

# **MONITORING REPORT**

**Hapugastenne and Hulu Ganga Small Hydropower Projects**

**Version 2**

**Dated 18<sup>th</sup> January 2010**

<b>Title</b>	<b>Hapugastenne and Hulu Ganga Small Hydropower Projects</b>
<b>UNFCCC Reference No</b>	<b>0085</b>
<b>Registration Date</b>	<b>30<sup>th</sup> October 2005</b>
<b>Crediting Period</b>	<b>1 January 2003 – 31 December 2012</b>
<b>Verification No.</b>	<b>Four</b>
<b>Monitoring Period</b>	<b>1 October 2008 to 31 December 2009</b>

(i) Implementation Status of Project

All four sub projects, Hapugastenne Phase I, Hapugastenne Phase II, Hulu Ganga Phase I and Hulu Ganga Phase II, were commissioned before the start of the monitoring period under consideration and the plants continued to operate during the entire period.

(ii) Monitoring Systems and Procedures

In respect of electricity supplied to the grid and electricity consumption from the grid, no special procedures were necessary to be implemented because the meter readings to determine this supply/consumption were read by an independent third party, the Ceylon Electricity Board (CEB). The meter recording supply to the grid was recalibrated during the period under consideration. Details are provided under (iv).

In respect of monitoring of environmental parameters (see under (iii) below), the Senior Manager – Operations of the company has been specifically tasked with ensuring the regular checks of erosion and sediment are carried out and also to arrange for the test reports required as part environmental monitoring.

(iii) Parameters Required to be Monitored and Reported

**Hapugastenne Phase I and II Plants**

Notes:

1. The Hapugastenne Phase I and II plants have the same civil works.
2. The Phase I plant consist of 2 sets of identical turbines/generators and related equipment
3. The Phase II plant (which was commissioned one year later) consists of 1 set of the same turbines/generators as the Phase I plant plus related equipment.
4. The CEB measures the output of the two plants separately using two separate meters.
5. In practice the 2 plants are operated as a single entity.

**Electricity Output – Hapugastenne Phase I Plant**

Month	Electricity Output (kWh)	Source (Invoice Nos raised for CEB)	Consumption from Grid (kWh)	Net Electricity Output (kWh)
<b>2008</b>				
October	1,773,770	4035	2,001	1,771,769
November	1,103,330	4036	3,263	1,100,067
December	1,892,130	4037	843	1,891,287
<b>2009</b>				
January	72,350	4038	8,055	64,295
February	6,617	4040	7,099	(482)
March	586,583	4041	5,214	581,369
April	1,028,422	4042	2,831	1,025,591
May	1,203,330	4043	4,403	1,198,927
June	3,594,088	4044	13	3,594,075
July	1,724,020	4045	1,071	1,722,949
August	1,681,080	4046	575	1,680,505
September	2,828,800	4047	26	2,828,774
October	2,191,280	4048	46	2,191,234
November	1,964,710	4049	361	1,964,349
December	2,133,091	4050	52	2,133,039
<b>Total</b>	<b>23,783,601</b>		<b>35,394</b>	<b>23,747,748</b>

## Electricity Output – Hapugastenne Phase II Plant

Month	Electricity Output (kWh)	Source (Invoice Nos raised for CEB)	Consumption from Grid (kWh)	Net Electricity Output (kWh)
<b>2008</b>				
October	1,576,590	5035	10	1,576,580
November	1,328,250	5036	216	1,328,034
December	1,622,810	5037	178	1,622,632
<b>2009</b>				
January	1,050,160	5038	176	1,049,984
February	524,090	5040	38	524,052
March	719,980	5041	938	719,042
April	1,421,321	5042	73	1,421,248
May	1,273,681	5043	91	1,273,590
June	1,674,708	5044	27	1,674,681
July	1,452,570	5045	128	1,452,442
August	1,455,060	5046	143	1,454,917
September	1,591,800	5047	170	1,591,630
October	1,458,800	5048	260	1,458,540
November	1,595,010	5049	487	1,594,523
December	2,025,680	5050	212	2,025,468
<b>Total</b>	<b>20,770,510</b>		<b>2,188</b>	<b>20,767,363</b>

