CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM SSC-PoA-DD) Version 01

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NOTE:

(i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.

(ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

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Biomass Heat Generation Development Programme of Activities Managed by INTRACO
Version: 04
Date: 18/06/2012

A.2. Description of the small-scale programme of activities (PoA):

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Description of the PoA

The "**Biomass Heat Generation Development Programme of Activities Managed by INTRACO**" later on referred to as "**The PoA**". The PoA will support the displacement of fossil fuel fired equipment(s) currently or would be used in industrial facilities in provinces throughout Vietnam that generate steam/heat to meet steam demand for industrial production. Each small-scale CDM Program Activity (referred later on as **CPA**) under this PoA will comprise one or more such biomass energy generation units within the threshold for a small-scale CDM project.

1. **General operating and implementing framework of PoA**

The PoA is operated and implemented by the Investment and Trade Consultancy Company Limited (referred later on as **INTRACO). INTRACO** is the "Coordinating / Managing Entity" (hereinafter referred to as CME). The managing entity, INTRACO, will work closely with the developers of biomass based heat producing systems (hereinafter referred on as the biomass based systems) and other organizations in Vietnam to facilitate the development of new biomass based systems and their inclusion into this PoA. The managing entity will also act as the focal point with the CDM Executive Board in all the aspects relating to the validation, verification, registration and issuance of carbon credits generated by this PoA.

2. Policy/measure or stated goal of the PoA

The goal of the PoA is to displace fossil fuel utilization for thermal energy generation by the Biomass Based Heat Producing Programme of Activities Managed by INTRACO. In the Project activities, biomass will be used as an alternative fuel for the production of steam or heat. Because fossil energy sources are becoming exhausted, the PoA would result in partly reducing the fossil fuel consumption with respect to that would have been used in the absence of the CPAs in the PoA. In this way, the PoA will help to reduce greenhouse gas (GHG) emissions in relation to avoided fossil fuel usage and reducing fossil fuel demand in steam/heat generation. The PoA contributes to the sustainable development of Vietnam, as determined by the sustainable development criteria of Vietnam DNA[1].

Contribution to Sustainable Development:

Economic well-being: The PoA promotes the use of a cleaner, more efficient and more environmentally friendly technology, which utilizes biomass, a new indigenous fuel source. It displaces the use of the imported fossil fuels, helps to decrease the Viet Nam' current account deficit, and helps promote the increased usage of renewable energy. Furthermore, this program through the project activities will bring additional investments through plants, machineries, storage and transportation system offering employment opportunities.

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

Environmental well-bring: on the national level, the PoA complies with environmental policies and standards imposed by the government. It also promotes sustainable use of natural resources by utilizing biomass waste sources which would have been abandoned in the country. On the local level, the PoA improves local environmental quality by reducing air pollution and ensures that biomass source of rice husk, sawdust is properly disposed of through controlled combustion with proper emissions control. Biomass combustion, wherein it is assumed that the amount of CO2 produced by the combustion of biomass in the PoA 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.

Social well-bring: The PoA provides rice millers and farmers access to additional income. Rice husk, which is a waste product in the rice milling process that is normally abandoned and left to decay, can now be sold to users of biomass technology. On the local level, the project activity provides education and training program to local staffs for operation and maintenance of the facilities.

The contribution to Sustainable Development has been confirmed by the host country DNA in the approval letter dated 21/09/2011[2]

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.
The PoA is a voluntary action being coordinated and managed by INTRACO, which is the CME of this PoA. The implementation of biomass based systems under this PoA is not required by law in Vietnam. Generally, there are no mandatory requirements in Vietnam enforcing the use of biomass based steam generation system. The confirmation that proposed PoA is a voluntary action by the Coordinating / Managing Entity is based on the management decision dated 18/04/2011[3].

A.3. Coordinating/managing entity and participants of POA:

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a) Coordinating or managing entity of the PoA as the entity which communicates with the Board
The project participants being registered in relation to the proposed PoA are:

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)	**Investment and Trade Consultancy Company Limited** (INTRACO Co., Ltd.) (Private entity)	No

b) Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the CPAs related to the PoA.

- Investment and Trade Consultancy Company Limited (INTRACO Co., Ltd.) is a private company registered in Viet Nam and is a Participant. INTRACO is also the Focal Point for all Scopes of Authority and the coordinating/managing entity (CME) of this SSC-PoA.

[2] Letter of Approval from the Host Country of Vietnam
[3] Corporate Resolution by the CME's Management Board

A.4. Technical description of the small-scale programme of activities:

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A.4.1. Location of the programme of activities:

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A.4.1.1. Host Party(ies):

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Viet Nam

A.4.1.2. Physical/ Geographical boundary:

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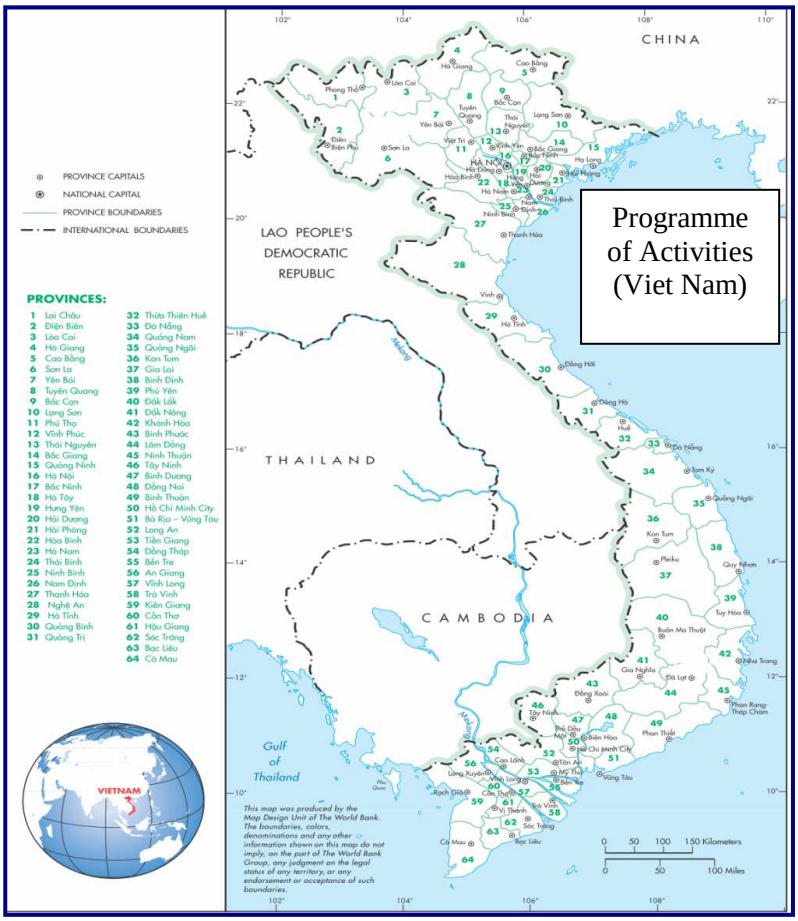
The PoA will be implemented within the geographical boundaries of Viet Nam, national and sectoral policies in the relevant sector are the same within the geographical boundaries of Viet Nam. With regard to this PoA there is no difference in the national or sectoral policies between regions or provinces.

The geographical coordinates of Viet Nam are[4]:

Longitude: from 102°09' to 109°30' East, Latitude: from 8°10' to 23°24' North

The geographical boundaries are shown in the figure below:



[4] http://www1.chinhphu.vn/cttdtcp/en/about_vietnam08.html

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

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The proposed small scale CDM Programme of Activity (CPA) will consist of installations of biomass boiler and/or heater for end users in Viet Nam. The CPA will consist of one or more individual small scale Project activities. The Project activities in the CPA under the PoA will include any/all of the following Project Scenarios.

Project Scenario	Description
1	Biomass fired thermal energy generation in Greenfield Projects or as a Replacement
2	Fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility.
3	Addition of renewable energy unit at an existing renewable energy facility.

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

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The Project activity is a small scale PoA Project activity and confirms to Appendix B of the simplified modalities and procedures for small-scale CDM Project activities.

Type I: Renewable Energy Projects.
Category I.C: "Thermal energy production with or without electricity"; Version 19, EB 61.
Sectoral Scope: 01

Technology employed:

The proposed small scale CDM Programme Activity (SSC-CPA) will consist of installations of biomass boiler and/or heater for end users in Viet Nam. The biomass used by the SSC-CPA under this PoA will be in compliance with "Definition of Renewable Biomass - Annex 18 of EB 23" and "Glossary of CDM Terms, Version -05". The exact type, quantity and other specifications of the renewable biomass utilized by each CPA will be described in each specific-CPA-DD.

Description of the System / Technology:

The SSC-CPA under the PoA will include any/all of the following Project Scenarios.

Project Scenario	Description
1	Biomass fired thermal energy generation in Greenfield Projects or as a Replacement of existing fossil fuel fired equipment
2	Fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility
3	Addition of renewable energy unit at an existing renewable energy facility

Scenarios 1 & 3: Under these Scenarios new heat generation systems (Boilers and /or Heaters) fired on Biomass and/or renewable energy are installed, as described below:

i) Thermal energy generation from biomass fired boilers

The thermal energy generated from biomass firing in the boiler furnace is transferred to the boiler water, through the heat transfer surfaces of the heat exchangers / pressure parts, which is converted to steam. This steam acts as a medium of transfer of thermal energy in the process for heating.

The boiler consists of mainly the following parts:

1. **Pressure parts:** form heat transfer area, holds steam, water and various mountings.
2. **Furnace fuel combustor:** designed to burn efficiently a particular type of biomass fuel or any compatible biomass fuel.
3. **Accessories:** for various systems like water treatment, storage & feeding, fuel storage, fuel handling & feeding, steam piping, water & fuel piping, drain lines, fans & draught system, flue gas discharge, ash discharge & handling, electrical systems, equipment safety & controls.

The type of boilers and the capacity range vary according to the user's requirement and choice. Various types of boiler shall be considered under this activity like smoke tube / water tube type or combination of these types. These boilers can be packaged / field erected / site assembled with refractory lined or water walled type integral /external furnace.

The water / steam drum is mounted on the top of the water tube type boilers. In smoke tube type boiler shell is mounted side wise of the external refractory lined /water walled furnace or have integral furnace.

All the biomass boilers that will be included in the SSC CPA shall comply with the Viet Nam Boiler regulation as per the latest amendments

ii) Thermal energy generation by biomass fuel fired Heaters:
The biomass fired heaters consist of thermic fluid / thermal oil heaters, pressurised and non pressurized hot water generators, which work on closed loop pipe line system, for transferring the thermal energy indirectly, to the process through the heat transfer medium like thermic fluids / thermal oil or pressurised / non pressurised water.

The biomass fired heaters are similar to the boilers, as both pick up the heat from the biomass fuel combustion & transfer it to the process/heat utilities.

The heaters transfer the thermal energy in the form of heat to the user which could be a process or heat utilities in a closed loop piping system. The heater consists of mainly the following parts:

1. **Heat Exchangers:** form the heat transfer surface of the heater,
2. **Furnace fuel combustor:** designed to burn efficiently a particular type of biomass fuel or any compatible biomass fuel.
3. **Accessories:** for various systems like fuel storage, fuel handling & feeding, heat transfer fluid/water pipe lines, fans & draught system, flue gas discharge, ash discharge & handling, electrical system, equipment safety & controls, de-aerator & expansion Tank, heat transfer fluid/treated water system and storage.

The heat generated by combustion of the fuels is picked up & carried by the heat transfer medium like thermal oil commonly called as thermic fluid or pressurised /non pressurised water which is forced circulated by the pump through the heat exchangers. The heat exchangers absorbs the radiation & convective heat from the combustion of fuel & hot flue gases generated in the furnace and pass it on to the heat transfer fluid being circulated. Thus, the heat transfer fluid gets heated and is transferred to the process or utilities to transfer the heat indirectly & returns back to the circulating pump.

The colder heat transfer medium is returned to the circulating pump after passing through the utilities and then through de-aerator. The de-aerator tank liberates & vents out the vapours trapped or generated in the closed system.

The expansion tank connected at the highest level in pipe line system ensures that the system is full of the heat transfer medium & also takes care of the increased volume of the heat transfer medium due to its heating.

The heaters are designed with single / two or multi flue pass design, with furnaces having forced /included / balanced draught, as per the model & capacity and biomass fuel properties.

The biomass fired heaters that will be included in CPAs will comply with applicable quality standards.

The type of heater and the capacity and range vary according to the user's requirement and choice. The biomass fuels are burnt in the combustors or furnaces of the heaters. The furnaces are lined fully or partly with refractory. The combustion system of the heaters is similar to the boilers.

Scenario 2:

Under this Scenario 2, Fuel switching from fossil fuel to biomass by modification including retrofit of existing facilities is considered i.e. solid, liquid and gaseous fossil fuels can be switched to biomass fuels.

The main pressure parts or heat exchangers of the existing equipment are reused with or without modifications, the combustor or the furnace part may be modified to suit the characteristic or the properties of biomass fuel to be used. The fuel feeding system may need to be modified. The heat thus generated by combustion of biomass is absorbed by the heat exchangers to produce steam or hot fluid, which is used for process heating.

The modification required is very specific or custom made and depends upon many factors like design of existing equipment, type of existing fossil fuel being used (solid, liquid or gas), the type of biomass fuel to be used, existing capacity of equipment, capacity of the modified equipment and the accessories used etc. Under this Scenario 2, the description of technology of heat generation and the combustion system after the modification including retrofitting of the existing facility will be similar to the technology of Scenario 1 and Scenario 3.

A.4.2.2. Eligibility criteria for inclusion of a CPA in the PoA:

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The CME has all competencies to check the features of potential CPAs and ensure that each CPA meets all requirements and eligibility criteria (as tabulated below) before inclusion in the registered PoA. The relevant documents for the compliance of paragraph 17 (for development and implementation of management system) annex 03 of EB 65 has been provided to the DOE for validation.

Each of the CPA to be included in the proposed PoA shall meet the following applicable eligibility criteria (considering the paragraph 14, annex 03 of EB 65):

Nr.	Eligibility criteria description	Description of conditions to be met and reference document
1.	Ref: EB 65, Annex 3 Para.14 (a): The boundary of the implemented CPA is within the geographical territory of Vietnam.	The following documents shall be provided: Business license of the CPA Operator issued by Vietnamese authorities. Declaration from the CPA Operator confirm that the boundary of the implemented CPA is within the geographical territory of Vietnam and including information regarding geographic reference (latitude and longitude), name and address of the SSC-

		CPA.
2.	Ref: EB 65, Annex 3 Para.14 (b): Confirmation that the CPA is not registered or being registered as a stand-alone CDM project outside of this PoA, a bundled CDM Project Activity or another registered PoA which leads to double counting of emission reductions and confirmation on the unique identification of the CPA location.	The following document shall be provided: Declaration from the CPA Operator confirming that the project is not registered or in the process of being registered as a stand-alone CDM project, outside of the PoA, a bundled CDM Project Activity or another registered PoA. Confirmation described in the SSC-CPA-DD that states that the project is not registered or in the process of being registered as a stand-alone CDM project, outside of the PoA. Confirmation check by reviewing the website of the UNFCCC/DNA by the CME. Confirmation on the unique identification of the CPA location (latitude and longitude)
3.	Ref: EB 65, Annex 3 Para.14 (c): The proposed CPA shall include Project activities of biomass heat generation system from any of the following Project Scenarios only: **Project scenario 1:** Biomass fired thermal energy generation in Greenfield Projects or as a Replacement of existing fossil fuel fired equipment (may use fossil fuel as backup fuel). **Project scenario 2:** Fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility. (may use fossil fuel as backup fuel) **Project scenario 3:** Addition of renewable energy unit at an existing renewable energy facility. (may use fossil fuel as backup fuel)	**For the project scenario 1**, "*Biomass fired thermal energy generation in Greenfield Projects or as a Replacement of existing fossil fuel fired equipment*" the following documents shall be provided: Declaration from CPA Operator to CME. Purchase contract/order of equipment For a replacement of existing fossil fuel fired equipments, additional documents shall be provided: Declaration from CPA Operator shall submit a declaration stating whether the existing equipment is scrapped or kept as a stand-by. Test Certificate of existing equipments In case of replacement of existing equipment, the new equipment shall have equal or higher capacity than the existing equipment otherwise the Project activity is not eligible to be considered as a CPA under the PoA. (refer: Clarification SSC_336[8]) In case of scrapping of existing equipment, the scrapping procedure as per section E.7.2 of PoA-DD must be followed

