



**PROGRAMME DESIGN DOCUMENT FORM FOR
SMALL-SCALE CDM PROGRAMMES OF ACTIVITIES (F-CDM-SSC-PoA-DD)
Version 02.0**

PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

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Southern African Fuel Switch (SAFS) Programme

Version 01.0

27/08/2012

A.2. Purpose and general description of the PoA

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The stated objective of this programme is to reduce the use of fossil fuels in thermal energy production equipment and thus to reduce the CO₂ emissions associated with the use of the thermal energy generation equipment in industrial and cogeneration processes.

The programme also supports the sustainable development of the Host non-Annex I parties in the following way:

- *Economic:* The programme encourages the use of renewable fuel sources. This reduces the dependence on fossil fuel sources and will diversify the countries energy supply as well as contribute to the mitigation of climate change. Secondly, the use of renewable biomass will create employment at the processing operations and/or at the plantation/biomass residue sites which will need to be accessed in order to produce the processed biomass. The investment in new production facilities directly contributes to national economic development.
- *Social:* The programme makes an indirect contribution to social development in that it promotes the use of renewable fuel sources. These will have to be sourced from a local supplier and as such there will be potential new employment opportunities associated with the fuel switch programme. In addition to the processing of renewable biomass, employment will also be created through the collection and transportation of the biomass and the promotion of farmers at dedicated renewable biomass plantations. Therefore the programme will result in the alleviation of poverty and improve the quality of life.
- *Environmental:* The programme will reduce the amount of CO₂ emissions as a result of the use of fossil fuels as a fuel source for thermal energy generation. This will contribute towards the Host Parties emission reduction targets as well as the mitigation of climate change. The project activities implemented under this programme will demonstrate the replicable use of clean renewable energy technologies.

The *Southern African Fuel Switch (SAFS) Programme* is a small scale programme of activities which will promote and facilitate a switch from fossil fuel use to renewable biomass use in thermal energy production applications, including cogeneration. The project activities included in the programme will be geographically located in South Africa, Zimbabwe and Botswana. The framework for implementation

involves the voluntary participation of potential project implementers that would like to operate as a CPA under the PoA. K2011/117952/07 (Pty) Ltd (South Africa) trading as African Sustainability Initiative (ASI), as the CME, will verify their eligibility and ensure that appropriate records and documentation is collected and that adequate monitoring systems are implemented.

The PoA is a voluntary action, not required by law and undertaken by African Sustainability Initiative (ASI) who is the Coordinating and Managing Entity (CME) for the PoA and Impala Platinum Ltd (Implats) who is the project implementer of the first CPA.

A.3. CMEs and participants of PoA

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African Sustainability Initiative (ASI) will be the Coordinating and Managing Entity (CME) of the PoA. As the CME, ASI's responsibilities will include ensuring that all project activities are executed in accordance with the objectives, guidelines and requirements of the programme as well as the implementation and effective execution of the monitoring plan for each CPA included under the programme.

A.4. Party(ies)

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of South Africa* (host)	African Sustainability Initiative (ASI) Impala Platinum (Pty) Ltd	No
Botswana* (host)	African Sustainability Initiative (ASI)	No
Zimbabwe* (host)	African Sustainability Initiative (ASI)	No

A.5. Physical/ Geographical boundary of the PoA

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The PoA is located within Southern Africa in South Africa, Zimbabwe and Botswana.

The boundary of the PoA is defined as the geographical area within which all the implemented small-scale CDM programme activities (SSC-CPAs) included in the PoA will be physically in operation and producing thermal energy. All fuel switch project activities which are enrolled in the CPAs under this PoA will be within the borders of South Africa, Zimbabwe and Botswana all of which are illustrated in the below Figure 1: Map of Southern Africa including South Africa, Zimbabwe and Botswana.



Figure 1: Map of Southern Africa including South Africa, Zimbabwe and Botswana

Each CPA will define the geographical boundary within which it operates.

The spatial extent of the CDM project activity boundary encompasses:

- (a) All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both.
- (b) All power plants connected physically to the electricity system (grid) that the project plant/equipment is connected to. This is applicable only in the case of co-generation facilities and/or where the biomass is processed onsite and the associated electricity consumption needs to be taken into account as leakage.
- (c) Industrial or commercial facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity.
- (d) Area where the biomass is extracted or produced including the processing plant of biomass residues, for project activities using solid biomass fuel (e.g. briquette).

A.6. Technologies/measures

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Type I: Renewable Energy Projects

Category I.C: 'Thermal energy production with or without electricity' (version 19)

Sectoral Scope: 01

Fuel switch

A CPA will consist of a project activity which looks to implement fuel switch technology in thermal energy generation equipment in industrial or power processes such as dryers, boilers or cogeneration units. This will involve changing the fuel source used to produce the thermal energy or co-generation from a fossil fuel source to a renewable biomass source. The exact retrofits/modifications/replacement or new equipment technology to be used to facilitate the fuel switch will be detailed at CPA level based on the characteristics of the original fossil fuel source versus that of the new renewable biomass source and the requirements of the thermal energy generation process. The fuel switch may be a total fuel switch to a renewable biomass source as compared to the baseline fossil fuel firing or co-firing or it may be a part switch whereby the project activity involves co-firing.



Renewable Biomass

The biomass used in the project activity fuel switch must be renewable as defined in EB23, Annex 18, 'Definition of Renewable Biomass' or any subsequent versions of the definition. It can be sourced from: biomass residues, processed biomass or biomass from dedicated plantations. The type of biomass intended for use in the project activity must be documented in the CPA-DD and all relevant applicability criteria with respect to that source documented and monitored where necessary.

A.7. Public funding of PoA

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The proposed PoA has not and will not receive any public funds resulting from official development assistance (ODA) from Parties included in Annex I to the Convention.

The CME will ensure that there is no public funding resulting from ODA at the time of inclusion of a CPA. The CPA will need to provide evidence that this is the case and this may include but is not limited to, a declaration from the CPA project implementer to this effect.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

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The Southern African Fuel Switch (SAFS) PoA facilitates and promotes the implementation of fuel switch technologies to allow for the use of renewable biomass for thermal energy generation processes rather than fossil fuels in Southern Africa.

Without the establishment of the programme there would be no collective drive to promote an expensive fuel switch technology especially with the abundance of fossil fuel availability in Southern Africa and particularly South Africa, Zimbabwe and Botswana as indicated below:

- **South Africa:** Coal provides for approximately 77% of South Africa's primary energy needs³ and there were 30 billion tonnes of coal reserves in June of 2011 (BP Statistical Review of World Energy, 2011)⁴.
- **Zimbabwe:** A total of 502 million tonnes of coal reserves also in June of 2011 (BP Statistical Review of World Energy, 2011) were reported for Zimbabwe.
- **Botswana:** Approximately 212 billion tonnes of coal were reported to be in the Botswana national coal reserve⁵.

Each project activity that is included under the PoA will need to join the PoA in order for its implementation and continuation to be possible.

³ http://www.energy.gov.za/files/coal_frame.html

⁴ http://www.worldenergy.org/documents/ser_2010_report_1.pdf

⁵ <http://mg.co.za/article/2011-09-05-botswana-seeks-to-exploit-its-coal-reserves>

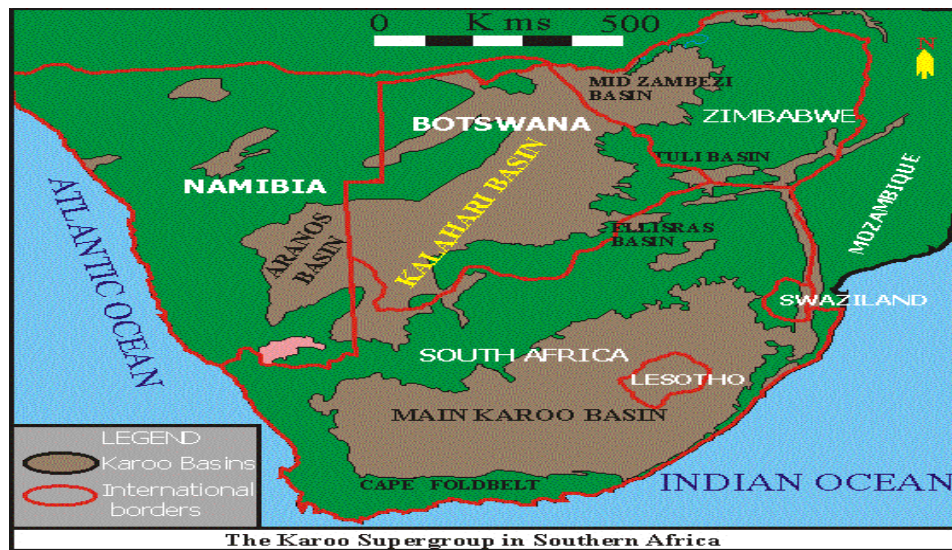


Figure 2: Southern African coal bearing areas⁶

A typical CPA must demonstrate additionally in accordance with the 'Guidelines on the demonstration of additionality of small scale project activities'⁷ (version 09) of the 'Simplified modalities and procedures for small scale CDM project activities'⁸ (version 08), additionality is demonstrated by showing that a CPA would not have occurred anyway due to the existence of certain barriers. This analysis will identify the barriers that are in place and how they would prevent the implementation of the proposed fuel switch project activities if the project activity was not registered as a CDM activity under the PoA.

Each CPA must identify and detail one of the following barriers to demonstrate additionality:

Option A: Technological barrier

- i) Demonstrate that the technological risks of implementing the new fuel switch technology are a barrier to the project activity by showing that a less technologically advanced alternative involves lower risks due to the performance uncertainty or low market share of the fuel switch technology to be adopted. Examples that may be used to demonstrate the technological barrier include, but are not limited to:
 - lack of infrastructure to utilize the fuel switch technology
 - non-availability of human capacity to operate and maintain the fuel switch technology
 - unacceptably high level of technology risk
 - unavailability and/or unreliability of the supply of renewable biomass

⁶ The Coal road map Pitso - An overview of Botswana's coal resources and future plans.

<http://www.mmewr.gov.bw/pitso/crmp/>

⁷ 'Guidelines on the demonstration of additionality of small scale activities' (version 09) of the 'Simplified modalities and procedures for small scale clean development mechanism project activities' EB 68, Annex 27.

⁸ EB 63, Annex 24

http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentA.pdf

Option B: Barrier Due to Prevailing Practice

- i) Demonstrate that the project activity is among the first-of-its-kind in terms of technology, geography, sector, type of investment, investor and market etc. in accordance with the ‘*Guidelines on additionality of first-of-its-kind project activities*’ (version 01)⁹.
- ii) Demonstrate that prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions.

Option C: Investment barrier

- i) Demonstrate that a financially more viable alternative to the project activity would have led to higher emissions i.e. the proposed project activity is not either not the most economically and financially attractive (or feasible) by using one of the following investment analysis methods according to the ‘*Guidelines on the assessment of investment analysis*’ (version 05):
 - Investment comparison analysis
 - Benchmark analysis
 - Simple cost or levelised cost analysis

Option D: Other barriers

- i) Demonstrate that the emissions would have been higher without the project activity, for any other project specific reason identified by the project participant, such as institutional barriers, unavailability of information, managerial resources, organizational capacity, financial resources or the capacity to absorb new technologies.

