



**Monitoring report form  
(Version 03.1)**

**Monitoring report**

<b>Title of the project activity</b>	West Nile Electrification Project (WNEP)
<b>Reference number of the project activity</b>	0775
<b>Version number of the monitoring report</b>	01.0
<b>Completion date of the monitoring report</b>	10/03/2013
<b>Registration date of the project activity</b>	10/02/2007
<b>Monitoring period number and duration of this monitoring period</b>	Monitoring period number: 2 <sup>nd</sup> monitoring period Duration of this monitoring period: 01/11/2009 to 31/12/2011
<b>Project participant(s)</b>	<p>Uganda: West Nile Rural Electrification Company Limited (WENRECo)</p> <p>Sweden: Government of Sweden – Swedish Energy Agency</p> <p>France: GDF Suez</p> <p>Japan: Chubu Electric Power Co., Inc; Japan International Cooperation Agency; Kyushu Electric Power Co., Inc; Mitsubishi Corporation; Shikoku Electric Power Co., Inc; Tohoku Electric Power Co., Inc; The Tokyo Electric Power Co., Inc; The Chugoku Electric Power Co., Inc; Mitsui &amp; Co.Ltd</p> <p>Netherlands: Electrabel S.A ; Netherlands' Ministry of Infrastructure and the Environment (IenM); Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&amp;I)</p> <p>Norway: Government of Norway – Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA</p> <p>United Kingdom of Great Britain and Northern Ireland:</p>

	BP Alternative Energy International Ltd.; Deutsche Bank AG  Finland: Fortum Corporation; Government of Finland – Ministry of Foreign Affairs and International Trade  Germany: RWE Power AG
<b>Host Party(ies)</b>	Uganda
<b>Sectoral scope(s) and applied methodology(ies)</b>	Sectoral scopes: 1-Energy industries (renewables-/nonrenewable sources);  Applied methodologies:  AMS-I.D. ver. 9 - Grid connected renewable electricity generation AMS-II.B. ver. 7 - Supply side energy efficiency improvements – generation
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	85,867
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	10,903

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

>> The objectives of the West Nile Electrification Project (WNEP) are to promote socio-economic development in rural Uganda and to reduce energy-related CO<sub>2</sub> emissions causing global climate change.

The project comprises of two components;

- Project Component #1: Installation and operation of 3.5 MW (2 units of 1.75 MW) hydroelectric power plant.
- Project Component #2: Installation and operation of a HFO-fired 1.5 MW generator to serve as a base load plant during the construction phase of the Hydro plant and as a peaking plant once the Hydro is operational.

Furthermore, there is the upgrade and extension of the distribution grid in the townships of Arua, Nebbi and Paidha, and connection of additional customers who would have instead used privately owned generators.

The 1.5 MW HFO generator was operational from May 2005 to November 2011. And the 3.5 MW Hydro plant on Nyagak river was not operational during the second monitoring period. The second monitoring period covers from 01/11/2009 to 31/12/2011, with total emission reductions of 10,903 tCO<sub>2</sub> achieved in this monitoring period.

### A.2. Location of project activity

>> The location of the project activity is in the area of Arua, Nebbi and Paidha, in the West Nile region, Uganda. The GPS coordinates are indicated as follow: +2.429053, +30.975695.

### 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)
Uganda (host)	West Nile Rural Electrification Company Limited (WENRECo)	No
Sweden	Government of Sweden – Swedish Energy Agency	Yes
France	GDF Suez	No

Japan	Chubu Electric Power Co., Inc; Japan International Cooperation Agency; Kyushu Electric Power Co., Inc; Mitsubishi Corporation; Shikoku Electric Power Co., Inc; Tohoku Electric Power Co., Inc; The Tokyo Electric Power Co., Inc; The Chugoku Electric Power Co., Inc; Mitsui & Co.Ltd	No
Netherlands	The International Bank for Reconstruction and Development (IBRD) as trustee of the Prototype Carbon Fund (“PCF”); Electrabel S.A ; Netherlands’ Ministry of Infrastructure and the Environment (IenM); Netherlands, Ministry of Economic Affairs, Agriculture and Innovation (EL&I)	Yes
Norway	Government of Norway – Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA	Yes
United Kingdom of Great Britain and Northern Ireland	BP Alternative Energy International Ltd.; Deutsche Bank AG	No
Finland	Fortum Corporation; Government of Finland – Ministry of Foreign Affairs and International Trade	Yes
Germany	RWE Power AG	No

#### A.4. Reference of applied methodology

>>Approved methodologies Version 9 of AMS-I.D “Grid connected renewable electricity generation”, and Version 07 of AMS-II.B “Supply side energy efficiency improvements – generation” were applied.

