IGES-INTEGRATED CAPACITY STRENGTHENING -CLEAN DEVELOPMENT MECHANISM

PROJECT DESIGN DOCUMENT (PDD)

LA SUERTE RICE MILL COGENERATION PLANT

by

MS. CLARISSA C. CABACANG

PROJECT DESIGN DOCUMENT

CONTENTS:

ANNEXES

PROJECT DESIGN DOCUMENT

A. GENERAL DESCRIPTION OF PROJECT ACTIVITY

A. GENERAL DESCRIPTION OF PROJECT ACTIVITY

A.1. TITLE OF THE PROJECT ACTIVITY:

LSRM COGENERATION PLANT

A. GENERAL DESCRIPTION OF PROJECT ACTIVITY

A.2. DESCRIPTION OF THE PROJECT ACTIVITY

PURPOSE:

TO USE LSRM EXISTING RICE HUSK WASTE DUE FOR BURNING TO GENERATE ITS OWN ELECTRICITY AND PROCESS HEAT REQUIREMENT

A. GENERAL DESCRIPTION OF PROJECT ACTIVITY

A.2. DESCRIPTION OF THE PROJECT ACTIVITY

CONTRIBUTION TO SUSTAINABLE DEVELOPMENT:

- USE OF CHEAP INDIGENOUS RENEWABLE ENERGY SOURCES IN AN IMPORT ENERGY-DEPENDENT COUNTRY
- USE OF ENVIRONMENT-FRIENDLY POWER GENERATION TECHNOLOGY
- REDUCTION OF AIR POLLUTION IN THE COUNTRYSIDE

A. GENERAL DESCRIPTION OF PROJECT ACTIVITY

A.3. PROJECT PARTICIPANTS:

PROPONENT: LSRM

CDM ADVISER

A.4 GENERAL DESCRIPTION OF PROJECT ACTIVITY

A.4. TECHNICAL DESCRIIPTION OF THE PROJECT ACTIVITY:

A.4. TECHNICAL DESCRIPTION OF THE PROJECT ACTIVITY:

1. **LOCATION OF PROJECT ACTIVITY:**

2-HECTARE ADJACENT TO EXISTING LSRM
RICE MILLING AND DRYING FACILTY

NATIONAL HIGHWAY, DISTRICT 1, SAN MANUEL
ISABELA PROVINCE, PHILIPPINES

A.4. TECHNICAL DESCRIPTION OF THE PROJECT ACTIVITY:

A.4.2 CATEGORIES OF PROJECT ACTIVITY

BIOMASS POWER GENERATION AND PROCESS HEATING THAT AVOIDS UNCONTROLLED BURNING OF BIOMASS

APPLICABLE APPROVED BASELINE METHODOLOGY:

1. GRID-CONNECTED BIOMASS POWER GENERATION THAT AVOIDS UNCONTROLLED BURNING OF BIOMASS AM 0004
2. BAGASSE-BASED COGENERATION CONNECTED TO AN ELECTRICITY GRID

A.4. TECHNICAL DESCRIPTION OF THE PROJECT ACTIVITY

A.4.3 TECHNOLOGY TO BE EMPLOYED

:

STEAM BOILER: VYNCKE BOILER SYSTEM (TYPE INO-HD-CLC)

ADVANTAGE - STEP GRATE DESIGN WITH MECHANICAL PUSHER
- SIMPLE AND RELIABLE DESIGN CAPABLE OF CONSISTENT OPERATION

STEAM TURBINE : KKK STEAM TURBINE (MODEL AFA4-G4a)

ADVANTAGE - WITH ELECTRIC GENERATOR AND PROCESS STEAM HEADER
- PROVEN COMPATIBLE SELECTED STEAM BOILER

TECHNOLOGY INFORMATION TO INCLUDE POLLUTION MITIGATING OPTIONS TO ARREST PARTICULATES EMISSION, SO2 EMISSION, NOISE POLLUTION, WASTE WATER EFFLUENT DISCHARGES ETC

HOWEVER, PROJECT CAN MINIMIZE NEGATIVE IMPACTS OF UNCONTROLLED RICE HUSK BURNING

A.4. TECHNICAL DESCRIPTION OF THE PROJECT ACTIVITY:

A.4.4 EXPLANATION ON HOW PROPOSED CDM PROJECT ACTIVITY CAN REDUCE GHG EMISSIONS

CDM PROJECT CAN REDUCE GHG EMISSIONS BY:

- DISPLACEMENT OF ELECTRICTY DEMAND FROM ELECTRICITY GRID PRIMARILY PRODUCED FROM FOSSIL FUEL WITH ELECTRICITY PRODUCED FROM BIOMASS – FIRED GENERATOR
- PREVENTION OF UNCONTROLLED OPEN AIR BURNING OF RICE HUSK AS A MODE OF DISPOSAL BY DIVERTING BIOMASS WASTE MATERIAL TO BOILER FUEL APPLICATION
- USE OF STEAM PRODUCED FROM BIOMASS FOR RICE/CORN DRYING TO FOSSIL FUEL AS HEAT SOURCE

A.4 TECHNICAL DESCRIPTION OF THE PROJECT ACTIVITY:

A.4.4.1 ESTIMATED AMOUNT OF EMISSION REDUCTION OVER A CHOSEN CREDITING PERIOD

- TOTAL GHG EMISSION REDUCTION OVER A 7 YEAR DREDITING PERIOD IS ABOUT 43,000 TONS CO2e
- ANNUAL GHG EMISSION REDUCTION DUE TO PROJECT ACTIVITIES IS ABOUT 6,000 TOTONS CO2e

B. APPLICATION OF A BASELINE METHODOLOGY

B. APPLICATION OF A BASELINE METHODOLOGY

B.1: <u>TITLE AND REFERENCE OF THE APPROVED BASELINE METHODOLOGY</u>

GRID-CONNECTED BIOMASS POWER GENERATION THAT AVOIDS UNCONTROLLED BURNING OF BIOMASS (AM0004)

B. APPLICATION OF A BASELINE METHODOLOGY

B.2: DESCRIPTION OF HOW THE METHODOLOGY IS APPLIED IN THE CONTEXT OF PROJECT ACTIVITY

STEPS IN METHODOLOGY APPLIED TO PROJECT TO ASCERTAIN THAT

1. PROJECT IS DIFFERENT TO BAU PRIMARILY DUE TO INVESTMENT AND TECHNOLOGY BARRIER

2. LARGE SURPLUS SUPPLY AVAILABILITY OF BIOMASS

3 THE GRID BASELINE IS A COMBINATION OF ALL POWER GENERATION TYPES

B. APPLICATION OF A BASELINE METHODOLOGY

B.3: DESCRIPTION OF HOW THE ANTHROPOGENIC GHG EMISSIONS BY SOURCES ARE REDUCED BELOW THOSE THAT WOULD HAVE OCCURRED IN THE ABSENCE OF A CDM PROJECT ACTIVITY

THIS PROJECT INTRODUCES STATE OF THE ART TECHNOLOGY TO THE COUNTRY THAT PROVIDES ENERGY FROM UNSED BIOMASS AS FUEL

THIS PROJECT IS ADDITIONAL SINCEELECTRICITY FROM RICE HUSK-FIRED POWER PLANTS NOT LOCALLY AVAILABLE DUE TO ABSENCE OF TECHNOLOGY EVEN IF RICE HUISK IS FREE; IMPORTED TECHNOLOGY IS NOT YET ECONOMICALLY VIABLE

RICE HUSK-FIRED POWER GENERATION IS NOT YET ACCEPTABLE LOCALLY

IT PRODUCES LESS CO2 EMISSIONS DUE TO DISPLACEMENT OF FOSSIL FUEL FOR HEAT AND POWER GENERATION IN THE BASELINE SCENARIO WITH BIOMASS FUEL IN THE PROJECT SCENARIO. BIOMASS IS CO2 NEUTRAL

B. APPLICATION OF A BASELINE METHODOLOGY

B.4: DESCRIPTION OF HOW THE DEFINITION OF THE PROJECT BOUNDARY RELATED TO THE BASELINE METHODOLOGY SELECTED IS APPLIED TO THE PROJECT ACTIVITY

PER METHODOLOGY, THE PHYSICAL DELINEATION IS DEFINED AS THE PLANT SITE AND ALL EMISSION SOURCES INCLUDED IN THE PROJECT BOUNDARY ARE WITHIN THE PLANT SITE

