



## Monitoring report form (Version 03.2)

### Monitoring report

<b>Title of the project activity</b>	Hapugastenne and Hulu Ganga Small Hydropower Projects
<b>Reference number of the project activity</b>	0085
<b>Version number of the monitoring report</b>	03
<b>Completion date of the monitoring report</b>	02/04/2014
<b>Registration date of the project activity</b>	30/10/2005
<b>Monitoring period number and duration of this monitoring period</b>	Fifth 01/01/2010 to 31/12/2012 (Both days included)
<b>Project participant(s)</b>	Eco Power (Private) Ltd. (EPL)
<b>Host Party(ies)</b>	Sri Lanka
<b>Sectoral scope(s) and applied methodology(ies)</b>	Sectoral Scope 1: Energy industries (renewable - / non-renewable sources) Type I: Renewable energy projects Category D: Renewable Electricity Generation for a Grid Methodology: AMS-I.D, version 5, "Renewable electricity generation for a grid"
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	149,388 t CO <sub>2</sub>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	125,804 t CO <sub>2</sub>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)</b>	125,804 t CO <sub>2</sub>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).</b>	0

**SECTION A. Description of project activity****A.1. Purpose and general description of project activity**

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***Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks***

This project is a bundle of four (4) small-scale, run-of-river hydropower plants in Sri Lanka. The four hydropower plants range in size from 2.526 MW to 5.052 MW, have a combined capacity of 13.568 MW.

Power Plant	Capacity (in MW)
Hapugastenne I	5.052
Hapugastenne II	2.526
Hulu Ganga I	3.000
Hulu Ganga II	2.990
Total Capacity	13.568

The electricity from each of the hydropower plants is sold to the monopoly government-owned utility in Sri Lanka, the Ceylon Electricity Board (CEB), through a standard power purchase agreement available to all renewable energy based power generators that have individual capacities lesser than 10 MW. The PP has signed separate agreements for Hapugastenne and Hulu Ganga.

The projects results in a reduction of anthropogenic emissions of greenhouse gas by displacing an equivalent volume of electricity that would otherwise be generated by the most expensive thermal power plants tied into the national grid.

***Brief description of the installed technology and equipment***

All four of the project sites involve installation of a run-of-river hydropower plant system using well-established technologies. Run-of-river hydropower facilities are emissions-free and considered one of the best forms of low impact renewable energy available today. The civil structures at each project site consist of a gated weir designed to store a low volume of water, an intake arrangement, a channel, a desilting/forebay arrangement, a penstock, a powerhouse and a tailrace. Run-of-river hydropower has very low impact on river flow volumes and all water diverted to the powerhouse is returned to the main stream. The Hapugastenne projects run on a Pelton Turbine whereas the Hulu Ganga projects rely on a Francis type turbine. Both turbine types have well-demonstrated application around the world and are considered optimal for the particular sites being developed.

***Commissioning dates for the project activity***

The projects were commissioned on following dates:

Site	Date of Commissioning
Hapugastenne Phase I	14/08/2001
Hapugastenne Phase II	09/09/2002
Hulu Ganga Phase I	03/06/2003
Hulu Ganga Phase II	25/10/2006

***Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period***

The project results in a total emission reduction of 125,804 tCO<sub>2</sub> over the monitoring period of 01 January 2010 to 31 December 2012.

**A.2. Location of project activity**

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- a) Host Party(ies): Sri Lanka
- b) Region/ State/ Province
  - For Hapugastenne Phase I and Phase II projects- Sabaragamuwa Province, Ratnapura District
  - For Hulu Ganga I and Hulu Ganga II projects- Central Province, Kandy District
- c) City/ Town/ Community
  - For Hapugastenne Phase I and Phase II projects- Near the town of Ratnapura
  - For Hulu Ganga I and Hulu Ganga II projects- Near the village of Panwila, north of the town of Kandy
- d) Physical/ Geographical location.

Hapugastenne Phase I and Phase II Small Hydropower Projects are both located within close proximity of one another at the Hapugastenne Estate. Both projects are found at the following coordinates:

Longitude N 6° 42.1' / Latitude E 80° 30.3'

The next two projects, although quite close, are two distinct power generation facilities. They are located at the following coordinates:

Hulu Ganga Phase I Small Hydropower Project  
Longitude N 7° 23.5' / Latitude E 80° 44.8'

Hulu Ganga Phase II Small Hydropower Project  
Longitude N 7° 23.3' / Latitude E 80° 44.5'

**A.3. Parties and project participant(s)**

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Sri Lanka (Host)	Eco Power (Private) Ltd. (EPL)	No

**A.4. Reference of applied methodology**

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

Type I: Renewable energy projects

Category D: Renewable Electricity Generation for a Grid

Methodology: AMS-I.D, version 5, "Renewable electricity generation for a grid"

**A.5. Crediting period of project activity**

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Fixed Crediting period from 1 January 2003 to 31 December 2012 (10 years, 0 months).