Alternative arguments, not listed here, but specific to the selected barrier and the project activity may also be considered when assessing additionality provided that the SSC CPA can clearly demonstrate that a legitimate barrier exists. The process of managing other barriers is highlighted in the CME procedure manual.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

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The eligibility criteria for the inclusion of a SSC-CPA in this PoA are as follows¹⁰:

1. The geographical boundary of the project activity must be situated within the borders of South Africa, Zimbabwe or Botswana.
2. The thermal energy generation equipment or cogeneration equipment used in the project activity must be specifically identified in the CPA-DD by determining the unique characteristics associated with it and/or its manufacturers and performance specifications, as well as compliance with testing and certifications. .

⁹ EB 63, Annex 11 http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid43.pdf

¹⁰ EB 65, Annex 3, Par 14

http://cdm.unfccc.int/filestorage/_/y/NQRE43STUFVP8190M2D6BYK5L7OIZC.pdf/eb68_repan03.pdf?t=VGV8bThkejNkfDCYIxS3SFJsFrLOZ5yCq09K

3. The fuel switch technology must comply with all relevant local and national environmental regulations and appropriate standards as regulated by law and by the safety and environmental policies of the facility at which the project is implemented.
4. The type of the renewable biomass must be identified and documented in the CPA-DD.
5. The expected performance specifications of the project dryer(s)/boiler(s)/cogeneration unit(s) must be equal to or less than $45\text{MW}_{\text{thermal}}$ in aggregate for each component project activity.
6. The project implementer must provide documented evidence of the estimated date that the thermal generation equipment is expected to first begin normal operation after the implementation of the fuel switch. Also, the start date of each CPA must be in accordance to the CDM Glossary of terms¹¹.
7. The project implementer must provide evidence that the biomass used in the fuel switch is renewable biomass as per the CDM definition of renewable biomass¹² and/or monitor the source of the biomass to ensure it is renewable.
8. The fuel switch must involve renewable energy technologies that supply users with thermal energy that displaces fossil fuel use.
 - (a) In the specific case of renewable biomass project activities the renewable biomass used must be either, *biomass residues* or *processed biomass* or *biomass from dedicated plantations*.
 - i. If processed biomass is used the CPA must demonstrate that it has used only renewable biomass and that all project and/or leakage emissions have been taken into account.
 - ii. If processed biomass is used and the project participant is not the producer of the processed solid biomass fuel, the CPA must demonstrate that there is a contract in place between the project participant and the producer which enables the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. The contract must also ensure that there is no double-counting of emission reductions.
 - iii. If biomass from dedicated plantations is used, the plantation must comply with the applicability conditions as stipulated in AM0042 or monitoring parameters must be in place to ensure that plantations established in the future or new dedicated plantation sources meet the applicability requirements of AM0042.
 - iv. The determination of leakage must be done by following the '*General guidance on leakage in biomass project activities*' (version 03)¹³,
 - (b) In the specific case of charcoal based biomass energy generation project activities, the charcoal must be produced from renewable biomass sources and;
 - i. The charcoal must be produced in kilns equipped with methane recovery and destruction or,
 - ii. Methane emissions from the production of charcoal shall be considered and calculated as per AMS-III.K. Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be

¹¹ EB 66, Annex 66. Glossary of Terms http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf

¹² EB 23, Annex 18

http://cdm.unfccc.int/EB/023/eb23_repan18.pdf

¹³ Attachment C to Appendix B, Indicative Simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, EB 47, Annex 28.

used, provided that it can be demonstrated that the parameters from these are comparable.

9. If the fuel switch involves the replacement of equipment and the replaced equipment is scrapped, the scrapped equipment should be stored until a check has been completed to monitor that the number of project activity equipment in use and the number of scrapped equipment correspond.
10. The CPA must demonstrate that the Project activity would not have occurred anyway in the absence of being able to join a CDM PoA.
 - (a) Where the CPA qualifies as a microscale project activity with the total project equipment capacity less than or equal to 5MW, the '*Guidelines for demonstrating additionality of microscale project activities*' (version 03)¹⁴, should be applied.
 - (b) For all other project activities the '*Guidelines on the demonstration of additionality of small scale project activities*' (version 09) of the '*Simplified modalities and procedures for small scale clean development mechanism project activities*' shall be used to assess the additionality of the CPA¹⁵. CPA's should therefore demonstrate that the project would not have occurred anyway due to one of the following barriers:
 - i. Technological barrier
 - ii. Barrier due to prevailing practice
 - iii. Investment barrier
 - iv. Other barriers
11. The CPA must demonstrate that they have conducted local stakeholder consultations and that all comments and queries have been documented and addressed. Where the CPA is situated at the same location as another CPA and involves a similar project activity, the responses from the stakeholder consultation in the original CPA are deemed valid for the subsequent CPA's, provided the local stakeholder group has not significantly changed in constitution since the original local stakeholder consultation.
12. The CPA must demonstrate and provide confirmation that funding received from Annex I parties, if any, does not result in a diversion of official development assistance.
13. The total installed capacity of the project equipment may not exceed 45MW thermal¹⁷ at the start of the project activity or throughout the crediting period.
 - (a) Where the project activity is a co-fired system, the total installed thermal energy generation capacity for the project equipment when using both fossil and renewable fuel, shall not exceed 45MW thermal.
 - (b) Where the project activity involves biomass cogeneration unit(s) the total project equipment capacity constraint is dependent on the origin of the emission reductions as detailed below:
 - i. If the project activity includes emission reductions from both the thermal and electrical energy components, the total installed energy generation capacity

¹⁴ EB 63, Annex 23.

http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid22.pdf

¹⁵ '*Guidelines on the demonstration of additionality of small scale project activities*' (version 09) EB68, Annex 27

¹⁷ Thermal energy generation capacity shall be manufacturer's rated thermal energy output, or if that rating is not available, the capacity shall be determined by taking the difference between the enthalpy of total output (for example steam or hot air in kcal/kg or kcal/m³) leaving the project equipment and the total enthalpy of input (for example feed water or air in kcal/kg or kcal/m³) entering the project equipment. For boilers, condensate return (if any) must be incorporated into enthalpy of the feed.

- (thermal and electrical) of the project equipment shall not exceed 45MW thermal¹⁸.
- ii. If the emission reductions of the cogeneration project activity are solely on account of thermal energy production, the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45MW thermal.
 - iii. If the emission reductions of the cogeneration project activity are solely on account of electrical energy production, the total installed electrical energy production capacity of the project equipment of the cogeneration unit shall not exceed 15MW.
14. The project activity must satisfy the debundling checks as determined in the ‘*Guidelines on assessment of debundling for SSC project activities*’ (version 03), Section II – Guidance for determining the occurrence of debundling under a programme of activities¹⁹.
 15. The CPA must follow the procedure established by the CME for the avoidance of double counting as specified in Section C. Also the CPA must be uniquely identifiable and defined in an unambiguous manner by way of providing geographic information (GPS coordinates).
 16. The CPA must meet the applicability criteria for AMS-I.C (version 19). The CPA must indicate any other single or multiple methodologies that will be used.
 17. There must be an agreement between the CPA implementer and the CME for each CPA in compliance to the PoA-specific requirements stipulated by the CME.
 18. The target group of this kind of methodology (which includes prospective thermal energy project developers) is not an applicable criterion. There are also no distribution mechanisms.
 19. The CPA (if required) must comply with the sampling requirements for the inclusion of CPAs to the PoA.

The CME (as stated in the CME procedures) will ensure that each of the above listed eligibility criteria is fully demonstrated and verifiable at CPA level²⁰.

¹⁸ For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy.

¹⁹ EB 54, Annex 13.

http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid17.pdf

²⁰ EB 65, Annex 3 Par 15.

Application of methodologies

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This PoA promotes and facilitates the switch from fossil fuel use to renewable biomass use in thermal energy generation equipment. This has the effect of displacing fossil fuel use with a renewable energy technology that supplies users with thermal energy

The approved simplified baseline and monitoring methodology AMS-I.C. ‘*Thermal energy production with or without electricity*’ (version 19), EB 61 is therefore applied to each SSC CPA included in the PoA.

There is no sampling required for this PoA and included CPAs.

SECTION C. Management system

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The following elements make up the management system that is implemented by the CME throughout the lifetime of the PoA.

CME database management system

The fuel switch project activities will occur within a fixed geographical area. The CME will establish a database with details about each project activity based on the following parameters:

- The exact geographic location of the project activity
- The type of fossil fuel source used in the baseline
- The type of renewable biomass fuel source used in the project activity
- The capacity of the thermal energy generation equipment/system
- The type of thermal energy that is produced by the equipment/system
- The type of equipment/system used to produce the thermal energy
- The contact details of the project implementer
- The location of the relevant renewable biomass source

The CME will provide the following information in the CME procedure manual in addition to the database management system stated above:

- A clear definition of the roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;
- Records indicating arrangements for training and capacity development for personnel;
- The procedure to be undertaken for technical review of the inclusion of CPAs;
- A procedure to avoid double counting;
- The records and documentation control process for each CPA under the PoA;
- Measures that will be followed for the maintenance of continuous improvement of the PoA management system;

The details of the management system are available in the CME procedure manual.

Avoidance of double counting procedures

Each CPA is specific to a fixed geographical location. The procedure to avoid double counting will therefore involve the following 2 steps at the time a CPA is considered for inclusion in the PoA:

Step 1.

The CME will use the database it maintains as per (i) above to cross-check the geographical location of the proposed CPA against all other geographic locations of the CPA's already included or proposed for inclusion in the Southern African Fuel Switch Programme.

- (a) If there are no CPA's at the same location, the CME continue to Step 2.
- (b) If there are other CPA's at the same location, the CME will perform the debundling checks as per the below section (iii) and complete Step 2.

Step 2.

The CME will check that no other PoA's promoting fuel switch technologies in thermal energy production equipment/systems have been registered in the Host Countries.

- (a) If there are no similar PoA's registered in the Host Countries, the double counting check will be complete.
- (b) If there are similar PoA's registered in the Host Countries, the CME will contact the CME of the PoA and request that they cross-check their CPA location records to ensure that the CPA is not being double counted.

At the time of validation of the PoA there are no other fuel switch for thermal energy production programmes registered in the Host Countries. The details of the avoidance of the double counting procedures are available in the CME procedure manual.

De-bundling checks

The following de-bundling checks will be performed on each CPA in accordance with the 'Guidelines on assessment of de-bundling for SSC project activities' (version 03) *Section II – Guidance for determining the occurrence of de-bundling under a programme of activities*, section 8²¹.

1. A SSC CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity (CPA), which satisfies **both** the below conditions:
 - (a) The activity implementer is the same as the proposed SSC CPA or has a CME which also manages a large scale PoA of the same technology/measure; and
 - (b) The boundary of the project activity is within 1km of the boundary of the proposed SSC CPA.

If the proposed CPA does not satisfy both of the above conditions then it is not a de-bundled component of a large scale activity.