B. APPLICATION OF A BASELINE METHODOLOGY

B.5: DETAILED BASELINE INFORMATION, INCLUDING THE DATE OF COMPLETION OF THE BASELINE STUDY AND THE NAME OF PERSON(S)/ENTITY(IES) DETERMINING THE BASELINE

DETAILS OF BASELINE INFORMATION : SEE ANNEX 3

DATE OF COMPETING THE FINAL DRAFT OF THIS BASELINE SECTION

DD/MM/YYYY

NAME OF PERSONS/ENTITY DETERMINING THE BASELINE

NAME OF ORGANIZATIION

AND ADDRESS

C. DURATION OF THE PROJECT ACTIVITY/ CREDITING PERIOD

C. DURATION OF THE PROJECT ACTIVITY/ CREDITING PERIOD

C.1. DURATION OF THE PROJECT ACTIVITY

20 YEARS?

C.1.1 STARTING DATE OF THE PROJECT ACTIVITY

2005

C..1.2. EXPECTED OPERATIONAL LIFETIME OF THE PROJECT ACTIVITY

MINIMUM 25 YEARS

C. DURATION OF THE PROJECT ACTIVITY/ CREDITING PERIOD

C.2. CHOICE OF CREDITING PERIOD AND RELATED INFORMATION

C.2.1. RENEWABLE CREDITING PERIOD (MAX. 7 YEARS)

STARTING DATE OF FIRST CREDITING PERIOD: 2005

LENGTH OF FIRST CREDITING PERIOD: DD/MM/YYYY ?

C.2.2 FIXED CREDITING PERIOD

STARTING DATE: DD/MM/YYYY

LENGTH: ? YEARS

D. APPLICATION OF A MONITORING METHODOLOGY AND PLAN

D. APPLICATION OF A MONITORING METHODOLOGY AND PLAN

D.1 NAME AND REFERENCE OF APPROVED MONITORING METHODOLOGY APPLIED TO THE PROJECT ACIVITY

GRID-CONNECTED BIOMASS POWER GENERATION THAT AVOIDS UNCONTROLLED BURNING OF BIOMASS

REFERENCE NO. AM0004

D. APPLICATION OF A MONITORING METHODOLOGY AND PLAN

D.2. JUSTIFICATION OF THE CHOICE OF THE METHODOLOGY AND WHY IT IS APPLICABLE TO THE PROJECT ACTIVITY

THE CHOICE OF METHODOLOGY IS JUSTIFIED SINCE THE PROPOSED PROJECT ACTIVITY AND THE CONTEXT OF PROJECT ACTIVITY MEET THE CONDITIONS UNDER WHICH THE METHODOLOGY IS APLLICABLE BASED ON THE FOLLOWING:

1. PROJECT ACTIVITY ALSO INVOLVES ELECTRICITY GENERATION UTILIZING RICE HUSK DUE FOR OPEN AIR BURNING

2. HAVE ACCESS TO ABUNDANT SUPPLY OF BIOMASS

3. PROPOSED POWER GENERATION PROJECT IS ALSO NOT CONSIDERED A BUSINESS AS USUAL SCENARIO

4. THE PROJECT IS ALSO TOO SMALL TO HAVE IMPACT ON PLANS FOR CONSTRUCTION OF NEW POWER PLANTS

D.2.1. OPTION 1: MONITORING OF THE EMISSIONS IN THE PROJECT SCENARIO AND BASELINE SCENARIO

D.2.1. OPTION 1: MONITORING OF THE EMISSIONS IN THE PROJECT SCENARIO AND BASELINE SCENARIO

MONITORING EMISSIONS IN THE PROJECT SCENARIO:

- DATA COLLECTION AND ARCHIVING
- APPLICABLE EQUATIONS

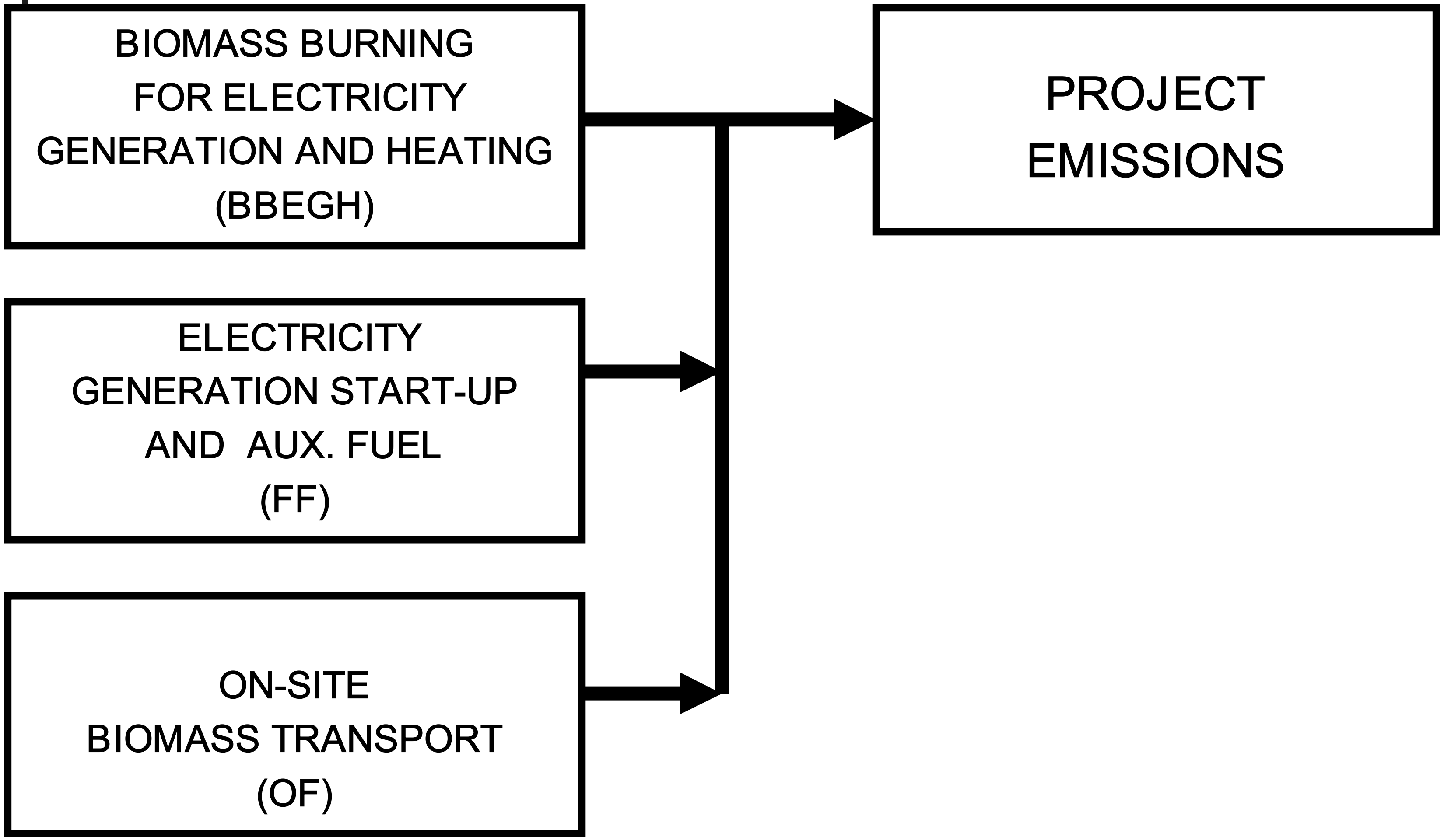
D.2.1.1 DATA TO BE COLLECTED IN ORDER TO MONITOR EMISSIONS FROM THE PROJECT ACTIVITY AND HOW THESE DATA WILL BE ARCHIVED

ID NUMBER	DATA TYPE	DATA VARIABLE	DATA UNIT	MEASURED (M) CALCULATED (C) ESTIMATED (E)
1 EF_CH4	QUANTITATIVE	CH4 IN STACK GAS	%	M
2 EF_N2O	QUANTITATIVE	N2O IN STACK GAS	%	M
3 BF_Y	QUANTITATIVE	AMOUNT BIOMASS COMBUSTED	TONS FUEL	M
4 FF_Y	QUANTITATIVE	START-UP AND AUX. FUEL OIL USED	LITERS	M
5 OF_Y	QUANTITATIVE	ON-SITE USE OF TRANSPORT FUEL	LITERS	M
6 EP_Y	QUANTITATIVE	ELECTRICITY PRODUCED	MWH	M
7 HR	QUANTITATIVE	BOILER EFFICIENCY (HEAT RATE)	TONS FUEL/ MWH	C

D.2.1.1 DATA TO BE COLLECTED IN ORDER TO MONITOR EMISSIONS FROM THE PROJECT ACTIVITY AND HOW THESE DATA WILL BE ARCHIVED CONT . . .

