CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	•The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. •As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	•The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

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Masan Biomass Boiler Project
Version 04
Date: 12/04/2012

A.2. Description of the small-scale project activity:

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The proposed project "Masan Biomass Boiler Project", developed by Tin Thanh Industrial Electricity and Steam Company Limited (hereafter referred to as "Tin Thanh") will consist of installation and operation of a biomass based boiler to displace the existing fossil fuel i.e. fuel oil (FO) fired boilers in Masan Industrial Corporation (hereafter referred to as "MSI") in Tan Dong Hiep A I.Z, Di An District, Binh Duong Province, Viet Nam.

The project activity will utilize sawdust which is wood waste residue derived from wood-based industries, and hence considered renewable biomass as per "Definition of Renewable Biomass" Annex 18 of EB 23 and Glossary of CDM Terms, version 05. The project activity employs one Fluidized Bed Combustors (FBC) technology boiler of 20 TPH capacity, at design pressure of 16 kg/cm^2 (g), for steam generation and the steam generated from the project activity shall be sold to MSI to meet the heat demand of process which was met by FO fired boilers, operated by MSI, in the scenario existing prior to the implementation of the proposed project activity. In the pre project scenario, the steam requirement of Masan Industrial Corporation (MSI) was in the range of 14 to 16 TPH at a pressure of 12-13 kg/cm^2 (g). This steam requirement was met by three numbers of Fuel Oil fired boilers having capacities of 6 TPH, 10 TPH and 15 TPH installed in the year 2004. Out of these three boilers, only the 15 TPH boiler and the 6 TPH boiler were working at a time and the 10 TPH boiler was kept as standby.

The project activity will displace approximately 7,770,000 litres of FO annually by utilizing approximately 34,243 tonnes of sawdust per annum for steam generation. The expected amount of greenhouse gases (GHGs) emissions reduction for the fixed crediting period of 10 years is approximately 21,976 tonnes of CO_2 equivalent per annum.

Contribution to Sustainable Development

In accordance to the sustainable development criteria indicators provided by the Designated National Authority (DNA)[1] of Viet Nam, the project activity will contribute to sustainable development of the Vietnam in the following areas:

- The project promotes the use of cleaner, more efficient and environment friendly technology, which utilizes biomass residue (sawdust) as an indigenous fuel source. It displaces the use of imported fossil fuel oil, helping to decrease the Viet Nam's current account deficit, and helps promote the increased usage of renewable energy.

[1] http://www.noccop.org.vn/images/article/Viet%20Nam%20CDM%20Pipeline_a43.pdf

- The project promotes sustainable use of natural resources by utilizing renewable biomass residue. On the local level, the project activity improves local environmental quality by reducing air pollution and ensures that sawdust is properly disposed of through controlled combustion with proper emissions control. Biomass combustion, wherein it is assumed that the amount of CO_2 produced by the combustion of biomass in the project activity is equivalent to the amount of CO2 absorbed by the biomass during its growth through photosynthesis, is considered zero emissions and does not produce pollutants like sulfur, unlike from combustion of fossil fuels.

- Increases employment opportunities in the area where the project is located.

A.3. Project participants:

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Viet Nam (host)	Private entity**: Tin Thanh Industrial Electricity and Steam Company Limited**	No
Viet Nam (host)	Private entity**: Investment and Trade Consultancy Company Limited** (INTRACO Co., Ltd.)	No
United Kingdom of Great Britain and Northern Ireland	Private entity**: ENECO Energy Trade B.V**	No

Contact information for each project participant is available in Annex 1 of this PDD.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

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A.4.1.1. Host Party(ies):

>>Viet Nam

A.4.1.2. Region/State/Province etc.:

>>Binh Duong Province

A.4.1.3. City/Town/Community etc:

>>Di An District

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

>>The project activity will be located at Tan Dong Hiep A Industrial Zone, Di An District, Binh Duong Province, Viet Nam. The nearest town from the project site is Bien Hoa at a distance of 10.4 km. The geographical locations of the project are: 10.9044^0 N ; 106.7824^0 E.
The project activity site is shown on the map below:

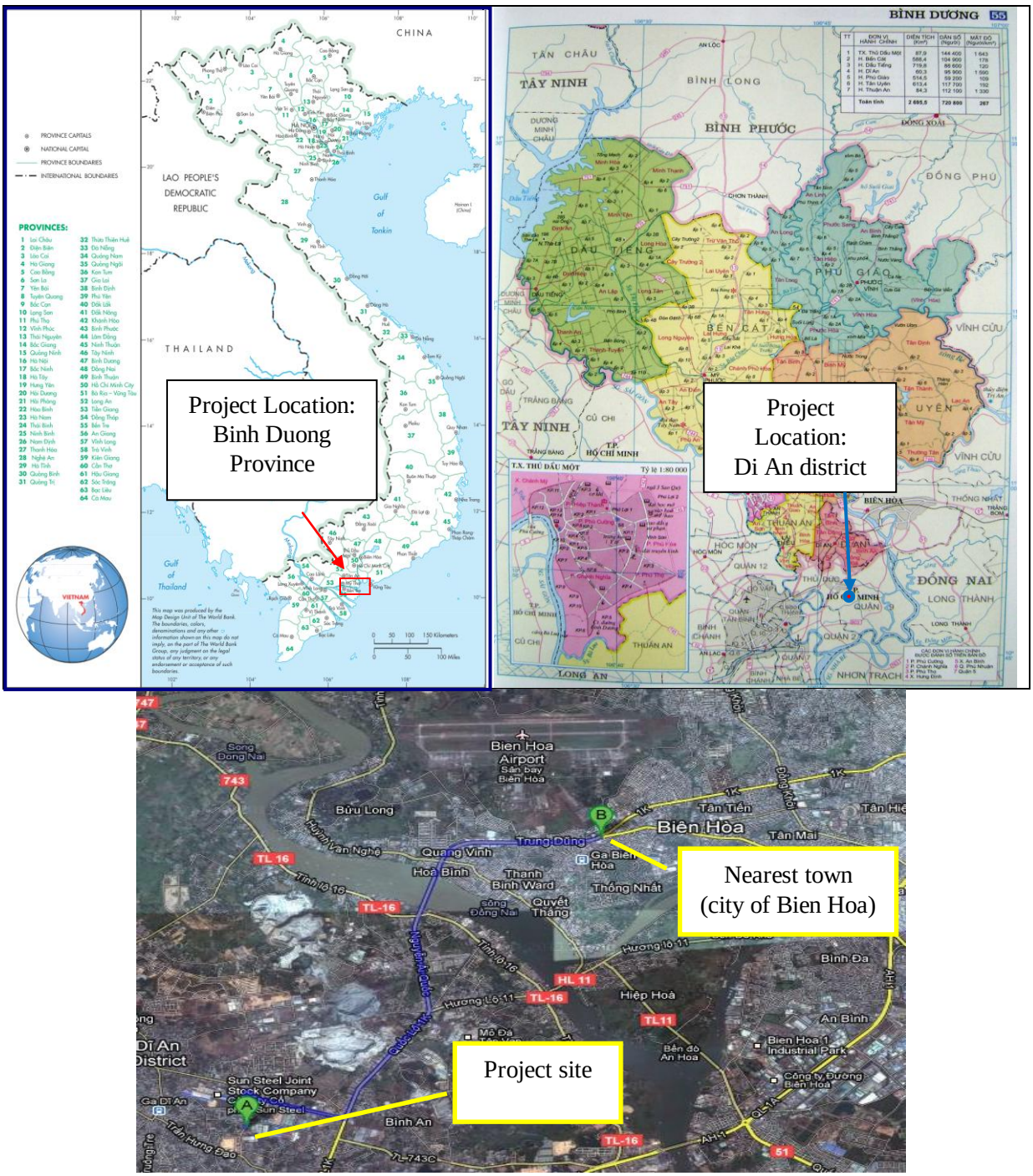

Figure A.4.1. Project Location

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

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Type I: Renewable energy projects

Category: AMS I.C, version 19 - ***Thermal energy production with or without electricity***

T**able A.4.2.1** Brief Technical specifications of boiler

Type of boiler	Fluidized Bed Combustor (FBC)
Make	Truong Quang II Company Limited
Model	TQ 20000 – 10TS
Number of boiler	1
Rated capacity of boiler	20 TPH
Working pressure	10 - 15 kg/cm^2 (g)
Design pressure	16 kg/cm^2
Fuel to be used[2]	Sawdust

The project is designed to produce clean energy by utilizing renewable biomass residue which is a carbon neutral fuel, hence does not cause any threat to the environment as compared to the technology being used by the fossil fuel based thermal energy generation unit. The technology employed is environmentally safe. The project activity involves no technology transfer.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Years	Estimation of annual emission reductions in tonnes of CO_2e
01/08/2012 to 31/07/2013	21,976
01/08/2013 to 31/07/2014	21,976
01/08/2014 to 31/07/2015	21,976
01/08/2015 to 31/07/2016	21,976
01/08/2016 to 31/07/2017	21,976
01/08/2017 to 31/07/2018	21,976
01/08/2018 to 31/07/2019	21,976
01/08/2019 to 31/07/2020	21,976
01/08/2020 to 31/07/2021	21,976
01/08/2021 to 31/07/2022	21,976
Total estimated reductions (tonnes of CO_2 e)	**219,760**
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period	**21,976**

[2] As per the technical specification of the boiler, it is designed to fired 100% biomass. Fossil fuel cannot be utilised.

A.4.4. Public funding of the small-scale project activity:

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No public funding or ODA from Annex 1 Parties is involved in the proposed project activity. Thus the project participant hereby confirms that there is no diversion of Official Development Assistance to the project activity.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

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According to paragraph 2 of Appendix C to the Simplified Modalities and Procedures for Small-Scale CDM project activities (FCCC/KP/CMP/2005/8/Add.1), a proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or a request for registration by another small-scale project activity:

- By the same project participants;
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

The project participant is promoting the proposed CDM project and confirms that it has not registered any small scale/large scale CDM project activity or applied for registration ofanother small scale/large scale CDM project activity within 1 km of the project boundaries of this proposed project activity, with the same or different technology/measurein the last 2 years. Hence, this project is not a de-bundled component of a large scale project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

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The approved baseline and monitoring methodology applied to this project is: "***Thermal energy production with or without electricity***", AMS I.C. / Version 19

In addition, the following methodological tools are applied in this PDD:

- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Version 01 (EB 39, Annex 7).
- "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" Version 02 (EB41, Annex 11).
- Demonstration and assessment of additionality, version 06.