[8] http://cdm.unfccc.int/methodologies/SSCmethodologies/clarifications/06563

		For project scenario 2 "*Fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility*" the following documents to be provided: Confirmation from CME that It shall be confirmed there is a fuel switch from fossil fuel to biomass by modification including retrofit of an existing facility (Refer: Clarification SSC_374[9]). Residual life assessment report of existing equipment which will be modified or retrofitted for fuel switching. Purchase contract/order for modification and retrofit of energy equipment Declaration by CPA operator that fossil fuel usage only in case of backup or unscheduled unavailability of biomass. Baseline Identification Report by CME with confirm by CPA Operator to demonstrate the historical fossil fuel usage by providing historical information (detailed records) on the use of energy sources (e.g., electricity, fossil fuel) and the existing facilities output (e.g., steam/heat) in the baseline facilities for a minimum one year Test Certificate of existing equipments prior to be modified including retrofit The residual life of the existing equipment is more than the crediting period of the CPA that to be eligible under this PoA. **For project scenario 3:** "*Addition of renewable energy unit at an existing renewable energy facility*" the following documents to be provided: Purchase contract/order of equipments of the addition equipments The Declaration by CPA Operator to CME that the total capacity of units added by the CPA including the existing renewable energy facility has to be equal or less than 45 MW thermal The declaration by the CPA Operator that Existing renewable facility and new

[9] http://cdm.unfccc.int/methodologies/SSCmethodologies/clarifications/40659

		renewable facility added should be physically distinct. (Physically distinct units are those that are capable of producing thermal energy without the operation of existing units, and that do not directly affect the characteristics of the existing facility).
4.	Ref: EB 65, Annex 3 Para.14 (d): The start date of the CPA shall not be before the commencement of validation of the PoA as a whole (date the PoA was published for global stakeholders comment on the website of the UNFCCC 11/10/2011)	The following document shall be provided: Purchase contract/order of equipments The earliest construction contract The date of signing of the earliest contract by the CPA Operator shall constitute the starting date of the CPA. In case CPA Operator has not committed to expenditures related to the implementation of the CPA, it shall be concluded that this eligibility requirement has been met.
5.	Ref: EB 65, Annex 3 Para.14 (e): The CPA shall meet all the application of the methodology AMS-I.C/Version 19	The CPA will provided the documents as per application of AMS-I.C/Version 19 as defined in the criteria from No. 15 to 31 of this eligibility criteria description
6.	Ref: EB 65, Annex 3 Para.14 (f): The additionality for each CPA is demonstrated by any one of the following approaches: **Approach 1:** EB 63 Annex 23 'Guidelines for Demonstrating Additonality of Microscale Project Activities'(Version 03). Or **Approach 2:** As per Attachment A to Appendix B of the "Simplified Modalities and Procedures for small – scale CDM Project activities", Version 08, EB 63, Annex 24 additionality is demonstrated only by Investment barrier route.	CPAs that are inline with the additionality guidelines as per Approach 1 or Approach 2. **In case of Approach 1**: the CPAs that employ renewable energy as primary technology are additional, if any of the conditions as per EB 63 Annex 23 'Guidelines for Demonstrating Additonality of Microscale Project Activities'(Version 03) The CPA that employs renewable energy as primary technology shall be additional as per Approach 1 only if the following condition is satisfied: The CPA is for distributed energy generation where in each of the independent subsystem/ measure in the Project activity is smaller than or equal to 4500 kW thermal installed capacity and the end users of subsystems or measures are SMEs, the following documents shall be provided Technical specifications of equipment and purchase contract for the equipment A letter from a local authority regarding

		end user being a SME as Governmental guidelines. In case of Approach 2, the additionality demonstration shall be inline with "Attachment A to Appendix B" investment barrier following the Levelized Unit Cost (LUC) method using a fixed template called as (LUC template). The LUC of steam / heat generation from at least one fossil fuel must be less than the LUC of steam / heat generation from each type of biomass feasible for the CPA, the following document shall be provided: The Levelized Unit Cost of the CPA
7.	Ref: EB 65, Annex 3 Para.14 (g): A CPA level local stakeholder's consultation and environmental impact analysis has to be carried out prior to inclusion.	The CPA level local stakeholder consultation and environmental impact analysis shall be carried out prior to inclusion, the following documents shall be provided: The stakeholder consultation report Environmental impact analysis report and its approved by a local authority
8.	Ref: EB 65, Annex 3 Para.14 (h): Confirmation on involvement of public funding or ODA from Annex I Parties in SSC-CPA	The following document shall be provided: Declaration from the CPA Operator regarding the no involvement of public funding or ODA from Annex I Parties.
9.	Ref: EB 65, Annex 3 Para.14 (i): Target group set by the CME for selected CPAs that the CPA shall only utilize renewable biomass which are in line with the "*Definition of Renewable Biomass*" as per Annex 18 of EB 23 and "Glossary of CDM terms (Version 05)", Charcoal shall not be used at all by the CPA activity and Information on Biomass availability in the region of the CPA shall be available.	The following document shall be provided: Declaration from CPA Operator for using renewable biomass Regional Biomass Availability Study carried out by Third Party.
10.	Ref: EB 65, Annex 3 Para.14 (j): The CPA Operator has signed a valid contractual agreement with the CME which permits its participation and inclusion in the PoA and specifies the duties and responsibilities of a CPA Operator and the acceptance of the terms and conditions of the PoA including the conditions related to	The following document shall be provided: Contractual agreement between CME and CPA Operator.

	sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys	
11.	Ref: EB 65, Annex 3 Para.14 (k): The SSC-CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those threshold throughout the credit period of the CPA	The following document shall be provided: Declaration from CPA Operator
12.	Ref: EB 65, Annex 3 Para.14 (l): Confirmation that the CPA is not a de-bundled component of another large-scale CPA or CDM project activity as per latest guidance given by the CDM Executive Board	The following document shall be provided: Declaration from the CPA Operator confirming that the CPA is not a de-bundled component of another large-scale CPA or CDM project activity as per latest guidance given by the CDM Executive Board.
13.	Confirmation on the crediting period of the CPA which shall not exceed the length of the PoA (28 years from the date of the PoA approved by the Board to be registered) regardless of the time of inclusion of CPA in the PoA	The following document shall be provided: Confirmation from CPA Operator
14.	The CPA activities involve in installation of biomass equipments for displacement of the existing fossil fuel equipment or retrofit/ modify an the existing fossil fuel equipment for biomass energy generation are only eligible if the remaining lifetime of the equipment estimated is more than the crediting period of the CPA activity	The following documents shall be provided: Baseline identification report to define the historical commissioning, operation and fossil fuel usage of the existing equipments First Commissioning Report the existing equipments Certificate given by inspectorate of the existing equipments Confirmation from the existing equipment Operator
The proposed CPA shall meet the applicability criteria of the methodology AMS-I.C./ Version 19 as elaborated below:		
15	Ref: AMS-I.C./ Version 19, Para.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.	The project activities in any of the CPA under the PoA shall utilize renewable biomass that displaces fossil fuel for the generation of thermal energy in boilers/heaters. The following documents shall be provided: Purchase contract/order of equipment Confirmation from CPA Operator
16	Ref: AMS-I.C./ Version 19, Para.2: Biomass-based cogeneration systems are included in this category. For the purpose of this methodology "cogeneration" shall mean	The project activities in any of the CPA under the PoA comprise of biomass-based system for thermal energy generation only. Co-generation projects are excluded from the PoA

	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.	The following documents shall be provided: Purchase contract/order of equipment Confirmation from CPA Operator
17	Ref: AMS-.I.C./ Version 19, Para.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).	The CPA shall not involve any cogeneration system or electricity generation The following documents shall be provided: Purchase contract/order of equipment Confirmation from CPA Operator
18	Ref: AMS-.I.C./ Version 19, Para.4: The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities).	The total installed/rated thermal energy generation capacity of all project activities under each CPA will be equal to or less than 45MW thermal The following documents shall be provided: Purchase contract/order of equipment Confirmation from the equipment supplier
19	Ref: AMS-.I.C./ Version 19, Para.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).	The CPA is co-fired sysem (the simultaneous combustion of both biomass residues and fossil fuels in a single equipment), the total installed thermal energy generation capacity of the CPA equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal The following documents shall be provided: Purchase contract/order of equipment Confirmation from CPA Operator
20	Ref: AMS-.I.C./ Version 19, Para.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	The CPA selected shall not involve any cogeneration system The following documents shall be provided: Purchase contract/order of equipment Confirmation from CPA Operator

	thermal. For the 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.	
21	Ref: AMS-.I.C./ Version 19, Para.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 total installed/rated thermal energy generation capacity of all the Project activities (new and/or retrofit) under each CPA will be determined according to the manufacturer's rated thermal energy output and shall be equal to or less than 45 MW thermal. 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 shall be equal to or less than 45 MW thermal. The CPA Operator shall ensure that the proposed CPA activity is physically distinct from the existing units. The following documents shall be provided: Purchase contract/order of equipment Confirmation from CPA Operator
22	Ref: AMS-.I.C./ Version 19, Para.8: Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	Project activities that seek to retrofit or modify of an existing facility for the purpose of fuel switch from fossil fuels to biomass residues in the heat generating equipment, such type of

		Project activities are included as a CPA in the PoA. The following documents shall be provided: Purchase contract/order of retrofit or modified equipment
23	Ref: AMS-.I.C./ Version 19, Para.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 CPA selected as New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario shall comply with the related and relevant requirements in the "General Guidelines to SSC CDM methodologies". The following documents shall be provided: Purchase contract/order of equipment Confirmation from CPA Operator
24	Ref: AMS-.I.C./ Version 19, Para.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.	In case of solid biomass fuel (e.g briquette) is used by a CPA, the respective CPA Operator shall demonstrate that the biomass 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 following document shall be provided: Confirmation from CPA Operator Confirmation from biomass supplier
25	Ref: AMS-.I.C./ Version 19, Para.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.	In case of solid biomass fuel (e.g briquette) is used by a CPA where the project participant is not the producer of the processed solid biomass fuel, the project participant of the CPA 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 The following documents shall be provided: A contract between biomass producer and CPA Operator to allow CPA Operator to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production including that there is no

		double-counting of emission reductions
26	Ref: AMS-.I.C./ Version 19, Para.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.	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 be entered into that ensures there is no double-counting of emission reductions. The following documents shall be provided: A contract between a third party steam/heat user and CPA Operator for no double-counting of emission reductions
27	Ref: AMS-.I.C./ Version 19, Para.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 selected CPA shall not recovers and utilizes biogas for power/heat production The following document shall be provided: Confirmation from CPA Operator
28	Ref: AMS-.I.C./ Version 19, Para.14: Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources[10] 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.[11] Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be	The CPA selected does not involve charcoal based biomass energy generation The following document shall be provided: Confirmation from CPA Operator

[10]Refer to EB 23, annex 18 for the definition of renewable biomass.
[11]AMS-III.K "Avoidance of methane release from charcoal production by shifting from traditional open-ended meth
to mechanized charcoaling process"

	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.	
29	Ref: AMS-.I.C./ Version 19, Para.47: If the energy generating equipment currently being utilised is transferred from outside the boundary to the project activity, leakage is to be considered.	The selected CPA shall describe clearly in the CPA DD If the energy generating equipment currently being utilized is transferred from outside the boundary to the CPA, the leakage is to be considered in the CPA DD The following document shall be provided: ☐ Confirmation from CPA Operator
30	Ref: AMS-.I.C./ Version 19, Para.48: In cases where the collection/processing/transportation of biomass residues is outside the project boundary CO2 emissions from the collection/processing/transportation of biomass residues to the project site shall be taken into account as leakage	The selected CPA shall describe clearly in the CPA DD where the collection/processing/transportation of biomass residues is outside the project boundary CO2 emissions from the collection/processing/transportation of biomass residues to the project site shall be taken into account as leakage The following document shall be provided: ☐ The biomass supply plan by the biomass supplier which clearly define in detail where biomass comes from, how it process/transport to determine the leakage to be taken into account
31	Ref: AMS-.I.C./ Version 19, Para.51: The following conditions apply for use of this methodology in a project activity under a programme of activities: a) In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues or processed biomass (e.g. briquette) only or biomass from dedicated plantations complying with the applicability conditions of AM0042; b) In the specific case of biomass project activities the determination of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of	A CPA project activity under this PoA shall satisfy the following: (a) The CPAs under PoA shall only use of biomass residues as per "Definition of Renewable Biomass Annex 18 of EB 23" and and shall not consider the biomass from dedicated plantations complying with the applicability conditions of AM0042. (b) The CPA under this PoA, the determinate of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1)

	Appendix B of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042; c) In case the project activity involves the replacement of equipment, and the leakage from the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	(c) The CPA will give a declaration that in case CPA involves replacement of equipment, the leakage from the use of the replaced equipment in another activity shall be neglected, because the replaced equipment shall be scrapped and an independent monitoring of scrapping of replaced equipment shall be implemented by a recognized independent agency (refer section E.7.2: Scrapping of equipment). The scrapping of replaced equipment shall be documented and independently verified. The scrapped equipment shall be stored until such correspondence has been checked. The following document shall be provided: ☐ Confirmation from CPA Operator

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

>>

(a) The proposed PoA is a voluntary coordinated action

The proposed PoA is a voluntary coordinated action by the Managing Entity. In Vietnam, it is not mandatory to (a) replace existing fossil fuel boilers and/or (b) to implement a biomass boiler/heater (refer to section A.4.2.1 above). The implementation of the PoA and associated CPAs need commercial incentives to encourage coordinated voluntary participation from various project participants. In general, the commercial incentives to each CPA are expected to be in the form of fossil fuel savings and potential CDM revenues to support cost of CDM registration.

(b) Additonality justification.

The additionality for the SSC-CPA is demonstrated by Approach 1 or Approach 2 applicable for the Project activity.

Approach 1- As per EB 63, Annex 23 "*Guidelines for Demonstrating Additonality of Microscale Project Activities*"(Version 03), According to paragraph 2 (c) of EB 63 Annex 23:

Project activities up to five megawatts that employ renewable energy technology are additional if any one of the conditions below is satisfied:

c) The Project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied

(i) Each of the independent subsystems/measures in the Project activity is smaller than or equal to 1500 kW electrical installed capacity;
(ii) End users of the subsystems or measures are households/communities/ SMEs.

The PoA will employ renewable energy technologies as their primary technology and this will be applicable for distribution of thermal energy generation. Project activities shall be eligible under Approach 1 only if each of the independent subsystem / measure in Project activity is smaller than or equal to 4500 $kW_{thermal}$ (1500 $kW_{electricity}$ x 3)[14] installed capacity and end user are households / communities / SMEs

OR

Approach 2 - The Project activity attempting Investment barrier analysis which shall be demonstrated as per Attachment A to the Appendix B.

A typical SSC CPA in this PoA consist of single or several installations of the biomass based boiler/heater system. As prescribed in the simplified modalities and procedures of small scale CDM Project activities, the Project can demonstrate the additionality as per Attachment A to Appendix B, approach 2.

Attachment A to appendix B will be referred to demonstrate the Additionality to show that the Project activity would not have occurred anyway.

Investment barrier

The investment barrier shall be demonstrated based on the investment analysis Sub-step 2b, Option II – Apply Investment Comparison Analysis of the 'Tool for the demonstration and assessment of additionality' as per the applicable EB guidance.

Financial additionality of the Projects would be demonstrated based on investment comparison analysis by using Levelized Unit Cost (LUC) of steam/heat generation as financial indicator. The data and the supporting documents would be submitted to DOE during validation for each individual SSC - CPA.

The investment comparison analysis will be carried out with the most plausible alternatives for the Project activity. The reasons for considering the chosen alternatives as 'most plausible' will be explained in the SSC CPA. The unit cost of steam generation from Biomass fuel shall be compared with the other fossil fuel alternatives.

The PoA-DD Levelized Unit Cost templates as per Annex 3 have been provided to DOE for validation. It shall be demonstrated by providing financial calculations as per the template having the condition that the LUC of a typical SSC-CPA Project activity operating on biomass is less than the baseline alternative then Project is not eligible. Only if the LUC of the Project activity is more than the fossil fuel fired baseline alternative, the SSC-CPA is considered as additional and eligible. It is clear that only by considering the CDM revenues the Project activity would be viable for the SSC-CPA Operator.

[14] Multiply by 3 to derive thermal capacity from electricity capacity according to AMS I.C ver.19 para. 6a)

Conclusion:

1. The Project activity is a voluntary initiative.
2. The PoA is not implementing any mandatory policy/regulation requirements in Viet Nam which enforces the use of biomass based heat generation system.