**SECTION B. Implementation of project activity****B.1. Description of implemented registered project activity**

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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.

The projects were commissioned on following dates:

Site	Date of Commissioning
Hapugastenne Phase I	14/08/2001
Hapugastenne Phase II	09/09/2002
Hulu Ganga Phase I	03/06/2003
Hulu Ganga Phase II	25/10/2006

**B.2. Post registration changes****B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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There are no temporary deviations in the monitoring plan.

**B.2.2. Corrections**

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The registered PDD has been revised to version 4 dated 27 November 2013 to incorporate the following five corrections. The revised PDD has been approved on 18 March 2014<sup>1</sup>.

a) Under Table 1, section A.4.3 and E.1.2.5, the registered PDD was indicating the estimated emission reductions as per the envisaged capacity of 13.15 MW. The revised PDD (version 4 dated 27 November 2013) reflects the correct installed capacity of 13.568 MW and the corresponding emissions estimate.

b) Under section D.3 of the registered PDD, no procedures for quality assurance and quality control was included and the same have been incorporated in section B.7.3 of the revised PDD, version 4 dated 27 November 2013.

c) The Annex 1 of the registered PDD has been corrected to reflect the actual details of the contact persons for the project activity as per the latest modalities of communication available in the project interface. Also, the details under section B.5.3 of the registered PDD indicating the contact persons of the entity working out the baseline have been removed.

d) Under section E.1.2.1 of the registered PDD, the equations for calculating the emission reductions related to transportation and small engine related emissions were wrongly including the distance travelled and hours of operation. The same have been rectified as follows:

For transportation-related emissions:

Fuel for transportation	*	2.68
(litres of fuel)		(kg CO <sub>2</sub> /litre)

For small engine-related emissions (cement mixer and generator):

Fuel for operation	*	2.68
(litres of fuel)		(kg CO <sub>2</sub> /litre)

e) Under section E.2, the registered PDD was indicating the estimated construction related emissions. The revised PDD, version 4 dated 27 November 2013 has included the actual construction related emissions under section B.6.3, which is same as the 298.7 tCO<sub>2</sub> indicated in the registered PDD.

<sup>1</sup> <http://cdm.unfccc.int/Projects/DB/SGS-UKL1125677521.56/view>

**B.2.3. Permanent changes from registered monitoring plan or applied methodology**

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The following has been changed from registered monitoring plan.

In the registered PDD, the monitoring of electricity output from Hulu Ganga I and Hulu Ganga II were mentioned to be from separate meters. 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 electricity generation by the two plants each month.

Thus a single bi-directional meter is used to monitor the electricity output from Hulu Ganga I and Hulu Ganga II projects.

The changes of monitoring plan has been elaborated in the revised PDD of version 4 dated 27 November 2013.

**B.2.4. Changes to project design of registered project activity**

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The following has been changed from registered project activity.

In the registered PDD, the project was to be implemented for a total capacity of 13.15 MW. However, during the actual implementation, the capacity implemented was slightly different from what was registered. This is because while purchasing the equipment, the exact capacity turbines as mentioned in PDD was not available and thus the nearest capacity turbines were installed. The actual combined capacity of project is 13.568 MW with following break-up:

Power Plant	Capacity indicated in the registered PDD (MW)	Actual installed capacity (MW)
Hapugatenne I	4.8	5.052
Hapugastenne II	2.4	2.526
Hulu Ganga I	3.0	3.000
Hulu Ganga II	2.95	2.990
Total Capacity	13.15	13.568

However, it is confirmed that the changes do not have any impact on additionality, scale and applicability/ application of methodology under which project was registered since the difference is only of 0.418 MW.

The changes of project design has been elaborated in the revised PDD of version 4 dated 27 November 2013.

**B.2.5. Changes to start date of crediting period**

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There are no changes in start date of crediting period.

**B.2.6. Types of changes specific to afforestation or reforestation project activity**

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Not applicable.

