<b>GWh</b>	<b>72.653</b>	<b>101.882</b>	<b>40.2%</b>
Baseline emission factor	tCO <sub>2</sub> /GWh	857.0	857.0	

Baseline emissions	tCO <sub>2</sub> e	62264	87313	
Project emissions	tCO <sub>2</sub> e	0	5	
<b>Net emission reductions</b>	<b>tCO<sub>2</sub>e</b>	<b>62264</b>	<b>87308</b>	<b>40.2%</b>

The net emission reduction for the reported period is 40.2% more than the estimated in the registered PDD due to more net electricity generation (exported to grid).

The reasons for the excess net electricity generations are

- Excess rainfall in the catchments area of river
- Power generation during the lean / off season
- Reduction in the Losses

The uncertainty relating to water discharges was in fact one of the key risk factors affecting the project. Most of the above factors keep changing on year to year basis. Due to favorable discharges from the above-mentioned factors and availability of plant, which could not be relied upon at the time of PDD writing, actual water flows during the monitored period were higher and thereby the power generations are higher than the estimated power generations. Justification for excess net electricity generations is furnished as Annex-2.

The detailed calculation of emission reductions is provided in excel spread sheet.

## 12. Measures to ensure the results/uncertainty analysis

The energy exported by Project is recorded from independent main meter installed at the 66/11KV substation .In the event, the Main Meter is not in operation, the reading from Check Meter is used for billing.

The calibration of monitoring equipment is being maintained as per the requirements mentioned in Article 7 of Power Purchase Agreement (PPA) and the same is being done regularly. Both meters are of same specifications & frequency and approved by KPTCL. The accuracy clause of these meters is 0.2.

## 13. Details of Monitoring team and Responsibilities

A VCS team has been formed in RSMHS activities for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management of Pioneer Power Corporation Limited (PPCL). Qualified and trained people monitor the parameters and emission



reduction calculations. In the complete implementation and monitoring Plan, PPCL is the sole agency responsible for implementation and monitoring.

Detailed contact information of project participant is provided in Annex 1.

**Table 5 - Monitoring Team**

S.No.	Name of the Person	Designation
1	Mr. P. Pratap Reddy	Managing Director
2	Mr. S.Ganapathi Rao	Executive Director
3	Comdr. (Retd.) K.C. Shibu	Chief Executive officer
4	Mr. G.Parda saradhi	Works Manager
5	Mr. S.V.Vivekananda	Shift Incharge
6	Mr. T.Gangadhar	Shift Incharge
7	Mr. B.R.Nanjunda Swamy	Shift Incharge

### **Roles and Responsibilities – Monitoring Plan**

#### **Board of Directors**

Review the quarterly reports submitted by Executive Director, suggesting necessary corrective actions to the person responsible and approving the quarterly reports to compile further as annual report which will be made available to the DoE for verification. The Board also examines the internal audit reports prepared by internal auditor and will in particular take note of any deviations in data over the norms and monitor that the corrective actions have resulted in adherence to standards.

#### **Executive Director (ED)**

Executive Director is responsible for review the monthly reports submitted by Chief Executive Officer and preparing a quarterly report on operational conditions of plant and also compiling the data on electricity export to the grid system on a quarterly basis for submission to the Board of Directors. The responsibility of ED also includes suggesting and modifying the structure of monitoring reports and data recording formats as and when required.

#### **Chief Executive Officer**

Summarization of data on monthly basis based on the daily reports provided by works manager, comparing the export data with monthly bills raised to BESCOM and making necessary corrections and modifications before reporting to Executive Director.

**Works Manager**

Reviewing the monitored parameters for correctness, corrective measures in case of minor errors in the monitored data and preparing a daily summary on project operation and electricity generation to the Chief Executive Officer on daily basis

**Shift Incharge**

Collection of meter reading for electricity export by the project activity. Report will be sent to the works manager on daily basis.