2. If a proposed small-scale CPA of a PoA is deemed to be a debundled 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 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 if it meets **either** of the following conditions:
 - (a) The total size of the proposed SSC CPA combined with the relevant registered SSC CPA(s) of the PoA does not exceed 45MW thermal rated capacity as per the eligibility criteria set out in Section B.2

²¹ EB 54, Annex 13.

http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid17.pdf



- (b) If each of the independent subsystems/project equipment included in the CPA is has a rated capacity of no larger than 1% of 45MW thermal as per the eligibility criteria set out in section B.2.

Therefore, if the proposed de-bundled SSC CPA meets one of the above criteria then it qualifies to use the simplified modalities and procedures for SSC CDM project activities and therefore passes the de-bundling check. If the proposed de-bundled SSC CPA does not meet one of the above criteria it is considered to be a de-bundled component of a large scale project activity and may not be included as a SSC CPA in the PoA.

Inclusion of project activity as a CPA

Contractual relations will be established between the CME and all Project Implementers operating the CPA's to ensure that they are aware that their project activity is being subscribed to the PoA. This will be in the form of a Project Developer CDM Undertaking Agreement and will also provide the details of all the responsibilities of the Project Implementer in accordance with the requirements of the PoA specifically in terms of both the eligibility and monitoring requirements. As indicated in the CME procedure manual, a letter of inclusion will be compiled and must indicate if and how the proposed CPA satisfies the eligibility criteria.

SECTION D. Duration of PoA

D.1. Start date of PoA

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19/05/2012

This is the start date of the Global Stakeholder Consultation (GSC) of this PoA. This date represents the the earliest date of the implementation or real action of the beginning of the PoA.

D.2. Length of the PoA

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28 years

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

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The environmental analysis is done at CPA level. This is because the location, specific technology and renewable biomass source will differ for each CPA and thus the environmental impacts of the specific component project activities need to be evaluated for each and every CPA.

E.2. Analysis of the environmental impacts

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Each CPA will be implemented at a specific site within the Host Countries and will be involved in producing thermal energy for varying industrial/power processes. As a result it is prudent that each CPA undertakes its own environmental analysis because the environmental impacts will differ between CPA's and is dependent on the specifics of the project activity.

Where the host country is South Africa the applicable environmental legislation that must be applied to the CPA is the *National Environmental Management Act (NEMA) No. 107 of 1998* read together with the

*amended EIA Regulations (2010) in terms of Chapter 5 of NEMA*²². Evidence that the necessary obligations under this legislation have been met or that the project activity is excluded from having to do an EIA must be documented in the CPA-DD and provided to the DOE.

Where the host country is Zimbabwe, the applicable environmental legislation is the *Environmental Management Act (2002*²³) and the *EIA Policy (August 1997)*. These require an EIA to be undertaken for certain prescribed activities and the CPA must check whether the project activity qualifies as a ‘prescribed activity’. Evidence that an EIA has been completed where necessary or that an EIA is not necessary must be documented in the CPA-DD and provided to the DOE.

Where the host country is Botswana, a Preliminary Environmental Impacts Assessments (PEIA) form for the proposed CPA project needs to be completed and submitted to the Department of Environmental Affairs (DEA). Based on the information contained in the PEIA, the DEA will take a decision as to whether a full EIA is required or whether the project activity is exempt in line with the *Environmental Assessment Act, 2011*. The potential CPA must comply with the decision made by the Botswana DEA and evidence that an EIA has been completed where necessary or that an EIA is not necessary must be documented in the CPA-DD and provided to the DOE.

SECTION F. Local stakeholder comments

F.1. Solicitation of comments from local stakeholders

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Local stakeholder consultation will be performed at CPA level since each project activity will have a different group of relevant stakeholders.

Each SSC CPA will need to determine the best approach to invite stakeholder comments. It is suggested that any (or a combination) of the following methods are used but the list is by no means exhaustive:

- Newspaper advertisement(s) inviting stakeholders to comment on the CDM project via an appropriate channel(s);
- Dedicated website page with project details as well as contact details. (This approach is not alone sufficient, but is complementary to other initiatives);
- Targeted emails to the interested and affected parties to the project activity with information about the CDM project and details on how to comment on the CDM project via an appropriate channel(s)
- Presentation of a dedicated stakeholder workshop at which attendees can comment on the CDM project.

The response(s) received from any of the above stakeholder consultation processes must be recorded for the DOE to inspect and comments received must be addressed where necessary. Details of the actions taken in response to the comments received must be recorded and presented in the SSC CPA-DD.

F.2. Summary of comments received

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Any Global Stakeholder comments relevant to the PoA will be included below once received.

²² These regulations are found in the Government Notice No. R. 543, R. 544, R. 545, R. 546 and R. 547 in Government Gazette No. 33306 of 18 June 2010.

²³ The *Environmental Management Act (2002)* can be found at the below site.
http://www.saiea.com/dbsa_handbook_update09/pdf/16Zimbabwe09.pdf

**F.3. Report on consideration of comments received**

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The consideration of any Global Stakeholder comments relevant to the PoA will be included below once received.

SECTION G. Approval and authorization

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The letters of Approval from the South African DNA, the Zimbabwean DNA and the Botswana DNA are in the process of being obtained and not available at the time of submitting this PoA-DD to the DOE.

PART II. Generic component project activity (CPA)**SECTION A. General description of a generic CPA****A.1. Purpose and general description of generic CPAs**

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A typical SSC CPA will consist of a project implementer who facilitates a fuel switch in the identified project equipment. This will entail a switch from the use of fossil fuels to the use of renewable biomass in the project equipment which is used in the production of thermal energy or cogeneration for the industrial or power facility.

The project activities in the CPA under the PoA will include any/all of the following Project Scenarios:

Table 1: Project scenarios

Scenario	Description
1	Industrial processes which include the use of a dryer(s) ²⁴ producing heat for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.
2	Industrial processes which include the use of a boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.
3	Industrial processes which include the use of co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.

A SCC-CPA may consist of project type:

- Project activities that are implemented without being registered as a CDM project activity;
- Project activities that seek to retrofit or modify existing facilities for renewable energy generation;
- Greenfield project activities (provided they comply with the related and relevant requirements in the ‘*General Guidelines to SSC CDM methodologies*’);
- Project activities involving capacity additions (provided they comply with the related and relevant requirements in the ‘*General Guidelines to SSC CDM methodologies*’);
- Project activities which do not retrofit or modify existing project equipment and ;
- Project activities which replace existing equipment.

SECTION B. Application of a baseline and monitoring methodology**B.1. Reference of the approved baseline and monitoring methodology(ies) selected**

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AMS-I.C: Thermal energy production with or without electricity. (Version 19)

The following tools and guidelines are used in the SSC CPA’s as per AMS-I.C:

Tool	Version	EB Reference
‘ <i>General Guidelines to SSC CDM methodologies</i> ’	version 17	EB61, Annex 21

²⁴ The term ‘Dryer’ is used generically and refers to any industrial equipment that produces heat.



<i>‘General Guidance on leakage in biomass project activities’</i>	version 03	EB47, Annex 28
<i>‘Definition of Renewable Biomass’,</i>		EB23, Annex 18,
<i>‘Guidelines for demonstrating additionality of microscale project activities’</i>	version 04	EB 68, Annex 26
<i>‘Simplified modalities and procedures for small scale clean development mechanism project activities’,</i>	version 09	EB 68, Annex 27
<i>‘Guidelines on assessment of debundling for SSC project activities’</i>	version 03	EB 54, Annex 13
<i>‘Guidance for determining the occurrence of de-bundling under a programme of activities’,</i>		EB 54, Annex 13
<i>‘The standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities’</i>	version 01.0	EB65, Annex 3
<i>‘Guidelines on the assessment of investment analysis’</i>	version 05	EB62, Annex 5
<i>‘Tool to calculate the emission factor for an electricity system’,</i>	version 2	EB50, Annex 14
<i>‘Tool to determine baseline efficiency of thermal and electric energy generation systems’</i>	version 1	EB48, Annex 12
<i>‘Tool to calculate baseline, project and/or leakage emissions from electricity consumption’,</i>	version 1	BE39, Annex 7
<i>‘Tool to calculate project or leakage CO2 emissions from fossil fuel combustion’</i>	version 1	EB41, Annex 11

The methodology has been approved for application to CPAs under a PoA provided that the project activities meet the conditions that apply for use of the methodology under a PoA. This is covered in the section below (B.2).

B.2. Application of methodology(ies)

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The CPA’s in this PoA implement a switch from fossil fuel use to renewable biomass use in thermal energy generation equipment. This has the effect of displacing fossil fuel use with a renewable energy technology that supplies users with thermal energy. AMS-I.C is therefore the applicable methodology.

Table 2: Methodological applicability criteria and justification of applicability

Applicability Criteria	SSC CPA Justification	Reference or Supporting documents
Biomass-based co-generating systems that produce heat and electricity 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 (Paragraph 2 of AMS-I.C	This PoA includes systems that qualify as co-generation systems i.e. the simultaneous generation of thermal and electrical energy in one process. (Eligibility criteria 2, refer to section B.2 above.)	Confirmation by the CME regarding the co-generation systems in the process, i.e. thermal, electrical or both. Refer to the CPA inclusion letter compiled by the CME.



<p>(version 19)).</p> <p>Emission reductions from a biomass cogeneration system can accrue from one of the following activities:</p> <p>(a) Electricity to a grid;</p> <p>(b) Electricity and/or thermal energy (steam or heat) for on-site consumption or for consumption by other facilities;</p> <p>(c) Combination of (a) and (b) (Paragraph 3 of AMS-I.C (version 19)).</p>	<p>SSC CPA may accrue emission reductions from any of (a), (b) or (c) provided the cogeneration is fired by renewable biomass in part or in full. (Technology/measures see section A.6 above.)</p>	<p>Confirmation by the CME regarding the source of emission reductions, i.e. a, b or c.</p>
<p>The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than $45\text{MW}_{\text{thermal}}$. (Paragraph 4 of AMS-I.C (version 19)).</p>	<p>The total installed/rated thermal energy generation capacity of the project(s) included under a SSC CPA will not exceed $45\text{MW}_{\text{thermal}}$. This has been included as a specific eligibility criterion for inclusion in the PoA. (Eligibility criteria #5, see section B.2 above.)</p>	<p>Declaration by the equipment manufacturer regarding the equipment rated thermal energy generation capacity.</p>
<p>For co-fired systems, the total installed/rated thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed $45\text{MW}_{\text{thermal}}$. (Paragraph 5 of AMS-I.C (version 19)).</p>	<p>Where the SSC CPA co-fires renewable biomass, the total installed/rated thermal energy generation capacity when using both fossil fuel and renewable fuel cannot exceed $45\text{MW}_{\text{thermal}}$. This has been included as a specific eligibility criterion for inclusion in the PoA. (Eligibility criteria #13(a))</p>	<p>Confirmation and declaration by the CPA to the CME implementer regarding the total installed/rated thermal energy generation capacity of the project equipment. Refer to the CPA inclusion letter compiled by the CME.</p>
<p>The following installed/rated capacity limits apply for biomass cogeneration units:</p> <p>(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 $45\text{ MW}_{\text{thermal}}$. 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 Project activities, the maximum limit of 15 MW_{e} is equivalent to $45\text{MW}_{\text{thermal}}$ output of the equipment or</p>	<p>Where the SSC CPA is a renewable biomass cogeneration project activity, the thresholds are applied as per (a), (b) and (c) to ensure that the cogeneration system does not exceed $45\text{MW}_{\text{thermal}}$ total installed/rated capacity. This has been included as a specific eligibility criterion for inclusion in the PoA. (Eligibility criteria #13(b))</p>	<p>Confirmation and declaration by the CPA to the CME implementer regarding the total installed/rated thermal energy generation capacity of the project equipment.</p>