Hence, this PoA will enable a number of users to opt for biomass based thermal (heat/steam) energy generation system. In the absence of CDM revenues, the proposed voluntary measures would not have been implemented.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

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A.4.4.1. Operational and management plan:

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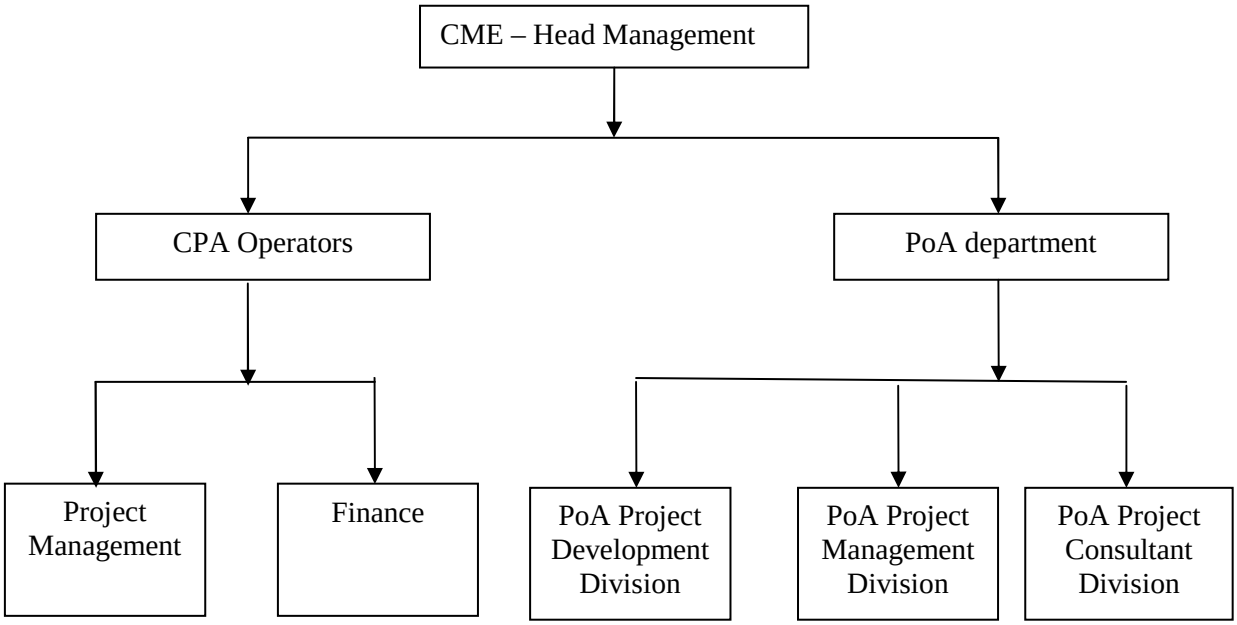
The proposed PoA involves a range of operational activities in order to implement and manage each CPA by the coordinating entity and CPA operators within the PoA. The chart and table below described the operation and management plan:



Key Operational roles	Management Responsibilities
CME – Head Management	• Registration of the PoA • Implementation of the Program objectives • Ensuring proper management of the PoA
PoA department	• Ensuring proper validation of the PoA • Ensuring the proper operation of the PoA as per CDM guidelines • Promotion of the PoA
PoA Project Development	• Identification of the CPAs

	• Listing of eligible CPAs • Inclusion of eligible CPAs under the PoA • Propose CPAs to DOE for consistency check • Validation / Verification support • Project document development • Preparation of Monitoring support for Emission Reductions
PoA Project Management	• General management of the CPAs • Collect information and documentation of CPAs • Collect and Scrutiny of all documents related to Eligibility criteria of CPAs inclusion • Ensuring proper CDM Project operation and management as per required guidelines throughout the crediting period • Validation and verification support to CPA operators throughout the crediting period • Collect necessary statutory approvals from CPA operators • Maintain existing relationships with the CPAs operators • Receive and distribute the CERS or its associated benefits to the CPAs ▪ A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA
PoA Project Consultant	• Baseline Identification • Emission reduction calculations • Validation and Verification of the PoA projects • Development and Implementation of monitoring system • Checking of documentation and Information as per Eligibility criteria of CPA under the PoA • Checking of the Supporting documents and site information data • Monitoring and record keeping and data back up / archival of monitoring parameters • Review of monitoring system
CPA Operators	▪ Implement and Operate CPAs (construction, daily operation, and maintenance of CPAs).
Finance	• Investment Analysis of the CPAs • Financial Documentation check
Project Management	• Collect necessary documents to provide the CME • Working with CME to properly manage and operate the CDM projects ▪ Comply to the terms and conditions of the CPA agreement signed with the management entity.

Monitoring plan for Programme of Activities (PoA)

The PoA and CPAs will be implemented by the CME. Data from each project site will be sent to the CME's server which will maintain/archive data from each Project site through their Monitoring system. Electronic data from each CPA will be analysed by the CME.

In addition to the above management tasks, the managing entity of INTRACO will implement the following operational elements to ensure proper management and oversight of the proposed PoA.

(i) A record keeping system for each CPA under the PoA

In order to unambiguously identify biomass boiler/heater projects participating in the PoA, a serial numbering system will be implemented that uniquely identify each biomass boiler project through numbers for the CPA and the CPA operator. This serial numbering system will be used to record baseline and monitoring data on a continuous basis using an Excel database. In this way, the PoA managing entity will be able to track the emission reduction of each CPA over the full duration of the crediting period.

In summary, a record keeping system will be set up by the CME, which contains the following details providing the unique identity for each SSC CPA as stated in the section A.4.1.2 of generic SSC CPA DD:

- Name of the CPA and its production capacity
- The name, address, and CPA operator details of each participating CPA
- The geographical coordinates of each CPA (GPS coordinates of plants in which biomass boilers/heaters are installed)
- The record of technical specification of each CPA participating in the PoA

The record keeping will be carried out by using the field instruments, hardware and software installed at the project site and/or manual data recording in the log book. The captured data then will be transferred to the server of CME. Each CPA operator will carry out a periodic analysis (quarterly) of data for the individual project. In case of any abnormalities identified during the review of the CPA operator, appropriate corrective actions will be taken. A review report will be submitted to the CME and DOE.

INTRACO will be responsible for the management of records and data associated with each CPA. The Excel database will be updated manually using the data supplied by the participating biomass projects. It will form the basis for the verification of CPAs and be available for inspection by the DOE at any point in time.

(ii) A system /procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA

The CME will confirm as per EB 55 Annex 38 Paragraph 6(i), that the Project activities included in the SSC CPA is not registered in any other SSC CPA of the PoA or any other registered CDM Project activity through following procedure to avoid double counting of CPA under any other CDM or PoA activity:

1. At time of CPA eligibility check, CME will seek confirmation in SSC-CPA and also check any double counting using public information sources like UNFCCC website data, cd4cdm data VCS website.

2. The CME will keep the unique identification information of each CPA in CME database.

Furthermore at the time of inclusion the CME is taking a declaration from the CPA operator (as a part of mandate) as below-

Mandate by CPA operators shall state that "*there is no double counting of CERs from this CPA under any CDM Project or CPA in another PoA*".

(iii) The SSC CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.

The managing entity will follow the "*Guidance for determining the occurrence of de-bundling under a Programme of Activity"* (version 3, EB54, Annex 13) to ensure that the proposed CPA is not a de-bundled component of a large scale activity.

Para 8. For the purposes of registration of a Programme of Activities (PoA), [15]a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity[16], which satisfies both conditions (a) and (b) below:
(a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;
(b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

Para 9. If a proposed small-scale CPA of a PoA is deemed to be a de-bundled component in accordance with paragraph 2 above, but the total size of such a CPA combined with a registered small-scale CPA of a PoA or a registered CDM project activity does not exceed the limits for small-scale CDM and small-scale A/R project activities as set out in Annex II of the decision 4/CMP.1[17] and 5/CMP.1 respectively, the CPA of a PoA can qualify to use simplified modalities and procedures for small-scale CDM and small-scale A/R CDM project activities.

Para 10. If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied[18], then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.

In relation to the Para 8, if CPA does not satisfy both the condition 8 (a) & 8 (b), the proposed small scale CPA of a PoA is not deemed to be debundled component of a large-scale activity, therefore is eligible to use the simplified modalities and procedures for small-scale Project activities. However if CPA satisfy above conditions and the total size of the SSC CPA does not exceed the limit for SSC Project activity, the proposed small scale CPA of a PoA is deemed to be debundled component of a large-scale activity but can qualify to use the simplified modalities and procedures for small-scale Project activities.

In relation to para 9, CPA will be included if the total size of such a CPA combined with a registered small-scale CPA of a PoA or a registered CDM Project activity does not exceed the limits for small-scale CDM Project activity.

[15] Only those PoAs need to be considered in determining de-bundling that are: (i) in the same geographical area; and (ii) use the same methodology; as the POA to which proposed CPA is being added
[16] Which may be a (i) registered small-scale CPA of a PoA, (ii) an application to register another small-scale CPA of a PoA or (iii) another registered CDM project activity.
[17] Limits have been revised as set in paragraph 28 of decision 1/CMP.2.
[18] i.e., 15 kW installed capacity or 0.6 GWh annual energy savings or 0.6 ktCO2e annual emission reductions.

In relation to para 10, the rated thermal capacity of Project activity under CPA included in this PoA will be larger than 1% (i.e. 450 kWth) of the small scale thresholds defined by the methodology applied. Hence the CPAs included in PoA will have to perform de-bundling check as per above mentioned para 8 & 9.

The CME will follow the guidance provided by the Executive Board in Annex 13 of EB 54 report, in order to avoid registering a SSC CPA that is a de-bundled component of another CPA or CDM Project

(iv) The CPA Operators are aware and have agreed that their activity is being subscribed to the PoA.
The CPA operator will provide the mandate to CME stating that, they are aware and have agreed that their activity is subscribed to the PoA.

The CPA operator has to give a declaration to CME that the Project activity is not a de-bundled component of large scale Project.

The CME will confirm that the Project activity is as per EB 54 Annex 13 guideline of debundling and the Project activity not a de-bundled component of large scale Project.

A.4.4.2. Monitoring plan:

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The monitoring plan is established to ensure that all CPAs within the PoA are monitored and verified; the list of all CPAs is available to DOE. The managing entity, INTRACO, will therefore set up a central monitoring database and provide to DOE for verification. The managing entity will submit a list of CPAs for verification by the DOE pursuant to the sequence described below:

- The managing entity will continuously update a list of all CPAs and monitoring reports which are available to be verified by the DOE
- The managing entity collects the monitoring information for all CPAs that will be verified and prepares one monitoring report.

1. Maintenance of a list of verification procedures to be applied to each CPA
The coordinating entity will develop and continuously update a list of CPAs and ensure that all CPAs will be monitored and verified.

2. Collection of monitored parameters and elaboration of the monitoring plan
The monitoring report will compile all required monitoring information for all CPAs that will be verified by the DOE. This report will unambiguously set out the data relating to the emission reductions generated by each specific CPA during the monitoring period consistent with the requirements of this PoA-DD and the corresponding CPA-DD.

The monitoring plan for parameters included in section E.7.1 will be implemented for each CPA with assistance from the coordinating entity as follows:

- CPA operator will implement each CPA individually and monitor and record all parameters included in section E.7.1.
- The managing entity will provide guidance to CPA operator on how monitoring should be conducted and data should be collected in regards to emission reductions calculation.
- The CPA operators will provide data on monitored parameters included in section E.7.1 to the coordinating entity.

- The managing entity will document and store all parameters included in section E.7.1 provided by CPA operators in an electronic database, while primary data will be stored by CPA operator
- The managing entity review relevant monitoring documents, prepare the monitoring report, and provide the latter to the DOE.

3. Computation of total emission reductions by the PoA

The total verified emissions reductions by the PoA will be the sum of the emissions reductions verified. Verified emission reductions generated by the latter type of CPAs will be aggregated in the monitoring reports.

A.4.5. Public funding of the Programme of Activities (PoA):

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No public funding is used to implement this Programme of activities (PoA). Furthermore the CME will ensure that, at the time of inclusion of CPA, there is no public funding from Annex - I parties received. This can be confirmed through mandate / declaration given by CPA operator to CME. In case public funding is received for CPA, an affirmation will be provided that such funding does not result in a diversion of Official Development Assistance (ODA).

SECTION B. Duration of the Programme of Activities (PoA)

B.1. Starting date of the Programme of Activities (PoA):

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The start date of the proposed PoA: The starting date of any CPA under the PoA cannot be prior to the commencement of validation of the PoA on 11/10/2011.

The start date of the credit period for the proposed PoA: The start date of the credit period for the PoA is 01/10/2012 or the registration date, whichever is later. The start of the crediting period for any CPA under the proposed PoA shall be the date of its inclusion to the PoA.

B.2. Length of the Programme of Activities (PoA):

>>

As per the "Guidance on the registration of Project activities under a Programme of Activities as a single CDM Project activity" (Version 04) EB 55, Annex 38 the length of the PoA shall not exceed 28 years.

Thus, the length of the PoA is: 28 years 0 month

SECTION C. Environmental Analysis

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C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

>>

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at CPA level ☒

Local and focalized impacts of project activity (depending on the location, production capacity) justify a separate environmental assessment for each CPA. Environmental analysis will therefore be conducted for each CPA included into the PoA according to the applicable environmental policies.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

Though the PoA involves the installation of biomass based heat producing system, the nature and characteristics of the Project activities at the SSC CPA level may vary. Hence, Environmental Impact Assessment or Environmental Compliance Certificate is considered at the SSC CPA level.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the Programme of Activities (PoA),:

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All CPAs in the PoA must prepare EIA or EEC according to the Environment Law 2005. The Decree 80/2006/ND-CP about Guidelines on implementation of Environment Law and Decree No.21/2008/ND-CP about Amendment and Addition of Decree No.80/2006/ND-CP. EIA or EEC must be carried out for separate CPA.

The CPA operator therefore commissioned a third party to conduct the required Environmental Compliance Analysis and the Environmental Compliance Certificate (ECC) is issued by the relevant authority. No environmental impact assessment is required for the PoA level.

SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

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1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at CPA level ☒

Prior to the implementation of this project, a meeting was held for the purpose of introducing and explaining the objectives, processes, implications and benefits for sustainable development of the PoA. Local and focalized impacts of each biomass based heat producing unit (depending on the location, production capacity) justify a local stakeholder consultation at both PoA and CPA level. Additional stakeholders' comments, especially at the CPA level must be collected through meeting and interviewing with local agencies and citizens who are elated to the CPAs

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

Stake holder's consultation shall be done prior to inclusion of the Project activity at CPA level by following means:

1. Invitation to the local stakeholder - The local stakeholder will invited through (i) Personal invitation and (ii) Open invitation notice pasted on public places / company entrance gate (iii) Newspaper advertisements / letter (iv) Newspaper advertisements / letter
2. The local stakeholder will be any of the below mentioned but not restricted to –
    - Local Community leaders
    - Equipment manufacturers
    - Equipment operators

- Biomass & Other Material suppliers
- Plant Staff & Employees
- Government Officials
- Local Residents
- Other means

3. Stakeholder consultation – The stakeholder consultation will be conduct to give opportunity to the stakeholders to understand the Project, its role in GHGs emission reduction and comment on the CDM initiative taken by the CPA operator. The proposed agenda for the consultation is mentioned as below –

- Welcome address
- Introduction about the Program & Purpose of the consultation
- Introduction & Explanation of the Project activity and it's social, environmental impacts
- CDM, benefits and Discussions on applicability to various types of Projects.
- Circulation of questionnaire to capture the Stake holder's/ Participant's views on Project
- Closure of consultation with vote of thanks.

D.3. Summary of the comments received:

>>

Comments from the stake holders will be summarized for each CPA and any doubts or concerns of the stakeholders about the proposed Project activity, will be addressed.

Assessment of the comments – The comments will be received in the form of filled in questionnaire. The CME/CPA operator will carry out the assessment of the comments by each filled in questionnaire and prepare an assessment summary of comments.

D.4. Report on how due account was taken of any comments received:

>>

A summary of how due account has been taken of comments received will be provided for each CPA. The summary of positive / negative comments will be addressed in the CPA-DD.

SECTION E. Application of a baseline and monitoring methodology

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a CPA included in the PoA:

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Methodology : AMS I.C.
Title : Thermal energy production with or without electricity
Methodology : Version 19, EB 61

E.2. Justification of the choice of the methodology and why it is applicable to a CPA:

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Baseline and Monitoring Methodology AMS I.C version 19 is applied in this PoA because the Programme involves renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. Detailed description of the justification of choice of the methodology is given in the following Table.