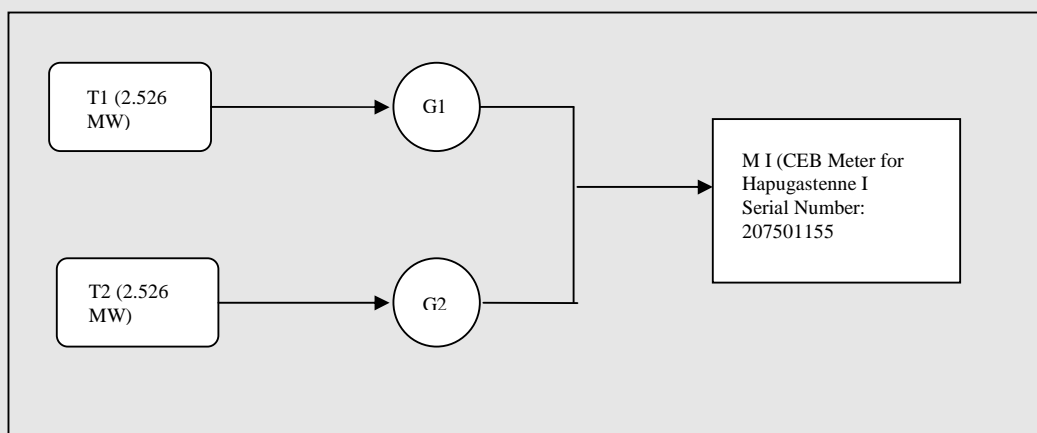
**SECTION C. Description of monitoring system**

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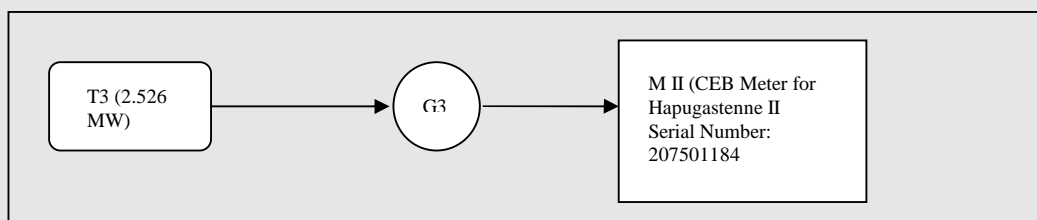
In respect of electricity supplied to the grid and electricity consumption from the grid, no special procedures were necessary to be implemented because the meter readings to determine this supply/consumption were read by an independent third party, the Ceylon Electricity Board (CEB).

In respect of monitoring of environmental parameters 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 of environmental monitoring.

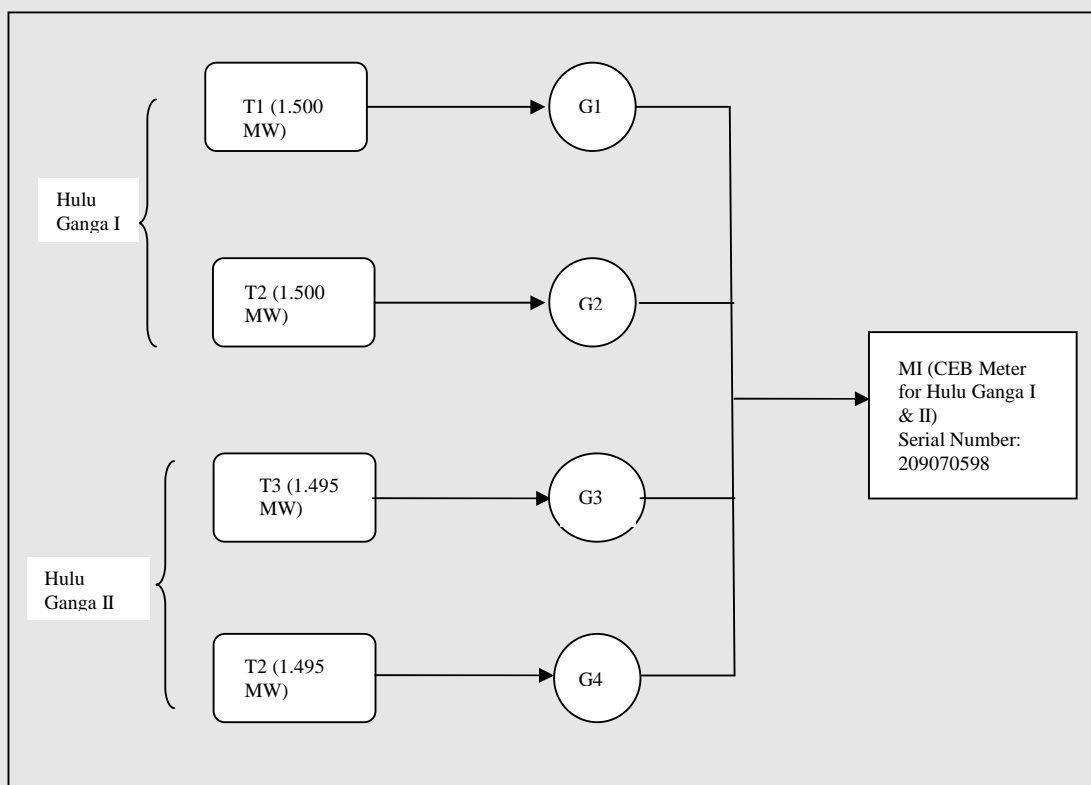
**Line Diagram Showing the Monitoring Points for the Project Activity**