## Environmental Parameters – Common for Hapugastenne Phase I and II Plants

Aspect Monitored	Parameters Monitored	Monitoring Location(s)	Monitoring Dates
Surface water	Nutrient levels in terms of phosphates and Total Inorganic Nitrogen (TIN)	Upstream of weir	September 2008 and September 2009
Surface water	BOD and COD levels	Upstream of weir and below the tailrace (water release point to the river after generation)	August 2008 and September 2009
Ecology	Flora and fauna	Within the courses of Rath Ganga below the diversion point.	February 2009
River bank erosion	Erosion level	Below the tailrace and at the bottom of the spill where water is diverted in the event of a plant shut down.	Once a month over entire period
Sediment	Sediment deposits.	Upstream of the weir.	Once a month over entire period

## Employment Details – Common for Hapugastenne Phase I and II Plants

Employee category	Number of Employees
Power Station Assistants	11
Power Station Operators	3
Power Station Supervisors	5

## Community Development Expenditure – Common for Hapugastenne Phase I and II Plants

Date	Payee	Nature of Expenditure	Amount (Rs)
29-Oct-08	Village Development Society-Keeriwandala	Road development	50,000
4-Feb-09	Village Development Sociaty-Keeriwandala	Road development	50,000
24-Jul-09	Sri Neegrodaramaya, Gallalla, Rathnapura	New constructions at temple	50,000
7-Oct-09	Pradesiya Saba -Rathnapura	Community welfare	50,000

Date	Payee	Nature of Expenditure	Amount (Rs)
24-Sep-09	Rathgala Viddalaya	Prizes - New Year Festival	4,800

### Hulu Ganga Phase I and II Plants

Notes:

1. The Hulu Ganga Phase I and II plants are situated next to each other and are considered a single plant complex by the CEB. As a result the CEB only has a single meter to measure the combined energy generation by the two plants each month.

### Electricity Output – Hulu Ganga Phase I and II Plants

Month	Electricity Output (kWh)	Source (Invoice Nos raised for CEB)	Consumption from Grid (kWh)	Net Electricity Output (kWh)
<b>2008</b>				
October	1,198,500	6036	725	1,197,775
November	1,692,120	6037	725	1,691,395
December	3,192,080	6038	725	3,191,355
<b>2009</b>				
January	1,099,000	6039	725	1,098,275
February	337,000	6040	725	336,275
March	459,000	6041	725	458,275
April	439,000	6042	725	438,275
May	949,000	6043	3,120	945,880
June	793,000	6044	120	792,880
July	897,000	6045	180	896,820
August	942,500	6046	660	941,840
September	1,356,500	6047	180	1,356,320
October	1,465,000	6049	180	1,464,820
November	2,830,000	6050	60	2,829,940
December	3,168,460	6051	120	3,168,340
<b>Total</b>	<b>20,818,160</b>		<b>9,335</b>	<b>20,808,465</b>

### Environmental Parameters – Hulu Ganga Phase I Plant

Aspect Monitored	Parameters Monitored	Monitoring Location(s)	Monitoring Dates
Surface water	Nutrient levels in terms of phosphates and Total Inorganic Nitrogen (TIN)	Upstream of weir	September 2008 and August 2009
Surface water	BOD and COD levels	Upstream of weir and below the tailrace (water release point to the river after generation)	August 2008 and August 2009
Ecology	Flora and fauna	Within the courses of Hulu Ganga below the diversion point.	April 2009
River bank erosion	Erosion level	Below the tailrace and at the bottom of the spill where water is diverted in the event of a plant shut down.	Once a month over entire period
Sediment	Sediment deposits.	Upstream of the weir.	Once a month over entire period

## Environmental Parameters – Hulu Ganga Phase II Plant

Aspect Monitored	Parameters Monitored	Monitoring Location(s)	Monitoring Dates
Surface water	Nutrient levels in terms of phosphates and Total Inorganic Nitrogen (TIN)	Upstream of weir	September 2008 and August 2009
Surface water	BOD and COD levels	Upstream of weir and below the tailrace (water release point to the river after generation)	August 2008 and August 2009
Ecology	Flora and fauna	Within the courses of Moragaha Oya below the diversion point.	April 2009
River bank erosion	Erosion level	Below the tailrace and at the bottom of the spill where water is diverted in the event of a plant shut down.	Once a month over entire period
Sediment	Sediment deposits.	Upstream of the weir.	Once a month over entire period

## Employment Details – Hulu Ganga Phase I and II Plants

Employee Category	Number of Employees	
	Phase I	Phase II
Power Station Assistants	3	3
Power Station Operators	3	3