[http://cdm.unfccc.int/filestorage/C/D/M/CDMWF\\_AM\\_2GHDC30TPDJK04LS07SY07X9MFZRG5/AMS\\_I.D.\\_ver09.pdf?t=RVR8bWtjNXgwfDDk5IFNSPA0XP\\_dR1aR9Hyn](http://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_2GHDC30TPDJK04LS07SY07X9MFZRG5/AMS_I.D._ver09.pdf?t=RVR8bWtjNXgwfDDk5IFNSPA0XP_dR1aR9Hyn)

[http://cdm.unfccc.int/filestorage/C/D/M/CDMWF\\_AM\\_37J5A0Z3CJB1LQANGM4Y7JJZ6BEMK3.1/SSC\\_II.B.pdf?t=WHB8bWtjNXdofDCQMBHq5fHZY4soczSfxRS4](http://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_37J5A0Z3CJB1LQANGM4Y7JJZ6BEMK3.1/SSC_II.B.pdf?t=WHB8bWtjNXdofDCQMBHq5fHZY4soczSfxRS4)

Tools referenced in the above methodologies:

Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion  
<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf>

Tool to calculate the emission factor for an electricity system  
<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v3.0.0.pdf>

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

>> The first crediting period of the project activity is 01/01/2005 to 31/12/2011

### **SECTION B. Implementation of project activity**

#### **B.1. Description of implemented registered project activity**

>>

The 1.5 MW HFO generator has been put into operation since May 2005. The 3.5 MW Hydro plant was not operational in the second monitoring period.

#### **B.2. Post registration changes**

##### **B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

>>N/A

##### **B.2.2. Corrections**

>>N/A

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

>>

Request for revision of the monitoring plan of "West Nile Electrification Project (WNEP)" (0775) is approved on 31/05/2011. The revised monitoring plan can be found in the link below:

<http://cdm.unfccc.int/filestorage/C/2/Z/C2ZWOBQDR1FH7054USGEAVXKTNJYL8/775%20revMP%20clean.pdf?t=WHd8bWsxNDVrfDDAhgmuDN-S9yDLOZC-xiZg>

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

>>N/A

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

>>N/A

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

>>N/A

**SECTION C. Description of monitoring system**

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The monitoring plan conforms to the approved monitoring methodology for this project type stating as follows: “Energy Savings shall be measured after implementation of the efficiency measures by calculating the energy content of the fuel used by generating Unit, and the energy content of electricity or steam produced by the unit. Thus both fuel use and output need to be metered” Also “ A standard emission coefficient for the fuel used by the generating unit is also needed. IPCC default values for emission coefficients may be used.”

The information on fuel consumption, generation output and other parameters necessary for the calculation of emission reductions is collected under the supervision of the Generation Superintendent.

The employees responsible for operation of the power plant are collecting information on a daily basis with QA/QC responsibility assigned to the Generation Superintendent. The Generation Superintendent checks the quality, consistency and comprehensiveness of the collected information on a daily basis. The information is recorded in both paper and electronic forms. The manager checks the data information.

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

(Copy this table for each piece of data and parameter.)

<b>Data/Parameter</b>	EF <sub>BL</sub>												
<b>Unit</b>	tCO <sub>2</sub> /MWh												
<b>Description</b>	Baseline emission factor												
<b>Source of data</b>	“An average emission coefficient for the diesel/petrol gen-sets and engines that would be operating in the project area in the absence of the proposed project which is calculated based on a comprehensive survey covering the service area in the West Nile region”												
<b>Value(s) applied</b>	1.843												
<b>Purpose of data</b>	Baseline emissions for both components												
<b>Additional comment</b>	<p>The baseline emission factor was calculated using the following diesel parameters:</p> <table border="1"> <thead> <tr> <th>Parameter</th><th>Value</th></tr> </thead> <tbody> <tr> <td>Density (Kg/l)</td><td>0.87</td></tr> <tr> <td>Net Calorific value (MJ/Kg)</td><td>43.33</td></tr> <tr> <td>Carbon emission factor (Tc/TJ)</td><td>20.20</td></tr> <tr> <td>Carbon – CO<sub>2</sub> conversion factor</td><td>3.667</td></tr> <tr> <td>Consumption based on 15% efficiency (l /kWh)</td><td>0.66</td></tr> </tbody> </table>	Parameter	Value	Density (Kg/l)	0.87	Net Calorific value (MJ/Kg)	43.33	Carbon emission factor (Tc/TJ)	20.20	Carbon – CO <sub>2</sub> conversion factor	3.667	Consumption based on 15% efficiency (l /kWh)	0.66
Parameter	Value												
Density (Kg/l)	0.87												
Net Calorific value (MJ/Kg)	43.33												
Carbon emission factor (Tc/TJ)	20.20												
Carbon – CO <sub>2</sub> conversion factor	3.667												
Consumption based on 15% efficiency (l /kWh)	0.66												