	The applicability criteria of AMS I.C./version 19 are	Methodology AMS I.C./version

No.	the following:	19 is applicable to an CPA under the proposed PoA because:
1	Ref: AMS-I.C./ Version 19, Para.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.	The project activities in any of the CPA under the PoA utilize biomass residues that will displace fossil fuel for the generation of thermal energy in boilers/heaters.
2	Ref: AMS-I.C./ Version 19, Para.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.	The project activities in any of the CPA under the PoA comprise of biomass-based system for thermal energy generation only. Co-generation projects are excluded from the PoA
3	Ref: AMS-.I.C./ Version 19, Para.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).	The CPA shall not involve any cogeneration system or electricity generation
4	Ref: AMS-.I.C./ Version 19, Para.4: The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities).	The total installed/rated thermal energy generation capacity of all projects under each CPA will be equal to or less than 45MW thermal
5	Ref: AMS-.I.C./ Version 19, Para.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).	The CPA is co-fired sysem (the simultaneous combustion of both biomass residues and fossil fuels in a single equipment), the total installed thermal energy generation capacity of the CPA equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal
6	Ref: AMS-.I.C./ Version 19, Para.6: The following capacity limits apply for biomass cogeneration units:	The CPA selected shall not involve any cogeneration system

	(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 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	Ref: AMS-.I.C./ Version 19, Para.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 total installed/rated thermal energy generation capacity of all the Project activities (new and/or retrofit) under each CPA will be determined according to the manufacturer's rated thermal energy output and shall be equal to or less than 45 MW thermal. 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 shall be equal to or less then 45 MW thermal. The CPA Operator shall ensure that the proposed CPA activity is physically distinct from the existing units.
8	Ref: AMS-.I.C./ Version 19, Para.8: Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	Project activities that seek to retrofit or modify of an existing facility for the purpose of fuel switch from fossil fuels to biomass

		residues in the heat generating equipment, such type of Project activities are included as a CPA in the PoA.
9	Ref: AMS-.I.C./ Version 19, Para.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 CPA selected as New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario shall comply with the related and relevant requirements in the "General Guidelines to SSC CDM methodologies"
10	Ref: AMS-.I.C./ Version 19, Para.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.	In case of solid biomass fuel (e.g briquette) is used by a CPA, the respective CPA DD shall demonstrate 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
11	Ref: AMS-.I.C./ Version 19, Para.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.	In case of solid biomass fuel (e.g briquette) is used by a CPA where the project participant is not the producer of the processed solid biomass fuel, the project participant of the CPA 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
12	Ref: AMS-.I.C./ Version 19, Para.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.	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 be entered into that ensures there is no double-counting of emission reductions.
13	Ref: AMS-.I.C./ Version 19, Para.13:	The selected CPA shall not

	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.	recovers and utilizes biogas for power/heat production
14	Ref: AMS-.I.C./ Version 19, Para.14: Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources[19] 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.[20] Alternatively, conservative emission factor values from peer reviewed literature or from a 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.	The CPA selected does not involve charcoal based biomass energy generation
15	Ref: AMS-.I.C./ Version 19, Para.51: The following conditions apply for use of this methodology in a project activity under a programme of activities: (a) In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues or processed biomass (e.g. briquette) only or biomass from dedicated plantations complying with the applicability conditions of AM0042; (b) In the specific case of biomass project activities the determination of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B of	A CPA project activity under this PoA shall satisfy the following: (a) The CPAs under PoA shall only use of biomass residues as per "Definition of Renewable Biomass Annex 18 of EB 23" and and shall not consider the biomass from dedicated plantations complying with the applicability conditions of AM0042. (b) The CPA under this PoA, the determinate of leakage shall be

[19] Refer to EB 23, annex 18 for the definition of renewable biomass.

[20] AMS-III.K "Avoidance of methane release from charcoal production by shifting from traditional open-ended methods to mechanized charcoaling process"

	simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042; (c) In case the project activity involves the replacement of equipment, and the leakage from the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) (c) The CPA will give a declaration that in case CPA involves replacement of equipment, the leakage from the use of the replaced equipment in another activity shall be neglected, because the replaced equipment shall be scrapped and an independent monitoring of scrapping of replaced equipment shall be implemented by a recognized independent agency (refer section E.7.2: Scrapping of equipment). The scrapping of replaced equipment shall be documented and independently verified. The scrapped equipment shall be stored until such correspondence has been checked.
16	Ref: AMS-.I.C./ Version 19, Para.47: If the energy generating equipment currently being utilised is transferred from outside the boundary to the project activity, leakage is to be considered.	The selected CPA shall describe clearly in the CPA DD If the energy generating equipment currently being utilised is transferred from outside the boundary to the project activity, the leakage is to be considered in the CPA DD
17	Ref: AMS-.I.C./ Version 19, Para.48: In cases where the collection/processing/transportation of biomass residues is outside the project boundary CO2 emissions from the collection/processing/transportation of biomass residues to the project site shall be taken into account as leakage	The selected CPA shall describe clearly in the CPA DD where the collection/processing/transportation of biomass residues is outside the project boundary CO2 emissions from the collection/processing/transportation of biomass residues to the project site shall be taken into account as leakage

The relevant tools / guidance as per AMS I.C (version 19) are given as below:

1. Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 01 EB 39 Annex 7)
2. Tool to calculate the emission factor for an electricity system (Version 2.2.1, EB 63 annex 19)
3. General Guidance on leakage in Biomass Project activities (Version 03; EB 47; Annex 28)
4. Tool to calculate Project or leakage CO_2 emissions from fossil fuel combustion (version 02 EB 41 Annex 11)

E.3. Description of the sources and gases included in the SSC-CPA boundary

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The Project boundary for the SSC-CPA is given as below

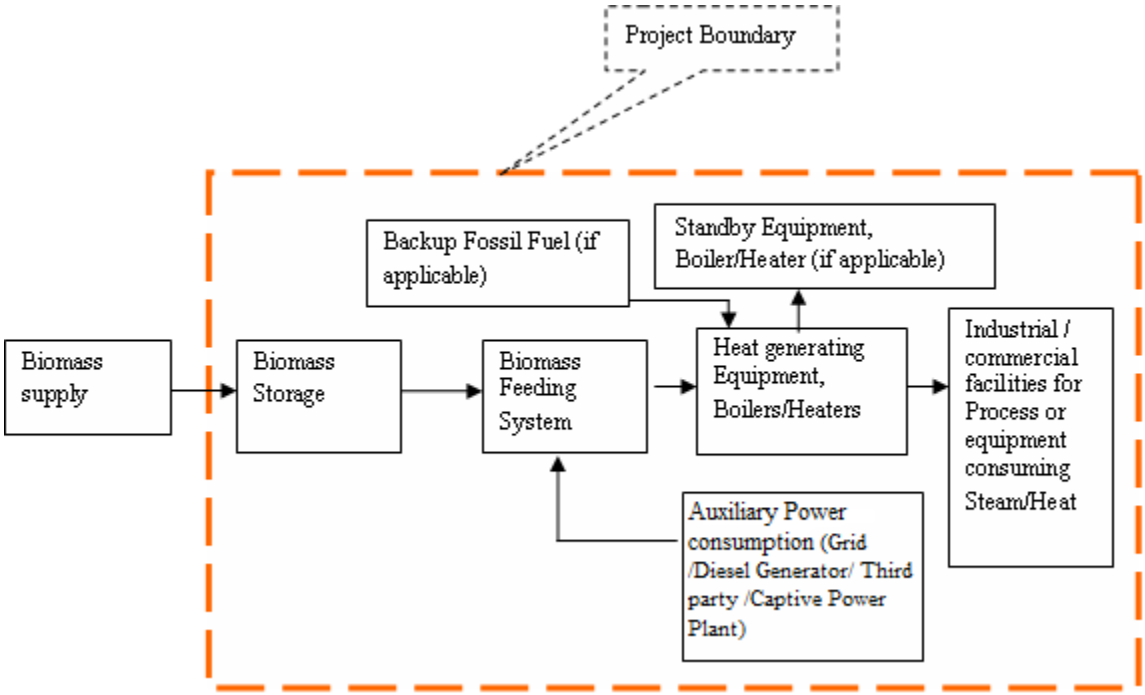

Figure E.3.1*: *Project Boundary for Scenario 1

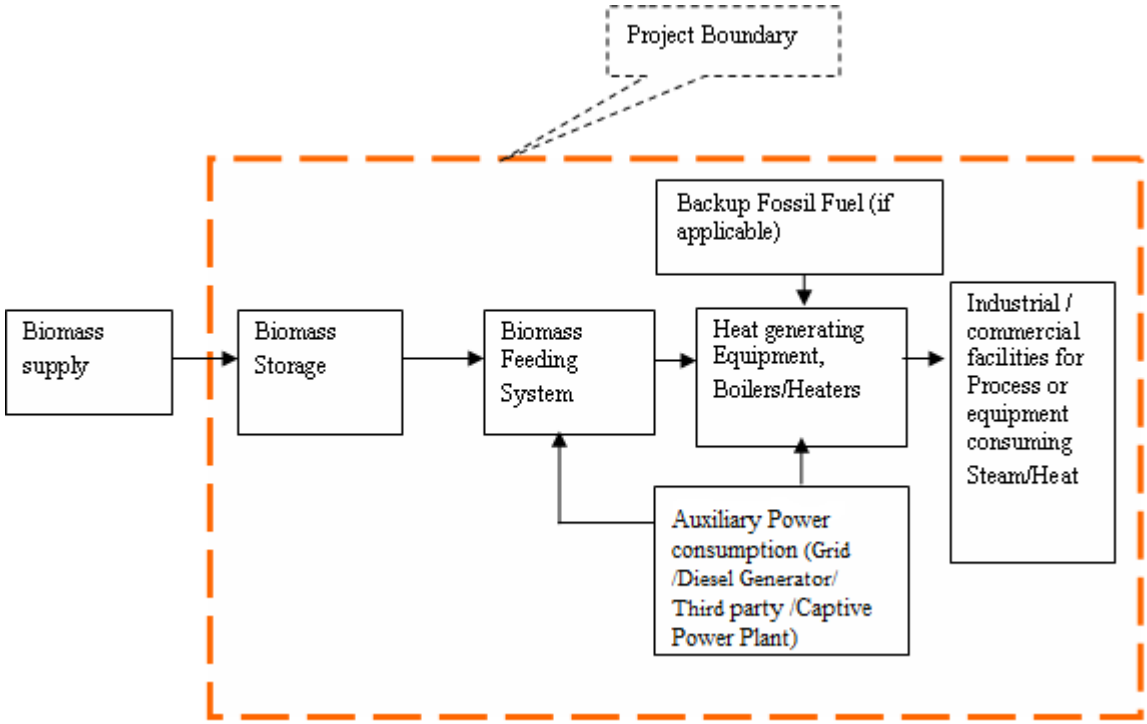

Figure E.3.2*: *Project Boundary for Scenario 2

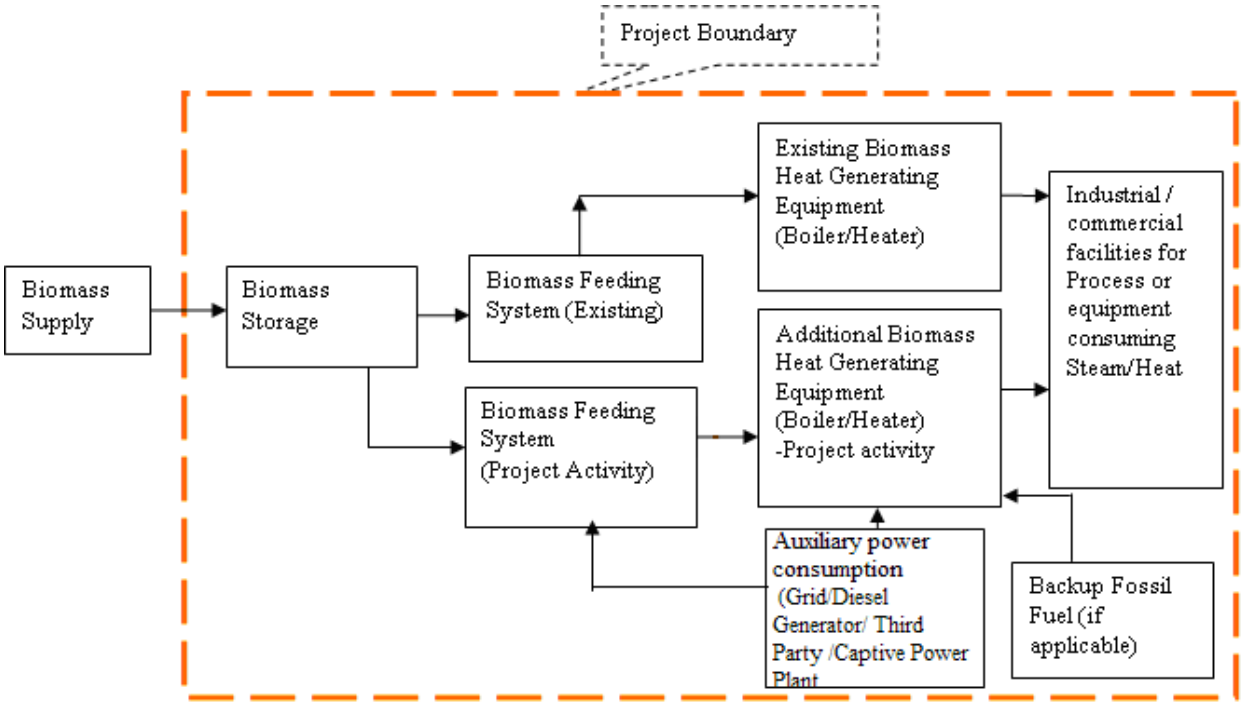

Figure E.3.3*: *Project Boundary for Scenario 3

The CPAs under PoA will consider the applicability of the methodology limited to use of biomass residues as per "Definition of Renewable Biomass Annex 18 of EB 23" and "Glossary of CDM terms (Version 05)" and shall not consider the biomass from dedicated plantations complying with the applicability conditions of AM0042.

In case of Project activities involving replacement of existing equipment by biomass fired heat generation equipment than the existing equipment shall be either scrapped or on standby. If the existing equipment is scrapped then this shall be monitored by recognised independent agency as detailed out in section E.7.2. If the existing equipment is kept as a standby for the Project activity then any fossil fuel consumption in the Project boundary shall be monitored.

The description of the sources and gases included in the Project boundary is given as below

	Source	**Gas**	**Included?**	**Justification/Explanation**
Baseline	Fossil fuel combustion in Boiler/Heater for steam/heat generation	CO_2	Yes	Emitted by combustion of fuel in the boilers/heaters for steam/heat supply in the absence of Project activity
		N_2O	No	Excluded for simplification. This is conservative
		CH_4	No	Excluded for simplification. This is conservative
	Uncontrolled burning or decay of the biomass residues	CO_2	No	It is assumed that CO_2 emission from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.
		N_2O	No	Excluded for simplification. This is
				conservative
		CH_4	No	Excluded for simplification. This is conservative
Project activity	On-site fossil fuel and electricity consumption	CO_2	Yes	Emitted by combustion of fossil fuel in the boiler/heater for steam/heat supply in the Project activity and auxiliary power consumption of biomass boiler/heater, biomass storage and fuel feeding system (if applicable).
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small
	Off-site transportation of biomass residues	CO_2	Yes	The emissions will be considered only if biomass is transported beyond 200 km of Project boundary.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small

		N_2O	No	Excluded for simplification. This emission source is assumed to be very small
	Combustion of biomass residues for heat generation	CO_2	No	It is assumed that CO_2 emission from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small
	Biomass storage	CO_2	No	It is assumed that CO_2 emission from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector.
		CH_4	No	Excluded for simplification. Since biomass residues are stored for not longer than one year, this emission source is assumed to be very small
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small

Table E.3.1*: *Sources & GHG's included in Baseline & Project activity of SSC CPA Boundary

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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As per paragraph 16 of the AMS I.C/ version 19, the description of the baseline is provided as follows:

"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 coefficient for the fossil fuel displaced. For calculating the emission factor, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data are not available or demonstrably difficult to obtain."

The baseline scenario is the steam/heat generation by fossil fuels prior to the implementation of the PoA. The scenario would be any one of the following as mentioned in the table below:

Project Scenario	Description	Baseline scenario
1	Biomass fired thermal energy generation in Greenfield Projects or as a Replacement of existing fossil fuel fired equipment	The baseline emission shall be calculated as per paragraph 22 of the methodology AMS I.C/Version 19 as Steam / Heat produced using fossil fuels.

2	Fuel switching from fossil fuel to Biomass by modification including retrofit of an existing facility	The baseline emission shall be calculated as per paragraph 38 of the methodology AMS I.C/Version 19 as Steam / Heat produced using fossil fuels.
3	Addition of renewable energy unit at an existing renewable energy facility	The baseline emission shall be calculated as per paragraph 37 of the methodology AMS I.C/Version 19. The Project activities that involve the addition of renewable energy units at an existing renewable energy production facility, where the existing and new units share the use of common and limited renewable resources (e.g., biomass residues), the potential for the Project activity to reduce the amount of renewable resource available to, and thus thermal energy production by, existing units must be considered in the determination of baseline emissions.

Table E.4.1: Project Type and Baseline Scenario

In order to identify the baseline scenario, CPA operator will apply the Baseline Identification test as per attachment A to Appendix B by considering all the most plausible alternatives to the Project activity. This Baseline identification test shall identify and demonstrate at least one credible and feasible fossil fuel alternative which would be more attractive than the proposed Project activity.

The following data are used to determine the baseline emissions:

Key Variables	Unit	Data Sources
Steam/heat generation	Boiler capacity –tons of steam generated/Hr Heater capacity –Million Kcal/Hr	Plant records / name plate details
Operating hours	Hour per year	Plant records / Estimation of CPA operators / Estimation of technology suppliers
Net calorific value of Baseline fossil Fuel	kJ/kg	Published data provided by the fossil fuel supplier compared with the national standard
Emission factor of fossil fuel	tCO_2/TJ	IPCC Guidelines for National Greenhouse Gas Inventories as referred in the methodology.
Efficiency of fossil fuel boiler(s)	%	As referred in the methodology

Table E.4.2: List of Key Variables & its Data Source

Baseline scenario for the new installation type of Project activities would be based on the type of fossil fuel used in the Project activity region and for Fuel switch type of Project activities based on the historical data of fossil fuel used. Baseline scenario as per the applicable methodology will be identified and indicated in detail in the SSC CPA for the Project activities in the specific SSC CPA.