**Annex -1****Details for Plant Shut downs & Reasons – Unit Wise**

<b>Outage Details for UNIT -1</b>				
<b>Date</b>	<b>Type of shut down (in Hr:Min)</b>			<b>Reason</b>
	<b>Off-season</b>	<b>Planned</b>	<b>Forced</b>	
18 Jun to 28 Jul 08	570:00			Insufficient water inflow
2-Aug-08		6:55		Trash cleaning
30 to 31 Aug 08		18:25		PLC/SCADA WORKS
26 to 30 Sep 08		101:50		Ele/Mech Maintenance
27 to 31 Oct 08		59:15		Ele/Mech Maintenance
27 to 30 Nov 08		58:10		Ele/Mech Maintenance
23 Dec 08 to 31 Mar 09	2332:00			Insufficient water inflow
01 Apr 09 to 30 Jun 09	2102:50			Insufficient water inflow
Other short interruptions			50:45	
<b>Total</b>	<b>5004:50</b>	<b>244:35</b>	<b>50:45</b>	<b>5300:10</b>

<b>Outage Details for UNIT -2</b>				
<b>Date</b>	<b>Type of shut down (in Hr:Min)</b>			<b>Reason</b>
	<b>Off-season</b>	<b>Planned</b>	<b>Forced</b>	
18 Jun 08 to 28 Jul 08	615:00			Insufficient water inflow
2-Aug-08		6:50		Trash cleaning
29-Aug-08		12:50		Ele/Mech Maintenance
30 to 31 Aug 08		27:05		PLC/SCADA WORKS
28 to 30 Sep 08		57:25		Ele/Mech Maintenance
29 to 31 Oct 09		57:45		Ele/Mech Maintenance
28 to 30 Nov 08		40:00		Ele/Mech Maintenance
24 Dec 08 to 31 Mar 09	2306:00			Insufficient water inflow
01 Apr 09 to 30 Jun 09	2102:05			Insufficient water inflow
Other short interruptions			49:55	
<b>Total</b>	<b>5023:05</b>	<b>201:55</b>	<b>49:55</b>	<b>5274:55</b>

Outage Details for UNIT -3				
Date	Type of shut down (in Hr:Min)			Reason
	Off-season	Planned	Forced	
18 Jun 08 to 28 Jul 08	596:00			Insufficient water inflow
2-Aug-08		6:50		Trash cleaning
28-Aug-08		14:10		TRC cleaning
30 to 31 Aug 08		38:10		PLC/SCADA WORKS
26 to 30 Sep 08		67:05		Ele/Mech Maintenance
29 to 31 Oct 09		50:35		Ele/Mech Maintenance
26 to 29 Nov 08		49:45		Ele/Mech Maintenance
24 Dec 08 to 31 Mar 09	2228:00			Insufficient water inflow
01 Apr 09 to 30 Jun 09	2169:35			Insufficient water inflow
Other short interruptions			60:35	
<b>Total</b>	<b>4993:35</b>	<b>226:35</b>	<b>60:35</b>	<b>5280:45</b>

**Annex -2****Justification for Excess Net Electricity Generation during the Reported Period**

The project is a run of the river hydroelectric scheme and it was located downstream of the existing Shiva anicut which is far downstream of the two major reservoirs viz. the Krishnarajasagar (KRS) reservoir across Cauvery and the Kabini reservoir across river Kabini.

The projected power generation (in GWh) in the Detailed Project Report (DPR), as reflected in the registered PDD and the actual generations during the reported period are furnished below:

Parameters	Units	18 Jun 08 to 30 Jun 09		
		As per Regd. PDD	Actual	Variation
Gross electricity generation	GWh	74.900 <sup>a</sup>		
Aux.consumption & Non-availability exigencies of grid	GWh	2.247		
Export to grid	GWh	72.653 <sup>b</sup>	101.993 <sup>c</sup>	
Import from grid	GWh	0.000	0.110 <sup>c</sup>	
<b>Electricity displaced</b>	<b>GWh</b>	<b>72.653</b>	<b>101.882</b>	<b>40.2%</b>

<sup>a</sup> As per Hydrology study carried out which forms part of the DPR.