<p>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 15MW. (Paragraph 6 of AMS-I.C (version 19)).</p>		
<p>The capacity limits specified in the above applicability criteria 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 for the total installed/rated capacity of the project equipment and/or the capacity limits biomass cogeneration units. (Paragraph 7 of AMS-I.C (version 19)).</p>	<p>Where the SSC CPA involves the addition of biomass renewable energy generation units at an existing renewable energy facility, the total installed/rated capacity limits of the project equipment will be less than 45MW_{thermal}.</p>	<p>Confirmation and declaration by the CPA to the CME implementer regarding the total installed/rated thermal energy generation capacity of the project equipment.</p>
<p>Project activities that are implemented without being registered as a CDM project activity;</p>	<p>The PoA does not include any project activities that are already implemented without being registered as a CDM project activity.</p>	<ul style="list-style-type: none"> • Declaration by CPA implementer to the CME.
<p>Project facilities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. (Paragraph 8 of AMS-I.C (version 19)).</p>	<p>The PoA includes SSC CPAs that seek to retrofit or modify an existing facility for renewable energy generation from biomass.</p>	<ul style="list-style-type: none"> • Declaration by CPA implementer to the CME. • Purchase order for the modification by the CPA implementer.



		<ul style="list-style-type: none"> • Residual lifetime assessment report of the existing equipment. • Declaration by the CPA implementer that only fossil fuel will be used in the event of the unavailability of renewable biomass. • Historical fossil fuel usage data from the CPA implementer.
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 ‘ <i>General Guidelines to SSC CDM methodologies</i> ’ (Paragraph 9 of AMS-I.C (version 19)).	All new Greenfield project activities comply with the ‘ <i>General Guidelines to SSC CDM methodologies</i> ’	Declaration by CPA implementer to the CME.
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 leakage emissions associated with its production shall be taken into account in the emissions reduction calculation. (Paragraph 10 of AMS-I.C (version 19)).	The SSC CPAs must demonstrate that the biomass used in the fuel switch is renewable and/or they must monitor that the biomass source is renewable biomass where the source may vary. This is eligibility criterion #7 as listed in section D5 and extends to the use of solid biomass fuel. Leakage emissions associated with the production of a solid biomass fuel are taken into account.	Declaration by CPA implementer to the CME.
Where the project participant is not the producer of the processed 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. (Paragraph 11 of AMS-I.C (version 19)).	Where the SSC CPA uses processed biomass fuel, the project implementer is required to show evidence of such a contract as part of the eligibility criteria for inclusion in the PoA. (Eligibility criteria #8(a)ii.)	<ul style="list-style-type: none"> • Declaration by CPA implementer to the CME. • Supplier contract between the biomass supplier and the CPA implementer.
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	Where the SSC CPA delivers electricity/steam/heat produced by renewable biomass to a third party, evidence of a contract between the supplier and the	<ul style="list-style-type: none"> • Declaration by CPA implementer to the CME. • Electricity layout diagram • Steam and/or heat layout diagram



<p>contract between the supplier and the consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions. (Paragraph 12 of AMS-I.C (version 19)).</p>	<p>consumer must be provided.</p>	
<p>If the project activity recovers and utilizes biogas for power/heat production and applies this methodology on a standalone basis, any incremental emissions occurring due to the implementation of the project activity shall be taken in account either as project or leakage emissions. (Paragraph 13 of AMS-I.C (version 19)).</p>	<p>This PoA does not include the utilization of biogas for power/heat and therefore this applicability criterion is not applicable.</p>	<p>Declaration by the CME.</p>
<p>Charcoal based biomass energy generation project activities are eligible to apply the methodology only in the charcoal is produced from renewable biomass sources provided: (a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or (b) Methane emissions from the production of charcoal shall be calculated as per the procedures defined in AMS-III.K. 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. (Paragraph 14 of AMS-I.C (version 19)).</p>	<p>Where the SSC CPA uses charcoal based biomass energy, this applicability criterion is taken into account and it is also an eligibility criterion for inclusion of the CPA into the PoA. (Eligibility criteria #8(b)).</p>	<p>Declaration by the CME.</p>
<p>For use of the methodology under a PoA the following conditions apply:</p>		<p>Reference or Supporting documents</p>
<p>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 only or biomass from dedicated plantations complying with the applicability conditions of AM0042. . (Paragraph 51a of</p>	<p>The SSC CPA may only use renewable biomass that is biomass residues, processed biomass or biomass from dedicated plantations. This has been included in the eligibility criteria for a CPA to be included under the PoA. (Eligibility criteria #8(a)).</p>	<p>Confirmation by the CME.</p>



<p>AMS-I.C (version 19)).</p> <p>In the specific case of biomass project activities the determination of leakage shall be done following the ‘<i>General guidance for leakage in small scale biomass project activities</i>’ (attachment C of Appendix B of simplified modalities and procedures for SSC CDM project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042. . (Paragraph 51b of AMS-I.C (version 19)).</p>	<p>Each SSC CPA is required to use the ‘<i>General guidance for leakage in small scale biomass project activities</i>’ (attachment C of Appendix B of simplified modalities and procedures for SSC CDM project activities; decision 4/CMP.1) to calculate leakage.</p>	<p>Confirmation by the CME.</p>
<p>In the 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. . (Paragraph 51c of AMS-I.C (version 19)).</p>	<p>Where the project activity involves the replacement of equipment, the project implementer is required to ensure that the scrapped equipment is stored until the independent check to confirm that the number of new equipment and scrapped equipment corresponds is completed satisfactorily. This is one of the eligibility criteria for inclusion of a CPA in the PoA. (Eligibility criteria #9)</p>	<p>Confirmation by the CME.</p>

Therefore the methodology is applicable to SSC CPA’s under this PoA.

The project activities included under the PoA as CPAs qualify as Type I – Renewable Energy Projects and will continue to do so during every year of the crediting period as the purpose of the PoA is to promote and facilitate projects that produce thermal energy from renewable energy technology using renewable biomass sources as the fuel input. All CPAs for inclusion under this PoA therefore qualify as Type I projects.

B.3. Sources and GHGs

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Table 3: Emission sources and gases

	Source	GHGs	Included?	Justification / Explanation
Baseline Scenario	Combustion of fossil fuel in thermal energy production process	CO ₂	Yes	The combustion of fossil fuels releases CO ₂ . This emission source will be calculated as per the simplified baseline detailed in the latest version of AMS-I.C ‘ <i>Thermal energy production with or without electricity</i> ’
		CH ₄	No	Minor source of emissions
		N ₂ O	No	Minor source of emissions
Project Scenario	Combustion of fossil fuel in thermal energy production process	CO ₂	Yes	The use of renewable biomass in the process makes the fuel combustion a carbon neutral activity. Any other CO ₂ emissions are accounted for as per the latest version of the ‘ <i>General guidance on leakage in biomass project activities</i> ’
		CH ₄	No	Minor source of emissions
		N ₂ O	No	Minor source of emissions

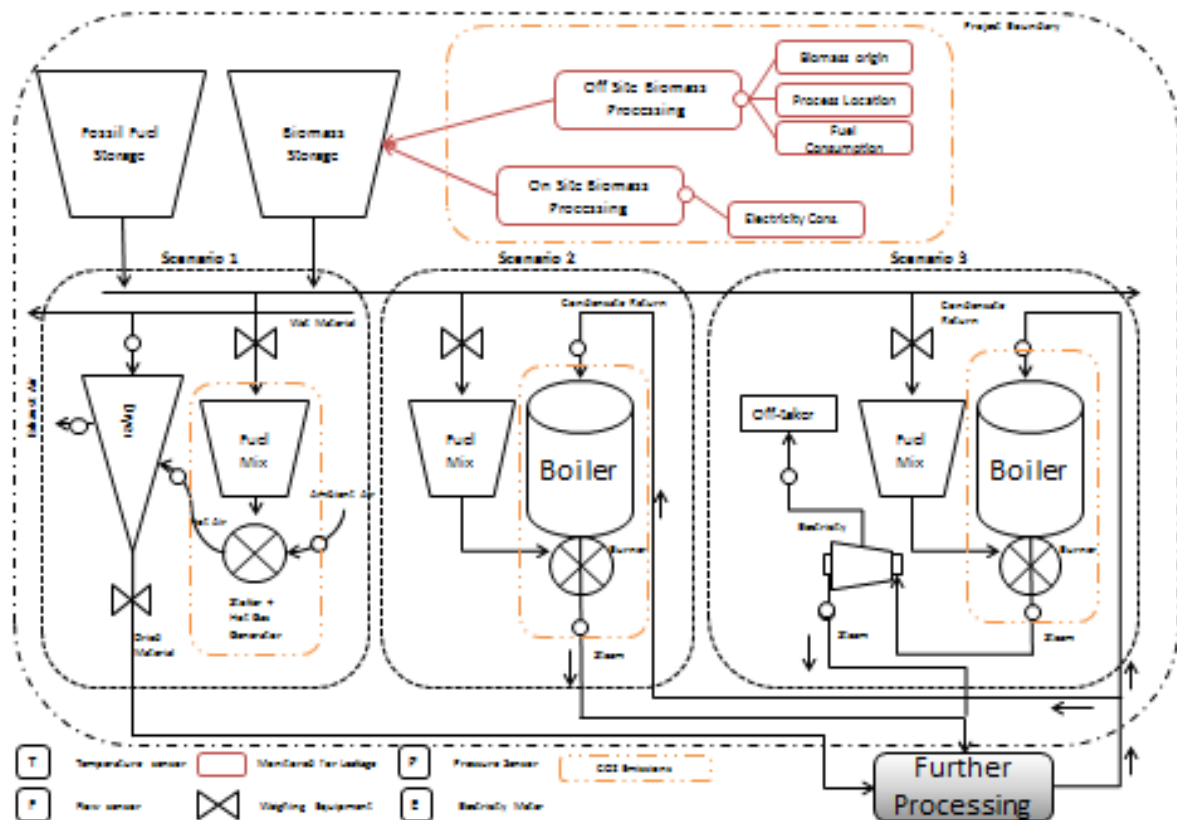


Figure 3: Flow diagram of typical CPA technology, emission sources & GHGs and data parameters to be monitored

B.4. Description of baseline scenario

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The simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity, multiplied by an emission factor for the fossil fuel displaced. The baseline specific to the CPA is identified based on the relevant Project Scenario and Project Type as provided below.