B.2 Justification of the choice of the project category:

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The project activity conforms to the applicability conditions of the methodology AMS I.C – "Thermal energy production with or without electricity" under Appendix B of the SSC M&P as demonstrated in the table below:

Applicability Criteria for AMS I.C.	**Project Activity**
1. This methodology comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.	Applicable and fulfilled: The Project Activity utilizes sawdust that will displace fossil fuel (FO) for the generation of thermal energy in boiler.
2. Biomass-based cogeneration systems are included in this category. For the purpose of this methodology "cogeneration" shall mean the simultaneous generation of thermal energy and electrical energy in one process. Project activities that produce heat and power in separate element processes (for example, heat from a boiler and electricity from a biogas engine) do not fit under the definition of cogeneration project.	Not applicable. The system does not involve cogeneration.
3. Emission reductions from a biomass cogeneration system can accrue from one of the following activities: (a) Electricity supply to a grid; (b) Electricity and/or thermal energy (steam or heat) production for on-site consumption or for consumption by other facilities; (c) Combination of (a) and (b).	Not applicable. The system does not involve cogeneration.
4. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal.	The biomass boiler has a capacity of 13.43 MW thermal energy generation, which is less than the eligibility limit of 45MW thermal. (Calculation shown at the end of this section)
5. For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities).	Not applicable. The project does not involve co-firing. Only sawdust will be used as fuel.
6. The following capacity limits apply for biomass cogeneration units: (a) If the project activity includes emission reductions from both the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal. For the	Not applicable. The system does not involve cogeneration.

purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e. for renewable energy project activities, the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant); (b) If the emission reductions of the cogeneration project activity are solely on account of thermal energy production (i.e. no emission reductions accrue from electricity component), the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45 MW thermal; (c) If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e. no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW.	
7. The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6, and should be physically distinct from the existing units.	The biomass boiler has a capacity of 13.43 MW thermal energy generation, which is less than the eligibility limit of 45 MW thermal. The project activity is a Greenfield activity and does not involve the addition of renewable energy units at an existing renewable energy facility.
8. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	Not applicable. There are no existing facilities for renewable energy generation at the project sites.
9. New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the "General Guidelines to SSC CDM methodologies".	The project activity is a Greenfield and comply with the related and relevant requirements in the "General Guidelines to SSC CDM methodologies".Pare 19 of the General Guidelines to SSC CDM methodologies, version 17 gives the steps for determination of the most plausible baseline sceniro for Greenfield projects for Type II and Type III project activities whereas this project activity is Type I. Moreover, the baseline scenario for this project activity has been selected in accordance with para 16 of the applied methodology.

10. If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction calculation.	The project uses sawdust and not solid biomass fuel, for heat generation
11. Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions.	Not applicable because the project activity does not use any processed solid biomass fuel.
12. If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions.	A contract has been entered in between the project developer (Tin Thanh Industrial Electricity and Steam Co. Ltd.) and the user of the steam (Masan Industrial Corporation), for the supply of steam generated by the 20 TPH saw dust fired boiler to MSI, which specifies that only the project developer will claim emission reductions for the energy displaced.
13. If the project activity recovers and utilizes biogas for power/heat production and applies this methodology on a stand-alone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions.	The project activity does not recovers and utilizes biogas for power/heat production
14. Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources provided: (a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology AMS-III.K. Alternatively, conservative emission factor values from peer reviewed literature or from a	Not applicable. The project does not involve charcoal based biomass energy generation. The project activity uses sawdust, a type of renewable biomass, as a source of energy.

registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.	
Footnote 1 That is residential, industrial or commercial facilities.	The project activity is situated at an industrial facility.
Footnote 2 This methodology however does not preclude production of heat and power from the same heat generating equipment, for example a portion of steam produced in a boiler is used for process heat and another portion of steam from the same boiler is used for electricity production.	The project activity only generates thermal energy (steam) and does not produce of heat and power from the same heat generating equipment
Footnote 3 Thermal energy generation capacity shall be manufacturer's rated thermal energy output, or if that rating is not available the capacity shall be determined by taking the difference between enthalpy of total output (for example steam or hot air in kJ/kg or kJ/m3) leaving the project equipment and the total enthalpy of input (for example feed water or air in kJ/kg or kJ/m3) entering the project equipment. For boilers, condensate return (if any) must be incorporated into enthalpy of the feed.	The thermal energy generation capacity has been calculated in accordance with the guidance specified in footnote 3. (Detailed calculation has been provided at the end of this section).
Footnote 4 A co-fired system uses both fossil and renewable fuels, for example the simultaneous combustion of both biomass residues and fossil fuels in a single boiler. Use of fossil fuel during a period of time when the biomass is not available is permitted.	The project activity does not involve co-firing. The boiler will utilize sawdust as the only source of fuel.
Footnote 5 Physically distinct units are those that are capable of producing thermal/electrical energy without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".	The project activity is a Greenfield activity and does not involve the addition of renewable energy units at an existing renewable energy facility. Hence this is not applicable to this project activity.
Footnote 6 Refer to EB 23, Annex 18 for the definition of renewable biomass.	The sawdust utilized in the project activity conforms to the definition of renewable biomass since it is the waste product of wood processing factories.

	As per paragraph 4 of the "*Definition of Renewable biomass*" Annex 18 of EB 23, sawdust used in the project activity is renewable biomass as follows: • Sawdust is the waste product of wood processing industry as per footnote 2 of Annex 18 of EB23 In the project activity, sawdust is used for energy generation under the CDM. Thus, the use of sawdust does not affect the carbon pools.

The project proponent also confirms that the project capacity will remain under the threshold limit of 45 MW thermal during every year of the crediting period.

Calculation of rated thermal energy generation capacity of the project equipment:

Description	Unit	Value
Rated thermal energy generation capacity of the project boiler	$MW_{thermal}$	13.43
Enthalpy of the saturated steam at design pressure of 16 kg/cm^2 (g)	kJ/kg	2,794.5
Enthalpy of boiler feed water at 90^{o}C	kJ/kg	377
Rated capacity of boiler	TPH	20

$MW_{thermal}$ = (Enthalpy of the saturated steam at design pressure of 16 kg/cm^2 (g) - Enthalpy of boiler feed water at 90^{o}C) * Rated capacity of boiler in TPH / 3600 =

(2,794.5 – 377) * 20 /3600 = 13.43 $MW_{thermal}$

Based on the above explanations, AMS-I.C, version 19 is applicable for this project activity.

B.3. Description of the project boundary:

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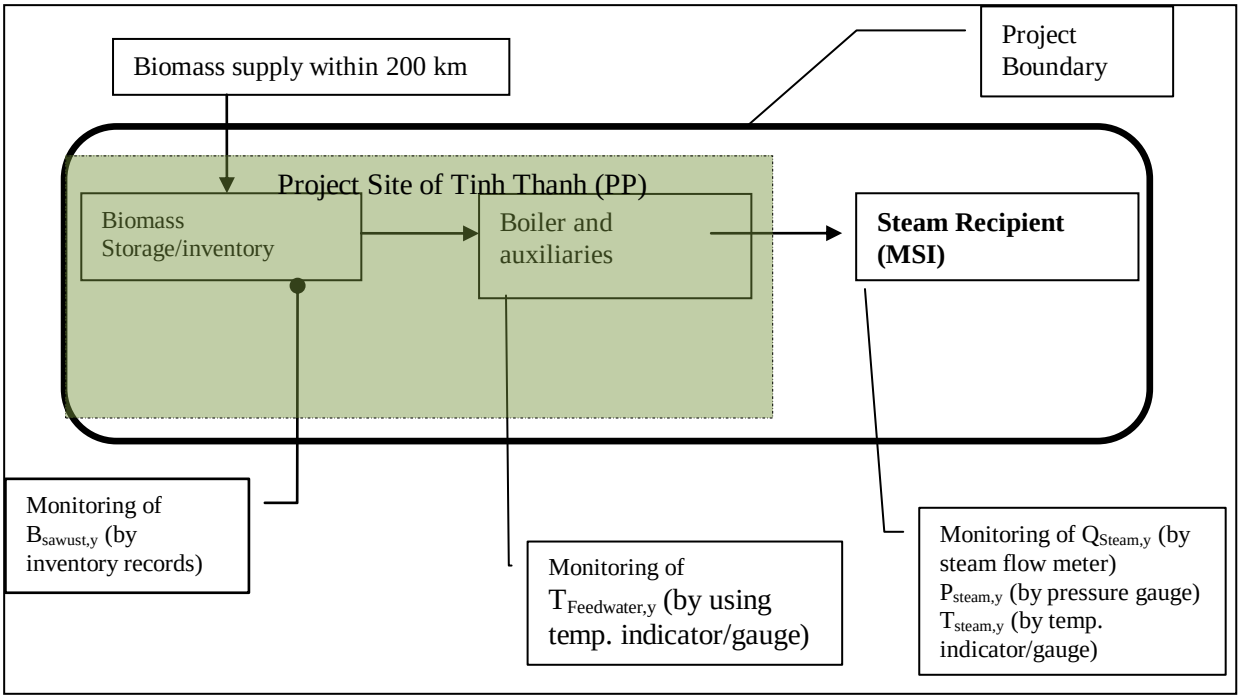
As per paragraph 15 of AMS I.C, version 19, the project boundary for the proposed project activity is

a) All plants generating power and/or heat located at the project site, whether firedwith biomass, fossil fuels or a combination of both;
b) All power plants connected physically to the electricity system (grid) that the project plant is connected to;
c) Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity;
d) The processing plant of biomass residues, for project activities using solid biomass fuel (e.g. briquette), unless all associated emissions are accounted for as leakage emissions;
e) The transportation itineraries, if the biomass is transported over distances greater than 200 kilometres, unless all associated emissions are accounted for as leakage emissions;

f) The site of the anaerobic digester in the case of project activity that recovers and utilizes biogas for power/heat production and applies this methodology on a stand alone basis i.e. without using a Type III component of a SSC methodology.