In case of replacement of fossil fuel fired system by the biomass based system, the existing fossil fuel heat generating system will either be scrapped or kept as stand by. Any Fossil fuel consumption in the Project activity shall be monitored and shall be available for verification.

In the case of Project activities that involve the addition of renewable energy units at an existing renewable energy production facility, where the existing and new units share the use of common and limited renewable resources (e.g., biomass residues), the potential for the Project activity to reduce the amount of renewable resource available to, and thus thermal energy production by, existing units must be considered in the determination of baseline emissions.

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):

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E.5.1. Assessment and demonstration of additionality for a typical CPA:

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A SSC-CPA can demonstrate the additionality using Approach 1 or Approach 2 given in the Section A.4.3 of the PoA-DD.

Additionality of the small scale CDM Project can be demonstrated by showing that the Project would not occurred anyway due to existence of the barrier as Approach 1 or investment barrier as per Approach 2.

Description of the barrier at PoA level is provided in section A.4.3. The arguments presented therein are also prevalent in the SSC-CPA Project area. Hence, the SSC-CPA need not re-write the arguments presented therein to support CPA additionality, except present an analysis to support the key barrier to the Project CPA Operator viz. investment barrier.

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

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As demonstrated in the section E.5.1 the key criteria for assessing the Additionality of a SSC-CPA would be either Approach 1 or Approach 2 as mentioned below:

Approach 1: Demonstrating additionality for very small- small scale CPAs

- The CPA to demonstrate compliance with the applicability conditions listed under EB 63 Annex 23 ‘Guidelines for Demonstrating Additonality of Microscale Project Activities’(Version 03)

OR

Approach 2: Demonstrating additionality for Small scale CPAs

- Barrier analysis such as Investment barrier as mentioned below:

Investment Barriers

The investment barrier shall be demonstrated based on the investment analysis as per sub-step 2 b, option II-Investment Comparison Analysis of ‘Tool for the demonstration and assessment of additionality’.

Any one of the above Approach will be demonstrated in the SSC CPA. The main criteria and data necessary to be provided by each CPA to fulfill the eligibility criteria are mentioned in section A.4.2.2 of the PoA-DD.

This PoA is not implementing any mandatory policy or regulation of the Government of Viet Nam and there are no policies or schemes which supports biomass combustion based thermal (steam/heat) energy generation Project activities in Viet Nam.

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

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The Project activities in any of the SSC CPA displace technologies using fossil fuels. As per the applicable methodology AMS I.C (Version 19), 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 coefficient for the fossil fuel displaced.

AMS I.C 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.

The methodological choices provided in the approved baseline and monitoring methodology applicable to implementation of SSC CPAs is provided in the following table:

Project Scenario	Description	Approved Baseline	Approved monitoring methodology
1	Biomass fired thermal energy generation in Greenfield Projects or as a Replacement of existing fossil fuel fired equipment	Paragraph 22	Paragraph 50
2	Fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility	Paragraph 38	Paragraph 50
3	Addition of renewable energy unit at an existing renewable energy facility	Paragraph 37	Paragraph 50

In related to above monitoring methodology, the following choices in the parameters shall apply to the CPA under the PoA.

1. Baseline Efficiency:

As per paragraph 30 of AMS-I.C. version 19, any one of the following criteria will be followed to determine the efficiency of the baseline units for all above mentioned Project Scenarios.

a. Highest measured operational efficiency over full range of operating conditions of a unit with similar specifications, using baseline fuel. The efficiency test will be based on national or international standards.
b. Highest of the efficiency values provided by two or more manufacturers for units with similar specifications, using the baseline fuel
c. Default efficiency of 100%.

The baseline efficiency shall be selected based on availability of the data. First (a) would be determined as the efficiency parameter, in case (a) is not available then (b) would be determined and in case of both (a) and (b) not being possible to be determined then (c) would be criteria selected.

2. Emission factor and net calorific value:

The determination of the emission factor and of the net calorific value for the fossil fuel used shall be followed where appropriate in the baseline scenario as per guidance given by the most recent version of IPCC Guidelines for National Greenhouse Gas Inventories. CPA Operator may either conduct measurements or they may use accurate and reliable local or national data where available. In the case of coal, the data shall be based on test results for periodic samples of the coal purchased if such tests are part of the normal practice for coal purchases. Where such data is not available, IPCC default emission factors (country-specific, if available) may be used if they are deemed to reasonably represent local circumstances. All values shall be chosen in a conservative manner (i.e., lower values should be chosen within a plausible range) and the choice shall be justified and documented as ex ante in the SSC-CPA-DD.

3. Grid emission factor shall be revised during the renewal of crediting period of PoA and shall be applied to new inclusion of CPAs in the PoA.

Equation for determining emission reductions are stipulated in section E.6.2.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

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Baseline emissions calculation:

Project Scenario 1 – Biomass fired thermal energy generation in Greenfield Projects or as a Replacement of existing fossil fuel fired equipment.

For steam/heat produced using fossil fuels the baseline emissions are calculated as below:

$$BE_{thermal,CO_2,y} = (EG_{thermal,y} / \eta_{BL,thermal}) * EF_{FF,CO_2} \quad \textbf{(2)}^{21}$$

Where:

$BE_{thermal,CO_2,y}$	The baseline emissions from steam/heat displaced by the project activity during the year *y* (tCO_2)
$EG_{thermal,y}$	The net quantity of steam/heat supplied by the project activity

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

	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 obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used (tCO_2/TJ)
$\eta_{BL,thermal}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

For boilers:

$EG_{thermal} = Q_{steam} * (H_{out} – H_{in}) * 10^{-6}$

Where:

$EG_{thermal}$	Net quantity of heat supplied by the project activity
Q_{steam}	Quantity of steam supplied in tons
H_{out}	Specific enthalpy of steam at corresponding absolute pressure and temperature at the outlet (kcal/kg)
H_{in}	Specific enthalpy of feed water at corresponding temperature at the boiler inlet (kcal/kg)

For heater:

$EG_{thermal} = Q_{flow} * C\rho_{out} * \sigma_{out} * (T_{out} - T_{in}) * 10^{-6}$

Where:

Q_{flow}	Flow of heat transfer fluid at the heater outlet (m3)
$C\rho_{out}$	The specific heat of the heat transfer fluid at T_{out} temperature (kcal/kg. ^{O}C)
σ_{out}	Density of heat transfer fluid at T_{out} temperature of the heater (kg/m3) at the outlet of the heater
T_{out}	Temperature of the heat transfer fluid at the outlet of the heater (^{O}C)
T_{in}	Temperature of the heat transfer fluid at the intlet of the heater (^{O}C)

Project Scenario 2- Fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility

Project activities that seek to retrofit or modify an existing facility for the purpose of fuel switch from fossil fuels to biomass residues in heat generation equipment, the baseline emissions shall be calculated as per paragraph 22 of the methodology.
For fuel switching from fossil fuel to renewable biomass in existing facilities, historical information (detailed records) on the use of energy sources (e.g. fossil fuel) and the plant output (e.g. steam / heat) in the baseline plant from at least 3 years prior to Project implementation shall be used in the baseline

calculations, For facilities that are less than 3 years old, all historical data shall be available (a minimum of one year data would be required).

The remaining lifetime of the modified existing equipment with retrofit shall be met as described in the General Guidance for SSC methodologies. If the remaining lifetime of the affected systems increases due to the Project activity, the crediting period shall be limited to the estimated remaining lifetime, i.e., the time when the affected systems would have been replaced in the absence of the Project activity.

Project Scenario 3 - Addition of renewable energy unit at an existing renewable energy facility
The baseline emissions shall be calculated as per paragraph 22 of the methodology:

In the case of Project activities that involve the addition of renewable energy units at an existing renewable energy production facility, where the existing and new units share the use of common and limited renewable resources (e.g., biomass residues), the potential for the Project activity to reduce the amount of renewable resource available to, and thus thermal energy production by, existing units must be considered in the determination of baseline emissions, Project emissions, and/or leakage, as relevant.

For Project activities that involve the addition of new energy production units (e.g., turbines) at an existing facility, net increase in thermal energy generation should be calculated as follows:

$$EG_{thermal,add,y} = EG_{thermal,PJ,y} - EG_{thermal,old,y}$$

Where

$EG_{thermal,add,y}$	Net increase in thermal energy generation at existing plant in year y that should be considered as energy baseline (EG_{BL}) (TJ)
$EG_{thermal,PJ,y}$	Total actual thermal energy produced in year y by all units, existing and new project units (TJ)
$EG_{thermal,old,y}$	Estimated thermal energy that would have been produced by existing units (installed before the project activity) in year y in the absence of the project activity (TJ)

The value $EG_{thermal,old,y}$ is given by:

$$EG_{thermal,old,y} = MAX\left(EG_{thermal,actual,y}, EG_{thermal,estimated,y}\right)$$

Where:

$EG_{thermal,actual,y}$	The actual, measured thermal energy production of the existing units in year *y* (TJ)
$EG_{thermal,estimated,y}$	The estimated thermal energy that would have been produced by the existing units under the observed availability of the renewable resource for year *y (*TJ)

For Boiler
$EG_{thermal,add,y}$ is calculated as = $EG_{thermal,PJ,y}$ - $EG_{thermal,old,y}$

$EG_{thermal,PJ,y} = Q_{steam,\ add} * (H_S - H_W) * 10^{-6} + EG_{thermal,old,y}$
Where:

$EG_{thermal,PJ,y}$	Net quantity of heat supplied by the project activity
Q_{steam}	Quantity of steam supplied in tons
H_S	Specific enthalpy of steam at corresponding absolute pressure and temperature at the outlet (kcal/kg)
H_W	Specific enthalpy of feed water at corresponding temperature at the boiler inlet (kcal/kg)

$EG_{thermal,actual,y}$ is determined from Plant record
$EG_{thermal,estimated,y}$ is determined from the rated capacity (output) and the operating parameter of the existing Boiler
The Baseline shall be calculated as per the paragraph 15 of the methodology.
$EG_{thermal,y} = EG_{thermal,add,y}$

For Heater
$EG_{thermal,add,y}$ is calculated as = $EG_{thermal,PJ,y}$ - $EG_{thermal,old,y}$

$EG_{thermal,PJ,y} = Q_{flow} * Cp_{out} * \delta_{out} * (T_{out} - T_{in}) + EG_{thermal,old,y}$
Where:

Q_{flow}	Flow of heat transfer fluid at the heater outlet (m^3).
Cp_{out}	The specific heat of heat transfer fluid at T_{out} temperature (kCal/kg. °C).
δ_{out}	Density of heat transfer fluid at T temperature of the heater (kg/m^3).
T_{out}	Temperature of the heat transfer fluid at the outlet of the heater (°C).
T_{in}	Temperature of the heat transfer fluid at the inlet of the heater (°C).

$EG_{thermal,actual,y}$ is determined from Plant record
$EG_{thermal,estimated,y}$ is calculated from the rated capacity (thermal output) and the operating parameter of the existing heater (Flow * rise in T * δ * Cp)

The Baseline shall be calculated as per the paragraph 15 of the methodology. $EG_{thermal,y} = EG_{thermal,add,y}$

If the existing units shut down, are derated, or otherwise become limited in production, the Project activity should not get credit for generating thermal energy from the same renewable resources that would have otherwise been used by the existing units (or their replacements). Therefore, the equation for $EG_{thermal,old,y}$ still holds, and the value for $EG_{thermal,estimated,y}$ should continue to be estimated assuming the capacity and operating parameters are the same as that at the time of the start of the Project activity.

In the case of Project activity consuming biomass and fossil fuel to produce thermal energy, specific energy consumption of each type of fuel (biomass or fossil) to be used shall be specified ex ante. The consumption of each type of fuel shall be monitored.

Specific energy consumption can be derived as follows:

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 CO_2 emissions from fossil fuel combustion".

In cases that the project activity consumes fossil fuels for operation of fossil fuel based boilers for running gensets when power outage happens, the "*Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion* (version 02)" (refer annex 11, EB41) (hereafter referred to as "Fossil fuel Tool") will be used.

CO_2 emissions from fossil fuel combustion in process *j* are calculated based on the quantity of fuels combusted and the CO_2 emission coefficient of those fuels, as follows:

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \quad \text{(Fossil fuel tool:1)}$$

Where

Parameter	Description	Unit
$PE_{FC,j,y}$	Are the CO_2 emissions from fossil fuel combustion in process j during year *y*	(t CO_2e/yr)
$FC_{i,j,y}$	Is the quantity of fuel type *i* combusted in process *j* during year *y*	(mass or volume unit/year)
$COEF_{i,y}$	Is the CO_2 coefficient of fuel type *i* in year *j*	(t CO_2/mass or volume unit)
i	Are the fuel types combusted in process *j* during the year *y*	

As the data on the chemical composition of the fossil fuel type *i* used by the project activity is not available. Thus, the option B of the Tool is adopted for calculation of the CO_2 emission coefficient $COEF_{i,y}$. The $COEF_{i,y}$ is calculated based on net calorific value and CO_2 emission factor of the fuel type *i*, as follows:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y} \quad \text{(Fossil fuel Tool: 4)}$$

Where:

Parameter	Description	Unit
$COEF_{i,y}$	CO_2 coefficient of fuel type *i* in year *j*	(t CO_2/mass or volume unit)
$NCV_{i,y}$	Weighted average net calorific value of the fuel type *i* in year *j*	(GJ/mass or volume unit)

$EF_{CO2,i,y}$	Weighted average CO_2 emission factor of fuel type *i* in year *y*	(t CO_2/GJ)
i	Fuel types combusted in process *j* during the year *y*	

Actually, within the project activity, there is no concurrent operation of biomass- and fossil fuel boilers because the biomass boilers will totally replace the fossil fuel boiler. Furthermore, due to the intermittent nature of this kind of operation, annual consumption is assumed to be zero per annum for all CPAs. Fossil fuel consumption will be part of the monitoring plan of each CPA.

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") 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:

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

Where:

Parameter	**Description**	**Unit**
$PE_{EC,y}$	Project emissions from electricity consumption in year y	tCO2e/yr
$EC_{PJ,j,y}$	Quantity of electricity consumed by the project electricity consumption source j in year y	(MWh/yr)
$EF_{EL,j,y}$	Emission factor for electricity generation for source j in year y	(tCO_2/MWh)
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y	-

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 Vietnam.

In line with the requirements of AMS-I.C./ Version 19, para 25 and version 02.2.1 of the 'Tool to calculate the emission factor for an electricity system' has been used as described, the following approach is used to calculate the uniform baseline for all CPAs:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system'.

OR

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Option (a) is applied for this project, which uses a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "*Tool to calculate the emission factor for an electricity system*", version 02.2.1.

The most recent data available (2000-2008) in Grid Emission Factor Report approved (2000-2008) by DNA Vietnam dated 26th March 2010 (at the time of the PoA-DD making available for validation in August 2010) is used as data source to determine the Operating Margin (OM) emission factor and the Build Margin (BM) emission factor. The EF of the Grid had been calculated and officially published by DNA Viet Nam on 26/03/2010 using "Tool to calculate the emission factor for an electricity system" version 01.1. The CME has utilized the most latest available data in the Vietnam DNA's GEF Report for updating the GEF applied in this PoA according to the "*Tool to calculate the emission factor for an electricity system" version 02.2.1*., the GEF calculation spreadsheet according to the "Tool to calculate the emission factor for an electricity system" version 02.2.1 is submitted with this PoA DD.

The description below follows the steps of the version 02.2.1 of the "*Tool to calculate the emission factor for an electricity system*" (here in after referred as Tool) and focuses on the key process of the calculation of the emission factors.

Step 1: Identify the relevant electricity systems

The "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) defines a project electricity system as "the spatial extent of the power plants that can be dispatched without significant transmission constraints". On this basis, the project electricity system is defined as the Vietnamese national electricity grid. The Vietnamese national electricity grid is also connected to the South China electricity grid and is a net importer of electricity from this source. As per the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) the emission factor for net electricity imports from another host country is assumed to be zero (0) tCO_2/MWh.

Step 2: Choose whether to include off grid power plants in the project electricity system (optional).
Only grid connected power plants are included in the calculation as per Option I of the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1).

Step 3: Select a method to determine the Operating Margin (OM)
The "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) provides four options for calculating the Operating Margin:

(a) Simple OM; or

(b) Simple adjusted OM; or

(c) Dispatch data analysis OM; or

(d) Average OM

Option (a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation (based on either average of the five most recent years, or on long-term averages for hydroelectricity production), between 2004-2008, the average contribution of low-cost/must-run resources to the Vietnamese national electricity grid was 34.77%, as shown in Table B.6.1 below. On this basis, the Simple OM has been used.