<sup>b</sup> Adjusted by taking 3% as Aux. consumption & other losses as projected in the PDD.

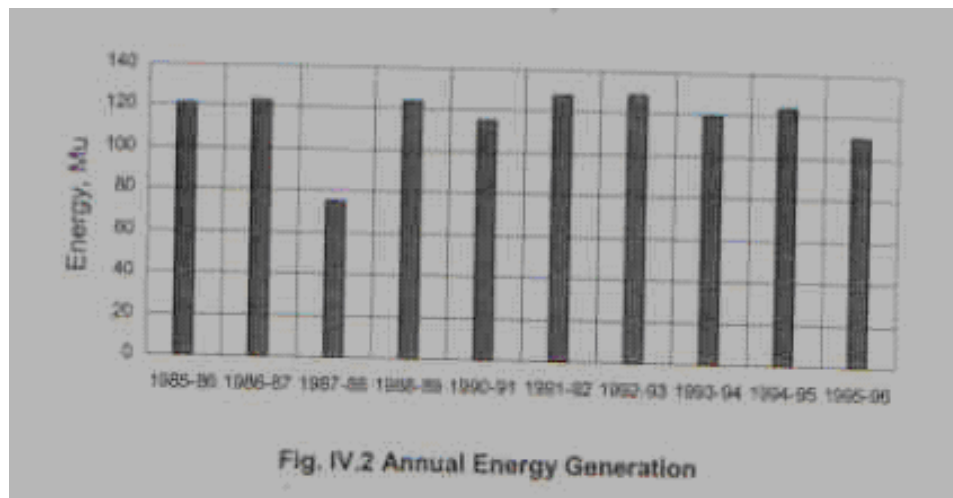
<sup>c</sup> Computed based on Monthly electricity readings recorded & certified by KPTCL personnel.

The first reason for the net electricity generation compared to the projection in the PDD is that the rainfall in the catchments area of river Cauvery and Kabini was above normal for the region. As per Annual climate summary 2008<sup>4</sup> published by India Meteorological Department, Govt. of India, the cumulative rainfall in the catchments area of Cauvery river for the reported period are above of its Long Period Average (LPA). The details of rain fall in **South Interior Karnataka** (Covered Cauvery river catchments area) are presented below:

<sup>4</sup> Page No. 22: Rainfall Statistics – Table-1 vide web link  
<http://www.imdpune.gov.in/research/ncc/climatebulletin/annual%20summary%202008.pdf>

	Normal	Year 2008	
		Actual	% Excess
Winter (Jan – Feb)	5.4	19.6	260
Pre-Monsoon (Mar-May)	150.4	219.2	46
Monsoon (Jun to Sep)	659.3	721.7	9
Post-Monsoon (Oct to Dec)	199.7	145.2	-27

At the time of Detailed Project Report preparation, the annual energy generation for the proposed plant configuration (3 x 8.25 MW) was estimated for the period of 10 years based on the daily flow data available from 1985-86 to 1995-96. The variations in annual energy are shown below and it was observed that the generation varies from a maximum of 129 MU (or GWh) in the year 1992-93 to a minimum of 75 MU in the year 1987-88. The 90% dependable annual energy generation was estimated as 74.9 MU (or GWh) and the same was reflected in the registered PDD.



Source: Detailed Project Report

In the absence of relevant data for the following were not accounted in the estimated average annual export power to grid of 74.9 MW.