ID NUMBER	RECORDING FREQUENCY	PROPORTION OF DATA MONITORED	HOW WILL DATA BE ARCHIVED PAPER / ELECTRONIC	FOR HOW LONG IS ARCHIVED DATA KEPT ?
1 EF_CH4	MINIMUM 4 / YEAR	_	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
2 EF_N2O	MINIMUM 4 / YEAR	100 %	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
3 BF_Y	MONTHYLY	100%	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
4 FF_Y	CONTINUOUS	100 %	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
5 OF_Y	CONTINUOUS	100 %	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
6 EP_Y	CONTINUOUS	100 %	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
7 HR	MINIMUM 4 / YEAR	_	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION



D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

PROJECT EMISSION SOURCES AND KINDS OF GAS EMISSIONS

EMISSION SOURCES	GASES	REMARKS/JUSTIFICATION
BIOMASS BURNING	CO2	EXCUDED, BIOMASS CO2
NEUTRAL, IPCC		
FOR ELECTRICITY	CH4	INCLUDED
GENERATION	N20	INCLUDED
FOSSIL FUEL FOR	CO2	INCLUDED
BIOMASS BURNING	CH4	INCLUDED
START-UP AND AS	N2O	INCLUDED
AUX. FUEL		
ON-SITE OF BIOMASS	CO2	INCLUDED
TREANSPORT FUEL	CH4	INCLUDED
	N2O	INCLUDED

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

A. BIOMASS BURNING FOR ELECTRICITY GENERATION AND HEATING (BBEGH) :

A.1 $BBEGH\_CH4_Y = BF_Y * BF\_HV * CE * EF\_CH4 * GWP\_CH4$

A.2 $BBEGH\_N2O_Y = BF_Y * BF\_HV * CE * EF\_N2O * GWP\_N2O$

A.3 $BBEGH\_GHG_Y = BF_Y * BF\_HV * CE * (EF\_N2O * GWP\_N2O + EF\_CH4 * GWP\_CH4)$

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

A. BIOMASS BURNING FOR ELECTRICITY GENERATION AND HEATING (BBEGH) : CONT ...

WHERE:	$BBEGH\_GHG_Y$	BBEGH GHG EMISSION, t CO2e/yr
	$BBEGH\_CH4_Y$	BBEGH CH4 EMISSION, t CO2e/yr
	$BBEGH\_N2O_Y$	BBEGH N2O EMISSION, t CO2e/yr
	BF_Y	BIOMASS FUEL CONSUMPTION, t/yr
	BF_HV	BIOMASS FUEL HEATING VALUE, TJ/t
	CE	COMBUSTION EFFICIENCY, FRACTION
	EF_CH4	CH4 EMISSION FACTOR FOR BIOMASS FUEL, t CH4/TJ
	EF_N2O	N2O EMISSION FACTOR FOR BIOMASS FUEL, t N2O/TJ
	GWP_CH4	CH4 GLOBAL WARMING POTENTIAL, t CO2e/t CH4
	GWP_N2O	N20 GLOBAL WARMING POTENTIAL, t CO2e/t N2O

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

B. ON-SITE FUEL FUEL USED TO TRANSPORT BIOMASS FRO STORAGE TO ELECTRICITY GENERATION FACILITY (OF):

B.1 $FF\_CO2_Y = FF_Y * OF\_HV * CE * GEF\_C * GF,CO2/C$

B.2 $FF\_CH4_Y = FF_Y * FF\_HV * CE * GEF\_CH4 * GWP\_CH4$

B.3 $FF\_N20_Y = FF_Y * FF\_HV * CE * GEF\_N2O * GWP\_N2O$

B.4 $FF\_GHG_Y = FF_Y * FF\_HV * CE * (GEF\_CO2 * GF,CO2/C + GEF\_CH4 * GWP\_CH4 + GEF\_N20 * GWP\_N2O)$

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

B. FOSSIL FUEL USED AS START-UP AND AUXLLIARY FUEL FOR ELECTRICITY GENERATION AND HEATING (FF) : CONT . . .

WHERE:

FF_GHG_Y	FF GHG EMISSION, t CO2e/yr
FF_CH4_Y	FF CH4 EMISSION, t CO2e/yr
FF_N2O_Y	FF N2O EMISSION, t CO2e/yr
FF_Y	START-UP AND AUXILLIARY FUEL CONSUMPTION, t/yr
FF_HV	FOSSIL FUEL HEATING VALUE, TJ/l
CE	COMBUSTION EFFICIENCY, FRACTION
GEF_C	GENERATING UNIT FOSSIL FUEL C EMISSION FACTOR, t C/TJ
GEF_CH4	GENERATING UNIT FOSSIL FUEL CH4 EMISSION FACTOR, t CH4/TJ
GEF_N2O	GENERATING UNIT FOSSIL FUEL N2O EMISSION FACTOR, t N2O/TJ
GWP_CH4	CH4 GLOBAL WARMING POTENTIAL, t CO2e/t CH
GWP_N2O	N20 GLOBAL WARMING POTENTIAL, t CO2e/t N2O

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

C. ON-SITE FUEL USED TO TRANSPORT BIOMASS FROM STORAGE TO BIOMASS BOILER (OF):

B.1 $OF\_CO2_Y = OF_Y * OF\_HV * CE * EF\_C * GF,CO2/C$

B.2 $OF\_CH4_Y = OF_Y * OF\_HV * CE * EF\_CH4 * GWP\_CH4$

B.3 $OF\_N20_Y = OF_Y * OF\_HV * CE * EF\_N2O * GWP\_N2O$

B.4 $OF\_GHG_Y = OF_Y * OF\_HV * CE * (VEF\_C * GF,CO2/C + VEF\_CH4 * GWP\_CH4 + VEF\_N20 * GWP\_N2O)$

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

B. FOSSIL FUEL USED AS START-UP AND AUXLLIARY FUEL FOR ELECTRICITY GENERATION AND HEATING (FF) : CONT . . .

WHERE:

OF_GHG_Y	OF GHG EMISSION, t CO2e/yr
OF_CH4_Y	OF CH4 EMISSION, t CO2e/yr
OF_N2O_Y	OF N2O EMISSION, t CO2e/yr
OF_Y	ON-SITE TRANSPORT FUEL CONSUMPTION, t/yr
OF_HV	ON-SITE TRANSPORT FUEL HEATING VALUE, TJ/l
CE	COMBUSTION EFFICIENCY, FRACTION
GF, CO2/C	CO2/C GRAVIMETRIC FACTOR
EF_C	ON-SITE VEHICLE FUEL C EMISSION FACTOR, t C/TJ
EF_CH4	ON-SITE VEHICLE FUEL CH4 EMISSION FACTOR, t CH4/TJ
EF_N2O	ON-SITE VEHICLE FUEL N2O EMISSION FACTOR, t N2O/TJ
GWP_CH4	CH4 GLOBAL WARMING POTENTIAL, t CO2e/t CH
GWP_N2O	N20 GLOBAL WARMING POTENTIAL, t CO2e/t N2O

D.2.1. OPTION 1: MONITORING OF THE EMISSIONS IN THE PROJECT SCENARIO AND BASELINE SCENARIO

MONITORING EMISSIONS IN THE BASELINE SCENARIO:

- DATA COLLECTION AND ARCHIVING
- APPLICABLE EQUATIONS

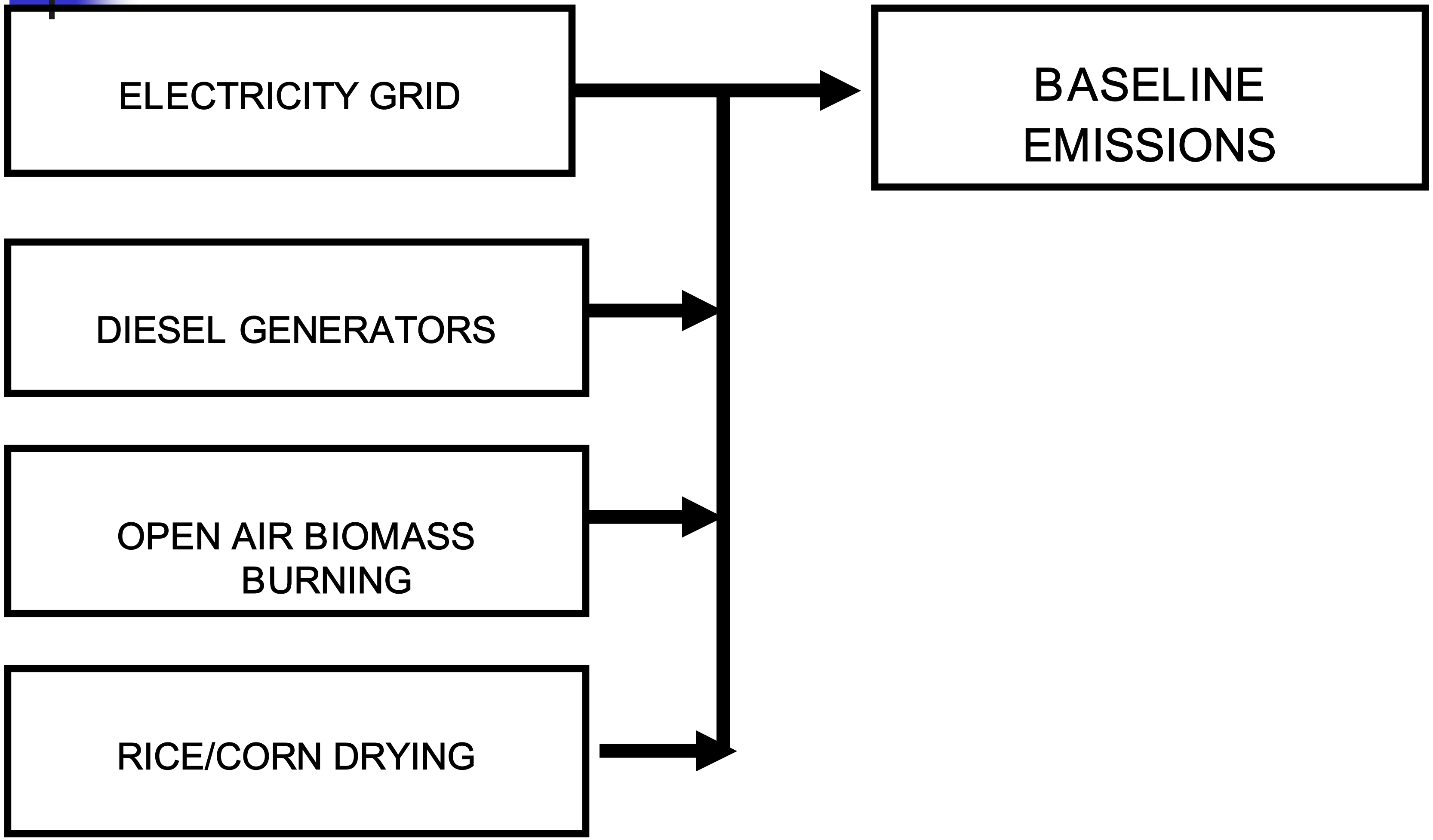
D.2.1.3. COLLECTION OF RELEVANT DATA NEEDED TO DETERMINE BASELINE GHG EMISSIONS BY SOURCES WITHIN PROJECT BOUNDARY AND MANNER OF ARCHIVING

ID NUMBER	DATA TYPE	DATA VARIABLE	DATA UNIT	MEASURED (M) CALCULATED (C) ESTIMATED (E)
8 EG_Y	QUANTITATIVE	ELCTRICITY USAGE FROM GRID	GWH	M
9 CEF_Y	QUANTITATIVE	GRID CO2 EMISSION FACTOR	T CO2/GWH	C
3 BF_Y	QUANTITATIVE	AMOUNT BIOMASS COMBUSTED	TONS FUEL	M
10 DG_Y	QUANTITATIVE	POWER USAGE FROM DIESEL GENERATORS	GWH	M
11 SRD_Y	QUANTITATIVE	AMOUNT EXHAUST STEAM USAGE	TONS	M

D.2.1.3. COLLECTION OF RELEVANT DATA NEEDED TO DETERMINE BASELINE GHG EMISSIONS BY SOURCES WITHIN PROJECT BOUNDARY AND MANNER OF ARCHIVING

ID NUMBER	RECORDING FREQUENCY	PROPORTION OF DATA MONITORED	HOW WILL DATA BE ARCHIVED PAPER / ELECTRONIC	FOR HOW LONG IS ARCHIVED DATA KEPT ?
8 EG_Y	MINIMUM 4 / YEAR	–	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
9 CEF_Y	ONCE A YEAR	–	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
3 BF_Y	MONTHYLY	100%	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
10 DG_Y	MINIMUM 4/YEAR	–	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR
11 SRD_Y	CONTINUOUS	100 %	ELECTRONIC	MIN. 2 YEARS AFTER LAST ISSUANCE OF ECR

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF BASELINE EMISSION



D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF B ASELINE EMISSION

BASELINE EMISSION SOURCES AND KINDS OF GAS EMISSIONS

EMISSION SOURCES	GASES	REMARKS/JUSTIFICATION
ELECTRICITY GRID	CO2	INCLUDED
	CH4	EXCLUDED, NEGLIGIBLE, CONSERVATIVE
	N20	EXCLUDED, NEGLIGIBLE, CONSERVATIVE
DIESEL GENERATORS	CO2	INCLUDED
	CH4	INCLUDED
	N2O	INCLUDED
DIESEL GENERATORS	CO2	INCLUDED
	CH4	INCLUDED
	N2O	INCLUDED
OPEN-AIR BIOMASS BURNING	CO2	EXCLUDED, BOIMASS CO2 NEUTRAL CONSERVATIVE
	CH4	INCLUDED
	N2O	INCLUDED

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF BASELINE EMISSION

A. GHG EMISSIONS FROM ELECTRICITY GRID (EG) :

A.1. $EG\_CO2_Y = EG_Y * CEF_Y$

A.2 $EG\_CHG_Y = EG_Y * CEF_Y$

WHERE:	EG_CO2_Y	CO2 EMISSIONS FROM ELECTRICITY GRID, t CO2/yr
	EG_CHG_Y	GHG EMISSIONS FROM ELECTRICITY GRID, t CO2 e/yr
	EG_Y	ELECTRICITY SUPPLIED BY ELECTRICITY GRID, GWH/yr
	CEF_Y	CO2 EMIISSION FACTOR OF ELECTRICITY GRID, t CO2/yr

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF BASELINE EMISSION

B. EMISSIONS FROM DIESEL GENERATORS (DG):

B.1 $DG\_CO2_{Y} = DG_{Y} * (ECE)^{-1} * GEF\_C * CE * GF,CO2/C$

B.2 $DG\_CH4_{Y} = DG_{Y} * (ECE)^{-1} * CE * GEF\_CH4 * GWP\_CH4$

B.3 $DG\_N20_{Y} = DG_{Y} * (ECE)^{-1} * CE * GEF\_N2O * GWP\_N2O$

B.4 $DG\_GHG_{Y} = DG_{Y} * (ECE)^{-1} * CE * (GEF\_C * GF,CO2/C + GEF\_CH4 * GWP\_CH4 + GEF\_N20 * GWP\_N2O)$

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF BASELINE EMISSION

B. FOSSIL FUEL USED AS START-UP AND AUXLLIARY FUEL FOR ELECTRICITY GENERATION AND HEATING (FF) : CONT . . .

WHERE:

DG_GHG_Y	OF GHG EMISSION, t CO2e/yr
DG_CH4_Y	OF CH4 EMISSION, t CO2e/yr
DG_N2O_Y	OF N2O EMISSION, t CO2e/yr
DG_Y	DIESEL GENERATOR ELECTRICITY GENERATION, TJ/yr
ECE	ENERGY CONVERSION EFFICIENCY, FRACTION
CE	COMBUSTION EFFICIENCY, FRACTION
GF, CO2/C	CO2/C GRAVIMETRIC FACTOR
DEF_C	DIESEL GENERATORN FUEL C EMISSION FACTOR, t C/TJ
DEF_CH4	DIESEL GENERATOR FUEL C EMISSION FACTOR, t CH4/TJ
DEF_N2O	DIESEL GENERATOR C EMISSION FACTOR, t N2O/TJ
GWP_CH4	CH4 GLOBAL WARMING POTENTIAL, t CO2e/t CH
GWP_N2O	N20 GLOBAL WARMING POTENTIAL, t CO2e/t N2O