Table 4: Project scenario and baseline scenario

Scenario	Description	Baseline Scenario
1	Industrial processes which include the use of a dryer(s) producing heat for use in the process where renewable biomass is combusted as the fuel source in the project activity, with or without fossil fuel.	The baseline emissions result from the use of fossil fuel combustion in the dryer(s) to produce heat.
2	Industrial processes which include the use of a boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source in the project activity, with or without fossil fuel.	The baseline emissions result from the use of fossil fuel combustion in the boilers(s) to produce steam.
3	Industrial processes which include the use of co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source in the project activity, with or without fossil fuel.	The baseline emissions result from the use of fossil fuel combustion, captive electricity producing units or grid electricity sources in the cogeneration equipment to produce thermal energy and electrical energy.

The following baselines are applicable for project type:

- a) **Project activities that are implemented without being registered as a CDM project activity;**
- b) **Project activities that seek to retrofit or modify existing facilities for renewable energy generation;**
 - Where the project activity is implementing a fuel switch in retrofitted/modified equipment, the baseline is the use of fossil fuel(s) in the original equipment.
- c) **Greenfield project activities;**
 - Where the project activity is implementing a fuel switch at new project equipment, the baseline will be determined by identifying and considering all the most plausible alternatives to the project activity. The most credible and feasible fossil fuel alternative which is more attractive than the project activity is identified as the baseline.
- d) **Project activities involving capacity additions;**
 - Where the project activity is implementing a fuel switch involving capacity additions at an existing facility, the baseline will be determined by identifying the fossil fuel use at the existing facility. The baseline of the project activity is identified as what is being used as a fossil fuel input in the existing facility.
- e) **Project activities which do not retrofit or modify existing project equipment;**
 - Where the project activity is implementing a fuel switch at existing project equipment, the baseline is the use of fossil fuel(s) in the project equipment prior to the implementation of the project activity.

f) **Project activities which replace existing equipment;**

- Where the project activity is implementing a fuel switch at an existing facility but replacing the original equipment with new project equipment, the baseline is the use of fossil fuel(s) in the original equipment prior to its replacement.

The relevant provisions from selected methodology AMS-IC for the establishment and description of the baseline scenario that are applicable to the different project scenarios and types are detailed in the below table. The relevant approved baseline paragraphs must be applied to each CPA as per the project activity scenario and type.

Table 5: Establishment of baseline scenario based on CPA project scenario and type

Project Scenario & Type	Description	Approved baseline paragraphs
1	Project activities that are implemented without being registered as a CDM project activity;	Generic baseline scenario
2(a)	Project activities that seek to retrofit or modify existing equipment used in an industrial processes which includes the use of a dryer(s) producing heat for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 42
2(b)	Greenfield project activities which include the use of a dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 22, 30,35
2(c)	Project activities which involve capacity additions to a dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 37, 38
2(d)	Project activities which do not retrofit or modify a dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35
2(e)	Project activities which replace existing dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 40, 41
3(a)	Project activities which seek to modify or retrofit equipment used in industrial processes which include the use of a boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 38
3(b)	Greenfield project activities which include the use of a boiler(s) producing steam for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 22, 30, 35
3(c)	Project activities which involve capacity additions to a boiler(s) producing steam for use in the industrial process where renewable biomass is combusted as the fuel source,	16, 17, 22, 30, 35, 37, 38

	with or without fossil fuel.	
3(d)	Project activities which do not retrofit or modify boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35
3(e)	Project activities which replace existing boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 40, 41
4(a)	Project activities which seek to retrofit or modify co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35
4(b)	Greenfield project activities which include the use of co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 19(a), 19(b), 19(c), 19(d), 19(h), 20, 21, 22, 23, 25, 26, 27, 29, 34, 35
4(c)	Project activities which involve capacity additions to co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35
4(d)	Project activities which do not retrofit or modify co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35
4(e)	Project activities which replace existing co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35, 40, 41

B.5. Demonstration of eligibility for a generic CPA

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The eligibility criteria for the inclusion of a SSC-CPA in the Southern African Fuel Switch PoA are detailed below with the necessary justification as to why a SSC CPA is eligible for inclusion.

Table 6: Confirmation of eligibility

#	Eligibility Criteria	Justification
1	The geographical boundary of the project activity must be situated within the borders of South Africa, Zimbabwe or Botswana.	The SSC CPA is situated within South Africa/Zimbabwe/Botswana.
2	The thermal energy generation equipment used in the project activity must be specifically identified in the CPA-DD by determining the unique characteristics associated with	The CPA must provide details of the specific identification of the thermal energy generation equipment used in the project activity.



	it/manufacturers specifications.	
3	The fuel switch technology must comply with all relevant local and national environmental regulations and appropriate standards as regulated by law and by the safety and environmental policies of the facility at which the project is implemented.	The CPA must determine if the project activity triggers the need for an EIA. Any necessary actions undertaken must be detailed in the CPA-DD. Therefore, the current operations are all compliant with the local and national environmental regulations and appropriate standards and policies of the facility.
4	The type of the renewable biomass must be identified and documented in the CPA-DD.	The CPA must detail the type of the renewable biomass.
5	The expected performance specifications of the project dryer(s)/boiler(s)/cogeneration unit(s) must be a rated capacity equal to or less than 45MW _{thermal} in aggregate for each project activity.	The CPA must state the rated capacity of the project equipment both individually and in aggregate (where applicable) and provide necessary documentary evidence to support the stated rated capacity.
6	The project implementer must provide evidence of the estimated date that the thermal generation equipment is expected to first begin normal operation after the implementation of the fuel switch.	The CPA must establish and state the date that the thermal generation equipment is first expected to begin normal operation after implementation of the fuel switch and provide evidence to support this.
7	The project implementer must provide evidence that the biomass used in the fuel switch is renewable biomass as per the CDM definition of renewable biomass and/or monitor the source of the biomass to ensure it is renewable.	The CPA must detail the evidence that is used to ensure the biomass is renewable and where monitoring is necessary, how the monitoring of the biomass source is conducted must be detailed.
8	<p>The fuel switch must involve renewable energy technologies that supply users with thermal energy that displaces fossil fuel use.</p> <ol style="list-style-type: none"> 1. In the specific case of renewable biomass²⁵ project activities the renewable biomass used must be either, <i>biomass residues</i> or <i>processed biomass</i> or <i>biomass from dedicated plantations</i>. <ol style="list-style-type: none"> (a) If processed biomass is used the CPA must demonstrate that it has used only renewable biomass and that all project and/or leakage emissions have been taken into account. (b) If processed biomass is used and the project participant is not the producer of the processed solid biomass fuel, the CPA must demonstrate that there is a contact in place between the project participant and the producer which enables the project participant to monitor 	<ol style="list-style-type: none"> (a) The project activity involves a fuel switch to the use of renewable biomass in the form of biomass residues/processed biomass/biomass from dedicated plantations. <ol style="list-style-type: none"> i. The processed biomass is renewable biomass as per eligibility criteria 7 and leakage is accounted for as per the ‘<i>Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion</i>’ and the ‘<i>General guidance on leakage in biomass project activities</i>’ (version 03). OR Processed biomass is not used in the project activity. ii. A contract has been drafted for agreement/signed between the processed biomass supplier and the project implementer. This

²⁵ Definition of renewable biomass

	<p>the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. The contract must also ensure that there is no double-counting of emission reductions.</p> <p>(c) If biomass from dedicated plantations is used, the plantation must comply with the applicability conditions as stipulated in AM0042 or monitoring parameters must be in place to ensure that plantations established in the future or new dedicated plantation sources meet the applicability requirements of AM0042.</p> <p>(d) The determination of leakage must be done by following the ‘<i>General guidance on leakage in biomass project activities</i>’ (version 03)²⁶,</p> <p>2. In the specific case of charcoal based biomass energy generation project activities, the charcoal must be produced from renewable biomass sources and;</p> <p>(a) The charcoal must be produced in kilns equipped with methane recovery and destruction or,</p> <p>(b) Methane emissions from the production of charcoal shall be considered and calculated as per AMS-III.K. 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.</p>	<p>contract allows the project implementer to monitor the source of the renewable biomass and to account for any emissions associated with solid biomass fuel production. This contract also ensures that there is no double-counting of emission reductions.</p> <p>OR</p> <p>Processed biomass is not being used or is processed onsite.</p> <p>iii. Where the biomass is sourced from a dedicated plantation, the plantation is monitored to ensure that it meets the applicability conditions stipulated in AM0042. The relevant monitoring parameters have been included in section B.7.1.</p> <p>OR</p> <p>The biomass will not be sourced from a dedicated plantation.</p> <p>iv. The determination and monitoring of leakage will be calculated according to the <i>General guidance on leakage in biomass project activities</i>’ (version 03).</p> <p>(b) The project activity does not use charcoal and therefore the conditions in the specific case of charcoal use are not applicable to this project activity.</p> <p>OR</p> <p>The project activity uses charcoal produced from renewable biomass and;</p> <p>i. The charcoal is produced in kilns equipped with methane recovery and destruction.</p> <p>OR</p> <p>ii. Methane emissions from the production of charcoal are considered and calculated as per AMS-III.K.</p> <p>OR</p>
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²⁶ Attachment C to Appendix B, Indicative Simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, EB 47, Annex 28.

		<p>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.</p>
9	<p>If the fuel switch involves the replacement of equipment and the replaced equipment is scrapped, the scrapped equipment should be stored until a check has been completed to monitor that the number of project activity equipment in use and the number of scrapped equipment correspond.</p>	<p>There is no replacement of equipment in the project activity and therefore there is no need to monitor scrapped equipment. OR Detail how the scrapped equipment has been/will be checked to correspond with the number of equipment scrapped.</p>
10	<p>The CPA must demonstrate that the Project activity would not have occurred anyway in the absence of CDM</p> <ol style="list-style-type: none"> 1. Where the CPA qualifies as a microscale project activity with the total project equipment capacity less than or equal to 15MW_{thermal}, the ‘<i>Guidelines for demonstrating additionality of microscale project activities</i>’ (version 03)²⁷, should be applied. 2. For all other project activities the ‘<i>Guidelines on the demonstration of additionality of small scale project activities</i>’ (version 09) of the ‘<i>Simplified modalities and procedures for small scale clean development mechanism project activities</i>’ shall be used to assess the additionality of the CPA. CPA’s should therefore demonstrate that the project would not have occurred anyway due to one of the following barriers²⁹: <ol style="list-style-type: none"> i. Technological barrier ii. Barrier due to prevailing practice iii. Investment barrier. iv. Other barriers 	<ol style="list-style-type: none"> i) The project activity does not/does qualify as a microscale project activity because the thermal/electrical rated capacity of the dryer/boiler/cogeneration equipment is more than/less than 15MW_{thermal}/5MW_{electrical}. The ‘<i>Simplified modalities and procedures for small scale clean development mechanism project activities</i>’ shall therefore be used to demonstrate additionality OR The ‘<i>Guidelines for demonstrating additionality of microscale project activities</i>’ shall therefore be used to demonstrate additionality. ii) Brief description of the barrier analysis that has been demonstrated in the ‘Confirmation of Additionality’ section below. OR Brief description of the application of the ‘<i>Guidelines for demonstrating additionality of microscale project activities</i>’.
11	<p>The CPA must demonstrate that they have conducted local stakeholder consultations and that all comments and queries have been documented and addressed. Where the CPA is situated at the same location as another CPA and involves a similar project activity, the responses from the stakeholder consultation in</p>	<p>The CPA must provide details of the local stakeholder consultation procedure, responses received and actions taken to address them.</p>

²⁷ EB 63, Annex 23.

http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid22.pdf

²⁹ ‘*Guidelines on the demonstration of additionality of small scale project activities*’ (version 09) EB68, Annex 27

	the original CPA are deemed valid for the subsequent CPA's, provided the local stakeholder group has not significantly changed in constitution since the original local stakeholder consultation.	
12	The CPA must demonstrate that funding received from Annex I parties, if any, does not result in a diversion of official development assistance.	No funding is received from Annex I parties. A statement to this effect has been provided by the project implementer.
13	<p>The total installed capacity of the project equipment may not exceed 45MW thermal³⁰ at the start of the project activity or throughout the crediting period.</p> <p>(a) Where the project activity is a co-fired system, the total installed thermal energy generation capacity for the project equipment when using both fossil and renewable fuel, shall not exceed 45MW thermal.</p> <p>(b) Where the project activity involves biomass cogeneration unit(s) the total project equipment capacity constraint is dependent on the origin of the emission reductions as detailed below:</p> <p>i. 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 45MW thermal³¹.</p> <p>ii. If the emission reductions of the cogeneration project activity are solely on account of thermal energy production, the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45MW thermal.</p> <p>iii. If the emission reductions of the cogeneration project activity are solely on account of electrical</p>	The CPA must detail the rated capacity of the relevant thermal generation project equipment.