<b>Data/Parameter</b>	CEF <sub>i</sub>
<b>Unit</b>	gC/MJ
<b>Description</b>	Carbon emission factor of fuel <i>i</i>
<b>Source of data</b>	IPCC
<b>Value(s) applied</b>	CEF <sub>HFO</sub> = 21.10 CEF <sub>diesel</sub> = 20.20
<b>Purpose of data</b>	Project
<b>Additional comment</b>	-

<b>Data/Parameter</b>	$CF_{C-CO_2}$
<b>Unit</b>	None
<b>Description</b>	Carbon – CO <sub>2</sub> Conversion factor
<b>Source of data</b>	IPCC
<b>Value(s) applied</b>	44/12
<b>Purpose of data</b>	Project
<b>Additional comment</b>	-

## D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

<b>Data/Parameter</b>	$FC_i$
<b>Unit</b>	Litres
<b>Description</b>	Amount of fuel <i>I</i> combusted by generator
<b>Measured/Calculated /Default</b>	Measured
<b>Source of data</b>	On-site register
<b>Value(s) of monitored parameter</b>	$FC_{HFO}$ (See Emission Reduction calculation sheet of “Daily Data” ) $FC_{diesel}$ (See Emission Reduction calculation sheet of “Daily Data”)
<b>Monitoring equipment</b>	The fuel dip sticks used for measurement of fuel consumption are calibrated on purchase and acceptable for the intended purpose. A certificate of calibration, obtained from the supplier is available.
<b>Measuring/Reading/ Recording frequency</b>	Daily
<b>Calculation method (if applicable)</b>	NA
<b>QA/QC procedures</b>	-
<b>Purpose of data</b>	Project
<b>Additional comment</b>	-

<b>Data/Parameter</b>	$GEN_{TH,gross}$
<b>Unit</b>	MWh
<b>Description</b>	Gross generation, HFO plant
<b>Measured/Calculated /Default</b>	Measured
<b>Source of data</b>	On-site register
<b>Value(s) of monitored parameter</b>	11,643

<b>Monitoring equipment</b>	<p>-SEPAM meter (ref. SEPAM 1000 +40), used from 1<sup>st</sup> May 2005 to October 2011</p> <p>-Landis + Gyr meter (model 400, type ZD4 CT S2), used from 22<sup>nd</sup> June to October 2011</p> <p>The SEPAM meter is a part of an overall assembly leading to practical constraints in calibration. For that reason, the Landis + Gyr meter was installed.</p> <p>Since the SEPAM meter could not be calibrated, the accuracy of its readings has been ascertained with the Landis + Gyr meter, comparing the readings of both meters and hence meeting the requirement of getting delayed calibration. The error has been reported to be just 0.32%, which is lower than the maximum permissible error of the old meter, which is +/- 1.0. Therefore, as per the guidance provided in "Guidelines for assessing compliance with calibration frequency requirements", the maximum permissible error of -1.0% has been applied to the data reported by the SEPAM meter.</p> <p>The Landis + Gyr meter has a 10 year grace period for calibration given by the UK regulator Ofgem. However, as per the "General guidelines to SSC CDM methodologies" (EB61 annex 21), measuring equipment has to be calibrated at least every three years. The purchase order was issued on 17<sup>th</sup> October 2008.</p>
<b>Measuring/Reading/Recording frequency</b>	Daily
<b>Calculation method (if applicable)</b>	-
<b>QA/QC procedures</b>	-
<b>Purpose of data</b>	Baseline and Project
<b>Additional comment</b>	-

  