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF BASELINE EMISSION

C. EMISSIONS FROM RICE/CORN DRYING (RD):

C.1 $RD\_CO2_Y = RD_Y * (ECE)^{-1} * DEF\_C * CE * GF,CO2/C$

C.2 $RD\_CH4_Y = RD_Y * (ECE)^{-1} * CE * DEF\_CH4 * GWP\_CH4$

C.3 $RD\_N20_Y = RD_Y * (ECE)^{-1} * CE * DEF\_N2O * GWP\_N2O$

C.4 $RD\_GHG_Y = RD_Y * (ECE)^{-1} * CE * (DEF\_C * GF,CO2/C + DEF\_CH4 * GWP\_CH4 + DEF\_N20 * GWP\_N2O)$

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION

C. EMISSIONS FROM RICE/CORN DRYING (RD) : CONT . . .

WHERE:

RD_GHG_Y	RD GHG EMISSION, t CO2e/yr
RD_CH4_Y	RD CH4 EMISSION, t CO2e/yr
RD_N2O_Y	RD N2O EMISSION, t CO2e/yr
RD_Y	RICE/CORN DRYING FUEL CONSUMPTION, t/yr
HEATING VALUE	RICE DRIER FUEL HEATING VALUE, TJ/l
CE	COMBUSTION EFFICIENCY, FRACTION
GF, CO2/C	CO2/C GRAVIMETRIC FACTOR
EF_C	ON-SITE VEHICLE FUEL C EMISSION FACTOR, t C/TJ
GEF_CH4	ON-SITE VEHICLE FUEL CH4 EMISSION FACTOR, t CH4/TJ
GEF_N2O	ON-SITE VEHICLE FUEL N2O EMISSION FACTOR, t N2O/TJ
GWP_CH4	CH4 GLOBAL WARMING POTENTIAL, t CO2e/t CH
GWP_N2O	N20 GLOBAL WARMING POTENTIAL, t CO2e/t N2O

D.2.1.2.
DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF BASELINE EMISSIONS

D. OPEN AIR BIOMASS BURNING (BB) :

D.1 $BB\_CH4_Y = BF_Y * BCF * CE * CH4F * CH4/C * GWP\_CH4$

D.2 $BB\_N2O_Y = BF_Y * BNF * CE * N2OF * N2O/N * GWP\_N2O$

D.3. $BB\_GHG_Y = BF_Y * CE * (BNF * N2OF * N2O/N * GWP\_N2O\ BF +$
$BCF * CH4F * CH4/C * GWP)$

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF BASELINE EMISSIONS

D. OPEN AIR BIOMASS BURNING : CONT . . .

WHERE: BB_GHG_Y	BB GHG EMISSION, t CO2e/yr
BB_CH4_Y	BB CH4 EMISSION, t CO2e/yr
BB_N2O_Y	BB N2O EMISSION, t CO2e/yr
BF_Y	BIOMASS FUEL CONSUMPTION, t/yr
BCF	BIOMASS CARBON FRACTION
BNF	BIOMASS NITROGEN FRACTION
CE	COMBUSTION EFFICIENCY, FRACTION
CH4F	FRACTION CARBON RELEASED AS CH4 EMISSION
N2OF	FRACTION NITROGEN RELEASED AS N2OEMISSION
CH4/C	CH4 - C MASS CONVERSION RATIO
N2O/N	N2O – N MASS CONVERSION RATIO
GWP_CH4	CH4 GLOBAL WARMING POTENTIAL, t CO2e/t CH4
GWP_N2O	N20 GLOBAL WARMING POTENTIAL, t CO2e/t N2O

D.2.3 TREATMENT OF LEAKAGE IN THE MONITORING PLAN

NOT APPLICABLE

NO LIKELY LEAKAGE IS EXPECTED

D.2.4 DESCRIPTION OF FORMULAE USED TO ESTIMATE EMISSION REDUCTION FOR THE PROJECT ACTIVITY

EMISSION REDUCTION, ER_Y = BASELINE EMISSION, PE_Y - PROJECT EMISSION - LEAKAGE, L

$$ER_Y = (EG\_CHG_Y + DG\_GHG_Y + RD\_GHG_Y + BB\_GHG_Y) – (BBEGH\_GHG_Y + FF\_GHG_Y + OF\_GHG_Y) - 0$$

APPLICATION OF A MONITORING METHODOLOGY AND PLAN

D.3. QUALITY CONTROL (QC) AND QUALITY ASSURANCE (FOR DATA MONITORED

D.3. QUALITY CONTROL (QC) AND QUALITY ASSURANCE (FOR DATA MONITORED

ID NUMBER	UNCERTAINTY LEVEL OF DATA (LOW,MEDIUM, HIGH)	ARE QA/QC PROCEDURES PLANNED FOR THESE DATA	OUTLINE THE QA/QC PROCEDURES OR EXPLAIN WHY THEY ARE NOT BEING PLANNED
1 EF_CH4	LOW	YES	USE OF MORE PRECISE INSTRUMENTS TO BE MAINTAINED PERIODICALLY. RESULT TO BE COMPARED WITH IPCC VALUE AND TO USE LARGER VALUES FOR CONSERVATISM
2 EF_N2O	LOW	YES	USE OF MORE PRECISE INSTRUMENTS TO BE MAINTAINED PERIODICALLY. RESULT TO BE COMPARED WITH IPCC VALUE AND TO USE LARGER VALUES FOR CONSERVATISM
3 BF_Y	LOW	YES	TRUCKS CARRYING BIOMASS TO BE WEIGHED TWICE IN PROPERLY MAINTAINED WEIGHING STATION
4 FF_Y	LOW	YES	FUEL PUMP READINGS WILL BE COMPARED WITH PURCHASE RECIEPTS
5 OF_Y	LOW	YES	TRUCKS' FUEL SUPPLY RECEIPTS TO BE COMPARED WITH PURCHASE RECEIPTS
6 EP_Y	LOW	YES	TWO ELECTRICITY METERS OPERATING IN SERIES WILL ADOPTED. READING TO BE TAKEN WEEKLY FOR EARLY DETECTION OF MALFUNCTION