For this project activity para a), b) and c) are applicable which is indicated in the below diagram and the write up.

Figure B.3 Project boundary



The only source of CO_2 emission that occurs within the project boundary is the CO_2 emission associated with consumption of electricity, where the mechanical equipment are run by electricity. Hence all power plants connected physically to the electricity system (grid) that the project plant is connected to is a part of project boundary for the accounting of project emissions. In such cases electricity is used to run the mechanical equipment such as the biomass conveyers. Emissions associated with the consumption of electricity by the project are accounted for while estimating the emission reductions. Moreover, as the biomass transportation distance will be less than 200 km, the same is not included in the project boundary.

B.4. Description of baseline and its development:

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The project activity involves installation of a renewable biomass fired 20 TPH boiler by Tin Thanh as a Greenfield project i.e., the project activity is a new facility. The steam produced by the project activity is supplied to Masan Industrial Corporation (MSI) under a contractual agreement.

The calculation of the baseline emissions for heat generation is conducted in accordance with paragraph 16 of AMS I.C, version 19 which states:

"*For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced.*".

In the pre project scenario, the steam requirement of Masan Industrial Corporation (MSI) was in the range of 14 to 16 TPH at a pressure of 12-13 kg/cm^2 (g). This steam requirement was met by three numbers of Fuel Oil fired boilers having capacities of 6 TPH, 10 TPH and 15 TPH installed in the year 2004. Out of these three boilers, only the 15 TPH boiler and the 6 TPH boiler were working at a time and the 10 TPH boiler was kept as standby. This arrangement was working satisfactorily for the MSI from the year 2004 (commissioning of these three boilers).

In the project scenario, the steam requirement of MSI is being displaced by renewable biomass (saw dust) fired boiler. The saw dust fired boiler of 20 TPH capacity and design pressure of 16 kg/cm^2 (g) has been installed by Tin Thanh which is located adjacent to the MSI plant to meet the steam requirement of MSI. The biomass fired boiler is installed by Tin Thanh after considering CDM benefits (refer section B.5 for details).

The three FO fired boilers used in the baseline have been scrapped in the year 2010. It is worthwhile to mention here that the existing three boilers were having remaining life time of 14 years. Since steam generating capacity of the new biomass fired boiler is of comparable capacity as in the baseline scenario boilers, in absence of the project activity the existing boilers would been continued in operation and thus become the baseline for the project activity, which fulfills the stipulation made under § 16 of AMS I.C, version 19 which defines the baseline as *the technologies that would have been used in the absence of the project activity* as described above.

The key parameters and data sources used for the baseline emission calculation are furnished below:

Key Parameter	Description	Data Source
$EF_{FF,CO2}$	CO_2 emission factor for FO	Value: 77,400 kg CO_2/TJ. Source: 2006 IPPC Guideline for National GHG inventories, Volume 2, Chapter 1, Page 1.23, table 1.4[3]. As per paragraph 22 of the AMS-I.C version 19, the CO_2 emission factor may be obtained from reliable local or national data if available, alternatively, otherwise, IPCC default emission factors can be used. only if the reliable local or national data is not available, the IPCC default values will be used. Because there has been no available

[3] Source publicly available for download at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

		CO_2 emission factor for FO in Vietnam, the IPCC default value of CO2 emission factor has been chosen for calculation.
$\eta_{BL,thermal}$	Efficiency of the plant using FO that would have been used in the absence of the project activity	Value: 100%. Justification: As per para 30 of the applied methodology i.e. AMS I.C. version 19, there are three options (in preferential order) i.e. a, b, and c. Since relevant document for option a and b is not available with the PP, in order to take most conservative approach 100% efficiency as per option c has been opted. This is a simplified and conservative approach.
$EG_{thermal,y}$	Net quantity of steam/heat energy supplied by the project activity during the year y	From the project site records, ex-post determination. To estimate the emission reduction ex-ante a value of 288.96 TJ/year has been applied. The detailed calculation procedure has been elaborated in section B.6.1

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

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CDM Prior consideration

A summary of the key events in the development of the project as a CDM project are provided in below demonstrated the compliance with on "Guidelines on the Demonstration and Assessment of Prior Consideration of The CDM" (EB 62, Annex 13).

Date	Project Activity	CDM Activity
15/02/2010	FSR completed	CDM revenue was considered as the key factor for the project revenue stream
18/02/2010	Board meeting to consider the project investment with CER income and approve of FSR	CDM serious consideration
02/08/2010	Signing of steam sale and system investment contract with Masan Industrial Corporation for investment of the biomass boiler	
14/08/2010	Signing of equipment contract with Truong Quang II Company Ltd.	Starting date of CDM project activity
05/11/2010	Notification to Vietnam DNA	CDM Prior Consideration
03/11/2010	Notification to UNFCCC	CDM Prior Consideration
01/12/2010	Commissioning of the Project	

Conforming to paragraph 2 to 4 of the Annex 13, EB 62, "*Guideline on the Demonstration and Assessment of prior consideration of the CDM*", the Project activity is considered as a New Project activity and not the Existing project activity as follows:

The Project participant has informed the Host Party DNA on 05/11/2010 and the UNFCCC secretariat in writing of the commencement of the project activity on 03/11/2010 on the intention to seek CDM status. Notifications have been made within six months of the project activity start date on 14/08/2010 and contained the precise geographical location and a brief description of the proposed project activity, using the standardized form F-CDM-Prior Consideration.

Consideration of national and/or sectoral policies and circumstances in baseline scenarios as per Annex 3, EB22:

As per the latest Electricity Master Plan of Viet Nam (Master Plan VI), which was approved by the Prime Minister in 2007, in order to meet the energy demand by 17% / year, the Government of Viet Nam has encouraged the development of all energy sources including fossil fuel as well as renewable project mainly hydro projects. In this plan, so far, no special incentives for less emission intensive technologies or emission intensive technologies have been declared by the Government. Moreover, since this policy is after the adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11 December 1997) and by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001) it shall not be taken into account when developing a baseline scenario as per Annex 3 of EB 22.

Additionality demonstration

In accordance with paragraph 28 of the simplified modalities and procedures for small-scale CDM project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used for a small-scale CDM project activity if project participants are able to demonstrate to a designated operational entity that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in Attachment A of Appendix. B as listed below:

(a) Investment barrier
(b) Technological barriers
(c) Barrier due to prevailing practice
(d) Other barriers

Investment barriers

The main barrier is the investment barrier due to the financial unattractiveness of the project activity without additional financial incentives, such as those obtained through the sales of CER. Additionality for this given project activity is demonstrated by showing that the project activity would not have occurred anyway due to the existence of an investment barrier, substantiated by a benchmark analysis.

Since there is no compulsion on the part of the project developer in the project, the "choice of the developer is to invest or not to invest". Therefore, as per paragraph 19 of "Guidelines on the assessment

of Investment Analysis" version 05, (Annex 3 of EB 62), the benchmark analysis is appropriate for the project activity.

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Post tax project IRR has been selected as the financial indicator. Since the project is funded by a mix of debt and equity, guidance to investment analysis permits the use of project IRR to demonstrate additionality and that the post tax project IRR is one of the financial indicators normally used by the banks and investors alike to gauge the investment worthiness of the project, adoption of post tax project IRR is considered appropriate financial indicator for the project having regard to the project type and decision making context.

Selection of the appropriate benchmark

As per guidance 12 of Annex 3 of EB 62 "*local commercial lending rates or weighted average cost of capital (WACC) are appropriate benchmarks for a project IRR*". Thus the project developer has selected the Local Commercial Lending Rate (LCLR) in Viet Nam at the time the decision was made to proceed with the project (in January 2010) as the benchmark.

At the time of decision making on 18/02/2010, the State Bank of Viet Nam's base interest rate was 8.00% (decision No. 134/QĐ-NHNN dated 25/01/2010[4]). According to the country's civil code (Civil law no. 33/2005/QH11, dated 14/06/2005) commercial banks may charge up to of 150% of the prime lending rate. By considering the decision No.134/QĐ-NHNN dated 25/01/2009 and Civil law No.33/2005/QH11, dated 14th June 2005, the benchmark has been arrived at 12%. Moreover, at that time the decision making, lending rate as published by IMF was 12.70%[5] which is higher than 12%. Furthermore, the actual lending rate for the project activity is 14% per annum. For these reasons, PP considers the benchmark of 12.00% selected as conservative.

Table B.5.1 – Input data used for financial calculation

No	Assumptions	Unit	Value	Reference
1	Rated capacity of boiler	TPH	20	Approved FSR and Equipment contract
2	Investment Cost	VND	27,616,668,000	Approved FSR and Equipment and construction Contract
3	No. of working Days in a year	Days/year	312	As per the records of operation at MSI
4	PLF	%	80	PLF is based on the FSR which

[4] http://www.sbv.gov.vn/wps/portal/!ut/p/c5/04_SB8K8xLLM9MSSzPy8xBz9CP0os3hnd0cPE3MfAyAwcjPwtDAMMgxyM3VydTfVDwfpQFLh7hXobODp7hVsYeJkCFRvDpE3wAEcDfT9PPJzU_ULsrPTHB0VFQFMFAZL/dl3/d3/L2dJQSEvUUt3QS9ZQnZ3LzZfMEQ0OTdGNTQwT0RKNTBJTzNTMk04OTM0MDU!/?WCM_GLOBAL_CONTEXT=/wps/wcm/connect/sbv_en/sbv_en/en.sbv.currency/en.sbv.currency.profit/en.sbv.currency.profit.1

[5] http://www.imf.org/external/pubs/ft/scr/2010/cr10281.pdf

				has been accepted by the Bank (which has extended loan for the project).
5	Steam generation	Ton/year	119,808	Calculated
6	Sawdust consumption	kg/ton of steam	286	Calculated
7	Sawdust price	VND/ton	750,000	Sawdust quotations / Saw dust supply contract, 08/06/2010
8	Steam price	VND/ton	300,000	FSR /Steam contract dated 02/08/2010
9	O&M and Administration Expense	**VND/year**	**7,912,216,080**	Calculated as breakdown below
9.1	Maintenance cost per year	VND/year	1,380,833,400	
	Maintenance cost per year as % of the initial investment cost	%	5	Letter from the equipment supplier
9.2	Manpower required for boiler operation	People	37	Letter from the equipment supplier
	Supervisory staff (Engineers)	People	04	Letter from the equipment supplier (03 shift in charge engineers and one plant manager)
	Other staff (operation workers and biomass loading workers)		33	Letter from the equipment supplier (11 workers per shift)
9.3	Manpower rate			
	Supervisory staff (Engineers)	VND/month/ person	8,000,000	Market Price
	Other staff (operation workers and biomass loading workers)	VND/month/ person	4,000,000	Market Price
9.4	Electricity cost	VND/year	**567,216,000**	
9.4.1	Electricity consumption	kW	75	Boiler technical Specifications
9.4.2	Electricity price	VND/kWh	1,010	Electricity bill
9.5	Land leasing cost	VND/month	**300,000,000**	FSR/ Land leasing contract