<b>Data/Parameter</b>	AUX <sub>TH</sub>
<b>Unit</b>	MWh
<b>Description</b>	Auxiliary electricity consumption, HFO plant
<b>Measured/Calculated/Default</b>	Measured
<b>Source of data</b>	On-site register
<b>Value(s) of monitored parameter</b>	520
<b>Monitoring equipment</b>	Auxiliary meter (reference: W0500036 CT) installed on 8 <sup>th</sup> January 2007 Last Calibration: 30 <sup>th</sup> July 2008
<b>Measuring/Reading/Recording frequency</b>	Daily
<b>Calculation method (if applicable)</b>	NA
<b>QA/QC procedures</b>	-
<b>Purpose of data</b>	Baseline and Project
<b>Additional comment</b>	-

  

<b>Data/Parameter</b>	GEN <sub>TH</sub>
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<b>Unit</b>	MWh
<b>Description</b>	Generation output (or electricity exported) from the thermal generator
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	NA
<b>Value(s) of monitored parameter</b>	See Annex for daily values
<b>Monitoring equipment</b>	NA
<b>Measuring/Reading/ Recording frequency</b>	Daily
<b>Calculation method (if applicable)</b>	11,123
<b>QA/QC procedures</b>	-
<b>Purpose of data</b>	Baseline and Project
<b>Additional comment</b>	-

<b>Data/Parameter</b>	$DEN_{prjct, fuel i}$
<b>Unit</b>	t/m <sup>3</sup>
<b>Description</b>	Density of fuel <i>i</i>
<b>Measured/Calculated /Default</b>	Measured for HFO Default for diesel
<b>Source of data</b>	Fuel supplier for diesel HFO Density provided by SGS Kenya Limited
<b>Value(s) of monitored parameter</b>	$DEN_{HFO}$ (See Emission Reduction calculation sheet of “Daily Data”) $DEN_{diesel} = 0.865 \text{ ton/m}^3$
<b>Monitoring equipment</b>	HFO: Contracted to SGS Kenya Limited, Mombasa Laboratory, an independent entity.
<b>Measuring/Reading/ Recording frequency</b>	HFO: On each HFO load delivered, to the HFO plant, a sample is taken and sent to the laboratory Diesel: A default value of $0.865 \text{ ton/m}^3$ for the monitoring period was approved by the UNFCCC based on the request for deviation reference I-DEV0386
<b>Calculation method (if applicable)</b>	NA
<b>QA/QC procedures</b>	SGS Kenya Limited, Mombasa Laboratory, is accredited in accordance with the recognized International Standard ISO / IEC 17025:2005
<b>Purpose of data</b>	Project
<b>Additional comment</b>	-

<b>Data/Parameter</b>	NCV
<b>Unit</b>	MJ/kg
<b>Description</b>	Calorific value
<b>Measured/Calculated /Default</b>	Measured for HFO Default for diesel
<b>Source of data</b>	IPCC default values at 95% upper confidence interval for diesel HFO NCV provided by SGS Kenya Limited
<b>Value(s) of monitored parameter</b>	$NCV_{HFO}$ (See Emission Reduction calculation sheet of “Daily Data”) $NCV_{diesel} = 43.3 \text{ MJ/kg} = 43.3 \text{ GJ/ton}$

<b>Monitoring equipment</b>	HFO: Contracted to SGS Kenya Limited, Mombasa Laboratory, an independent entity.
<b>Measuring/Reading/Recording frequency</b>	HFO: On each HFO load delivered, to the HFO plant, a sample is taken and sent to the laboratory Diesel: A default value of 43.3 GJ/ton for the monitoring period was approved by the UNFCCC based on the request for deviation reference I-DEV0386
<b>Calculation method (if applicable)</b>	NA
<b>QA/QC procedures</b>	SGS Kenya Limited, Mombasa Laboratory, is accredited in accordance with the recognized International Standard ISO / IEC 17025:2005
<b>Purpose of data</b>	Project
<b>Additional comment</b>	-

  

<b>Data/Parameter</b>	$HR_{\text{proct, fuel } i}$
<b>Unit</b>	MJ/kWh
<b>Description</b>	Heat rate
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	NA
<b>Value(s) of monitored parameter</b>	See Emission Reduction calculation sheet of “Daily Data”
<b>Monitoring equipment</b>	NA
<b>Measuring/Reading/Recording frequency</b>	Daily
<b>Calculation method (if applicable)</b>	$HR = (\sum FC_i * DEN_i * NCV_i) / GEN_{TH, gross}$
<b>QA/QC procedures</b>	-
<b>Purpose of data</b>	Project
<b>Additional comment</b>	-

  

<b>Data/Parameter</b>	$GEN_{\text{Nyagak}}$
<b>Unit</b>	MWh
<b>Description</b>	Electricity generated from the hydro plant
<b>Measured/Calculated /Default</b>	N/A
<b>Source of data</b>	N/A
<b>Value(s) of monitored parameter</b>	N/A
<b>Monitoring equipment</b>	N/A
<b>Measuring/Reading/Recording frequency</b>	N/A
<b>Calculation method (if applicable)</b>	NA
<b>QA/QC procedures</b>	-

<b>Purpose of data</b>	Project
<b>Additional comment</b>	The hydropower component was not operational during the second monitoring period.