³⁰ Thermal energy generation capacity shall be manufacturer's rated thermal energy output, or if that rating is not available, the capacity shall be determined by taking the difference between the enthalpy of total output (for example steam or hot air in kcal/kg or kcal/m³) leaving the project equipment and the total enthalpy of input (for example feed water or air in kcal/kg or kcal/m³) entering the project equipment. For boilers, condensate return (if any) must be incorporated into enthalpy of the feed.

³¹ For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy.

	energy production, the total installed electrical energy production capacity of the project equipment of the cogeneration unit shall not exceed 15MW.	
14	The project activity must satisfy the debundling checks as determined in the ‘ <i>Guidelines on assessment of debundling for SSC project activities</i> ’ (version 03), Section II – Guidance for determining the occurrence of debundling under a programme of activities ³² .	The CPA must satisfy the debundling checks as detailed in Section C.
15	The project activity must follow conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo)	The CPA must follow the procedure for the avoidance of double counting as detailed in Section C and in the CME procedure manual.
16	The project activity must meet the conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs	The CPA must comply with the methodology applicability criteria as indicated in AMS.I.C (version 19) and comply with any single or multiple methodologies as required.
17	There must be an agreement between the CPA implementer and the CME for each CPA in compliance to the PoA-specific requirements stipulated by the CME.	The CME will facilitate the drafting and signing of a contract between itself (the CME) and the CPA implementer.
18	Where applicable the target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/ off-grid) and distribution mechanisms (e.g. direct installation) must be indicated.	The target group includes prospective thermal energy project developers (for purposes of displacing fossil fuel use). There are no distribution mechanisms.
19	The conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys should be complied with where applicable.	The CPA (if required) must comply with the sampling requirements for the inclusion of CPA to the PoA.

The CME (as stated in the CME procedures) will ensure that each of the above listed eligibility criteria is fully demonstrated and verifiable at CPA level.

Confirmation of Additionality

The project activity uses the ‘*Simplified modalities and procedures for small scale clean development mechanism project activities*’ to assess additionality. The CPA will demonstrate that the project would not have occurred anyway in the absence of CDM by demonstrating that the proposed project activity faces barriers to its implementation which determine that the project activity would not go ahead in the absence of its inclusion as a CPA under this PoA. These barriers can either be technological, due to prevailing practice, investment barriers or other barriers and one or more of these barriers should be selected as the Option(s) to demonstrate additionality as applicable.

³² EB 54, Annex 13.

http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid17.pdf

Option A: Technological Barrier

- ii) Demonstrate that the technological risks of implementing the new fuel switch technology are a barrier to the project activity by showing that a less technologically advanced alternative involves lower risks due to the performance uncertainty or low market share of the fuel switch technology to be adopted. Examples that may be used to demonstrate the technological barrier include, but are not limited to:
 - lack of infrastructure to utilize the fuel switch technology,
 - non-availability of human capacity to operate and maintain the fuel switch technology,
 - unacceptably high level of technology risk,
 - unavailability and/or unreliability of the supply of renewable biomass.

Option B: Barrier Due to Prevailing Practice

- iii) Demonstrate that the project activity is among the first-of-its-kind in terms of technology, geography, sector, type of investment, investor and market etc in accordance with the ‘*Guidelines on additionality of first-of-its-kind project activities*’ (version 01)³³.
- iv) Demonstrate that prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions.

Option C: Investment Barrier

- ii) Demonstrate that a financially more viable alternative to the project activity would have led to higher emissions by using one of the following investment analysis methods according to the ‘*Guidelines on the assessment of investment analysis*’ (version 05):
 - i. Investment comparison analysis;
 - ii. Benchmark analysis;
 - iii. Simple cost analysis or levelised cost analysis.

Option D: Other Barriers

- i) Demonstrate that the emissions would have been higher without the project activity, for any other project specific reason identified by the project participant, such as institutional barriers, unavailability of information, managerial resources, organizational capacity, financial resources or the capacity to absorb new technologies.

Alternative arguments, not listed here, but specific to the selected barrier and the project activity may also be considered when assessing additionality provided that the SSC CPA can clearly demonstrate that a legitimate barrier exists. The process of managing other barriers is highlighted in the CME procedure manual.

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

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A CPA is eligible as a small scale project activity according to the latest version of AMS-I.C. ‘*Thermal energy production with or without electricity*’.

Project Boundary

³³ EB 63, Annex 11 http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid43.pdf

The transportation itineraries (if the biomass is transported over distances greater than 200km) are not included in the project boundary as all associated emissions will be accounted for as leakage as detailed in the below leakage section.

The SSC CPA must document which of the applicable baseline paragraphs are selected given the specific project scenario and type as detailed in Table 5: Establishment of baseline scenario based on CPA project scenario and type. The selected baseline paragraphs must then be applied to the SSC CPA to determine the baseline emissions as detailed below.

Emission Reductions

The emission reductions of a SSC CPA are calculated according to the following equation:

$$ER_y = BE_y - PE_y - LE_y \quad (1)$$

Where:

ER_y	Emission Reductions in year y (tCO ₂ e)
BE_y	Baseline emissions in year y (tCO ₂)
PE_y	Project emissions in year y (tCO ₂)
LE_y	Leakage emissions in year y (tCO ₂)

Baseline Emissions

The simplified baseline which is applicable to all SSC CPAs is the fuel consumption of the technologies that would have been used in the absence of the project activity, multiplied by an emission factor for the fossil fuel displaced. Depending on the project scenario and type of project activity, the baseline emissions are calculated accordingly as detailed in Table 5: Establishment of baseline scenario based on CPA project scenario and type.

The SSC CPA must document which of the applicable baseline paragraphs are selected given the specific project scenario and type. The selected baseline paragraphs must then be applied to the SSC CPA to determine the baseline emissions as detailed below.

The quantities, types of biomass and the biomass to fossil fuel ratios (in the case of co-fired systems) expected to be used during the crediting period should be explained and documented transparently in the CPA-DD. For the calculation of the baseline scenario emissions, an *ex ante* estimation of these quantities should be provided.

Baseline emissions must be calculated using one of the following datasets and the option chosen by the SSC CPA must be documented in the CPA-DD.

Option 1

Three years of historical data prior to the implementation of the project for the below parameters:

- Fossil fuel usage / electricity usage
- System / Equipment output (heat/steam)
- Thermal efficiency of the system / equipment

OR

Option 2

Parameters are to be determined using a performance test/measurement campaign prior to implementation of the project activity. The project implementer may follow the relevant provisions from the 'Tool to determine baseline efficiency of thermal and electricity systems.'

PROJECT SCENARIO 1:**For 1(a), 1(b), 1(c), 1(d) and 1(e)**

Where the baseline emissions result from the use of fossil fuel combustion in a dryer(s) to produce heat, the baseline emissions for **heat produced** using fossil fuels are calculated as follows:

$$BE_{\text{thermal,CO}_2,y} = (EG_{\text{thermal},y} / \eta_{\text{BL,captive plant}}) * EF_{\text{BL,FF,CO}_2} \quad (2)$$

Where:

$BE_{\text{thermal,CO}_2,y}$	The baseline emissions from steam/heat displaced by the project activity during the year y (tCO ₂)
$EG_{\text{thermal},y}$	The net quantity of heat supplied by the project activity during the year y (TJ)
$EF_{\text{FF,CO}_2}$	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)
$\eta_{\text{BL,thermal}}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

Efficiency of the baseline units shall be determined by adopting one of the following criteria (in preferential order)

- Highest measured operational efficiency over the full range of operating conditions of a unit with similar specifications, using baseline fuel. The efficiency tests shall be conducted following the guidance provided in relevant national/international standards;
- Highest of the efficiency values provided by two or more manufacturers for units with similar specifications, using the baseline fuel;
- Default efficiency of 100%.

If the baseline dryer system is a co-fired system:

The baseline emissions shall be determined based on three years average historical data on the relative share of fossil fuel and biomass in the baseline fuel mix. The relative share is determined based on the energy content of each fuel.

$$BE_{\text{cofire,CO}_2,y} = (EG_{\text{cofire,PJ},y} / \eta_{\text{BL,cofire}}) * EF_{\text{cofire,CO}_2} \quad (3)$$

Where:

$BE_{\text{cofire,CO}_2,y}$	The baseline emissions from thermal energy displaced by the project activity during the year y (tCO ₂ e)
$EG_{\text{cofire,PJ},y}$	The net quantity of energy (thermal) supplied by the project activity during the year y (TJ)
$\eta_{\text{BL,cofire}}$	The efficiency of the co-fired plant that would have been used in the absence of the project activity
$EF_{\text{cofire,CO}_2}$	CO ₂ emission factor of the baseline co-fired plant established using three years average historical data (tCO ₂ /TJ). In the case

where more than one fossil fuel is used by the co-fired plant, the weighted average emission factor (in energy basis) among the identified fossil fuels shall be used.

For 1(e)

If the remaining lifetime of the replaced dryer equipment increases:

Then the crediting period shall be limited to the time when the affected equipment would have been replaced in the absence of the project activity. This is the estimated remaining lifetime of the baseline equipment.