9.6	Other cost (e.g. insurance, annual inspection)	VND/year	**396,166,680**	Information gathered by PP
9.6.1	Insurance at 1 % of capital cost	VND/year	276,166,680	Assumed at 1% of the capital cost based on prevailing practice
9.6.2	Boiler Inspection cost	VND/year	120,000,000	Assumed at VND 10 million per month based on prevailing practice
10	Term Loan, Loan Interest Rate, Repayment period			
10.1	Loan	%	70	Loan contract
10.2	Equity	%	30	Loan contract
10.3	Loan interest rate	%/year	14	Loan contract
10.4	Repayment period	Quarters	28	Loan contract
11	Depreciation Rate of Boiler			
	Equipments	Years	10	FSR based on local regulations
	Constructions	Years	20	FSR based on local regulations
12	Corporate tax	%	25	Profits are subject to only Corporate Income Tax. Income tax is as per local regulation (Decree 124/2008/ND-CP dated 11/12/2008)
13	Salvage value	%	10	Prevailing standard
14	Volume of expected CER	CERs/year	21,976	Calculated
15	CER price	EUR	12	Expected price
16	Exchange rate	VND/EUR	26,217	Vietcombank dated 18/02/2010

All the input parameters are based either on the FSR which formed the basis for investment decision or documents which were available to the project developer at the time of decision making. Therefore, the input parameters considered conform to guidance 6 of Annex 3, EB 62.

For further clarity, main assumptions made in the calculation of financial indicator for the project and the basis for taking these assumptions were described below:

1) **Rated capacity of boiler:** The boiler's rated capacity is calculated based on the demand of the steam of manufacturing plant (MSI), the figure is taken from the approved FSR and the specification provided by the equipment supplier, it is clearly defined in the equipment purchase contract.

2) **Investment Cost:** The investment cost for the project activity was considered as per the approved FSR and the equipment contract.

3) **No. of Working days:** Since the biomass boiler operation is based on the production days of manufacturing plant, so a baseline study has been conducted by the biomass boiler developer (Tin Thanh), a normative figure of 312 working days per year or 7,488 hours/year is considered for the project activity resulted from a study of last three year of the manufacturing plant.

4) **Effective Steam Generation:** The steam generation applied for the project activity is calculated based on the steam need of the manufacturing plant which is calculated by the average of last three years history of fossil fuel boilers, the same value has been applied for the FSR submitted to the local bank that financed to the project activity. A confirmation letter from the bank authorities on the annual steam generation reported for the project activity is being submitted to the validation team.

5) **PLF**: PLF is based on the FSR which has been accepted by the Bank (which has extended loan for the project). This is in conformity with Annex 11, EB 48.

6) **Operating life of the project**: The operating life of the project has been assumed at 20 years based on machinery supplier's letter. This is in conformity with Annex 15, EB 50. Accordingly, the financial indicator has been computed for 20 years, which is in conformity with guidance 3 of Annex 3, EB 62.

7) **Sawdust consumption:** The consumption of sawdust provided by the equipment supplier, the same value has been applied for the FSR submitted to the local bank that financed to the project activity. A confirmation letter from the bank authorities on the annual steam generation reported for the project activity is being submitted to the validation team. However, in the financial indicator calculation, it has been recalculated taking into consideration various technical parameters and the consumption so arrived at is conservative to what the equipment supplier has given.

8) **Sawdust Price:** the project developer decided to purchase the sawdust from the spot market in place of signing a long term agreement with the sawdust supplier, three quotations have been collected and considered, the lowest price is chosen for calculation.

9) **Steam Price:** The project developer has negotiated and entered a steam sale contract with the manufacturing plant, the same value has been submitted to the bank financed to the project activity, a confirmation letter from the bank authorities on the steam price reported for the project activity is being submitted to the validation team.

10) **O&M and Administration Expense:** The O&M and Administration expenses is divided in various items and described in detail in the financial analysis sheet and bellows:

10.1. Equipment maintenance cost: 5% percent of the capital cost which is a reasonable assumption and confirmed by the equipment suppliers in the lowest offer.

10.2. Manpower Cost (Salaries and Wages): This is presented in detail in the finance calculation sheet as well as in the FSR, for the biomass boiler involved in 03 shifts operation and required the intensive manpower for loading biomass from incoming trucks to the storage and feed in the conveyor which can be verified on-site by the DOE, each shift required one supervisory staff for shift in charge and eleven other staff, with a plant manager, the total labor worked in the biomass boiler plant is 37. The average wage for supervisory staff as 8 million VND (~ 380 USD/month)/person/month include the plant manager, for other staff as 4 million VND (~140 USD/month) /person/month was budgeted in the approved FSR, it is the conservative calculated by studying on the media press published time to time.

10.3. Electricity consumption and tariff: The electricity requirement of the project activity is conservative calculated equal to the detailed equipment consumption stated by equipment supplier for each item. For the electricity used in the project activity, the electricity will be bought from the manufacturing plant (MSI) with the same price as the price MSI buys from the electricity distribution company, in this regard, a copy of a electricity bill charged by MSI is being submitted to the validation team for verification of the basic cost of electricity.

10.4. Land leasing cost: Due to the location of the project activity shall be out of the premise of the MSI therefore, a large size of land required, the project developer has to look for a private land nearby the manufacturing plant (MSI), the land contract leasing contract signed with the land owner is being submitted to the DOE for verification of the land leasing cost.

11) Term Loan, Loan Interest Rate, Repayment period: The project developer has taken loan of amount 21,264,834,500 VND (based on the project cost including VAT) equal to 70% of the project cost from An Phu Bank of Agriculture and Rural Development with the interest rate is 14% percent and the repayment period is 28 quarters. A copy of the term loan contract is being submitted to the DOE for validating this assumption. However, in the financial indicator calculation, cost has been considered without VAT and accordingly, the loan amount has also been considered on the same ratio as the loan amount bears to the project cost with VAT. Computation of interest based on the term loan sanctioned is in conformity with guidance 11 of Annex 3, EB 62 which requires actual interest payable should be taken into account where the post tax project IRR is considered as financial indicator.

12) Salvage value: Salvage value has been taken at 10% of the investment in the terminal year. Since the entire assets is fully depreciated and the tax shield has been fully taken into account, the salvage value represents potential profit expected in the terminal year and therefore conforms to guidance 4 of Annex 3 EB 62.

The results of project IRR is shown in the table below

Table B.5.2 Result of IRR calculation

Indicator	**Project without CDM**	
IRR	**5.31%**	
Selected Benchmark	12.0%	

As could be seen from the data given above, without the CDM revenue, the IRR of total investment is lower than the benchmark rate 12.00%. Thus the proposed project does not look financially attractive to the investors.

Sensitivity analysis

In order to test the robustness of the conclusion – that the project is additional – a sensitivity analysis has been conducted by subjecting critical parameters to reasonable variation as required by Annex 3 of EB 62. In accordance with "Guidance on Assessment of Investment Analysis", the sensitivity analysis should be carried out including variables constituting more than 20% of either total project costs or total project revenues. The guidance also requires the robustness of the conclusion to be proved through a sensitivity analysis by varying the critical assumption to a reasonable variation (at least 10%).

In the project activity, four variables: capital cost, operation & maintenance cost and revenue from sales of steam are identified as the critical assumption. These four parameters have been subjected to 10% variation on either side as required by guidance 21 of Annex 3, EB 62.

- **Investment cost**
- **Operation & maintenance cost**
- **Steam price**
- **Biomass price**

The results of IRR calculation for the above assumptions are shown in the following table (B.5.2):

Project IRR	**-10%**	**0**	**10%**
Investment cost	6.65%	5.31%	4.18%
O&M cost	8.76%	5.31%	1.36%
Steam price	Neg	5.31%	18.39%
Biomass price	15.18%	5.31%	Neg
With CDM	26.53%		
Benchmark	12.00%		

As shown in the above table, the sensitivity analysis reveals except when the steam price goes up by 10% or the biomass price goes down by 10%, the IRR would not exceed the benchmark. The project IRR breaches the benchmark, when the steam price increases by 4.6%. However, it is submitted that the steam price cannot go up as an agreement has already been signed and the agreement is valid for 10 years. As regards the biomass the price, the project IRR breaches the benchmark, when the biomass price decreases by 6.5%. However, a study conducted by Ho Chi Minh University of Technical Education (Centre for Research and Application of New Technology) in December 2010 reveals that the saw dust cost has registered a steady increase over the years as shown in the table given below:

Year	Cost per ton in VND
2005	100,000
2006	150,000
2007	300,000
2008	450,000
2009	600,000
2010	850,000

In the above background, the cost of biomass remaining constant even at VND 750,000/ton does not appear to be possible, leave alone any reduction.

A break even analysis reveals that the financial indicator will equal the benchmark when the investment cost has to go down by 38.5% or O&M cost has to register 20.77% decline for the financial indicator to equal the benchmark. O&M cost represents costs which are all subject to inflationary pressure or fixed through agreements or statutory regulations. Therefore, any decrease in O&M cost is ruled out. As regards the investment cost, orders have already been placed for the equipment and the project is already operational. Therefore, no reduction in the project cost is possible.

Therefore, the project is additional and will continue to remain additional

Barriers due to the prevailing practice

Sub-step 3(b) of Additionality Tool states that evidence for demonstrating barriers should be from organizations such as universities, research institutions, industry associations, companies, bilateral/multi lateral institutions etc. A study conducted by Ho Chi Minh University of Technology (Centre for Research and Application of New Technology) on April 26, 2011 reveals that out of 60,000 boilers in operation in Viet Nam, only 8 boilers use biomass. The boilers using biomass vis-à-vis total number of boilers in operation, therefore, works out to less than 0.1%. Therefore, using biomass as fuel is not a prevailing practice in Viet Nam.