D.3. QUALITY CONTROL (QC) AND QUALITY ASSURANCE (FOR DATA MONITORED

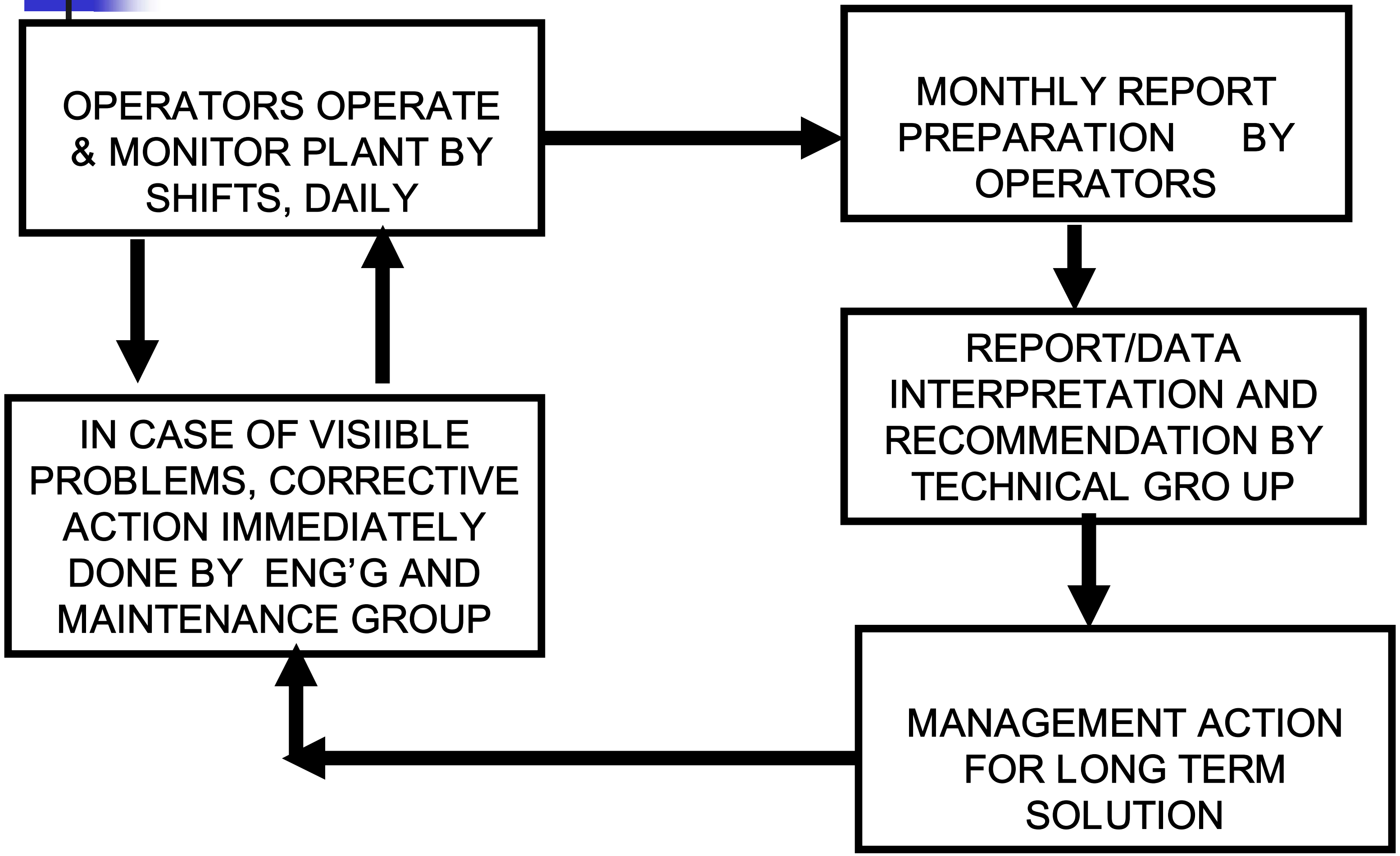
ID NUMBER	UNCERTAINTY LEVEL OF DATA (LOW,MEDIUM, HIGH)	ARE QA/QC PROCEDURES PLANNED FOR THESE DATA	OUTLINE THE QA/QC PROCEDURES OR EXPLAIN WHY THEY ARE NOT BEING PLANNED
7 HR	LOW	NA	STANDARD TEST PROCEDURES WILL BE USED TO CALCULATE THE HEAT RATE OF THE BOILER
8 EG_Y	MINIMUM 4 / YEAR	YES	TWO ELECTRICITY METERS OPERATING IN SERIES WILL ADOPTED. READING TO BE TAKEN WEEKLY FOR EARLY DETECTION OF MALFUNCTION
9 CEF_Y	LOW	YES	CALCULATION OF CO2 EMISSION FACTOR FOR ELECTRICITY GRID IS BASED ONLY ON OFFICICIAL DATA. GRID POWER MIX WILL BE UPDATED YEARLY FOR FOR ACCURACY
10 DG_Y	LOW	YES	TWO ELECTRICITY METERS OPERATING IN SERIES WILL ADOPTED. READING TO BE TAKEN WEEKLY FOR EARLY DETECTION OF MALFUNCTION
11 SRD_Y	LOW	100 %	AN ON-LINE STEAM METER WITH TOTALIZER WILL INSTALLED BOTH AT THE EXIT POINT OF THE STEAM BOILER AND THE ENTRY POINT THE RICE/CORN DRIER FOR MORE ACCURACY AND EARLY DETECTION OF MALFUNCTION

D. APPLICATION OF A MONITORING METHODOLOGY AND PLAN

D.4. DESCRIPTION OF OPERATIONAL AND MANAGEMENT STRUCTURE THAT THE PROJECT OPERATOR WILL IMPLEMENT TO MONITOR EMISSION REDUCTION AND LEAKAGE EFFECTS GENERATED BY PROJECT ACTIVITY

- TO MAINTAIN A DAILY OPERATION AND MAINTENANCE LOGS BY OPERATORS HEADED BY SHIFT LEADER THAT CAN ALLOW LSRM MANAGEMENT TO ADDRESS IMMEDIATE PROBLEMS
- TO PREPARE A MONTHLY REPORT TO THE MANAGEMENT'S TECHNICAL MONITORING GROUP TO DETERMINE SIGNIFICANT DEVIATIONS TO TARGET EMISSIONS LEVEL AND RECOMMEND APPROPRIATE ACTIONS
- SUMMARY REPORT INCLUDES THE FOLLOWING:
  1. SUMMARY
  2. ACCIDENTS AND MALFUNCTIONS
  3. SAFETY AND ENVRONMENT
  4. PLANT PERFORMANCE AND AVAILABILITY
  5. METER RECORDS
  6. FUEL REPORT
  7. PERSONNEL CHANGES

SCHEMATIC DIAGRAM
OPERATIONAL AND MANAGEMENT STRUCTURE TO MONITOR MISSION REDUCTION AND LEAKAGE EFFECTS



D. APPLICATION OF A MONITORING METHODOLOGY AND PLAN

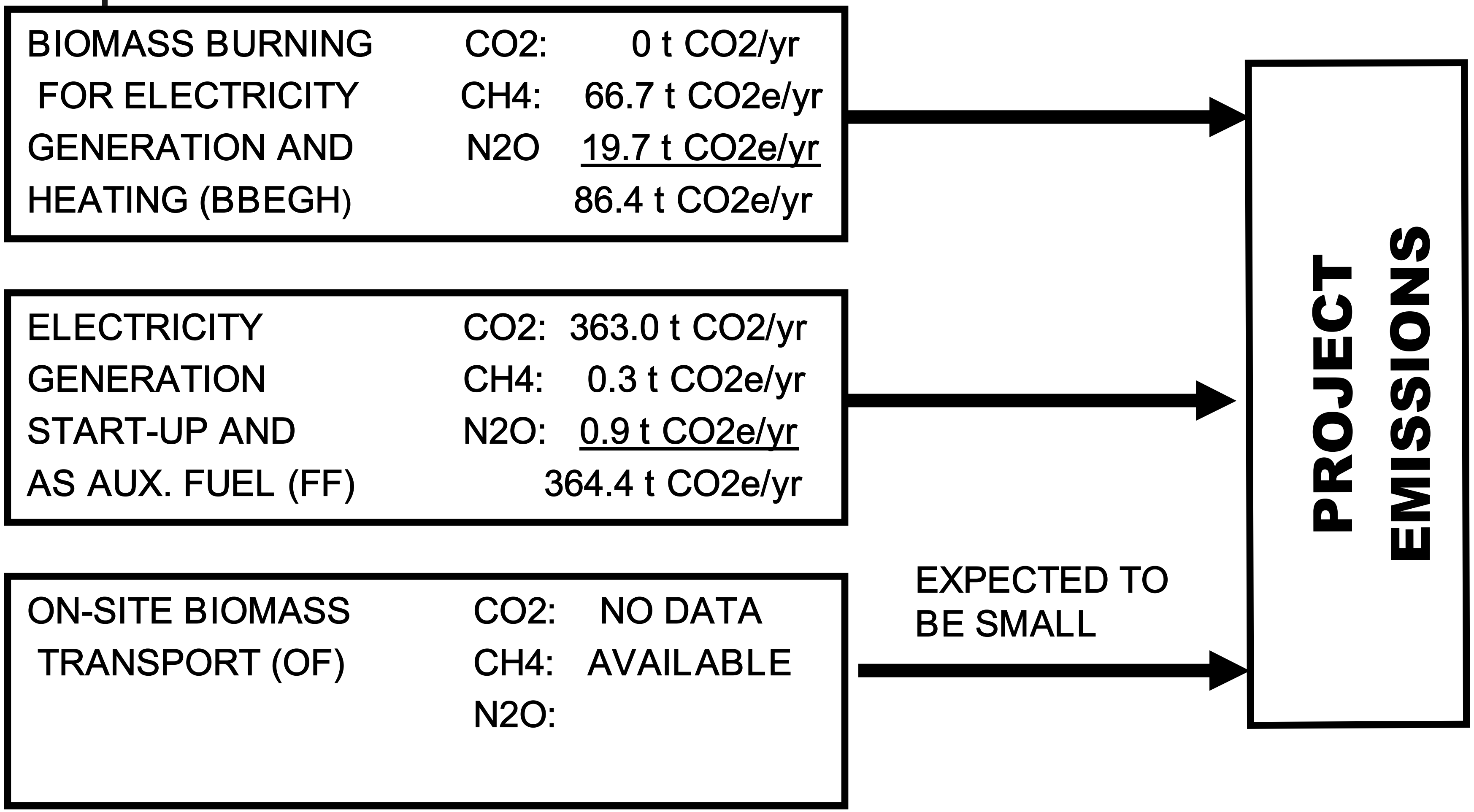
D.5. _NAME OF PERSONS/ENTITY DETERMINING THE MONITORING METHODOLOGY

LSRM PERSONNEL

E. ESTIMATION OF GHG EMISSIONS BY SOURCES

D.2.1.2.