### D.3. Implementation of sampling plan

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N/A

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

### E.1. Calculation of baseline emissions or baseline net GHG removals by sinks<sup>1</sup>

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The baseline emissions in both components are as follows:

$$E_{BL} = (GEN_{TH} * EF_{BL}) + (GEN_{Nyagak} * EF_{BL})$$

Where:

$E_{BL}$	=	baseline emissions (tCO <sub>2</sub> e)
$GEN_{TH}$	=	Electricity exported from the thermal generator in the second monitoring period (MWh)
$GEN_{Nyagak}$	=	Electricity generated from the Hydro power plant in the second monitoring period (MWh)
$EF_{BL}$	=	baseline emission factor (tCO <sub>2</sub> / MWh)

Parameter	Value
$GEN_{TH}$ (MWh)	11,123
$EF_{BL}$ (tCO <sub>2</sub> / MWh)	1.843

Since the hydropower plant component was not operational in this monitoring period, baseline emissions are calculated as  $E_{BL} = 11,123 * 1.843 = 20,499$  tCO<sub>2</sub>

Table 1: Monthly Baseline emissions generated during the second monitoring period

Month	Baseline emissions (tCO <sub>2</sub> )
November 2009	644
December 2009	754
January 2010	963
February 2010	788
March 2010	907
April 2010	1,003
May 2010	897
June 2010	1,017
July 2010	1,009

<sup>1</sup> For detailed calculation, please refer to Emission reductions calculation sheet “ Daily data November 2009 to December 2011”

August 2010	916
September 2010	913
October 2010	1,000
November 2010	1,050
December 2010	953
January 2011	734
February 2011	710
March 2011	507
April 2011	673
May 2011	907
June 2011	1,044
July 2011	940
August 2011	827
September 2011	235
October 2011	577
November 2011	212
December 2011	320
<b>Total</b>	<b>20,499</b>

## E.2. Calculation of project emissions or actual net GHG removals by sinks<sup>2</sup>

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According to Version 9 of AMS I.D. and registered PDD, there are no project emissions generated from hydropower component. Therefore, the total project CO<sub>2</sub> emissions are the sum for the emissions from the two fossil fuels used, in this case HFO and diesel under component #2. The formula applied is:

$$E_{\text{project}} = \frac{FC_{\text{HFO}} * DEN_{\text{HFO}} * NCV_{\text{HFO}} * CEF_{\text{HFO}} * CF_{\text{C-CO}_2} + FC_{\text{diesel}} * DEN_{\text{diesel}} * NCV_{\text{diesel}} * CEF_{\text{diesel}} * CF_{\text{C-CO}_2}}$$

Where:

$E_{\text{project}}$	=	project emissions (tCO <sub>2</sub> e)
$FC_{\text{HFO}}$	=	quantity of HFO consumed in litres
$FC_{\text{diesel}}$	=	quantity of diesel consumed in litres
$DEN_{\text{HFO}}$	=	Density of HFO (Kg/l)
$DEN_{\text{diesel}}$	=	Density of diesel (Kg/l)
$NCV_{\text{HFO}}$	=	Net calorific value of HFO, IPCC (TJ/10 <sup>3</sup> t)
$NCV_{\text{diesel}}$	=	Net calorific value of diesel, IPCC (TJ/10 <sup>3</sup> t)
$CEF_{\text{HFO}}$	=	Carbon emission factor of HFO (gC/MJ)
$CEF_{\text{diesel}}$	=	Carbon emission factor of diesel (gC/MJ)
$CF_{\text{C-CO}_2}$	=	Carbon- CO <sub>2</sub> conversion factor (44/12)

- $FC_{\text{HFO}}$  and  $FC_{\text{diesel}}$

The quantities of HFO and diesel consumed for the second monitoring period were measured and recorded on a daily basis. Details of the daily consumption are given in Emission Reduction calculation sheet of “Daily Data”.