Further, Annex 34, EB 35 states that barrier due to prevailing practice is deemed to exist if it could be demonstrated that the project is among the first of its kind in terms of technology, geography, sector, type of investment and investor, market etc. Generating and selling steam in Viet Nam is not a prevailing practice and there are no companies engaged in this activity as of now in Viet Nam. A letter issued by Ho Chi Minh City University of Technical Education (Centre for Research and Technology Transfer) on April 26, 2011 reveals, "According to a research done by Centre for Research and Technology Transfer of Ho Chi Minh University of Technical Education, all industrial facilities of Vietnam self-invest and operate boilers to produce steam and heat for manufacturing. The investment in boiler firing DO, FO, coal, biomass fuels by a third party and then sell steam for production is not a common practice in Viet Nam". Therefore, generating and selling steam in Viet Nam not necessarily using biomass, but even with fossil fuel, is not a prevailing practice in Viet Nam. Therefore, the project activity conforms to Annex 34 of EB 35.

Since this project activity is among the first its kind and not a prevailing practice, the project activity runs a great risk, in that the buyer of steam can decide to rescind the agreement at any point of time. Therefore, the CDM benefits received during the operational period would enable the project developer to cover the cost incurred.

In the above background, it is concluded that the project faces investment barrier and prevailing practices barrier. Therefore the project is not a business-as-usual scenario and hence additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Baseline emissions

For steam produced using fossil fuels the baseline emissions are calculated as follows:

$$BE_{thermal\downarrow CO_2,y} = (EG_{thermal\downarrow y} / \eta_{BL,thermal}) * EF_{FF,CO_2}$$ AMS.I.C Version 19 Equation **(2)**[6]

Where:

$BE_{thermal\downarrow CO_2,y}$	The baseline emissions from steam/heat displaced by the project activity during the year *y* (tCO_2)
$EG_{thermal\downarrow y}$	Net quantity of thermal energy supplied by the project activity during the year y (TJ)
EF_{FF,CO_2}	The CO_2 emission factor of the fossil fuel that would have been used in the baseline plant; tCO_2/TJ. As reliable local or national data are not available, IPCC default emission factors are used
$\eta_{BL,thermal}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity. As per para 30 of the applied methodology i.e. AMS I.C. version 19, there are three options (in preferential order) i.e. a, b, and c. Since relevant document for option a and b is not available with the PP, in order to take most conservative approach 100% efficiency as per option c has been opted. This is a simplified and conservative approach.

For boilers:

[6]Equations are numbered in accordance with the methodology.

$EG_{thermal,y} = Q_{S,y} * (E_{steam,y} - E_{feedwater,y}) *10^{-6}$

Where:

$EG_{thermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y (TJ)
$Q_{S,y}$	Quantity of steam supplied in tons in year y (tons/year)
$E_{steam,y}$	Enthalpy of the saturated steam supplied to the recipient (kJ/kg)
$E_{feedwater,y}$	Enthalpy of boiler feed water (kJ/kg)

Project emissions

As per paragraph 45 of AMS I.C, version 19, project emissions include:

CO_2 emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".

The project activity does not use any fossil fuel. Hence this is not applicable.

CO_2 emissions from electricity consumption by the project activity using the latest version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

As the project activity will consume electricity, the "Tool to calculate baseline, project and/or leakage emission from electricity consumption" Version 01 hereafter referred to as "Electricity Tool" (version 01) is applied to calculate project emission from electricity consumption ($PE_{EC,y}$).

Scenario A (electricity consumption from the grid) from the tool applies and emissions are calculated as follows:

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y}) \qquad \text{(Electricity Tool: 1)}$$

Where:

Parameter	**Description**	**Unit**	**Source**
$PE_{EC,y}$	Project emissions from electricity consumption in year y	tCO_2e/yr	Calculated
$EC_{PJ,j,y}$	Quantity of electricity consumed by the project electricity consumption source j in year y	(MWh/yr)	Calculated
$EF_{EL,j,y}$	Emission factor for electricity generation for source j in year y	(tCO_2/MWh)	Please refer to section B.6.2

$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y	%	As per EB 39 Annex 7, "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*" version 1.

Since grid electricity will be used, thus $EF_{EL,j,y} = EF_{grid,CM,y}$. Refer to Annex 3 for calculation of the combined margin grid emission factor for Viet Nam.

For the project activity, the project emissions due to electricity consumption are estimated in accordance with "*Tool to calculate baseline, project and/or leakage from electricity consumption*" (version 01) in which the Scenario A. **Electricity consumption from the grid** and the **option A1 (p-4 of 16 of the tool)** are chosen.

Option A1 directs to calculate the combined margin emission factor of the applicable electricity system, using the procedures in the latest approved version, i.e. version 02.2.1 of the "*Tool to calculate the Emission Factor for an electricity system*" ($EF_{ELy} = EF_{grid,CM,y}$).

The project proponent has opted for approach '(a)' i.e. combined margin emission factor with ex-ante approach where emission factor is fixed for the whole crediting period.

The grid emission factor has been calculated based on combined margin approach considering the data from Grid Emission Factor Report approved (2003-2008) by DNA Vietnam dated 26/03/ 2010 which is available at the time of preparation and webhosting of the PDD.

The combined margin emission factor worked out is 0.5764 tCO2/MWh.

Any other significant emissions associated with project activity within the project boundary;

There are no other significant emissions associated with the project activity within the project boundary.

For geothermal project activities, project participants shall account for the following emission sources, where applicable: fugitive emissions of carbon dioxide and methane due to release of non-condensable gases from produced steam; and carbon dioxide emissions resulting from combustion of fossil fuels related to the operation of the geothermal power plant.

The project activity is not a geothermal project.

Leakage

The leakage emissions will be determined as per paragraph 47 and 48 of the methodology:

Paragraph	Requirements	Explanations
47	If the energy generating equipment currently being utilized is transferred from outside the boundary to the project activity, leakage is to be considered.	The energy generating equipment, currently being utilized in the project activity is not transferred from outside the boundary to the project activity hence leakage is not envisaged due to this source.
48	In case collection/processing/transportation of biomass residues is outside the project boundary, CO_2 emissions from collection/ processing/ transportation of biomass residues to the project site shall be taken into account as leakage. If biomass residues are transported over a distance of more than 200 kilometers due to the implementation of the project activity then this leakage source attributed to transportation shall be considered, otherwise it can be neglected.	The collection and transportation of the biomass residue used in the project activity is done within a distance of 200 kilometers from the project site. Moreover, the biomass residue used in the project activity that is sawdust is a waste product of the wood industry and does not involve any processing. Hence, leakage on the account of collection/processing/transportation of biomass residues is not applicable for the present case.

In line with **t**able 1 of "*General guidance on leakage in biomass project activities"* (version 03, EB 47, Annex 28) the following sources of leakage shall be considered:.

Parameter	Guidance on leakage	Project activity status
Shift of pre project activities	Shift of pre-Project activities are relevant where in the absence of Project activity the land areas would be used for other purposes (i,e agriculture) and the renewable biomass from existing or new forests	This is not applicable since the project activity uses sawdust, which is a waste product of the wood processing industry.
Emissions from the production of the renewable biomass	Potentially significant emission sources from the production of renewable biomass can be (a) Emission from application of fertilizer; and (b) Project emissions from clearance of land	This is not applicable since the project activity uses sawdust, which is a waste product of the wood processing industry.
Competing use for the biomass	The Project developer shall evaluate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilized. If it is demonstrated (e.g, using published literature, official reports,	In line with this guidance on leakage associated with the use of biomass material for project activities, it is demonstrated through biomass survey study

	surveys, etc.) that the quantity of available biomass in the region (e.g 50 km radius) is at least 25 % larger than the quantity of biomass that is utilized including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions	that the quantity of surplus sawdust available within a distance of 50 km from the project site is 181[7] % larger than the quantity of sawdust that is utilized in the region including the project activity. The assessment has been conducted by third party. As the surplus availability of biomass is more than 25% leakage due to competing use of biomass is not considered.

Hence, leakage ($\mathbf{LE_y}$) is equal to 0.

Emission reductions

Emission reductions for any given year of the crediting period are obtained by subtracting project emissions from baseline emissions:

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y Emissions reductions of the project activity in year *y* (tCO2e / year)
BE_y Baseline emissions in year *y* (tCO2e / year)
PE_y Project emissions in year *y* (tCO2e / year)
LE_y Leakage emissions in year *y* (tCO2e / year)

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	$\eta_{BL,boiler}$
Data unit:	%
Description:	The efficiency of the boiler used in the baseline
Source of data used:	Default efficiency
Value applied:	100
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per para 30 of the applied methodology i.e. AMS I.C. version 19, there are three options (in preferential order) i.e. a, b, and c. Since relevant document for option a and b is not available with the PP, in order to take most conservative approach 100% efficiency as per option c has been opted. This is a simplified and conservative approach.
Any comment:	This parameter has been fixed ex-ante.

[7] Refer to Appendix 1 of the PDD

Data / Parameter:	TDL_y
Data unit:	%
Description:	Average technical transmission and distribution losses for providing electricity to source in year y
Source of data used:	Use recent, accurate and reliable data available within the host country; • Use as default values of 20% for (a) project or leakage electricity consumption sources; (b) baseline electricity consumption sources if the electricity consumption by all project and leakage electricity consumption sources to which scenario A or scenario C (cases C.I or C.III) applies is larger than the electricity consumption of all baseline electricity consumption sources to which scenario A or scenario C (cases C.I or C.III) applies.
Value applied:	20
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per EB 39 Annex 7, "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*" version 1
Any comment:	

Data / Parameter:	$EF_{EL,j,y}$
Data unit:	tCO_2/MWh
Description:	Emission factor for electricity generation from grid
Source of data used:	Grid Emission Factor Report approved (2003-2008) by DNA Vietnam dated 26/03/ 2010
Value applied:	0.5764
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value is the combined margin emission factor for Viet Nam grid published and calculated by DNA Viet Nam in accordance with the "Tool to calculate emission factor of an electricity system". Operating Margin Emission Factor: 0.6464 tCO_2/MWh Build Margin Emission Factor: 0.5064 tCO2/MWh Combined Margin Emission Factor: 0.5764 tCO_2/MWh
Any comment:	This parameter has been fixed ex-ante.