## Community Development Expenditure – Hulu Ganga Phase I and II Plants

Date	Payee	Nature of Expenditure	Amount (Rs)
24-Nov 08	Kosgama Development Fund	Village development (school/temple)	200,000

(iv) Calibration of Monitoring Instruments

The calibration dates of the electrical meters of the three sub-projects (there is one composite meter for the Hulu Ganga Phase I and Phase II plants) were as follows:

Plant	Meter Calibration Dates
Hapugastenne Phase I	05/01/2008, 08/06/2009
Hapugastenne Phase II	05/01/2008, 08/06/2009
Hulu Ganga (Phase I and II)	27/11/2008, 04/12/2009

(v) Emission Factor

The ex ante emission factor as per the PDD which is used for the purpose of monitoring is 0.8496 kgCO<sub>2</sub> per kWh

(vi) Deviation Requests

No deviation requests have been made in respect of this verification period..

(vii) Emissions Calculations

The emissions reductions during the monitoring period are as follows:

**Hapugastenne Phase I Plant**

Baseline emissions reduction  $(23,786,601 * 0.8496 / 1,000) = 20,206.5 \text{ tCO}_2$   
 Project emissions/leakages  $(35,394 * 0.8496 / 1,000) = 30.1 \text{ tCO}_2$   
 Net emissions reductions  $= 20,176.4 \text{ tCO}_2$

**Hapugastenne Phase II Plant**

Baseline emissions reduction ( $29,084,244 \times 0.8496 / 1,000$ )	= 17,646.2 tCO <sub>2</sub>
Project emissions/leakages ( $7,135 \times 0.8496 / 1,000$ )	= 1.9 tCO <sub>2</sub>
Net emissions reductions	= 17,645.0 tCO <sub>2</sub>

**Hulu Ganga Phase I and II Plant**

Baseline emissions reduction ( $20,818,160 \times 0.8496 / 1,000$ )	= 17,687.1 tCO <sub>2</sub>
Project emissions/leakages ( $9,335 \times 0.8496 / 1,000$ )	= 7.9 tCO <sub>2</sub>
Net emissions reductions	= 17,679.2 tCO <sub>2</sub>

**All Plants in PDD**

Baseline emissions reduction	= 55,540.3 tCO <sub>2</sub>
Project emissions/leakages	= 39.9 tCO <sub>2</sub>
Net emissions reductions	= 55,500.4 tCO <sub>2</sub>

Net emissions reductions rounded off to the nearest whole number is 55,500 tCO<sub>2</sub>.

**Notes:**

1. Baseline emissions reductions and project emissions/leakages for each plant are derived by multiplying the electricity output/consumption from the grid (in kWh) by the emissions factor specified in (v) and dividing by 1,000 to convert to tCO<sub>2</sub>.
2. Net emissions reductions for each plant are calculated by subtracting the project emissions/leakages from the baseline emissions reduction for the plant.
3. Totals for all plants in the PDD is the simple sum of each of the project values.

**(viii) Comparison with PDD Estimate of Emissions Reduction**

In the original PDD the Hapugastenne Phase I plant was projected to result in annual emissions reductions of 14,273 tCO<sub>2</sub>. Since the monitoring period under consideration is 1.25 years, the expected emissions reduction during the period (on a pro rated basis) would be 17,841 tCO<sub>2</sub>, which is somewhat less than the actual emissions reductions during the period.

In the original PDD the Hapugastenne Phase II plant was projected to result in annual emissions reductions of 15,463 tCO<sub>2</sub>. Since the monitoring period under consideration is 1.25 years, the expected emissions reduction during the period (on a pro rated basis) would be 19,556 tCO<sub>2</sub>, which is more than the actual emissions reductions during the period.

In the original PDD the combined Hulu Ganga Phase I and II plants was projected to result in annual emissions reductions of 18,352 tCO<sub>2</sub>. Since the monitoring period under consideration is 1.25 years, the expected emissions reduction during the period (on a pro rated basis) would be 22,940 tCO<sub>2</sub>, which is more than the actual emissions reductions during the period.

Prepared by: Eco Power (Private) Limited  
30/1 Bagatalle Road  
Colombo 3  
Sri Lanka



Dr. Romesh Dias Bandaranaike  
Chief Executive Officer  
January 18, 2009