LINE DIAGRAM SHOWING POINTS OF MONITORING FOR HAPUGASTANNE I



LINE DIAGRAM SHOWING POINTS OF MONITORING FOR HAPUGASTANNE II



LINE DIAGRAM SHOWING POINTS OF MONITORING FOR HULU GANGA I & II

The only quantitative figure that requires monitoring is the actual generation of electricity from each project site. The steps to ensure this and done correctly are as follows.

CEB installs and maintains a primary meter for purposes of billing and payment to EPL. The Metering Equipment is located in close proximity to the facility and is sealed. The equipment is tested and calibrated annually. Both parties also have the right to request a calibration at any time if they believe that the meter is dysfunctional.

For monitoring purposes, the project will conform the standard schedule negotiated with the CEB. This involves a CEB reading of the meter at the end of each month for determination of the electrical energy delivered to and accepted by CEB under the terms of the Power Purchase Agreement (PPA). EPL power plant operators back this information up by taking daily (sometimes hourly) readings of generation levels and recording them on-site. Monitoring data adjustments and uncertainties can only arise if the CEB does not read the meter precisely on the same date each month.

Responsibility of taking readings lies with the operator. The power plants are all automatic and the operators take down periodic readings. If there is some problem with operation, the operator contacts a senior engineer. In the event of a shut-down of the grid, the hydropower facility will automatically switch off and water will no longer be diverted to the turbine.

At the point of project verification, records of electricity generation, meter calibration and CEB power purchase receipts are available at EPL's offices in Colombo. The EPL CEO has direct responsibility for ensuring adherence to and review of compliance with these procedures.

#### **SECTION D. Data and parameters**

##### **D.1. Data and parameters fixed ex ante or at renewal of crediting period**

<b>Data / Parameter:</b>	<b>EF<sub>y</sub></b>
Unit:	kgCO <sub>2</sub> /kWh
Description:	Emission Coefficient
Source of data:	Ceylon Electricity Board (CEB) Expansion Plan 2002-2016
Value(s) applied):	0.8496
Purpose of data:	Calculation of Baseline Estimations
Additional comment:	-

##### **D.2. Data and parameters monitored**

<b>Data / Parameter:</b>	<b>Hapugastenne Phase I Net electricity output (H1-mmyy-kWh)</b>
Unit:	kWh
Description:	Hapugastenne Phase I project net electricity output
Measured/ Calculated / Default:	Measured
Source of data:	Monthly statements on net electricity supplied to the grid
Value(s) of monitored parameter:	60,713,750 (on which emission reductions have been calculated)

Monitoring equipment:	The data has been measured continuously using calibrated meter and recorded on a monthly basis from the monthly statements.																	
Measuring/ Reading/ Recording frequency:	Monthly																	
Calculation method (if applicable):	The actual net electricity export was 60,746,715 kWh and was adjusted downwards for generation and upwards for consumption of grid electricity with the accuracy of 1% of electricity meter due to delay in calibration.																	
QA/QC procedures:	<div>The bi-directional meter used to measure the electricity output has been calibrated as follows:</div> <table><tr><td>Meter and Accuracy</td><td>Calibrated on</td><td>Valid Till</td></tr><tr><td>Meter - 1%</td><td>3 June 2009</td><td>2 June 2010</td></tr><tr><td>Serial Number: 207501155</td><td>23 June 2010*</td><td>22 June 2011</td></tr><tr><td></td><td>5 April 2011</td><td>4 April 2012</td></tr><tr><td></td><td>20 March 2012</td><td>19 March 2013</td></tr></table> <div>The data is cross-checked with the invoices raised by the PP on CEB (Ceylon Electricity Board).</div> <div>* There is a gap of 21 days from due date of calibration. As the conservative approach in emission reductions calculation, the electricity export for the complete month of June 2010 has been reduced by the accuracy of the meter while the electricity import also has been increased by the same accuracy.</div>			Meter and Accuracy	Calibrated on	Valid Till	Meter - 1%	3 June 2009	2 June 2010	Serial Number: 207501155	23 June 2010*	22 June 2011		5 April 2011	4 April 2012		20 March 2012	19 March 2013
Meter and Accuracy	Calibrated on	Valid Till																
Meter - 1%	3 June 2009	2 June 2010																
Serial Number: 207501155	23 June 2010*	22 June 2011																
	5 April 2011	4 April 2012																
	20 March 2012	19 March 2013																
Purpose of data:	Calculation of Baseline Estimations																	
Additional comment:	The data is archived electronically and manually on paper. Data will be kept for two years after the end of crediting period or date of the last issuance of CERs for each project, whichever is later.																	