Data / Parameter:	Sawdust surplus availability
Data unit:	%
Description:	Surplus sawdust (types used in the project activity) availability in the region
Source of data used:	Based on report from independent researchers
Value applied:	181

Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is used from third party assessment report.
Any comment:	This parameter has been evaluated ex-ante once at the beginning of the crediting period in line with para 18 of Annex 28 of EB 47.

B.6.3 Ex-ante calculation of emission reductions:

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Baseline emission

$$BE_{thermal,CO_2,y} = (EG_{thermal,y} / \eta_{BL,thermal}) * EF_{FF,CO_2} \quad \textbf{(2)}^{8}$$

Where:

$BE_{thermal,CO_2,y}$	The baseline emissions from steam/heat displaced by the project activity during the year *y* (tCO_2)
$EG_{thermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y (TJ)
EF_{FF,CO_2}	The CO_2 emission factor of the fossil fuel that would have been used in the baseline plant; (tCO_2/TJ), As the reliable local or national data are not available, IPCC default emission factor (77.4 tCO_2/TJ)[9] are used
$\eta_{BL,thermal}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity. As per para 30 of the applied methodology i.e. AMS I.C. version 19, there are three options (in preferential order) i.e. a, b, and c. Since relevant document for option a and b is not available with the PP, in order to take most conservative approach 100% efficiency as per option c has been opted. This is a simplified and conservative approach

$\mathbf{EG_{thermal,y} = Q_{S,y} * (E_{steam,y} - E_{feedwater,y}) * 10^{-6}}$

And: $\mathbf{Q_{S,y} = CAP_{boiler} * PLF * H}$

[8] Equations are numbered in accordance with the methodology.

[9] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf (Table 1.4. Default CO2 emission factors for combustion Page 1.23)

Where:

Parameter	Description	Value	Source
$EG_{thermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y (TJ)	288.96	Calculated
$Q_{S,y}$	Quantity of steam supplied per year measured at recipient's end (tons/year)	119,808	Calculated
CAP_{boiler}	Boiler Steam Capacity (Tons per hour)	20	Equipment contract and Technical Specifications
PLF	Plant Load Factor (%)	80	Bank Confirmation as per paragraph 3, Annex 11, EB 48
H	Operating hours per year (hours/year)	7,488 (=312 days *24 hrs)	Approved FSR
$E_{steam,y}$	Enthalpy of the saturated steam supplied to the recipient (kJ/kg)	2,788.9	Determined using Standard steam table at the pressure of saturated steam 13 kg/cm2 (g)
$E_{feedwater,y}$	Enthalpy of boiler feed water (kJ/kg)	377	Determined using Standard steam table at the temperature of feed water at 90 ^{o}C

The quantity of steam generated per year:

$Q_{steam,y}$ = Boiler Steam Capacity (CAP_{boiler}) * Load Factor (PLF) * Operating hours (H)
= 20 * 80 % * 7488 = 119,808 tons steam per year.

The quantity of net equivalent heat supplied per year:

$EG_{thermal,y} = 119,808 * (2788.9 – 377) * 10^{-6} = 288.96$ (TJ)

Thus

$BE_{thermal, CO2, y} = (288.96 / 100 \%) * 77.4 = 22,365\ tCO_2$ / year

Project emission

Project emission due to grid electricity consumption by the project activity "$\mathbf{PE_{EC,y}}$" is determined using Equation 1 (Electricity Tool) and values provided in Section B.6.1 and B.6.2Within the project activity, CO_2 emission from grid electricity consumption is the only source of Project Emission. Thus:

$$\mathbf{PE_{EC,y} = EC_{PJ,y} *(1 + TDL_{j,y}) * EF_{grid,CM,y} = EC_{boiler} * H*(1 + TDL_{j,y}) * EF_{grid,CM,y}}$$

Where:

EC_{boiler}	Average electricity consumption of the boiler (kW)	75	Equipment quotation from dealer
H	Operating hours per year	7488 (=312 days *24 hrs)	Approved FSR
$EF_{grid,CM,y}$	Grid emission factor (tCO_2/MWh)	0.5764	Report on Grid emission factor of DNA Vietnam dated 26th March 2010
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y (%)	20	As per EB 39 Annex 7, "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*" version 1.
$EC_{PJ,y}$	Auxiliary electricity consumption of the project from Grid in year y (MWh)	562 = (0.075*312*24)	Calculated

$$\mathbf{PE_{EC,y} = 562*(1 + 20\ \%) * 0.5764 = 389\ tCO_2e/year}$$

PE_y = 389 tCO_2e/yr (conservatively rounded up)

Leakage

Within a distance of 50 km radius around the project site, surplus availability of sawdust is 181 % which is more than 25% as required by the guidance in Attachment C to Appendix B, the leakage associated with competing use of biomass is neglected.

As discussed in section B.6.1 leakage is neglected. Therefore, LE_y = **0** tCO_2e/yr

Emission Reduction

$ER_y = BE_y - PE_y - LE_y$ = 22,365 – 389 – 0 **= 21,976** tCO_2e/yr

B.6.4 Summary of the ex-ante estimation of emission reductions:

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Table B.6.4.1 Summary of estimation of overall emission reductions

Year	Estimation of	Estimation of	Estimation of	Estimation of

	project activity emissions (tCO_2e)	baseline emissions (tCO_2e)	leakage (tCO_2e)	overall emission reductions (tCO_2e)
01/08/2012 to 31/07/2013	389	22,365	0	21,976
01/08/2013 to 31/07/2014	389	22,365	0	21,976
01/08/2014 to 31/07/2015	389	22,365	0	21,976
01/08/2015 to 31/07/2016	389	22,365	0	21,976
01/08/2016 to 31/07/2017	389	22,365	0	21,976
01/08/2017 to 31/07/2018	389	22,365	0	21,976
01/08/2018 to 31/07/2019	389	22,365	0	21,976
01/08/2019 to 31/07/2020	389	22,365	0	21,976
01/08/2020 to 31/07/2021	389	22,365	0	21,976
01/08/2021 to 31/07/2022	389	22,365	0	21,976
Total (tonnes of CO_2e)	**3,880**	**223,650**	**0**	**219,760**

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Parameter:	**$Q_{S,y}$**
Unit:	Tons/year
Description:	Quantity of steam supplied per year measured at recipient's end
Source of data:	On-site measurements using steam flow meter
Value of data:	119,808
Brief description of measurement methods and procedures to be applied:	Measurement method: Onsite measurement Measurement Procedure and frequency: The quantity of steam supplied will be continuously monitored, integrated hourly and recorded monthly at the recipient's end. The monthly data will be aggregated annually. Measuring equipment: Steam flow meter cum totalizer. Calibration process: Calibration shall be as per the relevant paragraphs of the "*General guidelines to SSC CDM methodologies*" and be conducted by independent accredited third party or instrument manufacturer. Calibration frequency: As per local/national standard or as per manufacturer's specifications. If the local/national standards and manufacturer's specifications is not available, it will be as per international standard, but at least once in 3 years. Accuracy of steam flow meter: 1.0 % Responsible entity: Steam recipient and PP
QA/QC procedures to be applied (if any):	Quantity of steam supplied will be measured by calibrated steam flow meter cum totalizer and the same can be crosschecked from invoices raised by Tin Thanh for billing purpose.
Any comment:	Quantity of steam supplied will be measured directly by the steam flow

	meter in tons/hr and continuously totalized in tons. Archiving policy: The data will be archived by electronic mode and be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

Parameter:	$\mathbf{T_{steam,y}}$
Unit:	°C
Description:	Temperature of steam at the recipient's end
Source of data:	Directly measured using temperature gauge.
Value of data:	195
Brief description of measurement methods and procedures to be applied:	Measurement method: Onsite measurement Measurement Procedure and frequency: The temperature of the saturated steam will be continuously monitored and hourly readings will be recorded. The lowest of the hourly readings in a day will be used for the conservative calculation of enthalpy of steam supplied on a day. Measuring equipment: Temperature indicator. Calibration process: Calibration shall be as per the relevant paragraphs of the "*General guidelines to SSC CDM methodologies*" and be conducted by independent accredited third party. Calibration frequency: As per local/national standard or as per manufacturer's specifications. If the local/national standards and manufacturer's specifications is not available, it will be as per international standard, but at least one in 3 years. Accuracy of temperature indicator: 1.0 % Responsible entity: Steam recipient and PP
QA/QC procedures to be applied (if any):	Temperature of steam will be measured by duly calibrated temperature gauge.
Any comment:	Archiving policy: The data will be archived by electronic/paper mode and be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later

Parameter:	$\mathbf{P_{steam,y}}$
Unit:	kg/cm^2
Description:	Pressure of steam at the recipient's end
Source of data:	Directly measured using pressure gauge.
Value of data:	13 (value used for ex-ante estimation of steam enthalpy based on the steam contract in between MSI and Tin Thanh, but the actual value will be monitored ex-post)
Brief description of measurement methods and procedures to be applied:	Measurement method: Onsite measurement at steam recipient's end. Measurement Procedure and frequency: The pressure of saturated steam will be continuously monitored and hourly readings will be recorded. The lowest of the hourly readings in a day will be used for the conservative calculation of enthalpy of steam supplied on a day.