The rate of low-cost/must run resources based on electricity generation in Vietnam is showed in the

following table:

Table E.6.2.1 Rate of low cost/must-run sources based on electricity generation[22]

Year	2004	2005	2006	2007	2008	Average
Rate of low cost/must-run sources generation, %	39.71	32.52	34.13	33.74	34.72	34.77

The Simple OM is calculated ex ante as the 3-year generation-weighted average, based on the most recent data available. Under this option there is no requirement to monitor or recalculate the emission factor during the crediting period.

Step 4: Calculate the Operating Margin Emission Factor according to the selected method

The "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) identifies two options to calculate the Simple OM:

- Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or
- Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option A has been selected as the required data is available for Vietnam. Under this option, the simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OM,simple,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \quad \text{(Equation 1 of Tool)}$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y (*MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
m	All power plants/units serving the grid in year *y* except low-cost/must-run power plants/units
i	All fossil fuel types combusted in power plant/unit *m* in year *y*
y	The relevant year as per the data vintage chosen in step 3.

Under Option A, $EF_{EL,m,y}$ is determined using one of the following 3 sub-options:

- Option A1: if data on fuel consumption and electricity generation is available for relevant power units.
- Option A2: if only data on electricity generation and the fuel types is available.
- Option A3: to be used if only data on electricity generation is available.

[22] Grid Emission Factor Report approved (2000-2008) by DNA Vietnam dated 26th March 2010

As the data of fuel consumption of individual power plant connected to the Vietnam National Grid is available in Report on calculation of Vietnam Grid Emission Factor for 2008 approved and published by Vietnam DNA in a letter dated 26th March 2010 so option A1 is applied and used to calculate the Simple OM emission factor as follows:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}} \quad \text{(Equation 2 of Tool)}$$

Where:

$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
$FC_{i,m,y}$	Amount of fuel type *i* consumed by power plant/unit *m* in year *y*. (Mass or volume unit of the fuel)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type *i* in year *y (*GJ/mass or volume unit)
$EF_{CO2,i,y}$	CO2 emission factor of fossil fuel type *i* in year *y (* tCO2/GJ)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power plant/unit *m* in year *y (*MWh)
m	All power plants/units serving the grid in year *y* except low-cost/must-run power units
i	All fossil fuel types combusted in power plant/unit *m* in year *y*
y	The relevant year as per the data vintage chosen in step 3.

Calculation of simple OM is not included low cost/must run power plants but electricity imported from China is included. The emission factor of imported electricity is 0t CO2e/MWh as indicated in Step 1 above.

Note: As the values of fuel emission factors and NCVs of fossil fuels are not provided by the respective fuel suppliers, the same values are taken from in the Report on calculation of Vietnam Grid Emission Factor for 2008 approved and published by Vietnam DNA in a letter dated 26th March 2010. This report provides fuel specific fuel emission factors and plant specific NCVs.

Step 5: Calculate the build margin (BM) emission factor

According to "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) there are two alternatives for selecting the sample group of power units (*m*):

a) The set of five power units that have been built most recently; or

b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The comparison carried out by the project participants shows that the group of power capacity additions that have been built most recently and comprise 20% of the system electricity generation has the larger annual generation than the group of five power units that have been built most recently and hence it is employed. The calculated values of option a) and b) are provided in Report on calculation of Vietnam Grid Emission Factor for 2008 approved and published by Vietnam DNA in a letter dated 26th March 2010.

In carrying out the comparison the electricity data at plant level is used as all the power units of the respective power plant site are identical by virtue of same capacity, age and type.

Power plants registered as project activities are excluded in the sample group that is used to calculate the BM. Moreover, in the period from 2004 to 2008 (2008 being the most recent year for which data is available), the amount of power capacity additions made up over 20% of the total grid generation capacity in 2008. Therefore, identified for estimating the build margin emission factor includes power units that are built not more than 10 years.

In terms of vintage of data, Option 1 shall be chosen for the proposed project. Details are as follows: in the ten years of crediting period, calculating the BM emission factor ex-ante shall be based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation.

Step 6: Calculate the combine margin emission factor

The build margin emission factor is the generation-weighted average emission factor (tCO_2/MWh) of all power plant units *m* during the most recent year *y* for which power generation data is available at the time of preparing the PDD. The Build Margin is calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$	The build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	The net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
y	The most recent historical year for which power generation data is available

The combined margin emission factor is calculated as:

$$\mathbf{EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}}$$

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$\mathbf{EF_{grid,OM,y}}$	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
W_{OM}	The operating margin weight, which is 0.5 by default for a hydro plant for the first crediting period
W_{BM}	The build margin weight, which is 0.5 by default for a hydro plant for the first crediting period

Table E.6.2.2. Data Used to Determine the Baseline Scenario

Variable	Value / Unit	Source
Operating Margin Emission Factor	0.6464 tCO_2/MWh	Grid Emission Factor Report (2003-2008) approved by DNA Vietnam dated 26th March 2010
Build Margin Emission Factor	0.5064 tCO2/MWh	Grid Emission Factor Report (2003-2008) approved by DNA Vietnam dated 26th March 2010
Combined Margin Emission	0.5764 tCO_2/MWh	Grid Emission Factor Report (2003-2008)

Factor		approved by DNA Vietnam dated 26th March 2010

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 CPA project activity in this PoA 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 equipments in all the selected CPAs under the PoA are new and have not been transferred from another activity; hence leakage is not envisaged due to this source.
48	In cases where the collection/processing/transportation of biomass residues is outside the project boundary CO2 emissions from the 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 leakage estimation at the SSC CPA level will be evaluated following 3 aspects as per Table 1 of the "General Guidance on leakage in biomass project activities" (version 03, EB47, Annex 28)

In this regard, following 3 aspects as per Table-1 of "General Guidance on leakage in Biomass Project Activities (Version 03; EB 47; Annex 28)" are evaluated for leakage estimation at the SSC CPA level.

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	Project activities use biomass residues. Hence this is not applicable
Emissions from the production of the renewable biomass	Potentially significant emission sources from the production of renewable biomass can be	Project activities use biomass residues. Hence, this is not applicable

	(a) Emission from application of fetilizeerr; and (b) Project emissions from clearance of land	
Competing use for the biomass	The CPA operator 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, 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	If the surplus availability of the biomass residues 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. Biomass availability will be assessed at the beginning of the crediting period.

In case the surplus of biomass in the region is less than 25 % leakage emissions with regard to the collection / processing / transportation from outside the Project activity boundary will be considered for each project activity under a CPA. The leakage will be estimated as follows:

1. Leakage emissions due to processing of biomass by utilizing electricity
2. Leakage emissions due to transportation of collection of biomass to biomass processing sites
3. Leakage emissions due to transportation of processed biomass to Project site.

1. Leakage emissions due to processing of biomass by utilizing electricity

Leakage Emissions due to processing of biomass by utilizing electricity will be calculated using "Tool to calculate baseline, Project and/or leakage emissions from electricity consumption" (refer Project emissions due to electricity consumption as per scenario C.I, C.II and C.III as mentioned above tool). The leakage emissions will be included in the SSC CPA under the PoA.

$$LE_{EC,y} = EC_{LE,l,y} * EF_{EL,l,y} * (1+TDL_{,l,y})$$

Where,

$LE_{EC,y}$	Leakage emissions from electricity consumption in year y (tCO2/yr)
$EC_{LE,l,y}$	Net increase in electricity consumption of source l in year y as a result of leakage (MWh/yr)
$EF_{EL,l,y}$	Emission factor for electricity generation for source l in year y (tCO_2/MWh)
$TDL_{,l,y}$	Average technical transmission and distribution losses for providing electricity to source l in year y

2. Leakage emissions due to transportation of collection of biomass to biomass processing sites

The leakage due to transportation of collection of biomass to biomass processing site is calculated as follows:

$$LE_{Col,y} = N_{c,y} \cdot AVD_{c,y} \cdot EF_{km,y}$$ (ACM0006: 40)

Where:

$LE_{col,y}$	Emissions during the year y due to transport of the biomass residues to the project plant (tCO_2)
$N_{c,y}$	Number of truck trips for the transportation of biomass during the year *y*
$AVD_{c,y}$	Average round trip distance (from and to) between the biomass residues fuel supply sites and the site of the project plant during the year *y* (km)
$EF_{km,y}$	Average CO_2 emission factor for the trucks measured during the year *y* (tCO_2/km)

3. Leakage emissions due to transportation of processed biomass to Project site.

Leakage due to transportation of processed biomass to project site will be calculated as follows:

$$LE_{TR,y} = N_y \cdot AVD_y \cdot EF_{km,y}$$

Where:

$LE_{TR,y}$	Emissions during the year y due to transport of the biomass residues to the project plant (tCO_2)
N_y	Number of truck trips for the transportation of biomass during the year *y*
AVD_y	Average round trip distance (from and to) between the biomass residues fuel supply sites and the site of the project plant during the year *y* (km)
$EF_{km,y}$	Average CO_2 emission factor for the trucks measured during the year *y* (tCO_2/km)

As per paragraph 48 of the methodology:
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 Leakage Emissions due to biomass transportation will be considered whenever the biomass residues are transported over a distance of more than 200 km due the implementation of Project activity under the PoA.

$LE_y = LE_{ECy} + LE_{coly} + LE_{try}$

Emission reductions

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

$$\mathbf{ER_y = BE_y - PE_y - LE_y}$$

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)

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

Data / Parameter:	CAP_{boiler}
Data unit:	Tons/hr
Description:	Rated capacity (thermal output) of the boiler of the Project activity.
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario1 and Scenario 2.

Data / Parameter:	CAP_{heater}
Data unit:	kCal/hr or kJ/hr
Description:	Rated capacity (thermal output) of the heater of the Project activity.
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1 and Scenario 2

Data / Parameter:	$\eta BL_{,thermal}$
Data unit:	%
Description:	The Efficiency of the plant using fossil fuel that would have been used in the absence of the Project activity
Source of data used:	Recorded /Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)

Justification of the choice of data or description of measurement methods and procedures actually applied :	The value shall be chosen according to Para 30 (a), (b) or (c) of AMS I.C. methodology.
Any comment:	This data will be archived upto 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2 and Scenario 3

Data / Parameter:	$EF_{FF,CO2}$
Data unit:	tCO_2e/TJ
Description:	CO2 Emission Factor of the fossil fuel that would have been used in the baseline plant
Source of data used:	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
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value of the Baseline fuel shall be indicated as per the baseline identification test for each Project activity/CPA. The baseline identification test shall conclude the specific fossil fuel (like furnace oil, coal etc.) as a plausible alternative to the Project activity/CPA.
Any comment:	This data will be archived upto 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1 Scenario 2 and Scenario 3

Data / Parameter:	SA_k
Data unit:	%
Description:	Surplus availability of Biomass within 50 km radial distance
Source of data used:	Published literature/official reports/Third Party Survey report/ public domain document at the beginning of crediting period
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per Annex 28 – EB – 47, C. Competing uses for the Biomass, the CPA operator 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 at the beginning of each crediting period 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 utilised including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions.
Any comment:	This data will be archived upto 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1

	Scenario 2 Scenario 3

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Ex-ante Grid Emission Factor in a year y
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 calculated in accordance with the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". Operating Margin Emission Factor: 0.6464 tCO2/MWh Build Margin Emission Factor: 0.5064 tCO2/MWh Combined Margin Emission Factor: 0.5764 tCO2/MWh
Any comment:	The ex-ante grid emission factor will be revised at the point of the renewal of crediting period of the PoA. (if so required). This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2 and Scenario 3

Data / Parameter:	$EF_{EL,j,y} = EF_{EL,l,y}$
Data unit:	tCO2/MWh
Description:	Emission Factor for fossil fuel based electricity generation for source j and/or l in year y
Source of data used:	The value will be considered as per " Tool to calculate baseline, Project and/or leakage emissions from electricity consumption"
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2, Scenario 3

Data / Parameter:	$EC_{LE,l,y}$
Data unit:	MWh
Description:	Auxiliary Electricity Consumption for biomass processing, outside Project boundary.
Source of data used:	Declaration by biomass supplier / Technical specification of electricity consumption for biomass processing.
Value applied	--
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the monitoring of the parameter is out of control of CPA operator, the declaration by the biomass supplier will be submitted at the time of first periodic verification of each CPA. OR The auxiliary electricity consumption for biomass processing from equipment shall be calculated in MWh by using the technical specification of electricity consumption for biomass processing from the equipment supplier in MW/Ton multiplied by the total processed biomass consumed in the monitoring period. Not applicable if surplus of biomass within 50km is >25%.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2, Scenario 3.

Data / Parameter:	$EF_{km,CO2}$
Data unit:	tCO_2/km
Description:	Average CO2 emission factor for the trucks measured during the year y
Source of data used:	Available literature / National data in conservative manner
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2, Scenario 3

Data / Parameter:	$TDL_{l,y} = TDL_{j,y}$
Data unit:	--
Description:	Average technical transmission and distribution losses for providing electricity to source l and/or j in year y
Source of data used:	Use recent, accurate and reliable data available within the host country; Use as a default value of 20 % , a) For leakage electricity consumption. 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 % (if host country data is not available)
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". TDLl,y is considered if leakage emission is applicable
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario1, Scenario 2, Scenario 3

Data / Parameter:	$CAP_{boiler,old}$
Data unit:	Tons/hr
Description:	Rated capacity (output) of the existing renewable fuel fired boiler
Source of data used:	Manufacturer's specification/ Plant data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data / Parameter:	$CAP_{boiler,add}$
Data unit:	Tons/hr
Description:	Rated capacity (output) of the Boiler added to the existing renewable facility
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data / Parameter:	$CAP_{heater,old}$
Data unit:	kCal/hr or KJ/hr
Description:	Rated capacity (thermal output) of the existing renewable fuel fired heater
Source of data used:	Manufacturer's specification/ Plant data

Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer/Plant data.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data / Parameter:	$CAP_{heater,add}$
Data unit:	kCal/hr or KJ/hr
Description:	Rated capacity (thermal output) of the heater added to the existing renewable facility
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data / Parameter:	$Q_{historical,steam,y}$
Data unit:	Tons or tonnes
Description:	Historical steam delivered by the existing facility
Source of data used:	Plant data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$T_{historical,steam,y}$
Data unit:	°C
Description:	Average Historical steam temperature at MSSV (Main steam stop valve) outlet of the existing facility
Source of data used:	Plant data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--

Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$P_{historical,steam,y}$
Data unit:	Kg/cm2g
Description:	Average Historical steam pressure (gauge) at MSSV (Main steam stop valve) outlet of the existing facility
Source of data used:	Plant data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$T_{historical,FWB,y}$
Data unit:	°C
Description:	Average Feed Water Temperature at inlet of the existing facility
Source of data used:	Plant data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$Q_{ci,historical}$
Data unit:	Tons or tonnes
Description:	Quantity of fossil fuel consumed in baseline plant in year y.
Source of data used:	Plant average historical data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--

Any comment:	This data will be archived upto 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario2.

Data / Parameter:	$NCV_{i,historical}$
Data unit:	kCal/kg
Description:	Calorific value of fossil fuel consumed in baseline plant in year y.
Source of data used:	Plant average historical data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2.