Data / Parameter:	Hapugastenne Phase II Net electricity output (H2-mmyy-kWh)
Unit:	kWh
Description:	Hapugastenne Phase II project net electricity output
Measured/ Calculated / Default:	Measured
Source of data:	Monthly statements on net electricity supplied to the grid
Value(s) of monitored parameter:	39,954,297 (on which emission reductions have been calculated)
Monitoring equipment:	The data has been measured continuously using calibrated meter and recorded on a monthly basis from the monthly statements.
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	The actual net electricity export was 39,970,840 kWh and was adjusted downwards for generation and upwards for consumption of grid electricity with the accuracy of 1% of electricity meter due to delay in calibration.



QA/QC procedures:	<p>The bi-directional meter used to measure the electricity output has been calibrated as follows:</p> <table><tr><td>Meter and Accuracy</td><td>Calibrated on</td><td>Valid Till</td></tr><tr><td>Meter - 1%</td><td>3 June 2009</td><td>2 June 2010</td></tr><tr><td>Serial Number:</td><td>23 June 2010*</td><td>22 June 2011</td></tr><tr><td>207501184</td><td>5 April 2011</td><td>4 April 2012</td></tr><tr><td></td><td>20 March 2012</td><td>19 March 2013</td></tr></table> <p>The data is cross-checked with the invoices raised by the PP on CEB (Ceylon Electricity Board).</p> <p>* There is a gap of 21 days from due date of calibration. As the conservative approach in emission reductions calculation, the electricity export for the complete month of June 2010 has been reduced by the accuracy of the meter while the electricity import also has been increased by the same accuracy.</p>			Meter and Accuracy	Calibrated on	Valid Till	Meter - 1%	3 June 2009	2 June 2010	Serial Number:	23 June 2010*	22 June 2011	207501184	5 April 2011	4 April 2012		20 March 2012	19 March 2013
Meter and Accuracy	Calibrated on	Valid Till																
Meter - 1%	3 June 2009	2 June 2010																
Serial Number:	23 June 2010*	22 June 2011																
207501184	5 April 2011	4 April 2012																
	20 March 2012	19 March 2013																
Purpose of data:	Calculation of Baseline Estimations																	
Additional comment:	The data is archived electronically and manually on paper. Data will be kept for two years after the end of crediting period or date of the last issuance of CERs for each project, whichever is later.																	

<b>Data / Parameter:</b>	<b>Hulu Ganga Phase I &amp; II Net electricity output (HG1-mmyy-kWh and HG2-mmyy-kWh)</b>
Unit:	kWh
Description:	Hulu Ganga Phase I and Hulu Ganga Phase II project net electricity output
Measured/ Calculated / Default:	Measured
Source of data:	Monthly statements on net electricity supplied to the grid
Value(s) of monitored parameter:	47,408,101 (on which emission reductions have been calculated)
Monitoring equipment:	The data has been measured continuously using calibrated meter and recorded on a monthly basis from the monthly statements.
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	The actual net electricity export was 47,412,830 kWh and was adjusted downwards for generation and upwards for consumption of grid electricity with the accuracy of 1% of electricity meter due to delay in calibration.