- No corrections to the recorded data for the additional catchment area made at Dhanagere anicut.
- The releases into Dhanagere irrigation canal

The uncertainty relating to water flows was in fact one of the key risk factors affecting the project. The investment decision, and hence the projected power generation in the PDD, were based on a conservative average water flows of 24 cubic meters per second (cumec) as reflected in PDD, corresponding to an average plant load factor of around 35%. Due to favorable water flows in the river from the above-mentioned factors which could not be relied upon at the time of PDD writing, the actual net electricity generation during the monitoring period is 40.2% excess than the estimated in the PDD.

As there is no restriction on the plant load factor (PLF) from the state electricity board authorities (Karnataka Power Transmission Corporation Limited), the project activity has utilized the available water flows and generated excess electricity generation is deemed acceptable.

Page No. 22: Rainfall Statistics – Table-1 vide web link <http://www.imdpune.gov.in/research/ncc/climatebulletin/annual%20summary%202008.pdf>

**TABLE - 1**  
**METROLOGICAL SUB-DIVISION WISE SEASONAL AND ANNUAL RAINFALL STATISTICS FOR THE YEAR 2008 BASED ON**  
**OPERATIONAL DATA**



## PPCL - Monitoring Report

S.NO.	SUBDIVISION NAME	WINTER SEASON			PRE-MONSOON			MONSOON			POST MONSOON SEASON			ANNUAL 2008		
		ACTUAL	NORMAL	%DEP	ACTUAL	NORMAL	%DEP	ACTUAL	NORMAL	%DEP	ACTUAL	NORMAL	%DEP	ACTUAL	NORMAL	%DEP
1	A & N ISLANDS	72.3	85.1	-15	867.1	461.01	88	1752.1	1755.2	0	643.6	700.4	-8	3335.1	3001.7	11.1
2	ARUNACHAL PRADESH	106.3	137.8	-23	409.1	719.52	-43	1809.5	1834.9	-1	145.7	243.7	-40	2470.6	2935.9	-15.8
3	ASSAM & MEGHALAYA	42.7	44.8	-5	489.1	681.53	-28	1604.6	1885.3	-15	134.6	190.5	-29	2271.0	2802.2	-19.0
4	NAG.,MANI.,MIZO.& TRIP	40.8	41.0	0	221.3	443.35	-50	1057.3	1240.9	-15	162.3	195.3	-17	1481.7	1920.6	-22.9
5	S.H.W.B.&SIKKIM	35.6	48.9	-27	369.4	429.68	-14	2101.7	1955.4	7	112.1	183.1	-39	2618.8	2617.0	0.1
6	GANGATIC W.B.	65.1	32.3	102	153.4	166.68	-8	1291.7	1136.3	14	70.3	159.3	-56	1580.5	1494.6	5.7
7	ORISSA	47.9	31.9	50	104.1	120.56	-14	1418.6	1164.9	22	29.9	155.2	-81	1600.5	1472.5	8.7
8	JHARKHAND	14.7	38.5	-62	71.9	85.79	-16	1097.5	1092.5	0	16.5	100.4	-84	1200.6	1317.2	-8.9
9	BIHAR	43.8	28.3	55	86.3	84.68	2	1145.0	1039.2	10	31.6	78.6	-60	1306.7	1230.8	6.2