<sup>2</sup> For detailed calculation, please refer to Emission reductions calculation sheet “ Daily data November 2009 to December 2011”

- $DEN_{HFO}$  and  $DEN_{diesel}$

The density of the HFO and diesel received at the generating plant is recorded on a daily basis. These details are also included as part of the assumptions in the calculation worksheet of “Daily data November 2009-December 2011”.

- $NCV_{HFO}$  and  $NCV_{diesel}$

The net calorific values of HFO and diesel received at the generating plant are recorded on a daily basis. These details are also included as part of the assumptions in calculation worksheet of “Daily data November 2009-December 2011”.

- $CEF_{HFO}$  and  $CEF_{diesel}$

The Carbon emission factors of HFO and Diesel were pre-determined and the following figures were used for the calculations.

Parameter	Value
$CEF_{HFO}$ (gC/MJ)	21.10
$CEF_{diesel}$ (gC/MJ)	20.20

- $CF_{C-CO_2}$

The Carbon-  $CO_2$  conversion factor is also pre-determined. The value used in the calculations is 44/12 or 3.67

Daily project emissions are calculated according to the above formula. The aggregated amount of emissions from project activity during the second monitoring period is 9,596 tCO<sub>2</sub>.

Table 2: Monthly Project Emissions generated during the second monitoring period

Month	Project emissions (tCO <sub>2</sub> )
November 2009	314
December 2009	355
January 2010	437
February 2010	359
March 2010	409
April 2010	484
May 2010	417
June 2010	472
July 2010	478
August 2010	426
September 2010	438
October 2010	473
November 2010	495
December 2010	438
January 2011	343
February 2011	339
March 2011	231
April 2011	312
May 2011	441

June 2011	456
July 2011	420
August 2011	371
September 2011	121
October 2011	276
November 2011	121
December 2011	170
<b>Total</b>	<b>9,596</b>

### E.3. Calculation of leakage

>>

Following Version 9 of AMS I.D (Grid connected renewable electricity generation): Given that the hydropower plant is not transferred from another activity, or the existing diesel gen-sets and engines are not transferred to another location or activity, the possibility of leakage can be ignored.

Following Version 7 of AMS II.B (Supply side energy efficiency improvements – generation): Given that the internal combustion unit is not transferred from another activity, or the existing diesel gen sets and engines are not transferred to another location or activity, the possibility of leakage can be ignored.

$$LE = 0$$

### 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)
<b>Total</b>	20,499	9,596	0	10,903

Monthly emission reductions are summarized in Table 3 below.

Table 3: Monthly Emission Reductions generated during the second monitoring period

Month	Baseline emissions (tCO <sub>2</sub> )	Project emissions (tCO <sub>2</sub> )	Leakage (tCO <sub>2</sub> e)	Emission Reductions (tCO <sub>2</sub> )
November 2009	644	314	0	330
December 2009	754	355	0	399
January 2010	963	437	0	526
February 2010	788	359	0	429
March 2010	907	409	0	499
April 2010	1,003	484	0	518
May 2010	897	417	0	480
June 2010	1,017	472	0	546
July 2010	1,009	478	0	531
August 2010	916	426	0	489

September 2010	913	438	0	476
October 2010	1,000	473	0	526
November 2010	1,050	495	0	554
December 2010	953	438	0	515
January 2011	734	343	0	391
February 2011	710	339	0	371
March 2011	507	231	0	276
April 2011	673	312	0	362
May 2011	907	441	0	465
June 2011	1,044	456	0	588
July 2011	940	420	0	520
August 2011	827	371	0	456
September 2011	235	121	0	114
October 2011	577	276	0	301
November 2011	212	121	0	91
December 2011	320	170	0	150
<b>Total</b>	<b>20,499</b>	<b>9,596</b>	<b>0</b>	<b>10,903</b>

#### 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 <sup>3</sup>	Actual values achieved during this monitoring period
<b>Emission reductions or GHG removals by sinks (tCO<sub>2</sub>e)</b>	<b>85,867</b>	<b>10,903</b>

Calculation of ex-ante ER estimates of the registered PDD corresponding to the second monitoring period is done as follows:

PDD registered: 39,623 tCO<sub>2</sub>/year = 108.55 tCO<sub>2</sub>/day

Monitoring period (01/11/2009 – 31/12/2011) = 791 days

Therefore the value of estimated ex ante ERs as per the registered PDD for the current monitoring period is calculated as follows:

Estimated ERs = 108.55 \* 791 = 85,867 tCO<sub>2</sub>

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

>> The actual emission reductions achieved during the second monitoring period are lower than ex-ante estimated value in registered PDD.

#### 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

>> N/A

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)		

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
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.
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