

SECTION D. Application of a monitoring methodology and plan:

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

The two approved methodologies applied to the project activity are:

Project Type I - Renewable Energy Projects. Category I.D: Grid connected renewable electricity generation. Version 9. 28 July 2006.

Project Type II - Energy Efficiency Improvement Projects. Category II.B: Supply side energy efficiency improvements – generation. Version 7. 28 November 2005.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

The proposed project activity consists of two project components that are eligible under the simplified modalities and procedures for small-scale CDM projects:

Project Type I - Renewable Energy Projects. Category I.D: Grid connected renewable electricity generation

The monitoring methodology conforms entirely to the approved monitoring methodology for this project type stating as follows: “Monitoring shall consist of metering the electricity generated by the renewable technology.”¹

Project Type II - Energy Efficiency Improvement Projects. Category II.B: Supply side energy efficiency improvements – generation

The monitoring methodology conforms entirely 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 the generating unit and the energy content of the 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.”²

¹ http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_2GHDC30TPDJK04LS07SY07X9MFZRG5

² http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_37J5A0Z3CJB1LQANGM4Y7JJZ6BEMK3

D.3 Data to be monitored:

Data related to component 2: The HFO plant

Data / Parameter:	FC_i
Data unit:	Liters
Description:	Amount of fuel combusted by generator
Source of data to be used:	Plant register
Value of data	
Description of measurement methods and procedures to be applied:	Measured and recorded daily Using fuel dipsticks or flow meters
QA/QC procedures to be applied:	Currently the fuel dipstick option is used. However if a flowmeter is installed, the meter calibration will be conducted as per manufacturer specifications, national standards, or international guidelines as appropriate
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

Data / Parameter:	$GEN_{TH, gross}$
Data unit:	MWh
Description:	Gross generation, HFO plant
Source of data to be used:	Plant register
Value of data	
Description of measurement methods and procedures to be applied:	Continuous measurement, recorded daily Using an electricity meter
QA/QC procedures to be applied:	Meter calibration will be conducted as per manufacturer specifications, national standards, or international guidelines as appropriate
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

Data / Parameter:	AUX_{TH}
Data unit:	MWh
Description:	Auxiliary consumption, HFO plant
Source of data to be used:	Plant register
Value of data	
Description of measurement methods and procedures to be applied:	Continuous measurement, recorded daily Using a separate meter measuring an auxiliary consumption alone
QA/QC procedures to	Meter calibration will be conducted as per manufacturer specifications, national

be applied:	standards, or international guidelines as appropriate
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

Data / Parameter:	GEN_{TH}
Data unit:	MWh
Description:	Generation output, HFO plant
Source of data to be used:	Plant operator
Value of data	
Description of measurement methods and procedures to be applied:	Calculated Daily Calculated as the difference between the gross electricity generation ($GEN_{TH,gross}$) and the auxiliary consumption (AUX_{TH})
QA/QC procedures to be applied:	
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

Data / Parameter:	$DEN_{prjct,fuel j}$
Data unit:	t/m ³
Description:	Density
Source of data to be used:	Independent laboratory
Value of data	
Description of measurement methods and procedures to be applied:	Measured, based on one sample taken on each load of fuel delivered to the facility
QA/QC procedures to be applied:	Laboratories accredited in accordance with ISO/IEC 17025:2005 A second sample will be kept at the HFO power plant until reception of the test results.
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

Data / Parameter:	NCV
Data unit:	MJ/kg
Description:	Calorific value
Source of data to be used:	Independent laboratory
Value of data	
Description of measurement methods and procedures to be applied:	Measured, based on one sample taken on each load of fuel delivered to the facility
QA/QC procedures to be applied:	Laboratories accredited in accordance with ISO/IEC 17025:2005 A second sample will be kept at the HFO power plant until reception of the test results.
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

Data / Parameter:	$HR_{prjct, fuel\ j}$
Data unit:	MJ/kWh
Description:	Heat rate
Source of data to be used:	Plant operator
Value of data	
Description of measurement methods and procedures to be applied:	Project operator will calculate heat rate daily, using data on calorific value of fuel(s). $HR = (\sum FCI) / GEN_{TH, gross}$
QA/QC procedures to be applied:	
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