Data / Parameter:	$CAP_{BL,retrofit}$
Data unit:	Tons/hr
Description:	Rated capacity (output) of the Baseline fuel fired boiler
Source of data used:	Manufacturer's specification/ Plant data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer/Plant data.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$Cp_{i,historical,out}$
Data unit:	kCal/kg °C or kJ/kg ^{0}C
Description:	Specific heat of heat transfer fluid type 'i' at outlet of existing fossil fuel facility.
Source of data used:	Manufacturer's specification
Value applied	XX
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on outlet of heat transfer fluid. Value will be derived from Manufacturer's standard based on outlet temperature. Data Archiving: Data will be archived by electronic / Paper mode
Any comment:	This data will be archived up to 2 years after the completion of crediting

	period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$\delta_{i,historical,out}$
Data unit:	Kg/m^3
Description:	Density of heat transfer fluid type 'i' at T_{out} temperature of existing fossil fuel facility
Source of data used:	Manufacturer's specification
Value applied	XX
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on historical data provided by manufacturer. Data Archiving: Data will be archived by electronic/Paper mode. Monitoring: Value will be derived from Manufacturer's standard based on outlet temperature
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$Q_{historical,flow}$
Data unit:	m^3/hr
Description:	Flow of heat transfer fluid at the heater outlet of existing fossil fuel facility.
Source of data used:	Historical records
Value applied	XX
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$T_{historical,in}$
Data unit:	°C
Description:	Average Inlet Temperature of heat transfer fluid at the inlet of the heater existing fossil fuel facility.
Source of data used:	Historical records.
Value applied	XX
Justification of the choice of data or description of measurement methods and	--

procedures actually applied :	
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$T_{historical,out}$
Data unit:	°C
Description:	Average Temperature of heat transfer fluid at the outlet of the heater of existing fossil fuel facility.
Source of data used:	Historical records
Value applied	XX
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$h_{,historical,y}$
Data unit:	Hr or hours
Description:	Operational hours of the baseline plant in a year y
Source of data used:	Plant data
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$CAP_{retrofit}$
Data unit:	For Boiler –Tons/hr, For Heater - kCal/hr or kJ/hr
Description:	Rated capacity (output) of the boiler or heater after retrofit
Source of data used:	Manufacturer's specification and plant data

Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data obtained from the technical specifications provided by manufacturer/plant.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$Cp_{i,out}$
Data unit:	kCal/kg °C or kJ/kg°K
Description:	Specific heat of heat transfer fluid at heater outlet. The specific heat is a physical property of the fluid 'i' and is a function of temperature for a given fluid. The specific heat value for a given fluid corresponding to the temperature range is provided by the heat transfer fluid manufacturer / for water as a heat transfer medium, water specifications from standard tables are to be considered.
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on outlet of heat transfer fluid. Value will be derived from Manufacturer's standard based on outlet temperature. Data Archiving: Data will be archived by electronic / Paper mode
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario1, Scenario 2

Data / Parameter:	$\delta_{i,out}$
Data unit:	Kg/m^3
Description:	Density of heat transfer fluid at T_{out} temperature of the heater (kg/m3)
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on data provided by manufacturer. Data Archiving: Data will be archived by electronic/Paper mode. Monitoring: Value will be derived from Manufacturer's standard based on outlet temperature
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2

Data / Parameter:	$Cp_{i,\ retrofit,out}$

Data unit:	kCal/kg °C or kJ/kg^{o}K
Description:	Specific heat of heat transfer fluid type 'i' at outlet of renewable energy unit after retrofit
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on outlet of heat transfer fluid. Value will be derived from Manufacturer's standard based on outlet temperature. Data Archiving: Data will be archived by electronic / Paper mode
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$\delta_{i,retrofit,out}$
Data unit:	Kg/m^3
Description:	Density of heat transfer fluid type 'i' at T_{out} temperature after retrofit
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on data provided by manufacturer. Data Archiving: Data will be archived by electronic/Paper mode. Monitoring: Value will be derived from Manufacturer's standard based on outlet temperature
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data / Parameter:	$Cp_{i,out,old,y}$
Data unit:	kCal/kg °C or kJ/kg°K
Description:	Specific heat of heat transfer media of type 'i' at outlet of an existing renewable energy production facility in year y.
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on outlet of heat transfer fluid. Value will be derived from Manufacturer's standard based on outlet temperature. Data Archiving: Data will be archived by electronic / Paper mode
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data / Parameter:	$Cp_{i,\ out,add,y}$

Data unit:	kCal/kg °C or kJ/kg°K
Description:	Specific heat of heat transfer media 'i' at outlet of additional renewable energy unit at an existing renewable energy production facility in year y.
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on outlet of heat transfer fluid. Value will be derived from Manufacturer's standard based on outlet temperature. Data Archiving: Data will be archived by electronic / Paper mode
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data / Parameter:	$\delta_{i,out,old,y}$
Data unit:	Kg/m
Description:	Density of heat transfer fluid type 'i' at T_{out} temperature of an existing renewable energy production facility in year y.
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on data provided by manufacturer Data Archiving: Data will be archived by electronic/Paper mode. Monitoring: Value will be derived from Manufacturer's standard based on outlet temperature
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data / Parameter:	$\delta_{i,out,add,y}$
Data unit:	Kg/m^3
Description:	Density of heat transfer fluid type 'i' at T_{out} temperature of new renewable energy unit at the renewable energy facility in year y
Source of data used:	Manufacturer's specification
Value applied	XX (value applicable for the Project activity as per CPA XXX)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data type: Determined based on data provided by manufacturer. Data Archiving: Data will be archived by electronic/Paper mode. Monitoring: Value will be derived from Manufacturer's standard based on outlet temperature
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Parameter:	Q_{steam}
Unit:	Tons or tonnes
Description:	Quantity of steam supplied in year y
Source of data:	Steam flow meter On site measurement
Value of data:	XX
Brief description of measurement methods and procedures to be applied:	Data type: On line measurement Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy : + 3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied (if any):	Check of calibration certificate on quarterly basis towards validity of the certificate.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Parameter:	T_{steam}
Unit:	°C
Description:	Steam Temperature at MSSV (Main steam stop valve) outlet
Source of data:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent
Value of data:	XX
Brief description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode Accuracy Class: RTD : Class B or better Accuracy: RTD + Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.

QA/QC procedures to be applied (if any):	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	P_{steam}
Data unit:	Kg/cm^2g
Description:	Steam Pressure (gauge) at MSSV (Main steam stop valve) outlet
Source of date to be used:	Pressure transmitter/ Pressure Gauge On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy: + 2 % or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Calibration will be conducted by independent accredited third party entity
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	T_{FWB}
Data unit:	°C
Description:	Feed Water Temperature at inlet of boiler
Source of date to be used:	RTD/ RTD + Temperature Transmitter/Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode.

	Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	Q_{flow}
Data unit:	m^3/hr
Description:	Flow of heat transfer fluid at the heater outlet
Source of date to be used:	Heat Flow Meter On site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy + 3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration..
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	T_{in}
Data unit:	°C
Description:	Inlet Temperature of the heat transfer fluid at the inlet of the heater
Source of date to be used:	RTD / RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission	XX

reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration frequency– As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	T_{out}
Data unit:	°C
Description:	Temperature of the heat transfer fluid at the outlet of the heater
Source of date to be used:	RTD/ RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent : +2% or better Calibration frequency – As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	$h_{,y}$
Data unit:	hr or hours
Description:	Boiler / Heater operating hours of the Project activity in year y
Source of date to be used:	Built in timer in monitoring system On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Recording Frequency: Monitored daily, reported monthly and consolidated annually. Data Archiving: Data will be archived by Electronic/Paper mode The basis for measurement of operating hours is the Induced Draft Fan for balanced draft systems / Forced Draft Fan for forced draft systems operating hours. The Auxiliary contact of I.D/F.D fan switch gear is connected to Monitoring system for measurement of run hours.
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1

Data/parameter:	$Q_{ob,k}$
Data unit:	Tons or t
Description:	Quantity of stored fuel type biomass k on the starting date of each monitoring period measured at the Project site
Source of date to be used:	Weigh bridge Log Book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: Biomass stored will be measured (by using calibrated Weigh bridge) Calibration Frequency: at least once a year as per the valid regulation (Decision 25/2007/QD-BKHCN issued by the Ministry of Science and Technology on the Frequency of the metering equipments) Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	$Q_{np,k}$
Data unit:	Tons or t
Description:	Quantity of subsequent delivery of fuel type k biomass at the Project site
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: Biomass delivery note obtained from the fuel supplier. Calibration Frequency: at least once a year as per the valid regulation (Decision 25/2007/QD-BKHCN issued by the Ministry of Science and Technology on the Frequency of the metering equipments). Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1

Data/parameter:	$Q_{in,k}$
Data unit:	Tons or t
Description:	Quantity of remaining biomass fuel type k available at the end date of each monitored period measured at the Project site
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: will be measured by using calibrated weigh bridge. Calibration Frequency: at least once a year as per the valid regulation (Decision 25/2007/QD-BKHCN issued by the Ministry of Science and Technology on the Frequency of the metering equipments). Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. The biomass will be used by first in first out (FIFO) basis and biomass will not be stored for more than one year after the receipt. Applicable for Scenario 1.

Data/parameter:	$Q_{c,k} = FC_{biomass,k,y}$

Data unit:	Tons or t
Description:	Quantity of biomass fuel type k consumed during the monitoring period
Source of date to be used:	Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	--
Description of measurement methods and procedures to be applied:	Data type: Calculated Data Archiving: Data will be archived by Paper mode Monitoring: It is calculated by the formula for biomass fuel type $Q_{ob,k}+\Sigma(Q_{np,k})-Q_{in,k}$
QA/QC procedures to be applied:	This can be verified with the help of steam generation and steam to fuel ratio.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	$Q_{ob,i}$
Data unit:	Tons or t
Description:	Quantity of stored fuel type fossil i on the starting date of each monitoring period measured at the Project site
Source of date to be used:	Weigh bridge Log Book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: Fossil fuel stored will be measured (by using calibrated Weigh bridge) Calibration Frequency: As per weigh bridge Manufacturer's standards as per Weight & Measurement department. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	$Q_{np,i}$
Data unit:	Tons or t
Description:	Quantity of subsequent delivery of fuel type fossil fuel i
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to	Data type: Measured Data Archiving: Data will be archived by Paper mode.

be applied:	Monitoring: Fossil fuel delivery note obtained from the fuel supplier. Calibration Frequency: at least once a year as per the valid regulation (Decision 25/2007/QD-BKHCN issued by the Ministry of Science and Technology on the Frequency of the metering equipments). Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	$Q_{in,i}$
Data unit:	Tons or t
Description:	Quantity of remaining fossil fuel type i available at the end date of each monitored period measured at the Project site
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: It will be measured by using calibrated weigh bridge. Calibration Frequency at least once a year as per the valid regulation (Decision 25/2007/QD-BKHCN issued by the Ministry of Science and Technology on the Frequency of the metering equipments). Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Data/parameter:	$Q_{c,i} = FC_{j,PJ,y}$
Data unit:	Tons or t
Description:	Quantity of fossil fuel type i consumed during the monitoring period
Source of date to be used:	Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	--
Description of measurement methods and procedures to be applied:	Data type: Calculated Data Archiving: Data will be archived by Paper mode Monitoring: It is calculated by the formula for fossil fuel type Qob,i+Σ(Qnp,i)- Qin,i Measured Quantity of Fossil fuel type i available at site on the starting date of the monitoring period (Qob,i) in a year y + Quantity of subsequent delivery of Fossil fuel type i at site throughout monitoring

	period in a year y (Σ(Qnp,i))- Quantity of remaining Fossil fuel type i available at the end date of each monitored period measured at the Project site in a year y (Qin,i).
QA/QC procedures to be applied:	This can be verified with the help of steam generation and steam to fuel ratio.
Any comment:	The value of Qc,i = FCj,PJ,y This data will be archived upto 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1.

Parameter:	**$MC_{biomass,y}$**
Data Unit:	% water
Description:	Moisture content of the biomass
Source of data to be used:	Laboratory reports
Value of data:	--
Brief description of measurement methods and procedures to be applied:	Measurement of the moisture content of the biomass samples will be for each batch on site by calibrated equipments.
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 CPA 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 CPA 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 CPA project activity, whichever occurs later Applicable for ☐ Scenario 1, ☐ Scenario 2, ☐ Scenario 3

Data/parameter:	NCV_k
Data unit:	TJ/Gg or GJ/t
Description:	Net calorific value of biomass fuel k used in the Project activity.
Source of date to be used:	Analysis report of the biomass. One sample randomly picked up from site.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Calculated Analysis Frequency: Annually. Data Archiving: Data will be archived annually by Paper mode. Monitoring: Analysis from accredited or certified independent agency.
QA/QC procedures to be applied:	--

Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. If the NCV report specifies unit other than TJ/Gg, then it will be appropriately converted. Applicable for Scenario 1, Scenario 2, Scenario

Data / Parameter:	NCVi ,y	
Data unit:	TJ/Gg or GJ/t	
Description:	Weighted average net calorific value of the fuel type i in year y	
Source of data to be used:		
Value of data applied for the purpose of calculating expected emission reductions in section B.5:	Data source	Conditions for using the data source
	a) Values provided by the fuel supplier in invoices	This is the preferred source
	b) Measurements by the Project participants	If a) is not available
	c) Regional or national default values	If a) is not available These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances).
	d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If a) is not available
Description of measurement methods and procedures to be applied:	--	
QA/QC procedures to be applied:	Data type: Calculated Recording Frequency: Annually Data Archiving: Data will be archived by Paper mode. Monitoring: Analysis by an independent agency.	
Any comment:	--	
	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. If the NCV report specifies unit other than TJ/Gg, then it will be appropriately converted. NCVi = NCVj,y is the fuel type combusted in process j during the year y. Applicable for ☐ Scenario 1 ☐ Scenario 2 ☐ Scenario 3	

Data/parameter:	$FC_{i,j,y}$
Data unit:	Tons or t
Description:	Quantity of fossil fuel type i consumed in a process j during the year y
Source of date to be used:	Log book/Plant record
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	--

Description of measurement methods and procedures to be applied:	Data type: Calculated Data Archiving: Data will be archived by Paper mode
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. (this also includes the startup fossil fuel) Applicable to Scenario 1, Scenario 2, Scenario 3,

Data/parameter:	$EC_{PJ,j,y}$
Data unit:	MWh
Description:	Auxiliary Electricity Consumption of the Project activity from the from Grid in year y
Source of date to be used:	Electromechanical Energy meter/ Electronic Energy Meter/ equivalent Log book/ Plant record
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	--
Description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: Monthly Monitoring frequency : Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Accuracy class : Class2 or better Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2,Scenario 3

Data/parameter:	$EC_{EL,j,y}$
Data unit:	MWh
Description:	Auxiliary Electricity Consumption of the Project activity from the off grid Captive Power Plant (Diesel Generator set or Fossil fuel based power source) in a year y
Source of date to be used:	Electromechanical Energy meter/ Electronic Energy Meter/ equivalent Log book/ Plant record
Value of data applied for the purpose of calculating expected emission	XX

reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Data type: Measured using calibrated meters Recording: In case of power failure Monitoring Frequency : Continuous, during power failure Data Archiving: Data will be archived by Electronic/Paper mode Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Accuracy class : Class 2 or better Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2,Scenario 3

Data/parameter:	$AVD_{,y}$
Data unit:	Km
Description:	Average return trip distance (from and to) between the source of the biomass and the site of the Project plant during the year y
Source of date to be used:	Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data Type: Calculated based on the distance kilometres provided by trucker / supplier Monitoring frequency : Continuous, at each trip Data Archiving: Data will be archived by Paper mode.
QA/QC procedures to be applied:	Check consistency of distance record provided by trucker / supplier by comparing recorded distances with other information from other sources (eg. maps)
Any comment:	If biomass is supplied from different sites this parameter will correspond to the mean value of kilometre travelled by trucks that supply the biomass plant. This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2,Scenario 3

Data/parameter:	$N_{,y}$
Data unit:	--
Description:	Number of truck trips during the year y
Source of date to be used:	Log book/Plant record.
Value of data applied for the purpose of calculating	XX

expected emission reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Monitoring Frequency: Continuous, at each trip Data Archiving: Data will be archived by Paper mode.
QA/QC procedures to be applied:	The data will be checked for consistency by comparing the quantity delivered (no. of truck, 'Ny') from invoice / delivery note with the quantity of biomass combusted.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2,Scenario 3

Data/parameter:	$AVD_{c,y}$
Data unit:	Km
Description:	Average round trip distance (from and to) between the biomass fuel supply sites and the site of biomass processing in year y
Source of date to be used:	Data / declaration from supplier
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	The CPA operator shall ensure provision of this parameter from the biomass supplier in the form of declaration Monitoring frequency : Continuous , at each trip
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario2,Scenario 3

Data/parameter:	$N_{c,y}$
Data unit:	--
Description:	Number of truck trips during the transportation of biomass to the biomass processing site in year y
Source of date to be used:	Data / declaration from supplier
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	The CPA operator shall ensure provision of this parameter from the biomass supplier in the form of declaration. Monitoring Frequency: Continuous ,at each trip
QA/QC procedures to be applied:	The data will be check for consistency of the number of truck trips with quantity of biomass combusted
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 1, Scenario 2,Scenario 3

Data/parameter:	$Q_{Steam,old,y}$
Data unit:	Tons or tonnes
Description:	Quantity of steam produced by an existing renewable energy unit in year y
Source of date to be used:	Steam flow meter On site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: On line measurement Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy : +3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{Steam,add,y}$
Data unit:	Tons or tonnes
Description:	Quantity of steam generated by additional renewable energy unit at an existing renewable energy production facility in year y
Source of date to be used:	Steam flow meter On site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: On line measurement Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy : +3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. .

	Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{steam,old,y}$
Data unit:	°C
Description:	Steam Temperature at MSSV (Main steam stop valve) outlet of an existing renewable energy production facility in year y
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Estimated/Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{steam,add,y}$
Data unit:	°C
Description:	Steam Temperature at MSSV (Main steam stop valve) outlet of additional renewable energy unit (Boiler) at an existing renewable energy production facility in year y
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating	XX

expected emission reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$P_{steam,old,y}$
Data unit:	Kg/cm^2g
Description:	Steam Pressure (gauge) at MSSV (Main steam stop valve) outlet of an existing renewable energy production facility
Source of date to be used:	Pressure transmitter/ Pressure Gauge On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy : + 2 % or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$P_{steam,add,y}$
Data unit:	Kg/cm^2g
Description:	Steam Pressure (gauge) at MSSV (Main steam stop valve) outlet of additional renewable energy unit (boiler) at an existing renewable energy production facility in year y
Source of date to be used:	Pressure transmitter/ Pressure Gauge On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy : + 2 % or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quaterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{FWB,old,y}$
Data unit:	°C
Description:	Average Feed Water Temperature at inlet an existing renewable energy production facility (boiler) in year y.
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Estimated/Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better. Calibration Frequency: As per local/national standard or as per

	manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quaterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{FWB,add,y}$
Data unit:	°C
Description:	Feed Water Temperature at inlet of additional renewable energy unit (boiler) at an existing renewable energy production facility in year y.
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{flow,old,y}$
Data unit:	m3/hr
Description:	Flow of heat transfer fluid at the heater outlet of an existing renewable energy production facility in year y.
Source of date to be used:	Heat Flow Meter On site measurement
Value of data applied for	XX

the purpose of calculating expected emission reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Data type: Estimated/Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy + 3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{flow,add,y}$
Data unit:	m^3/hr
Description:	Flow of heat transfer fluid at the heater outlet of additional renewable energy unit (heater) at an existing renewable energy production facility in year y
Source of date to be used:	Heat Flow Meter On site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy + 3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{in,old,y}$

Data unit:	°C
Description:	Inlet Temperature of the heat transfer fluid at the inlet of the heater in an existing renewable energy production facility in year y
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Estimated/Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency – As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{in,add,y}$
Data unit:	°C
Description:	Inlet Temperature of the heat transfer fluid at the inlet of the heater in an additional renewable energy unit at an existing renewable energy facility in year y
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency – As per local/national standard or as per manufacturer's specifications. If local/national standards and

	manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{out,old,y}$
Data unit:	°C
Description:	Temperature of the heat transfer fluid at the outlet of the heater in an existing renewable energy production facility in year y
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Estimated/Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency – As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$T_{out,add,y}$
Data unit:	°C
Description:	Temperature of the heat transfer fluid at the outlet of the heater in an additional renewable energy unit at an existing renewable energy facility in year y
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent

	On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency – As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$h_{,old,y}$
Data unit:	Hr or hours
Description:	Boiler / Heater operating hours of the existing renewable facility in a year y
Source of date to be used:	Built in timer, in monitoring system. On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Recording Frequency: Monitored daily, reported monthly and consolidated annually Data Archiving: Data will be archived by Electronic/Paper mode The basis for measurement of operating hours is the Induced Draft Fan for balanced draft systems / Forced Draft Fan for forced draft systems operating hours. The Auxiliary contact of I.D/F.D fan switch gear is connected to Monitoring system for measurement of run hours.
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$h_{,add,y,}$
Data unit:	hr or hours

Description:	Boiler / Heater operating hours of the renewable energy unit in a year y
Source of date to be used:	On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording Frequency: Monitored daily, reported monthly and consolidated annually Data Archiving: Data will be archived by Electronic/Paper mode The basis for measurement of operating hours is the Induced Draft Fan for balanced draft systems / Forced Draft Fan for forced draft systems operating hours. The Auxiliary contact of I.D/F.D fan switch gear is connected to Monitoring system for measurement of run hours.
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{ob,k,add}$
Data unit:	Tons or t
Description:	Quantity of stored fuel type k biomass on the starting date of each monitoring period measured at the Project site
Source of date to be used:	Weigh bridge Log Book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: Biomass stored will be measured (by using calibrated Weigh bridge) Calibration Frequency: As per weigh bridge Manufacturer's standards as per Weight & Measurement department. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on monthly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{np,k,add}$
Data unit:	Tons or t
Description:	Quantity of subsequent delivery of fuel type k biomass at the Project site
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for	XX

the purpose of calculating expected emission reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: Biomass delivery note obtained from the fuel supplier. Calibration Frequency: As per weigh bridge Manufacturer's standards as per Weight & Measurement department. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on monthly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{in,k,add}$
Data unit:	Tons or t
Description:	Quantity of remaining biomass fuel type k available at the end date of each monitored period measured at the Project site
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: It will be measured by using calibrated weighing machine. Calibration Frequency: As per weigh bridge Manufacturer's standards as per Weight & Measurement department. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on monthly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{c,k,add}$
Data unit:	Tons or t
Description:	Quantity of biomass fuel type k consumed during the monitoring period
Source of date to be used:	Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	--
Description of measurement methods and procedures to	Data type: Calculated Data Archiving: Data will be archived by Paper mode Monitoring: It is

be applied:	calculated by the formula for biomass fuel type Qob,k,add+Σ(Qnp,k,add)-Qin,k,add
QA/QC procedures to be applied:	This can be verified with the help of steam generation and steam to fuel ratio.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 3

Data/parameter:	$Q_{retrofit,steam}$
Data unit:	Tons or t
Description:	Quantity of steam supplied after fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility in year y.
Source of date to be used:	Steam flow meter Onsite measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy : +3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$T_{retrofit,steam}$
Data unit:	°C
Description:	Steam Temperature at MSSV (Main steam stop valve) outlet after fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility.
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to	Data type: Measured Recording: Daily

be applied:	Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$P_{retrofit,steam}$
Data unit:	Kg/cm^2g
Description:	Steam Pressure (gauge) at MSSV (Main steam stop valve) outlet after fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility.
Source of date to be used:	Pressure transmitter/ Pressure Gauge On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy : + 2 % or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$T_{retrofit,FWB}$
Data unit:	°C
Description:	Feed Water Temperature at inlet of the boiler after fuel switching from fossil fuel to biomass by modification including retrofit of an existing

	facility.
Source of date to be used:	RTD /RTD + Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+ Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$Q_{retrofit,flow}$
Data unit:	m^3/hr
Description:	Flow of heat transfer fluid at the heater outlet after fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility in year y.
Source of date to be used:	Heat Flow Meter On site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy + 3% or better Calibration Frequency: As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Calibration will be conducted by independent accredited third party entity.

QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$T_{retrofit,in}$
Data unit:	°C
Description:	Inlet Temperature of heat transfer fluid at the inlet of the heater after fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility.
Source of date to be used:	RTD /RTD+ Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+ Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency – As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration. Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$T_{retrofit,out}$
Data unit:	°C
Description:	Temperature of heat transfer fluid at the outlet of the heater after fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility.
Source of date to be used:	RTD /RTD+ Temperature Transmitter/ Temperature Gauge/ equivalent On-site measurement
Value of data applied for the purpose of calculating expected emission	XX

reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Data type: Measured Recording: Daily Monitoring Frequency: Continuous Data Archiving: Data will be archived by Electronic/Paper mode. Accuracy Class: RTD: Class B or better Accuracy: RTD+ Temperature Transmitter/ Temperature Gauge/ equivalent: + 2% or better Calibration Frequency – As per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specification is not available, it will be as per international standard, but at least once in 3 years. . Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$h_{,retrofit,y}$
Data unit:	Hr or hours
Description:	Operating hours of Boiler / Heater after fuel switching from fossil fuel to biomass by modification including retrofit of an existing facility in year y.
Source of date to be used:	Built in timer in monitoring system. On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	The basis for measurement of operating hours is the Induced Draft Fan for balanced draft systems / Forced Draft Fan for forced draft systems operating hours. The Auxiliary contact of I.D/F.D fan switch gear is connected to Monitoring system for measurement of run hours. Recording Frequency: Monitored daily, reported monthly and consolidated annually Data Archiving: Data will be archived by Electronic/Paper mode
QA/QC procedures to be applied:	--
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$Q_{retrofit,ob,k}$
Data unit:	Tons or t
Description:	Quantity of stored fuel type biomass k on the starting date of each monitoring period measured at the Project site in a year y
Source of date to be used:	Weigh bridge

	Log Book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: Biomass stored will be measured (by using calibrated Weigh bridge) Calibration Frequency: As per weigh bridge Manufacturer's standards as per Weight & Measurement department. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$Q_{retrofit,np,k}$
Data unit:	Tons or t
Description:	Quantity of subsequent delivery of fuel type biomass k in a year y
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	XX
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: Biomass Delivery note obtained from the fuel supplier. Calibration Frequency: As per weigh bridge Manufacturer's standards as per Weight & Measurement department. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$Q_{retrofit,in,k}$
Data unit:	Tons or t
Description:	Quantity of remaining biomass fuel type k available at the end date of each monitored period measured at the Project site in a year y
Source of date to be used:	Weigh bridge Log book/Plant record.
Value of data applied for	XX

the purpose of calculating expected emission reductions in sections B.5:	
Description of measurement methods and procedures to be applied:	Data type: Measured Data Archiving: Data will be archived by Paper mode. Monitoring: It will be measured by using calibrated weigh Bridge. Calibration Frequency: As per weigh bridge Manufacturer's standards as per Weight & Measurement department. Calibration will be conducted by independent accredited third party entity.
QA/QC procedures to be applied:	Check of calibration certificate on quarterly basis towards validity of the certificate. Compare with manufacturer's standards towards accuracy after calibration.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$Q_{retrofit,c,k}$
Data unit:	Tons or t
Description:	Quantity of biomass fuel type k consumed during the monitoring period
Source of date to be used:	Log book/Plant record.
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	--
Description of measurement methods and procedures to be applied:	Data type: Calculated Data Archiving: Data will be archived by Paper mode Monitoring: It is calculated by the formula for biomass fuel type Qretrofit,ob,k,+Σ(Qretrofit,np,k,)-Qretrofit,in,k,
QA/QC procedures to be applied:	This can be verified with the help of steam generation and steam to fuel ratio.
Any comment:	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later. Applicable for Scenario 2

Data/parameter:	$EF_{CO2,i,y}$	
Data unit:	tCO_2/GJ	
Description:	Weighted average CO2 emission factor of fuel type i in year y	
Source of date to be used:	The following data sources may be used if the relevant conditions apply:	
	Data source	Conditions for using
	a) Value provided by the fuel supplier in invoices	This is the preferred source
	b) Measurements by the Project participants	If, a) is not available
	c) Regional of national default values	If, a) is not available These sources can only be used for liquid fuels and should be based on well-documented,reliable sources (such as national energy balances)
	d) IPCC default values at the upper limit of the uncertainty at	If, a) is not available

	a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	
Value of data applied for the purpose of calculating expected emission reductions in sections B.5:	--	
Description of measurement methods and procedures to be applied:	For a) and b): Measurements should be undertaken in line with national or international fuel standards For a) and b): The CO2 emission factor should be obtained for each fuel delivery, from which weighted average annual values should be calculated. For c): Review appropriateness of the values annually For d): Any future revision of the IPCC Guidelines should be taken into account	
QA/QC procedures to be applied:	--	
Any comment:	Applicable where Option B is used. For a): If the fuel supplier does provide the NCV value and the CO2 emission factor on the invoice and these two values are based on measurements for this specific fuel, this CO2 factor should be used. If another source for the CO2 emission factor is used or no CO2 emission factor is provided, Options b), c) or d) should be used. Applicable for Scenario 1, Scenario 2, Scenario 3.	

E.7.2. Description of the monitoring plan for a CPA:

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(a) Description of monitoring plan for the SSC-CPA

The biomass based steam system parameters will be monitored using Field Instruments, Hardware & Software installed at every Project site and/or Manual data recording in the log book.

☐ **Monitoring of boiler:**

No.	Parameters	Measuring instruments
1	Steam flow	Flow meter
2	Steam pressure	Directly measured by separate pressure measuring instrument or field instrument integral to steam flow meter
3	Feed water temperature	Temperature measuring instruments
4	Electricity consumption	Electricity meter
5	Fuel consumption	Mass meter

The thermal energy generated from the biomass fired boiler is calculated as the differential value between thermal energy of the steam at the outlet of the main steam stop valve (MSSV) and the thermal

energy (Specific enthalpy) of the feed water, measured at the inlet of the boiler at corresponding feed water temperature. The equation is expressed as below:

$EG_{thermal} = Q_{steam} * (H_s - H_w) * 10^{-6}$

Where:

$EG_{thermal}$ = Net quantity of heat supplied by the Project activity

Q_{steam} = Quantity of steam supplied in Tons

H_s = Specific enthalpy of steam at corresponding absolute pressure and temperature at the outlet (KJ/kg)

H_w = Specific Enthalpy of feed water at corresponding temperature at the Boiler inlet (KJ/kg)

☐ **Monitoring of heaters**

Parameters to be monitored:

No	Parameters	Measuring instruments
1	Fluid flow	Flow meter
2	Heat transfer fluid / heating medium – inlet and outlet temperature sensors	Directly measured by field instruments integral to flow meter or separate temperature measuring instrument
3	Electricity consumption	Electricity meter
4	Fuel consumption	Mass meter

The net quantity of heat supplied from a heater is calculated by the product of mass flow of the heat transfer fluid, the specific heat of the fluid at the measuring point and the temperature differential (or rise) across the heater.

Volumetric flow (Q_{flow}) is measured in m3 with the help of a flow meter installed at the outlet line of the heater, the flow obtained is then converted to mass flow by multiplying with density (σ) which is computed in the monitoring system and determined based on data provided by manufacturers at corresponding operating temperature (T_{out}) recorded at the heater outlet. No other monitoring parameter is considered to determine this parameter

Similarly, the specific heat, $C\rho$, of the heat transfer fluid is also computed in the monitoring system based on manufacturer's data corresponding to the operating temperature (T_{out}) recorded near the flow measuring point of the heater outlet

$\Delta T = T_{out} - T_{in}$ is a direct function to account for the heat generated, temperature sensors are installed at the inlet and outlet line (two each – one working and one stand by) of the heater to measure the rise in temperature of the heat transfer fluid entering the heater and leaving the heater respectively.

The net quantity of heat supplied from the heater shall be calculated by using the below mentioned thermodynamic equation:

$EG_{thermal} = Q_{flow} * C\rho_{out} * \sigma_{out} * (T_{out} - T_{in}) * 10^{-6}$

Where:

Q_{flow}	Flow of heat transfer fluid at the heater outlet (m3)
$C\rho_{out}$	The specific heat of the heat transfer fluid at T_{out} temperature

	(kcal/kg. ^{O}C)
σ_{out}	Density of heat transfer fluid at T_{out} temperature of the heater (kg/m3) at the outlet of the heater
T_{out}	Temperature of the heat transfer fluid at the outlet of the heater (^{O}C)
T_{in}	Temperature of the heat transfer fluid at the intlet of the heater (^{O}C)

(B) Description of the monitoring system for CPA

In order to ensure all CPAs are monitored and verified, the managing entity prepare a comprehensive monitoring plan for all CPAs joined in the PoA. Furthermore, the managing entity conducts periodical inspection of units randomly at any given time in a year. For this purpose the managing entity deploys monitoring personnel who visit the CPAs, study their records and get satisfied with the upkeep. The monitoring personnel would duly attest the records as a mark of satisfactory inspection. The managing entity would randomly check the visits of monitoring personnel in order to ensure due compliance.

Various templates are made to record the data to be monitored. The monitoring personnel of the managing entity would be provided with such templates. As the steps involved in monitoring are simple, in-house training is imparted in recording the data and to translate the same into the computation of ERs.

Each CPA is responsible to form an operational and management team, which will be responsible for carrying out all monitoring functions as prescribed in the monitoring plan. This team consists of a general manager, shift managers and operators. The operators, who are under the supervision of the shift managers, will be assigned for monitoring of the parameters on a timely basis as well as recording and archiving data in an orderly manner. Monitoring reports will be forwarded to and reviewed by the general manager on a monthly basis in order to ensure the Project follows the requirements of the monitoring plan.

All data collected as part of monitoring plan will be archived electronically and be kept at least 2 years after the end of the last crediting period or the last issuance of CERs for the project activity, whichever occurs later. Data archived will also be verified regularly by the DOE. The performance of the Project will be reviewed and analyzed by the consultant on a regular basis.

(C) Scrapping of equipments:

If in case, a CPA involves replacement of equipment wherein, the old equipment is scrapped, the procedure for monitoring of scrapping of replaced equipment will be as follows:

An independent third party recognised agency like Govt. Valuer / Inspection bodies or equivalent will be appointed for monitoring scrapping of equipment. The monitoring should include a check if the number of the CPA equipment distributed by the CPA operator and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. This agency will check that

i. the number of scrapped equipment corresponds to new equipment and
ii. the scrapped equipment has capacity equal or less capacity than the new equipment.

The same agency shall provide a certificate to CPA operator who will keep a record of scrapped equipment and submit to the DOE.

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

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Date of completion: 30/08/2011

Responsible person/entity:

Mr. Hoang Anh Dung

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

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The entity is also a project participant for this PoA.

Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

Organization:	**Investment and Trade Consultancy Company Limited (INTRACO Co., Ltd.)**
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The "**Biomass Heat Generation Development Programme of Activities Managed by INTRACO"** will not receive any public funding from Parties included in Annex I of the UNFCCC.

Annex 3

BASELINE INFORMATION

Data used to calculate the baseline emissions factor of the electricity grid:

Variable	Value / Unit	Source
Operating Margin Emission Factor	0.6464 tCO_2/MWh	Grid Emission Factor Report (2003-2008) approved by DNA Vietnam dated 26th March 2010
Build Margin Emission Factor	0.5064 tCO_2/MWh	Grid Emission Factor Report approved (2003-2008) by DNA Vietnam dated 26th March 2010
Combined Margin Emission Factor	0.5764 tCO_2/MWh	Grid Emission Factor Report (2003-2008) approved by DNA Vietnam dated 26th March 2010

Annex 4

MONITORING INFORMATION

Please refer section A.4.4.2