10	EAST U.P.	5.4	33.3	-84	32.5	33.06	-2	1067.8	913.6	17	16.2	61.9	-74	1121.9	1041.8	7.7
11	WEST U.P.	0.3	36.2	-99	30.7	29.01	6	798.3	772.8	3	11.2	50.8	-78	840.5	888.8	-5.4
12	UTTARANCHAL	25.6	115.8	-78	81.9	156.97	-48	1151.0	1223.1	-6	40.1	86.7	-54	1298.6	1582.6	-17.9
13	HAR., CHANDI.& DELHI	5.2	35.7	-85	84.4	34.4	145	536.4	470.0	14	6.9	27.4	-75	632.9	567.6	11.5
14	PUNJAB	21.4	51.1	-58	72.3	54.4	33	603.8	501.8	20	11.4	41.5	-73	708.9	648.8	9.3
15	HIMACHAL PRADESH	154.1	192.0	-20	102.3	246.6	-59	737.9	773.7	-5	54.6	111.5	-51	1048.9	1323.8	-20.8
16	JAMMU & KASHMIR	238.7	234.1	2	165.5	345.7	-52	524.3	513.6	2	158.7	152.6	4	1087.2	1246.0	-12.7
17	WEST RAJASTHAN	0.5	8.2	-94	25.4	17.14	48	277.2	262.8	5	6.5	8.9	-27	309.6	297.1	4.2
18	EAST RAJASTHAN	0.00	11.3	-100	18.9	17.31	9	604.0	623.6	-3	4.2	26.0	-84	627.1	678.2	-7.5
19	WEST M.P.	0.4	17.1	-98	6.1	14.45	-58	715.3	904.3	-21	26.0	52.0	-50	747.8	987.9	-24.3
20	EAST M.P.	6.7	44.8	-85	23.5	28.07	-16	946.3	1097.4	-14	13.3	59.1	-77	989.8	1229.3	-19.5
21	GUJARAT REGION	0.00	2.1	-100	2.3	8.52	-73	918.2	933.6	-2	11.9	34.7	-66	932.4	978.9	-4.8
22	SAURASHTRA & KUTCH	0.3	1.9	-84	0.7	4.73	-85	558.5	485.7	15	12.8	26.0	-51	572.3	518.3	10.4
23	KONKAN & GOA	0.0	1.0	-100	30.1	40.1	-25	2968.8	2802.1	6	52.6	135.4	-61	3051.5	2978.6	2.4
24	MADHYA M'RASHTRA	0.0	3.6	-100	41.4	41.39	0	755.6	700.1	8	61.9	105.4	-41	858.9	850.4	1.0
25	MARATHAWADA	0.4	6.7	-94	36.1	33.37	8	585.3	704.3	-17	29.2	96.0	-70	651.0	840.4	-22.5
26	VIDARBHA	4.3	21.8	-80	48.5	31.33	55	782.8	976.2	-20	20.1	75.3	-73	855.7	1104.6	-22.5
27	CHATTISGARH	15.3	27.3	-44	53.3	53.26	0	1064.4	1205.8	-12	11.1	82.0	-86	1144.1	1368.4	-16.4
28	COASTAL A.P.	72.8	15.4	372	124.1	94.41	31	598.8	575.2	4	261.5	326.2	-20	1057.2	1011.2	4.5
29	TELANGANA	20.0	10.2	96	137.6	55.65	147	797.5	767.3	4	42.9	109.6	-61	998.0	942.8	5.9
30	RAYALASEEMA	22.6	6.7	236	133.2	78.17	70	387.5	380.9	2	251.8	212.1	19	795.1	677.9	17.3
31	TAMIL NADU & POND.	45.9	35.2	30	261.8	127.7	105	324.5	315.6	3	563.6	431.8	31	1195.8	910.3	31.4
32	COASTAL KARNATAKA	9.1	2.0	367	264.3	179.41	47	2653.0	3173.9	-16	124.5	258.0	-52	3050.9	3613.2	-15.6
33	N.I.KARNATAKA	6.6	4.6	43	163.9	87.86	87	429.9	490.9	-12	100.1	136.7	-27	700.5	720.1	-2.7
34	S.I.KARNATAKA	19.6	5.5	260	219.2	150.35	46	721.7	659.3	9	145.2	199.7	-27	1105.7	1014.8	9.0
35	KERALA	30.5	28.1	8	398.3	427.81	-7	1678.3	2143.0	-22	427.0	498.5	-14	2534.1	3097.4	-18.2
36	LAKSHADWEEP	25.4	36.9	-31	316.5	233.7	35	933.9	985.2	-5	450.6	328.9	37	1726.4	1584.7	8.9