Data related to component 1: The hydropower plant on the Nyagak river

Data / Parameter:	GEN_{Nyagak}
Data unit:	MWh
Description:	Net electricity export, hydro plant
Source of data to be used:	Plant register
Value of data	
Description of measurement methods and procedures to be applied:	Continuous measurement, reported daily Using an electricity meter
QA/QC procedures to be applied:	Meter calibration will be conducted as per manufacturer specifications, national standards, or international guidelines as appropriate
Any comment:	Archived on paper, or electronic version until 2 yrs after end of crediting period

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

Information on fossil fuel consumption, generation output, and various other performance variables are currently being collected under the oversight of the manager of the HFO generator in Arua in the West Nile region. The staff responsible for the operation of the power plant is collecting information daily and the ultimate responsibility for QC/QA is assigned to the manager. The manager checks the quality, consistency and comprehensiveness of the collected information on a daily basis and compares with kept data records. The information is recorded in both paper and electronic form before it is electronically stored. The manager finally quality checks the information and data before it is reported to the WENRECo management team.

The QC/QA procedures that will be followed by WENRECo will be fully consistent with the QC/QA procedures generally put into practice at hydroelectric stations around the world and in CDM projects in which the World Bank is a project participant. Professional support and experience will be sought when the operational and management approach is identified and put in place at the Nyagak hydrostation.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

The operator of the West Nile Hydro Power project will have certain operational and data collection obligations to fulfil, in order to minimise greenhouse gas emissions and to ensure that sufficient information is available to calculate ERs in a transparent manner and to allow for a successful verification of these ERs.

A separate, detailed monitoring plan (MP) and work sheets will be developed specifically for this project activity. The operator shall comply with the data collection, testing and analysis, and data management obligations contained in this MP. Key parameters define the performance of the project and the operator shall integrate the data collection requirements into the company's database and information collection policies. Table 6 summarizes the management structure and the division of responsibility among the project participants.

Table 6: Management and Operation System: Roles of Project Partners

	WENRECO	The World Bank
Monitoring System	<ul style="list-style-type: none"> - Review MP and suggest adjustments if necessary - Develop and establish management and operations system - Establish and maintain monitoring system and implement MP - Prepare for initial verification and project commissioning 	<ul style="list-style-type: none"> - Review monitoring and management system - Ensure project meets the Bank requirements and safeguards - Arrange for initial verification
Data Collection and Provision	<ul style="list-style-type: none"> - Establish and maintain data measurement and collection system and collect data for all MP indicators and inputs as required - Maintain valid permits and licenses and collect information on compliance with relevant Ugandan regulations - Collect relevant information on electricity generation and fuel consumption by power plants in Uganda 	<ul style="list-style-type: none"> - Review data collection systems
Data Computation	<ul style="list-style-type: none"> - Enter data in MP worksheets - Use MP worksheets to calculate ERs 	<ul style="list-style-type: none"> - Review completed worksheets
Data Storage Systems	<ul style="list-style-type: none"> - Implement record maintenance system - Store and maintain records (paper trail) - Forward completed worksheets to the World Bank - Complete brief annual report 	<ul style="list-style-type: none"> - Receive copies of key records and reports - Maintain the Bank records
Performance Monitoring and Reporting	<ul style="list-style-type: none"> - Analyze data and compare project performance with project targets - Analyze system problems, recommend and implement improvements (performance management) - Prepare and forward periodic reports 	<ul style="list-style-type: none"> - Review reports - Evaluate performance and assist with performance management, if necessary
MP Training and Capacity Building	<ul style="list-style-type: none"> - Develop and establish MP training, skills review and feedback system - Ensure that operational staff is trained and enabled to meet the needs of this MP 	<ul style="list-style-type: none"> -
Quality Assurance, Audit and Verification	<ul style="list-style-type: none"> - Establish and maintain quality assurance system with a view to ensuring transparency and allowing for audits and verification - Prepare for and facilitate audits and verification process 	<ul style="list-style-type: none"> - Supervise the Project - Arrange for initial and periodic verification

D.6. Name of person/entity determining the monitoring methodology:

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The International Bank for Reconstruction and Development (IBRD) is acting as trustee for the Prototype Carbon Fund, and is a project participant.