QA/QC procedures:	The bi-directional meter used to measure the electricity output has been calibrated as follows:		
	Meter and Accuracy	Calibrated on	Valid Till
	Meter (replaced) - 1% Serial Number: 9200208	13 November 2009	12 November 2010
	Meter (New) - 1% Serial Number: 209070598	8 January 2010	7 January 2011
		7 December 2010	6 December 2011
3 August 2011		2 August 2012	
	5 September 2012*	4 September 2013	
	<p>The old meter was replaced on 8 January 2010 with a new calibrated meter of accuracy class 1%. Both the old and new meters were calibrated on 8 January 2010.</p> <p>The data is cross-checked with the invoices raised by the PP on CEB (Ceylon Electricity Board).</p> <p>* There is a gap of 34 days from due date of calibration. As the conservative approach in emission reductions calculation, the electricity export for the complete months of August and September 2010 have been reduced by the accuracy of the meter while the electricity import also has been increased by the same accuracy.</p>		
Purpose of data:	Calculation of Baseline Estimations		
Additional comment:	The data is archived electronically and manually on paper. Data will be kept for two years after the end of crediting period or date of the last issuance of CERs for each project, whichever is later.		

Other Parameters (Environmental & Social) benefits have been listed below. These parameters have no impact on emission reduction calculation and have been monitored in-line with the revised PDD.

#### A) Hapugastenne Phase I and II Plants

##### 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 2010, January 2012, February 2013
Surface water	BOD and COD levels	Upstream of weir and below the tailrace (water release point to the river after generation)	September 2010, January 2012, February 2013
Ecology	Flora and fauna	Within the courses of Rath Ganga below the diversion point.	March 2010, March 2011, March 2012
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	6
Power Station Supervisors	5

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

Date	Voucher No.	Nature of Expenditure	Amount (LKR)
20/01/2010	994	Construction expenses for Sri Neegrodharamaya	45,000.00
20/12/2010	Reimbursement Journal No. 319	Contribution for the state function held by Ratnapura Divisional Secretariat	16,000.00
30/03/2011	1288	Contribution for CEB sports festival	4,000.00
13/10/2011	1642	Donation to purchase medicine to cancer hospital	5,000.00
20/10/2011	1666	Contribution for “Divi Neguma” program	50,000.00
20/10/2011	1669	Contribution for price giving of Kirulapana Sri Somananda Dharma Vidyalaya	6,250.00

**B) Hulu Ganga Phase I and II Plants****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	October 2010, January 2012, March 2013
Surface water	BOD and COD levels	Upstream of weir and below the tailrace (water release point to the river after generation)	October 2010, January 2012, March 2013
Ecology	Flora and fauna	Within the courses of Hulu Ganga below the diversion point.	March 2010, March 2011, March 2012
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	October 2010, January 2012, March 2013
Surface water	BOD and COD levels	Upstream of weir and below the tailrace (water release point to the river after generation)	October 2010, January 2012, March 2013
Ecology	Flora and fauna	Within the courses of Moragaha Oya below the diversion point.	March 2010, March 2011, March 2012

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 Hulu Ganga Phase I and II Plants

Employee Category	Number of Employees
Power Station Assistants	11
Power Station Operators	7

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

Date	Voucher No.	Nature of Expenditure	Amount (LKR)
20/01/2010	995	Contribution for Baddegama Development Program	600,000.00
29/06/2010	Reimbursement Journal No. 126	Sponsorship for Wesak Day programs	10,000.00
08/02/2011	1084	Contribution for Baddegama Development Program - 2010	200,000.00
14/02/2011	1111	Contribution for Kosgama Development fund	200,000.00
30/05/2011	301	Contribution for Baddegama Development Program - 2011	200,000.00
21/06/2011	Reimbursement Journal No. 71	Donation to CEB on Sri Sambuddha Jayanthi Program	10,000.00
13/10/2011	1642	Donation to purchase medicine to cancer hospital	5,000.00
20/10/2011	1669	Contribution for price giving of Kirulapana Sri Somananda Dharma Vidyalyaya	6,250.00
01/02/2012	2117	Community service expenses of Kosgama Village	200,000.00
19/06/2012	317	Annual contribution for Baddegama Development Program	200,000.00

#### D.3. Implementation of sampling plan

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No sampling is involved.

#### SECTION E. Calculation of emission reductions or GHG removals by sinks

##### E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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Baseline emissions reduction for each project is derived by multiplying the electricity output to the grid (in kWh) by the baseline emissions 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.