In order to estimate the point in time when the existing equipment would need to be replaced in the absence of the project activity ($DATE_{\text{baseline,retrofit}}$), CPAs may follow the procedures described in the ‘*General Guidelines to SSC CDM methodologies*’

For 1(c)

If the project activity involves the capacity addition of new dryer units at an existing facility:

Where the project activity involves the addition of new renewable biomass energy production units at an existing heat production facility, net increase in thermal energy generation should be calculated as follows:

$$EG_{\text{thermal,add,y}} = EG_{\text{thermal,PJ,y}} - EG_{\text{thermal,old,y}} \quad (4)$$

Where:

$EG_{\text{thermal,add,y}}$	Net increase in thermal energy generation at existing plant in year y that should be considered as energy baseline (EG_{BL}) (TJ)
$EG_{\text{thermal,PJ,y}}$	Total actual thermal energy produced in year y by all units, existing and new project units (TJ)
$EG_{\text{thermal,old,y}}$	Estimate 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 of $EG_{\text{thermal,old,y}}$ is given by:

$$EG_{\text{thermal,old,y}} = \text{MAX} (EG_{\text{thermal,actual,y}}; EG_{\text{thermal,estimated,y}}) \quad (5)$$

Where:

$EG_{\text{thermal,actual,y}}$	The actual, measured thermal energy production of the existing units in year y (TJ)
$EG_{\text{thermal,estimated,y}}$	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)

If project activity involves capacity addition as a result of retrofit or modification to an existing facility:

Where the project activity involves a capacity addition to the dryers as a result of retrofit or modification that will increase production, then, $EG_{\text{thermal,old},y}$ can be estimated using the procedures described for $EG_{\text{BL,thermal,retrofit},y}$:

$$EG_{\text{BL,thermal,retrofit},y} = \text{MAX} (EG_{\text{HY,thermal,retrofit},y}; EG_{\text{estimated,thermal},y}) \text{ until } \text{DATE}_{\text{baseline,retrofit}} \quad (6)$$

Where:

$EG_{\text{BL,thermal,retrofit},y}$	Thermal energy production by an existing facility in the absence of the project activity in year y (TJ)
$EG_{\text{HY,thermal,retrofit},y}$	Average of historical thermal energy levels delivered by the existing facility, spanning all data from the most recent available year to the time at which the facility was constructed, retrofitted or modified in a manner that significantly affected output. (TJ)
$EG_{\text{estimated,thermal},y}$	Estimated thermal energy that would have been produced by the existing units under the observed availability of renewable resources in year y (TJ)
$\text{DATE}_{\text{baseline,retrofit}}$	Date at which the existing generation facility is likely to be replaced or retrofitted in the absence of the CDM project activity.

PROJECT SCENARIO 2:

For 2(a), 2(b), 2(c), 2(d) and 2(e)

Where the baseline emissions result from the use of fossil fuel combustion in a boiler(s) to produce heat, the baseline emissions for **steam produced** using fossil fuels are calculated as follows:

$$BE_{\text{thermal,CO}_2,y} = (EG_{\text{thermal},y} / \eta_{\text{BL,captive plant}}) * EF_{\text{BL,FF,CO}_2} \quad (7)$$

Where:

$BE_{\text{thermal,CO}_2,y}$	The baseline emissions from steam/heat displaced by the project activity during the year y (tCO ₂)
$EG_{\text{thermal},y}$	The net quantity of heat supplied by the project activity during the year y (TJ)
$EF_{\text{FF,CO}_2}$	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)
$\eta_{\text{BL,thermal}}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

Efficiency of the baseline units shall be determined by adopting one of the following criteria (in preferential order)

- (a) Highest measured operational efficiency over the full range of operating conditions of a unit with similar specifications, using baseline fuel. The efficiency tests shall be conducted following the guidance provided in relevant national/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%.

If the baseline boiler system is a co-fired system:

The baseline emissions shall be determined based on three years average historical data on the relative share of fossil fuel and biomass in the baseline fuel mix. The relative share is determined based on the energy content of each fuel.

$$BE_{\text{cofire,CO}_2,y} = (EG_{\text{cofire,PJ},y} / \eta_{\text{BL,cofire}}) * EF_{\text{cofire,CO}_2} \quad (8)$$

Where:

$BE_{\text{cofire,CO}_2,y}$	The baseline emissions from thermal energy displaced by the project activity during the year y (tCO ₂ e)
$EG_{\text{cofire,PJ},y}$	The net quantity of energy (thermal) supplied by the project activity during the year y (TJ)
$\eta_{\text{BL,cofire}}$	The efficiency of the co-fired plant that would have been used in the absence of the project activity
$EF_{\text{cofire,CO}_2}$	CO ₂ emission factor of the baseline co-fired plant established using three years average historical data (tCO ₂ /TJ). In the case where more than one fossil fuel is used by the co-fired plant, the weighted average emission factor (in energy basis) among the identified fossil fuels shall be used.

For 2(e)

If the remaining lifetime of the replaced boiler equipment increases:

Then the crediting period shall be limited to the time when the affected equipment would have been replaced in the absence of the project activity. This is the estimated remaining lifetime of the baseline equipment.

In order to estimate the point in time when the existing equipment would need to be replaced in the absence of the project activity (DATE_{baseline,retrofit}), CPAs may follow the procedures described in the ‘*General Guidelines to SSC CDM methodologies*’

For 2(c)

If the project activity involves the capacity addition of new boiler units at an existing facility:

Where the project activity involves the addition of new renewable biomass energy production units at an existing steam production facility, net increase in thermal energy generation should be calculated as follows:

$$EG_{\text{thermal,add},y} = EG_{\text{thermal,PJ},y} - EG_{\text{thermal,old},y} \quad (9)$$

Where:

$EG_{\text{thermal,add},y}$	Net increase in thermal energy generation at existing plant in year y that should be considered as energy baseline (EG _{BL}) (TJ)
$EG_{\text{thermal,PJ},y}$	Total actual thermal energy produced in year y by all units,

$EG_{\text{thermal,old},y}$ existing and new project units (TJ)
Estimate 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 of $EG_{\text{thermal,old},y}$ is given by:

$$EG_{\text{thermal,old},y} = \text{MAX} (EG_{\text{thermal,actual},y}; EG_{\text{thermal,estimated},y}) \quad (10)$$

Where:

$EG_{\text{thermal,actual},y}$ The actual, measured thermal energy production of the existing units in year y (TJ)

$EG_{\text{thermal,estimated},y}$ 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 2(a) and 2(c)

If project activity involves capacity addition as a result of retrofit or modification to an existing facility:

Where the project activity involves a capacity addition to the boilers as a result of retrofit or modification that will increase production, then, $EG_{\text{thermal,old},y}$ can be estimated using the procedures described for $EG_{\text{BL,thermal,retrofit},y}$:

$$EG_{\text{BL,thermal,retrofit},y} = \text{MAX} (EG_{\text{HY,thermal,retrofit},y}; EG_{\text{estimated,thermal},y}) \text{ until } \text{DATE}_{\text{baseline,retrofit}} \quad (11)$$

Where:

$EG_{\text{BL,thermal,retrofit},y}$ Thermal energy production by an existing facility in the absence of the project activity in year y (TJ)

$EG_{\text{HY,thermal,retrofit},y}$ Average of historical thermal energy levels delivered by the existing facility, spanning all data from the most recent available year to the time at which the facility was constructed, retrofitted or modified in a manner that significantly affected output. (TJ)

$EG_{\text{estimated,thermal},y}$ Estimated thermal energy that would have been produced by the existing units under the observed availability of renewable resources in year y (TJ)

$\text{DATE}_{\text{baseline,retrofit}}$ Date at which the existing generation facility is likely to be replaced or retrofitted in the absence of the CDM project activity.

PROJECT SCENARIO 3

For 3(a), 3(b), 3(c), 3(d) and 3(e)

Where the baseline scenario is 19(a), 19(b) or 19(c):

The baseline emissions are calculated as the sum of emissions from the production of electricity and steam/heat calculated as follows:

Baseline emissions from electricity produced in captive plants

$$BE_{\text{captelec},y} = (EG_{\text{captelec},PJ,y} / \eta_{\text{BL,captive plant}}) * EF_{\text{BL,FF,CO}_2} \quad (12)$$

Where:

$BE_{\text{captelec},y}$	The baseline emissions from electricity displaced by the project activity during the year y (tCO ₂)
$EG_{\text{captelec},PJ,y}$	The amount of electricity produced by the project activity during the year y (TJ)
$EF_{\text{BL,FF,CO}_2}$	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)
$\eta_{\text{BL,captive plant}}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

Baseline emissions from heat/steam production

$$BE_{\text{thermal,CO}_2,y} = (EG_{\text{thermal},y} / \eta_{\text{BL,captive plant}}) * EF_{\text{BL,FF,CO}_2} \quad (13)$$

Where:

$BE_{\text{thermal,CO}_2,y}$	The baseline emissions from steam/heat displaced by the project activity during the year y (tCO ₂)
$EG_{\text{thermal},y}$	The net quantity of heat supplied by the project activity during the year y (TJ)
$EF_{\text{FF,CO}_2}$	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)
$\eta_{\text{BL,thermal}}$	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

Where the baseline scenario is 19(d):

Baseline emissions where electricity and heat/steam produced in a baseline cogeneration unit using fossil fuel are calculated as follows:

$$BE_{\text{cogen,CO}_2,y} = [(EG_{\text{PJ,thermal},y} + EG_{\text{PJ,electrical},y} * 3.6) / \eta_{\text{BL,cogen}}] * EF_{\text{FF,CO}_2} \quad (14)$$

Where:

$BE_{\text{cogen,CO}_2,y}$	Baseline emissions from electricity and thermal energy displaced by the project activity during the year y (tCO ₂)
$EG_{\text{PJ,thermal},y}$	The net quantity of thermal energy supplied by the project activity during the year y (TJ)
$EG_{\text{PJ,electrical},y}$	The amount of electricity supplied by the project activity during the year y (GWh)
3.6	Conversion factor (TJ/GWh)
$\eta_{\text{BL,cogen}}$	The total annual average efficiency of the cogeneration plant using

EF_{FF,CO2} fossil fuel determined in accordance the below paragraph
The CO₂ emission factor of the fossil fuel that would have been used in the baseline cogeneration plant obtained from reliable local or national data available, alternatively, IPCC default emission factors can be used (tCO₂/TJ)

The efficiency of the existing baseline cogeneration plant shall be calculated as total steam/heat extracted and total electricity generated divided by the thermal energy value of the fuel use.

Where the baseline scenario is 19(e):

Baseline emissions from the production of electricity are calculated using equation (12) OR the procedures as detailed in AMS-I.D. Emission reductions from heat generation are not eligible.

Where the baseline scenario is 19(f):

Baseline emissions from the production of steam/heat using fossil fuel shall be calculated using equation (14). Emission reductions from displacing on-site electricity generation are not eligible.

Where the baseline scenario is 19(h):

The baseline emissions of a co-fired system are determined based on the relative share of fossil fuel and biomass in the baseline fuel mix. The relative share is determined based on the energy content of each fuel as follows:

$$\mathbf{BE}_{\text{cofire,CO2},y} = (\mathbf{EG}_{\text{cofire,PJ},y} / \eta_{\text{BL,cofire}}) * \mathbf{EF}_{\text{cofire,CO2}} \quad (15)$$

Where:

BE_{cofire,CO2,y} The baseline emissions from thermal energy displaced by the project activity during the year y (tCO₂e)
EG_{cofire,PJ,y} The net quantity of energy (thermal) supplied by the project activity during the year y (TJ)
η_{BL,cofire} The efficiency of the co-fired plant that would have been used in the absence of the project activity
EF_{cofire,CO2} CO₂ emission factor of the baseline co-fired plant established using three years average historical data (tCO₂/TJ). In the case where more than one fossil fuel is used by the co-fired plant, the weighted average emission factor (in energy basis) among the identified fossil fuels shall be used.