DESCRIPTION OF FORMULAE USED FOR GHG CALCULATION OF PROJECT EMISSION



E. ESTIMATION OF GHG EMISSIONS BY SOURCES

E.2 ESTIMATED LEAKAGE

NOT APPLICABLE

NO LIKELY LEAKAGE IS EXPECTED

E. ESTIMATION OF GHG EMISSIONS BY SOURCES

E.3 THE SUM OF E.1 AND E.2 REPRESENTING PROJECT ACTIVITY EMISSIONS

BIOMASS BURNING FOR ELECTRICITY GENERATION AND HEATING (BBEGH)	CO_2:	0 t CO_2/yr
	CH_4:	66.7 t CO_2e/yr
	N_2O	19.7 t CO_2e/yr
		86.4 t CO_2e/yr

→ PROJECT EMISSIONS

ELECTRICITY GENERATION START-UP AND AS AUX. FUEL (FF)	CO_2:	363.0 t CO_2/yr
	CH_4:	0.3 t CO_2e/yr
	N_2O:	0.9 t CO_2e/yr
		364.4 t CO_2e/yr

→ PROJECT EMISSIONS

ON-SITE BIOMASS TRANSPORT (OF)	CO_2:	NO DATA
	CH_4:	AVAILABLE
	N_2O:	

→ PROJECT EMISSIONS

PROJECT EMISSIONS

E. ESTIMATION OF GHG EMISSIONS BY SOURCES

E.4 ESTIMATED ANTHROPOGENIC EMISSIONS BY SOURCES GHG OF THE BASELINE, 2004

SOURCE	CO_2 t CO_2/YR	CH_4 t CO_2e/YR	N_2O t CO_2e/YR	TOTAL t CO_2e/YR
ELECTRICITY GRID	1,382.3	0	0	1,387.2
DIESEL GENERATORS	4,289.6	3.7	10.9	4,304.2
RICE/CORN DRYING	725.9	0.6	1.8	728.3
RICE HUSK BURNING	0	338	115	453.0
TOTAL	6,397.8	342.3	127.7	6,867.8

E. ESTIMATION OF GHG EMISSIONS BY SOURCES

E.5 DIFFERENCE BETWEEN E.4 AND E.3 REPRESENTING EMISSIONS REDUCTION OF THE PROJECT ACTIVITY

EMISSION REDUCTION

=

BASELINE EMISSIONS

CO2: 6,397.8 t CO2/yr

CH4: 342.3 t C02e/yr

N2O: 127.7 t CO2e/yr

—

PROJECT EMISSIONS

CO2: 363.0 t CO2/yr

CH4: 67.0 t C02e/yr

N2O: 20.6 t CO2e/yr

+

ON-SITE TRANSPORT EMISSIONS

E. ESTIMATION OF GHG EMISSIONS BY SOURCES

E.6 TABLE PROVIDING VALUES OBTAINED WHEN APPLYING FORMULAE ABOVE

EMISSIONS REDUCTION

GHG EMISSION	t CO2e/YR
CO2	6,034.8 - OT_CO2
CH4	66.7 - OT_CH4
N2O	19.7 - OT_N2O
TOTAL	6,121.2 - OT_GHG

NOTE: OT_GHG CONSIDERED SMALL

F. ENVIRONMENTAL IMPACTS

F. ENVIRONMENTAL IMPACTS

F.1 DOCUMENTATION ON THE ANALYSIS OF THE ENVIRONMENTAL IMPACTS, INCLUDING TRANSBOUNDARY IMPACTS

1. CAN MINIMIZE THE NEGATIVE ENVIRONMENTAL IMPACTS OF UNCONTROLLED OPEN AIR RICE HUSK BURNING;

2. AVAILABLE INFORMATIONS TO MITIGATE THE FOLLOWING ENVIRONMENTAL IMPACTS
   - A. SO2 AND N2O EMISSIONS
   - B. PARTICULATES AND FLY ASH EMISSIONS
   - C. WASTEWATER POLLTION
   - D. NOISE POLLUTION
   - E. 1,000 t/yr ASH DISPOSAL PROBLEM

F. ENVIRONMENTAL IMPACTS

F.2 CONCLUSIONS AND REFERENCES TO SUPPORT DOCUMENTATION OF AN ENVIRONMENTAL IMPACT ASSESSMENT UNDERTAKEN, IF IMPACTS ARE CONSIDERED SIGNIFICANT

G. STAKEHOLDERS' COMMENTS

Under process

G. STAKEHOLDERS' COMMENTS

G.1. BRIEF DESCRIPTION OF THE PROCESS ON HOW COMMENTS BY LOCAL STAKEHOLDERS HAVE BEEN INVITED AND COMPLIED

Under process

G. STAKEHOLDERS' COMMENTS

G.2. SUMMARY OF THE COMMENTS RECEIVED

Under process

G. STAKEHOLDERS' COMMENTS

G.3. REPORT ON HOW DUE ACCOUNT WAS TAKEN OF ANY COMMENTS RECEIVED

Under process

ANNEX 1. CONTACT INFORMATION ON ARTICIPANTS IN THE PROJECT ACTIVITY

PROPONENT

LA SUERTE RICE MILL
- ADDRESS
- TELEPHONE NO.
- FAX NO
- E-MAIL ADDRESS

REPRESENTATIVE
- NAME
- TITLE
- DEPARTMENT
- TELEPHONE NO
- FAX
- E-MAIL ADDRESS

CDM ADVISER

COMPANY
- ADDRESS
- TELEPHONE NO
- FAX NO
- E-MAIL ADDRESS

REPRESENTATIVE
- NAME
- TITLE
- DEPARTMENT
- TELEPHONE NO
- FAX
- E-MAIL ADDRESS

PROJECT DESIGN DOCUMENT

ANNEX 2:

INFORMATION REGARDING PUBLIC FUNDING

PROJECT TO BE FUNDED BY THE FOLLOWING

LSRM	20%
OTHER FUNDING SOURCE	80%

USE OF PUBLIC FUNDING NOT SPECIFIED

ANNEX 3. BASELINE INFORMATION
RICE/CORN DRIER HEATING DIESEL CONSUMPTION

ASSUMPTIONS AND DEFAULT VALUES

DENSITY,DIESEL , t / KL	0.87	DEFAULT VALUE, DOE
BARREL / TON, DIESEL	7.35	DEFAULT VALUE, D0E
BFOE / BARREL, DIESEL	0.9328	DEFAULT VALUE, DOE
TOE / BFOE	0.1444	DEFAULT VALUE, DOE
KTOE / TOE	0.001	BY CONVERSION
TJ /KTOE	43.868	DEFAULT VALUE, IPCC

RICE HUSH FOR POWER GENERATION AND PROCESS HEATING

ASSUMPTIONS AND DEFAULT VALUES

MJ / MWH	3,600	CONVERSION FACTOR
TJ / MJ	10^{-6}	CONVERSION FACTOR
ENERGY CONVERSION EFF.	30 %	STUDY, IPCC APPROVED
RICE HUSK OXIDATION EFFICIENCY	90%	DEFAULT VALUE, IPCC

ANNEX 3. GHG EMISSION BY SOURCE- RICE HUSK BOILER

BASIS AND ASSUMPTIONS:

RICE HUSK :

CO_2 EMISSION FACTOR	0	ASSUMED, IPCC
CH_4 EMISSION FACTOR, t CH_4 / TJ	0.03	DEFAULT VALUE, IPCC
N_2O EMISSION FACTOR, t N_2O / TJ	0.0006	DEFAULT VALUE, IPCC
CH_4 GWP	21	DEFAULT VALUE, IPCC
N_2O GWP	310	DEFAULT VALUE, IPCC

ANNEX 3. BASELINE INFORMATION
TOTAL COMBUSTION ENERGY DEMAND PER GWH GENERATED

	ASSUMPTION AND DEFAULT VALUES	
GWH / MMBFOE	600	DEFAULT VALUE, DOE
TOE / BFOE	0.1444	DEFAULT VALUE, DOE
KTOE / TOE	1000	CONVERSION FACTOR
BFOE/MMBFOE	10^6	CONVERSION FACTOR
TJ / KTOE	41.868	DEFAULT VALUE,IPCC

ANNEX 3. ESTIMATION OF POWER PLANT EMISSIONS FOR FOSSIL FUEL FIRED PLANTS

ASSUMPTIONS AND DEFAULT VALUES

STORED CARBON	0	DEFAULT VALUE,IPCC
CARBON EMISSION FACTOR, t C / TJ		
OIL(RESIDUAL FUEL OIL)	21.1	DEFAULT VALUE,IPCC
DIESEL	20.2	DEFAULT VALUE,IPCC
COAL	26.2	DEFAULT VALUE,IPCC
NATURAL GAS	15.6	DEFAULT VALUE,IPCC
CO2-C MASS RATIO	44 / 12	DEFAULT VALUE,IPCC
CH4 EMISSION FACTOR, KG CH4 / TJ		
OIL	3	DEFAULT VALUE, IPCC
DIESEL	3	DEFAULT VALUE, IPCC
COAL	1	DEFAULT VALUE, IPCC
NATURAL GAS	1	DEFAULT VALUE, IPCC

ANNEX 3. ESTIMATION OF POWER PLANT EMISSIONS FOR FOSSIL FUEL FIRED PLANTS CONT . . .