	Measuring equipment: Pressure gauge. Calibration process: Calibration shall be as per the relevant paragraphs of the "*General guidelines to SSC CDM methodologies*" and be conducted by independent accredited third party. Calibration frequency: as per local/national standard or as per manufacturer's specifications. If the local/national standards and manufacturer's specifications is not available, it will be as per international standard, but at least one in 3 years. Accuracy of pressure gauge: 1.0 % Responsible entity: Steam recipient and PP
QA/QC procedures to be applied (if any):	Steam Pressure will be measured by duly calibrated pressure gauge.
Any comment:	Archiving policy: The data will be archived by electronic mode and be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

Parameter:	**$E_{steam,y}$**
Unit:	kJ/kg
Description:	Enthalpy of the saturated steam supplied to the recipient
Source of data:	Steam table
Value of data:	2788.9
Brief description of measurement methods and procedures to be applied:	The enthalpy of steam will be determined using the standard steam table based on temperature or pressure of the saturated steam measured at the recipient's end. Enthalpy of the steam will be recorded on daily basis based on the lowest of the hourly temperature or pressure recorded. Daily enthalpy values will be aggregated monthly and annually. Responsible entity: Tin Thanh (PP)
QA/QC procedures to be applied (if any):	As enthalpy of steam is directly obtained from standard steam table, no QA/QC procedure is required for this parameter.
Any comment:	Archiving policy: The data will be archived by electronic mode and be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later

Parameter:	**$T_{Feedwater,y}$**
Unit:	^{o}C
Description:	Temperature of boiler feed water
Source of data:	Onsite measurement using temperature indicator/gauge
Value of data:	90
Brief description of measurement methods and procedures to be applied:	Measurement method: Onsite measurement Measurement Procedure and frequency: The temperature of boiler feed water will be continuously monitored and hourly readings will be recorded. The highest of the hourly readings in a day will be used for the calculation of enthalpy of feed water supplied on a day. Measuring equipment: Temperature indicator. Calibration process: Calibration shall be as per the relevant paragraphs

	of the "*General guidelines to SSC CDM methodologies*" and be conducted by independent accredited third party. Calibration frequency: As per local/national standard or as per manufacturer's specifications. If the local/national standards and manufacturer's specifications is not available, it will be as per international standard, but at least one in 3 years. Accuracy of temperature indicator: 1% Responsible entity: PP
QA/QC procedures to be applied (if any):	Temperature of boiler feed water will be measured by duly calibrated temperature indicator.
Any comment:	Archiving policy: The data will be archived by electronic mode and be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

Parameter:	$\mathbf{E_{Feedwater,y}}$
Unit:	kJ/kg
Description:	Enthalpy of boiler feed water
Source of data:	Estimated based on the boiler feed water temperature
Value of data:	377
Brief description of measurement methods and procedures to be applied:	The enthalpy of boiler feed water (make up water and condensate returns) will be estimated using the standard steam table. Enthalpy of the boiler feed water will be recorded on daily basis based on the highest of the hourly temperature recorded. Daily enthalpy values will be aggregated monthly and annually. Responsible entity: Tin Thanh (PP)
QA/QC procedures to be applied (if any):	As enthalpy of boiler feed water is directly obtained from standard steam table, no QA/QC procedure is required for this parameter.
Any comment:	Archiving policy: The data will be archived by electronic mode and be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later

Parameter:	$\mathbf{EG_{thermal,y}}$
Unit:	TJ
Description:	Net quantity of thermal energy supplied by the project activity during the year y
Source of data:	Calculated
Value of data:	288.96
Brief description of measurement methods and procedures to be applied:	The net quantity of thermal energy supplied by the project activity during the year y is calculated as the difference of heat supplied by the project activity and enthalpy of the boiler feed water and multiplied by the quantity of steam supplied [$(=\mathbf{E_{steam}} - \mathbf{E_{Feedwater,y}}) * Q_{S,y}$] in the year y. Responsible entity: Tin Thanh (PP)
QA/QC procedures to be applied (if any):	The quantity of steam supplied will be cross checked with the invoice raised for billing purpose.

Any comment:	Archiving policy: The data will be archived electronically and kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

Parameter:	**$B_{sawdust,y}$**
Unit:	Ton
Description:	Net quantity of biomass consumed in year y (on dry basis)
Source of data:	Inventory records
Value of data:	20,546 [=34,243*(1-0.4)]
Brief description of measurement methods and procedures to be applied:	Quantity of biomass (=saw dust) fired in the project boiler will be measured in batches. Moisture content will be adjusted to determine the quantity of dry biomass. For ex-ante estimation, from the wet quantity of the biomass, the anticipated moisture content of 40% has been deducted to obtain the biomass quantity on dry basis.
QA/QC procedures to be applied (if any):	Cross-check the measurements with an annual energy balance that is based on purchased quantities (e.g. with sales receipts) and stock changes. In cases where emission reductions are calculated based on energy output, check the consistency of measurements ex post with annual data on energy generation and biomass used and the efficiency of energy generation as determined ex ante (= 80%).
Any comment:	The data will be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

Parameter:	**$MC_{sawdust,y}$**
Unit:	% water
Description:	Moisture content of the sawdust
Source of data:	Laboratory reports
Value of data:	40
Brief description of measurement methods and procedures to be applied:	Measurement of the moisture content of the homogenous saw dust samples will be for each batch on site by calibrated equipments. Responsible entity: Tin Thanh (PP)
QA/QC procedures to be applied (if any):	--
Any comment:	As per the methodology, this parameter applies for the cases where the emission reductions are calculated based on the biomass energy input. However, emission reductions for the project activity are not calculated based on biomass energy input. This parameter will be used for the determination of dry biomass consumed since the biomass used in the project activity will be on wet basis. Archiving policy: The data will be archived by paper mode and be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later

Parameter:	**$NCV_{saw\ dust,y}$**

Unit:	GJ/Ton
Description:	Net calorific value of biomass residue (saw dust)
Source of data:	Laboratory reports
Value of data:	10.55
Brief description of measurement methods and procedures to be applied:	Determined once in the first year of the crediting period. Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. Measure the NCV based on dry biomass. Responsible entity: Tin Thanh (PP)
QA/QC procedures to be applied (if any):	Check the consistency of the measurements by comparing the measurement results with measurements from previous years, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC. If the measurement results differ significantly from other relevant data sources, conduct additional measurements
Any comment:	The data will be kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

Parameter:	**$EC_{PJ,y}$**
Unit:	MWh
Description:	Electricity consumed by the project activity from the grid in the year y
Source of data:	On-site measurement using energy meter
Value of data:	562
Brief description of measurement methods and procedures to be applied:	Measurement method: Onsite measurement Measurement Procedure and frequency: The quantity of electricity will be continuously measured and recorded monthly. Measuring equipment: Measured using calibrated energy meter. Calibration process: Calibration shall be as per the relevant paragraphs of the "General guidelines to SSC CDM methodologies" and be conducted by independent accredited third party. Calibration frequency: As per local/national standard or as per manufacturer's specifications. If the local/national standards and manufacturer's specifications is not available, it will be as per international standard, but at least one in 3 years. Accuracy of energy meter: 2% Responsible entity: PP
QA/QC procedures to be applied (if any):	The measurement results shall be cross-checked with records for purchased energy (e.g. invoices/receipts)
Any comment:	Archiving policy: The data will be archived electronically and kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later

Parameter:	**$EF_{CO2,FF,boiler}$**
Unit:	tCO_2/TJ

Description:	The CO_2 emission factor of the FO fuel that would have been used in the baseline plant.
Source of data:	IPCC Default value
Value of data:	77.4
Brief description of measurement methods and procedures to be applied:	IPCC Default value from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 1 (Table 1.4). The lower values should be chosen in conservative manner. Any future revision of the IPCC Guidelines should be taken into account
QA/QC procedures to be applied (if any):	IPCC data is an authentic source of data
Any comment:	Archiving policy: The data will be archived electronically and kept for minimum of two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later

B.7.2 Description of the monitoring plan:

>>

Tin Thanh has formed a CDM monitoring team comprising of personnel from the Mechanical, Instrumentation and accounts departments, headed by the Managing Director of the company. The indicative diagram for the monitoring points are shown in section B.3. The personnel in the team perform the dual functions of power plant O&M and compliance with CDM procedures. The structure of CDM team is given in the figure below:

Figure B.7.2.1 Management and operational structure for monitoring

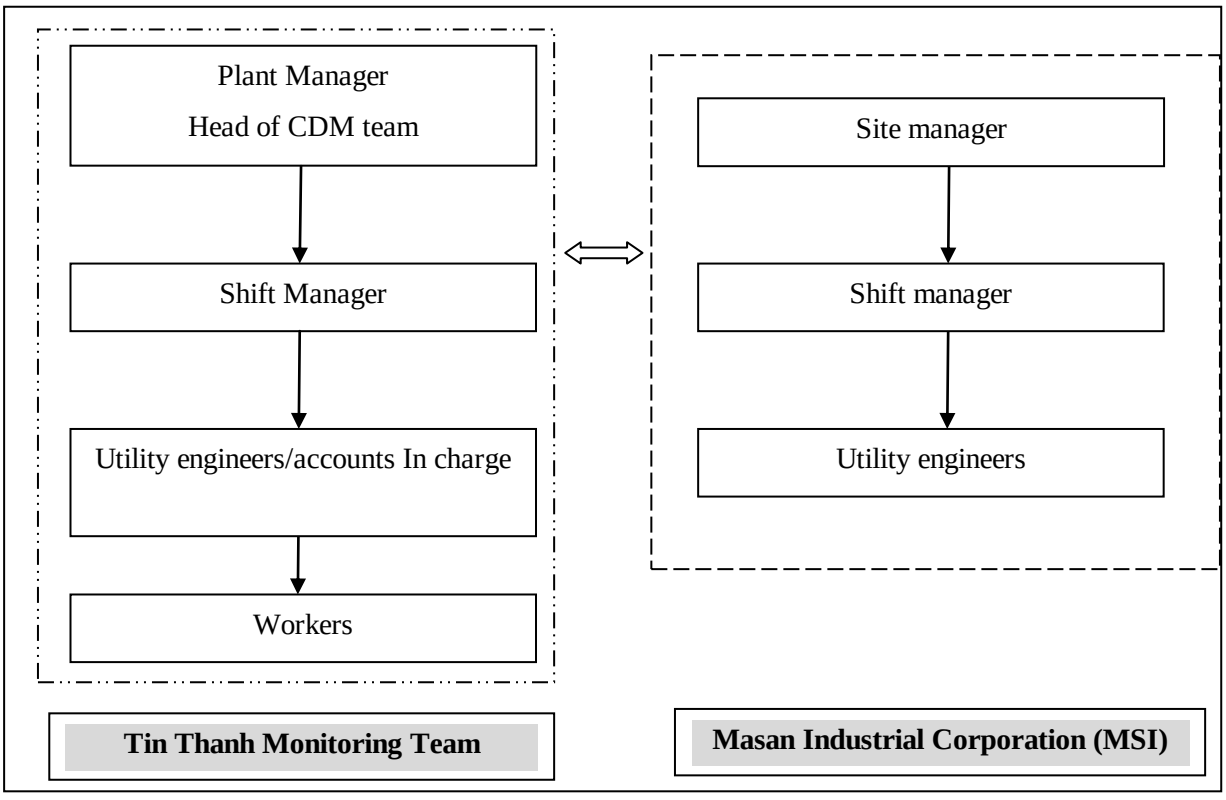

Table B.7.2.1 Responsibility of the monitoring team

Position	Responsibilities
Plant Manager (Head of CDM team)	Overall Responsibilities of Management& Monitoring of Project Internal review and Submission of Documents/Data for final reporting into emission reduction sheet. Monthly Performance Review
Shift manager (Tin Thanh)	Performance the monitoring for each shift Verification / review of data Cross-check of data obtained with MSI Submission of Documents/Data to the plant manager
Utility engineer (Tin Thanh)	Recording & Archiving the data Checking of monitored data Submission of Documents/Data to the shift manager Calibration of monitoring equipments Maintenance of monitoring equipments
Accountant in charge (Tin Thanh)	Recording / Collection of Data Cross check the obtained data with invoices
Worker (Tin Thanh)	Recording / Collection of Data Daily fill in the operation and monitoring in the logbook
Site manager of MSI	Performance review and approve the obtained monitoring data Working with site manager of Tin Thanh for cross-checking data
Shift manager of MSI	Performance the monitoring for each shift Verification / review of data Cross-check of data obtained with Tin Thanh Submission of Documents/Data to the site manager
Utility engineer of MSI	Recording and Archiving monitored data Submission of Documents/Data to the shift manager Calibration of monitoring equipments belong to MSI Maintenance of monitoring equipments

Note that no emission reductions will be claimed for the use of excess steam if the end user is no longer Masan Industrial Corporation as the baseline for any other user would not have been validated.

Emergency Preparedness.

Any uncertainty like breakdown in plant, inconsistency/discrepancy of data parameters, malfunctioning of energy meters /monitoring equipments etc. will be dealt with various corrective actions. These will be reported along with its time of occurrence, possible reasons and its duration and accordingly, the corrective actions will be undertaken.

All the critical & essential spares & consumables will be kept at project site to reduce the breakdown time. Duly calibrated spare energy meters will be maintained at the site for immediate replacement of faulty meters. The spare meters will also be calibrated on annual basis.
The back-up of recorded monitoring data will be taken at the end of each month, which can be presented in case of loss of original data.

Training on monitoring of the project activity.

Regular training will be provided to the monitoring team regarding the system and requirement of monitoring as per CDM procedure. The Head of monitoring team having experience of implementing and monitoring of CDM project will be responsible for providing the requisite training. The training procedure will include proper recording & maintenance of the data, reporting of data and corrective actions to be taken during the emergency situation. In addition, the O & M staff at the plant would be imparted training based on individual maintenance function such as mechanical, electrical, instrumentation etc. as per the instruction provided by the manufacturer including preventive maintenance, breakdown maintenance, emergency procedures etc. If need arises, the equipment supplier would be asked to provide the desired training either at plant site or at their end.

Internal audit and its scope

The Managing Director along with the Accounts in-charge will be responsible for performing internal audit of CDM Project activities to assess effectiveness of the system, deviations from the planned activities and taking necessary measures. The periodicity of the audit shall be once in a year. The scope of internal audit includes:

- Checking of steam exported and electricity Consumption
- Checking of daily and monthly fuel consumption recording details
- Checking of fuel analysis reports
- Review of biomass fuel supplier assessment records and biomass availability status
- Review of calibration reports of critical equipment
- Review of financial & accounts department status & performance
- Review of O&M activities and team performance
- Suggesting discrepancies in the records, if any
- Suggesting improvement measures to be taken

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Date of completion: 25/05/2011

Responsible person and entity:

Mr. Hoang Anh Dung

Investment and Trade Consultancy Company Limited (INTRACO Co. Ltd.)

Address: Unit 1303, HITTC Building, 185 Giang Vo, Hanoi, Vietnam

Phone : +84 4 35122580

Fax : +84 4 35122582

Email : dung.hoang@carbonvietnam.com

Web : www.carbonvietnam.com

The entity is also a project participant for this project activity.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
14/08/2010 (the date when the equipment contract was signed)

C.1.2. Expected operational lifetime of the project activity:

>>
20 years

C.2 Choice of the crediting period and related information:

>>
The project activity will use a fixed crediting period.

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>
Not applicable.

C.2.1.2. Length of the first crediting period:

>>
Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
01/08/2012 or on the effective date of registration date whichever is later.

C.2.2.2. Length:

>>
10 years and 0 months

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

According to the regulations of the Law on Environmental protection of Viet Nam (the Law on According to the Decision No. 80/2006/ND-CP[10] dated 09/08/2006, the guidance on Environmental Protection Law of Vietnam 2005 and Circular No. 08/2006/TT-BTNMT[11] dated 08/09/2006, the project activity is required to secure Environmental Compliance Commitment (ECC) and submitted a Environmental Compliance Analysis. The project activity owner therefore commissioned a third party to conduct the required Environmental Compliance Analysis and the Environmental Compliance Certificate (ECC) was issued by the local authority.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

No significant environmental impacts are expected to result from the Project. The project activity will involve installation of more advanced emission control systems than the ones currently used by the existing fossil fuel fired boilers, and will continue to pass regulatory standards. In fact, the Project will contribute to environmental preservation by reducing greenhouse gas emissions and noxious odors from fossil fuel oil combustion.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

The local stakeholders consultation for the project activity was conducted on 18/07/2010 at the conference room of Masan Industrial Corporation in Tan Dong Hiep A I.Z, Di An District, Binh Duong Province. The local authorities were invited by official invitation letter, the local radio broadcast was used to provide information on the project activity, invite local residents. The local stakeholders identified for the proposed project are as follows:

- Representative of the Commune People Committee
- Interested local residents and neighboring commercial facilities
- Representative of the Commune Fatherland Committee
- Representatives of nearby residential areas.
- Representative of employees from Masan Industrial Corporation, project developer invited the participants in the meeting to express their comments and concerns about the project activity and CDM introduction, all documents related to the Project were answered and seriously considered.

[10] http://vea.gov.vn/VN/vanbanphapquy/quyphapphapluat/Pages/Ngh%E1%BB%8B%C4%91%E1%BB%8Bnhc%E1%BB%A7ach%C3%ADnhph%E1%BB%A7s%E1%BB%91802006N%C4%90-CP.aspx

[11] http://www.monre.gov.vn/v35/default.aspx?tabid=664&DocCode=3c0b88ed-a08f-4a01-9806-70ead581393d&interface=

E.2. Summary of the comments received:

>>

The issue and concerns raised by the stake holders and the clarifications provided by the project developer are summarized below:

Queries raised by stakeholders	Clarifications by the project developer
Question raised by Representative of Commune People Committee *How is the project useful for the local residences?*	The project developer clarified that the implementation of the project activity would entail direct and indirect employment opportunities.
Question raised by a representative of local village *Will there be employment opportunities for skilled labour available locally*?	The project developer clarified that the local villagers will be given preference for the manpower requirement of construction work as well as requirements during the operation life of the project. However, they would have to go through a proper selection procedure.
Question raised by Representative of Commune Fatherland Committee *Will the installation of machines create noise and disturb the surroundings?*	The project developer personnel clarified that they have already implemented ECC in the neighbouring area and no such problem has been reported anywhere owing to advanced machine design that ensures minimal noise.

E.3. Report on how due account was taken of any comments received:

>>

The comments received from the attendees are all in favour of the proposed project and no negative comments have been received. Some participants requested for copies of permits and emissions analysis, and will be provided accordingly.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	**Tin Thanh Industrial Electricity and Steam Company Limited**
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Salutation:	Mr.
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Represented by:	
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Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from Annex 1 Parties is involved in the proposed project activity.

Annex 3

BASELINE INFORMATION

Baseline information has been provided in section B.6.1.

Annex 4

MONITORING INFORMATION

See Section B.7 above.

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Appendix 1

Information on Biomass Surplus Availability[12]

No	Supplier	Address	Distance from project site	Annual output (tons/year)
1	Dong Hoa wood processing enterprise	Dong Hoa Commune, Di An district, Binh Duong Province	8 km	25,470
2	Di An wood processing enterprise	Thong Nhat Road, Di An town, Di An district, Binh Duong Province	13 km	9,480
3	Minh Dương Minh Duong wood JSC	An Binh Commune, Di An district, Binh Duong Province	10 km	23,460
4	Hoa Nguyen Trade and Production Enterprise	West Commune, Dong Hoa, , Di An district, Binh Duong Province	18 km	12,780
5	Lan Anh Trade and Production Enterprise	Tan An , Tan Dong Hiep Commune, , Di An district, Binh Duong Province	7 km	10,950
6	Tan Thuan Hong Trade and Production Enterprise	Noi Hoa, Binh An Commune, Di An district, Binh Duong Province	19 km	22,899
7	Trong Nghia Trade and Production Enterprise	12A, 1K Avenue,Chau Thoi, Bình An Commune, , Di An district, Binh Duong Province	13 km	6,900
8	Phi Ma Wood Enterprise	Group 3, Hoa Lan 1, Thuan Giao Commune,	39 km	13,590

[12] This research has been carried out by a third party considering the sawdust consumption of other consumers

		Thuan An District, Binh Duong Province		
9	BHA Wood Product Enterprise	4/28, Binh Duc, Binh Hoa Commune, Thuan An District, Binh Duong Province	33 km	12,360
10	Lam Dat Hung Co., Ltd.,	Song Than 2, I.Z, Di An District, Binh Duong Province	21 km	6,420
11	Globe Wood Company	1B Group, An Phu Commune, Thuan An District, Binh Duong Province	43 km	6,150
12	Hai Duong Wood Co., Ltd.,	54a, Binh Hoa Street, Binh Duong Lai Thieu Avenue Thuan An District, Binh Duong Province	47 km	11,040
Total		**151,479 tons**		
Quantity of sawdust to be used by the project activity		**34,243 tons**		
Other sawdust consumer		**19,600 tons**		
Total sawdust consumption including the project activity		**53,843 tons**		
Surplus sawdust available		**97,636 tons**		
Biomass surplus availability		**181 %**		