Electricity Output – Hapugastenne Phase I Plant							
Month	Export to Grid			Import from Grid			Net Electricity Output (kWh)
	Electricity Output (kWh)	Deduction for Non Calibration of Meter	Adjusted Electricity Output	Consumption from Grid (kWh)	Addition for Non Calibration of Meter	Adjusted Consumption	
Year 2010							
January	402,111		402,111	3,167		3,167	398,944
February	359,473		359,473	5,808		5,808	353,665
March	4,633		4,633	6,987		6,987	-2,354
April	1,512,197		1,512,197	2,133		2,133	1,510,064
May	1,622,289		1,622,289	127		127	1,622,162
June	3,296,300	32,963	3,263,337	125	2	127	3,263,210
July	3,116,841		3,116,841	46		46	3,116,795
August	1,438,008		1,438,008	1,895		1,895	1,436,113
September	2,275,719		2,275,719	89		89	2,275,630
October	2,702,555		2,702,555	38		38	2,702,517
November	1,430,603		1,430,603	2,876		2,876	1,427,727
December	3,872,209		3,872,209	14		14	3,872,195
Year 2011							
January	776,925		776,925	1,920		1,920	775,005
February	289,586		289,586	4,648		4,648	284,938
March	766,732		766,732	3,054		3,054	763,678
April	1,466,967		1,466,967	3,754		3,754	1,463,213
May	2,052,232		2,052,232	1,426		1,426	2,050,806
June	2,278,099		2,278,099	861		861	2,277,238
July	1,393,318		1,393,318	1,232		1,232	1,392,086
August	2,178,612		2,178,612	32		32	2,178,580
September	2,575,599		2,575,599	85		85	2,575,514
October	2,205,429		2,205,429	939		939	2,204,490
November	2,399,562		2,399,562	35		35	2,399,527
December	2,191,266		2,191,266	625		625	2,190,641
Year 2012							
January	560,534		560,534	3,008		3,008	557,526
February	560,446		560,446	2,229		2,229	558,217
March	996,375		996,375	1,969		1,969	994,406
April	1,960,807		1,960,807	185		185	1,960,622
May	977,570		977,570	2,169		2,169	975,401
June	1,527,216		1,527,216	903		903	1,526,313
July	1,728,512		1,728,512	534		534	1,727,978
August	1,686,811		1,686,811	965		965	1,685,846
September	2,259,192		2,259,192	26		26	2,259,166
October	2,541,000		2,541,000	502		502	2,540,498
November	2,114,525		2,114,525	62		62	2,114,463
December	1,282,078		1,282,078	1,148		1,148	1,280,930
Total	60,802,331	32,963	60,769,368	55,616	2	55,618	60,713,750

**Electricity Output – Hapugastenne Phase II Plant**

Month	Export to Grid			Import from Grid			Net Electricity Output (kWh)
	Electricity Output (kWh)	Deduction for Non Calibration of Meter	Adjusted Electricity Output	Consumption from Grid (kWh)	Addition for Non Calibration of Meter	Adjusted Consumption	
Year 2010							
January	368,344		368,344	88		88	368,256
February	1,060,248		1,060,248	24		24	1,060,224
March	595,765		595,765	112		112	595,653
April	1,881,135		1,881,135	0		0	1,881,135
May	986,388		986,388	156		156	986,232
June	1,654,190	16,542	1,637,648	69	1	70	1,637,578
July	1,618,675		1,618,675	20		20	1,618,655
August	1,470,375		1,470,375	234		234	1,470,141
September	1,514,598		1,514,598	98		98	1,514,500
October	1,507,131		1,507,131	105		105	1,507,026
November	1,212,314		1,212,314	419		419	1,211,895
December	2,063,045		2,063,045	79		79	2,062,966
Year 2011							
January	1,602,432		1,602,432	224		224	1,602,208
February	843,112		843,112	273		273	842,839
March	529,659		529,659	1,715		1,715	527,944
April	1,703,488		1,703,488	464		464	1,703,024
May	1,435,754		1,435,754	205		205	1,435,549
June	1,099,607		1,099,607	966		966	1,098,641
July	783,698		783,698	1,608		1,608	782,090
August	1,192,445		1,192,445	771		771	1,191,674
September	1,023,608		1,023,608	989		989	1,022,619
October	1,047,510		1,047,510	1,346		1,346	1,046,164
November	1,181,709		1,181,709	911		911	1,180,798
December	1,001,581		1,001,581	1,349		1,349	1,000,232
Year 2012							
January	348,480		348,480	2,254		2,254	346,226
February	274,776		274,776	2,214		2,214	272,562
March	445,720		445,720	2,082		2,082	443,638
April	1,005,415		1,005,415	1,003		1,003	1,004,412
May	467,618		467,618	2,234		2,234	465,384
June	830,950		830,950	1,362		1,362	829,588
July	1,046,906		1,046,906	1,125		1,125	1,045,781
August	1,027,566		1,027,566	1,178		1,178	1,026,388
September	1,203,564		1,203,564	588		588	1,202,976
October	1,277,335		1,277,335	670		670	1,276,665
November	1,403,547		1,403,547	295		295	1,403,252
December	1,289,872		1,289,872	490		490	1,289,382
Total	39,998,560	16,542	39,982,018	27,720	1	27,721	39,954,297