ASSUMPTIONS AND DEFAULT VALUES

N_2O EMISSION FACTOR, KG N_2O / TJ		
OIL	0.6	DEFAULT VALUE, IPCC
COAL	1.4	DEFAULT VALUE, IPCC
NATURAL GAS	0.1	DEFAULT VALUE, IPCC
GLOBAL WARMING POTENTIAL, GWP		
CH_4, t CO_2 / t CH_4	21	DEFAULT VALUE, IPCC
N_2O, t CO_2 / t N_2O	310	DEFAULT VALUE, IPCC
OXIDATION EFFICIENCY		
OIL	99	DEFAULT VALUE, IPCC
COAL	98	DEFAULT VALUE, IPCC
NATURAL GAS	99.5	DEFAULT VALUE, IPCC

ANNEX 3. ESTIMATION OF POWER PLANT EMISSIONS FOR FOSSIL FUEL FIRED PLANTS

A.2 GEOTHERMAL PLANT

ASSUMPTIONS

CO2 EMISSIONS	5 % COAL GHG EMISSIONS
CH_4 EMISSIONS	0 ASSUMED
N_2O EMISSIONS	0 ASSUMED

ANNEX 3. ESTIMATION OF GHG EMISSIONS FROM ELECTRICITY GRID

ASSUMPTIONS:

TOTAL POWER USAGE	7200 MWH	CALCULATED
% POWER USAGE,	33 %	
GRID EMISSION FACTOR, t CO2e /GWH	589	CALCULATED
GWH / MWH	0.001	CONVERSION FACTOR

ANNEX 3. ESTIMATION GHG EMISSIONS FROM DIESEL GENERATORS

ASSUMPTIONS:

TOTAL POWER USAGE	7,200 MWH	
% TOTAL POWER USAGE,	67 %	
DIESEL EMISSION FACTOR, t CO_2e /GWH	741.6	CALCULATED
GWH / MWH	0.001	CONVERSION FACTOR

ANNEX 3.
CALCULATION OF DIESEL HEATING VALUE

ASSUMPTIONS:

DENSITY	0.87 t/KL	DEFAULT VALUE, DOE
BARRELS / t	7.35	DEFAULT VALUE, DOE
BFOE / BARREL	0.9328	DEFAULT VALUE, DOE
TOE / BFOE	0.1444	DEFAULT VALUE, DOE
KTOE / TOE	0.001	DEFAULT VALUE, DOE
TJ /KTOE	41.868	DEFAULT VALUE, DOE

ANNEX 3. ESTIMATION OF GHG EMISSIONS FROM RICE/CORN DRIER

ASSUMPTIONS AND DEFAULT VALUES

DIESEL OXIDATION EFF.	99%	DEFAULT VALUE,IPCC
STORED CARBON	0	DEFAULT VALUE,IPCC
CARBON EMISSION FACTOR, t C / TJ	20.2	DEFAULT VALUE,IPCC
CO2-C GRAVIMETRIC FACTOR	44 / 12	DEFAULT VALUE,IPCC
CARBON EMISSION FACTOR, t C / TJ	20.2	DEFAULT VALUE,IPCC
CO2-C GRAVIMETRIC FACTOR	44 / 12	DEFAULT VALUE,IPCC
CH4 EMISSION FACTOR, KG CH4 / TJ	3	DEFAULT VALUE, IPCC
N2O EMISSION FACTOR, KG N2O / TJ	0.6	DEFAULT VALUE, IPCC
GLOBAL WARMING POTENTIAL, GWP		
CH4, t CO2 / t CH4	21	DEFAULT VALUE, IPCC
N2O, t CO2 / t N2O	310	DEFAULT VALUE, IPCC

ANNEX 3. ESTIMATION OF GHG EMISSIONS FROM OPEN AIR RICE HUSK BURNING

ASSUMPTIONS AND DEFAULT VALUES:

OXIDATION EFF.	90%	DEFAULT VALUE, IPCC
t CARBON / t RICE HUSK	0.358	FATL,1994**
RICE HUSK N/C RATIO	0.014	DEFAULT VALUE, IPCC
CH_4/C MASS RATIO	16/12	DEFAULT VALUE, IPCC
N_2O/N_2 MASS RATIO	44/28	DEFAULT VALUE, IPCC
CH_4 GWP	21	DEFAULT VALUE, IPCC
N_2O GWP	310	DEFAULT VALUE, IPCC
OPEN AIR RICE HUSK BURNING		
t CO_2 / TJ	0	ASSUMED, IPCC
t C IN CH_4/ t C OXIDIZED	0.005	DEFAULT VALUE, IPCC
t N IN N_2O/ t C OXIDIZED	0.007	DEFAULT VALUE, IPCC

ANNEX 3. ESTIMATION OF GHG EMISSIONS FOR ON-SITE TRANSPORT FUEL

ASSUMPTIONS AND DEFAULT VALUES

DIESEL OXIDATION EFF.	99%	DEFAULT VALUE,IPCC
STORED CARBON	0	DEFAULT VALUE,IPCC
CARBON EMISSION FACTOR, t C / TJ	20.2	DEFAULT VALUE,IPCC
CO2-C GRAVIMETRIC FACTOR	44 / 12	DEFAULT VALUE,IPCC
CARBON EMISSION FACTOR, t C / TJ	20.2	DEFAULT VALUE,IPCC
CO2-C GRAVIMETRIC FACTOR	44 / 12	DEFAULT VALUE,IPCC
CH4 EMISSION FACTOR, KG CH4 / TJ	3	DEFAULT VALUE, IPCC
N2O EMISSION FACTOR, KG N2O / TJ	0.6	DEFAULT VALUE, IPCC
GLOBAL WARMING POTENTIAL, GWP		
CH4, t CO2 / t CH4	21	DEFAULT VALUE, IPCC
N2O, t CO2 / t N2O	310	DEFAULT VALUE, IPCC

ANNEX 3. SUMMARY OF CALCULATED GHG EMISSIONS FROM POWER GENERATION BY PLANT TYPE

	EMISSIONS, t CO2EQUIV / GWH			
	CO2	CH4	N20	TOTAL
OIL	772.1	0.6	1.9	774.6
COAL	949	0.2	4.4	953.6
NATURAL GAS	573.7	0.2	0.3	574.2
GEOTHERMAL	47.4	0	0	47.4
HYDRO	0	0	0	0
WIND/SOLAR	0	0	0	0

ANNEX 3. ESTIMATION OF LUZON ELECTRICITY GRID AVERAGE EMISSIONS

2004 LUZON POWER GENERATION GRID

SOURCE:	GWH	%		CO2 EMISSION t CO2/GWH
OIL	5,408	9.0		772
COAL	22,687	37.5		908
NATURAL GAS	16,761	27.7		562
HYDRO	6,125	10.1		0
GEOTHERMAL	9,486	15.7		45
TOTAL	60,467	100	AVE.	589

ANNEX 3. 2004-2013 LUZON ELECTRICITY GRID AVERAGE EMISSION FACTORS

YEAR	GHG EMISSION FACTOR $CO2_{EQUIV.}$ / GWH	YEAR	GHG EMISSION FACTOR $CO2_{EQUIV.}$ / GWH
2004	589.0	2009	648.2
2005	612.6	2010	623.0
2006	623.7	2011	612.3
2007	635.8	2012	610.6
2008	648.1	2013	603.7

PROJECT DESIGN DOCUMENT

ANNEX 4:

MONITORING PLAN

THE END

THANK YOU