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

Electricity Output - Hard Banga Phase I and II Plants							
Month	Export to Grid			Import from Grid			Net Electricity Output (kWh)
	Electricity Output (kWh)	Deduction for Non Calibration of Meter	Adjusted Electricity Output	Consumption from Grid (kWh)	Addition for Non Calibration of Meter	Adjusted Consumption	
Year 2010							
January *	2,013,089		2,013,089	75		75	2,013,014
February	993,125		993,125	299		299	992,826
March	335,600		335,600	3,780		3,780	331,820
April	745,459		745,459	1,342		1,342	744,117
May	1,811,168		1,811,168	139		139	1,811,029
June	1,182,674		1,182,674	386		386	1,182,288
July	2,364,094		2,364,094	276		276	2,363,818
August	1,475,459		1,475,459	582		582	1,474,877
September	1,311,239		1,311,239	229		229	1,311,010
October	1,920,738		1,920,738	314		314	1,920,424
November	2,242,436		2,242,436	124		124	2,242,312
December	2,584,915		2,584,915	108		108	2,584,807
Year 2011							
January	2,403,707		2,403,707	109		109	2,403,598
February	2,137,840		2,137,840	56		56	2,137,784
March	920,666		920,666	129		129	920,537
April	1,217,562		1,217,562	712		712	1,216,850
May	828,737		828,737	520		520	828,217
June	633,831		633,831	497		497	633,334
July	335,610		335,610	1,474		1,474	334,136
August	299,405		299,405	1,695		1,695	297,710
September	583,840		583,840	1,141		1,141	582,699
October	1,450,576		1,450,576	2,058		2,058	1,448,518
November	2,436,529		2,436,529	39		39	2,436,490
December	2,217,839		2,217,839	28		28	2,217,811
Year 2012							
January	975,153		975,153	204		204	974,949
February	1,454,550		1,454,550	147		147	1,454,403
March	257,909		257,909	1,923		1,923	255,986
April	699,104		699,104	932		932	698,172
May	149,799		149,799	3,207		3,207	146,592
June	77,005		77,005	4,917		4,917	72,088
July	652,883		652,883	1,031		1,031	651,852
August	259,284	2,593	256,691	3,570	36	3,606	253,085
September	206,331	2,064	204,267	3,524	36	3,560	200,707
October	2,511,822		2,511,822	1,309		1,309	2,510,513
November	2,890,401		2,890,401	46		46	2,890,355
December	2,869,474		2,869,474	101		101	2,869,373
Total	47,449,853	4,657	47,445,196	37,023	72	37,095	47,408,101

\* New meter was installed on 8 January 2010. As per bill for January 2010, there is no electricity import under old meter during the period from 1 January to 8 January 2010. The usage of 75 kWh is the consumption under the new meter.

#### Hapugastenne Phase I

Baseline emissions reduction  $(60,713,750 \times 0.8496)/10^3 = 51,582 \text{ tCO}_2\text{e}$  (after rounding down)

#### Hapugastenne Phase II

Baseline emissions reduction  $(39,954,297 \times 0.8496)/10^3 = 33,945 \text{ tCO}_2\text{e}$  (after rounding down)

#### Hulu Ganga Phase I and II

Baseline emissions reduction  $(47,408,101 \times 0.8496)/10^3 = 40,277 \text{ tCO}_2\text{e}$  (after rounding down)

#### All Plants in PDD

Baseline emissions reduction = 125,804 tCO<sub>2</sub>e (after rounding down)

### E.2. Calculation of project emissions or actual net GHG removals by sinks

>>

There are no project emissions.

### E.3. Calculation of leakage

>>

There are no leakage emissions associated with the project activity.

### E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO <sub>2</sub> e)
Total	125,804	0	0	125,804

### E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	149,388 (Estimated annual emission reductions as per revised PDD is 49,796 tCO <sub>2</sub> e)	125,804



**E.6. Remarks on difference from estimated value in registered PDD**

&gt;&gt;

The emission reductions achieved in the monitoring period are 16% lower than the estimation.

**E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	125,804	Not available

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**Document information**

Version	Date	Description
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory		
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