For 3(e)

If the remaining lifetime of the replaced cogeneration equipment increases:

Then the crediting period shall be limited to the time when the affected equipment would have been replaced in the absence of the project activity. This is the estimated remaining lifetime of the baseline equipment.

In order to estimate the point in time when the existing equipment would need to be replaced in the absence of the project activity (DATE_{baseline,retrofit}), CPAs may follow the procedures described in the ‘*General Guidelines to SSC CDM methodologies*’

For 3(b)

Where the baseline scenario is 19(d):

The total annual average efficiency of the cogeneration plant using fossil fuel shall be defined as the ratio of steam/heat and electricity produced to total thermal energy value of the fuel use. This ratio is determined using one of the following two options (in preferential order):

- i) Calculated as a single value with consideration of the following:

STEP 1:

The total annual average efficiency of the cogeneration plant using fossil fuel is determined using documented efficiency specification for new steam turbines and steam generators provided by two or more manufacturers for each type of such equipment within the region.

- Efficiency values for the steam turbine(s) and steam generator(s) shall be based on turbines with steam generators with specifications nearly equivalent to baseline units that would have been utilized in the absence of the project activity;
- The efficiency values utilized shall be the highest individual efficiency values (over the full range of expected operating conditions of the baseline cogeneration system) that can be achieved by the steam turbine(s) and generator(s).

STEP 2:

The total annual average efficiency of the cogeneration plant using fossil fuel is then calculated as the product of the highest efficiency value of the steam generator(s), assuming both efficiencies are in the form of a percentage of output per input.

Project Emissions

Project emissions include the following sources:

- CO₂ emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the '*Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion*';
- CO₂ 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*'
- Any other significant emissions associated with the project activity within the project boundary.

Leakage

The leakage emissions shall be calculated as per paragraph 47 and 48 of the methodology.

Paragraph 47 (of AMS-I.C '*Thermal energy production with or without electricity*' (version 19)) refers to the use of energy generating equipment that is transferred from outside the project boundary to the project activity and states that if there is any transfer then leakage would be considered. This paragraph is not relevant to this PoA as there will be no transferring of energy generating equipment from another project activity.

According to paragraph 48, in cases where the collection/transportation of biomass residues is outside the project boundary, CO₂ emissions from the collection/transportation³⁵ of biomass residues to the project site shall be taken into account as leakage. As per the ‘*General guidance on leakage in biomass project activities*’ (version 03) this source is however likely to be smaller than 10% and therefore where this is the case, transportation of biomass emissions source can be neglected in the context of the SSC CPAs.

The CPA needs to assess potentially significant emission sources from the use of renewable biomass. These emission sources are only considered significant where they are >10% of emission reductions.

The 3 types of emission sources to be considered are:

- Shifts of pre-project activities.
- Emissions related to the production of the biomass.
- Competing uses for the biomass.

The source of the biomass used in the project activity needs to be identified and monitored by each CPA. The below table details the emission sources that should be considered based on the biomass source type.

Table 7: Emission sources per type of biomass³⁶

Biomass Type	Activity/Source	Shift of pre-project activities	Emissions from biomass generation/cultivation	Competing use of biomass
Biomass from forests	Existing Forests	-	-	X
	New Forests	X	X	-
Biomass from croplands or grasslands (woody or non-woody)	In the absence of the project the land would be used as cropland/wetland	X	X	-
	In the absence of the project the land would be abandoned	-	X	-
Biomass residues or wastes	Biomass residues or wastes are collected and used	-	-	X

Where one or more of the emission sources are relevant, the CPA must consider if the leakage from that source is >10% of emission reductions according to the latest version of the ‘*General guidance on leakage in biomass project activities*’ as contained in Attachment C to Appendix B of the ‘*Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*’³⁷.

In this regard the 3 aspects as per the table above (emission sources per type of biomass), are evaluated for leakage at CPA level through the following assessment:

³⁵ If biomass residues are transported over a distance of more than 200km due to the implementation of the project activity then this leakage source attributed to the transportation shall be considered.

³⁶ Table 7: Emission sources per type of biomass, is taken from the Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, ‘*General guidance on leakage in biomass project activities*’ (version 03), Table 1.

³⁷ EB 47, Annex 28 http://cdm.unfccc.int/EB/047/eb47_repan28.pdf

Table 8: Guidance on leakage in biomass project activities assessment

Parameter	Guidance on leakage	Project activity status
Shift of pre-project activities	The shifts of pre-project activities are relevant in cases where: <ul style="list-style-type: none">• In the absence of the project activity, the land would be used for other purposes like agriculture;	Project activities under this PoA will use processed biomass and the shifting of pre-project activities is not anticipated and therefore not applicable.
Emissions from biomass generation/ cultivation	Significant emission sources from the biomass generation and/or cultivation include: <ul style="list-style-type: none">• Emissions from the use of fertiliser;• Emissions from the clearance of the land.	Project activities under this PoA will use processed biomass and the generation and cultivation of biomass is not anticipated and therefore not applicable.
Competing use of biomass	Competing use of biomass is assessed by: <ul style="list-style-type: none">• Analysing the availability of biomass in the region is assessed so as to ascertain if there is a surplus in the region of the project activity;• Demonstrating (by way of publicly available literature, surveys, official reports e.t.c) that the quantity of biomass available in the region (e.g. 50km radius) is at least 25% larger than the quantity utilised in the project;• If the project activity utilises biomass quantities that are less than those available in the region then leakage can be neglected;• If the project activity utilises biomass quantities that are more than those available in the region then leakage shall be estimated and deducted from the emission reductions.	Biomass availability will be assessed at the beginning of the crediting period to ascertain the percentage of the biomass used in the project activity in comparison to the biomass available in the region.

For each CPA, the quantity of biomass used in the project activity will be assessed in relation to whether is more or less than 25% of the quantity available in the region (e.g. 50km radius).

Data and parameters that are to be reported ex-ante

Data / Parameter	$\eta_{BL,thermal}$
Unit	%
Description	Efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.
Source of data	Measured operational efficiency OR Manufacturers specifications OR Default value of 100%
Value(s) applied	
Choice of data or Measurement methods and procedures	Measured operational efficiency OR Manufacturers specifications OR Default value of 100%
Purpose of data	Calculation of baseline emissions;
Additional comment	

B.6.2. Ex-ante calculations of emission reductions

B.6.2.

Emission Reductions

For example, the emission reductions of a potential SSC CPA are calculated according to the following equation:

B.6.2.

$$ER_y = BE_y - PE_y - LE_y \tag{1}$$

B.6.2.

Where:

B.6.2. ER_y Emission Reductions in year y (tCO₂e)

B.6.2. BE_y Baseline emissions in year y (tCO₂)

B.6.2. PE_y Project emissions in year y (tCO₂)

B.6.2. LE_y Leakage emissions in year y (tCO₂)

B.6.2.

Therefore:

B.6.2.

$$ER_y = \text{Baseline emissions in year y (tCO}_2\text{)} - \text{Project emissions in year y (tCO}_2\text{)} - \text{Leakage emissions in year y (tCO}_2\text{)}$$

B.6.2.

The calculation of the parameters is detailed in the below section.

B.6.2.

Baseline Emissions

B.6.2.

The simplified baseline which is applicable to this SSC CPAs is the fuel consumption of the technologies that would have been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.

Depending on the project scenario and type of project activity, the baseline emissions are calculated according to the applicable paragraphs in AMS-I.C as detailed in the below Table 9: Approved baseline paragraphs for SSC CPA project activity scenario and type.

Table 9: Approved baseline paragraphs for SSC CPA project activity scenario and type



Project Scenario & Type	Description	Approved baseline paragraphs
1	Project activities that are implemented without being registered as a CDM project activity;	Generic baseline scenario
2(a)	Project activities that seek to retrofit or modify existing equipment used in an industrial processes which includes the use of a dryer(s) producing heat for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 42
2(b)	Greenfield project activities which include the use of a dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 22, 30,35
2(c)	Project activities which involve capacity additions to a dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 37, 38
2(d)	Project activities which do not retrofit or modify a dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35
2(e)	Project activities which replace existing dryer(s) producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 40, 41
3(a)	Project activities which seek to modify or retrofit equipment used in industrial processes which include the use of a boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 38,
3(b)	Greenfield project activities which include the use of a boiler(s) producing steam for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 22, 30, 35
3(c)	Project activities which involve capacity additions to a boiler(s) producing steam for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 37, 38
3(d)	Project activities which do not retrofit or modify boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35
3(e)	Project activities which replace existing boiler(s) producing steam for use in the process where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 22, 30, 35, 40, 41
4(a)	Project activities which seek to retrofit or modify co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35

4(b)	Greenfield project activities which include the use of co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 19(a), 19(b), 19(c), 19(d), 19(h), 20, 21, 22, 23, 25, 26, 27, 29, 34, 35
4(c)	Project activities which involve capacity additions to co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35
4(d)	Project activities which do not retrofit or modify co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35
4(e)	Project activities which replace existing co-generation equipment producing both thermal energy and electrical energy simultaneously where renewable biomass is combusted as the fuel source, with or without fossil fuel.	16, 17, 19(a), 19(b), 19(c), 19(d), 19(e), 19(f), 19(h), 20, 21, 22, 23, 25, 27, 28, 32, 33, 35, 40, 41

Therefore the project scenario and type is 1(d) – A project activity which does not retrofit or modify dryers producing heat for use in the industrial process where renewable biomass is combusted as the fuel source, with or without fossil fuel.

Baseline emissions will be calculated using the following dataset:

Option 1 has been selected as the appropriate dataset i.e. three years of historical data (2009, 2010 & 2011) prior to the implementation of the project for the below parameters:

- Fossil fuel usage – coal consumption
- Equipment output – heat produced by the dryers
- Thermal efficiency of the equipment – thermal efficiency of the dryers

PROJECT SCENARIO 1:

For 1(a), 1(b), 1(c), 1(d) and 1(e)

Where the baseline emissions result from the use of fossil fuel combustion in a dryer(s) to produce heat, the baseline emissions for **heat produced** using fossil fuels are calculated as follows:

$$BE_{\text{thermal,CO}_2,y} = (EG_{\text{thermal,y}} / \eta_{\text{BL,thermal}}) * EF_{\text{BL,FF,CO}_2} \quad (2)$$

Where:

- BE**_{thermal,CO₂,y} The baseline emissions from steam/heat displaced by the project activity during the year y (tCO₂)
- EG**_{thermal,y} The net quantity of heat supplied by the project activity during the year y (TJ)
- EF**_{FF,CO₂} The CO₂ emission factor of the fossil fuel that would have been used in the baseline plant obtained from reliable local or national data if

$\eta_{BL,thermal}$ available, alternatively, IPCC default emission factors can be used (tCO₂/TJ)
The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

Efficiency of the baseline units shall be determined by adopting one of the following criteria (in preferential order)

- (a) Highest measured operational efficiency over the full range of operating conditions of a unit with similar specifications, using baseline fuel. The efficiency tests shall be conducted following the guidance provided in relevant national/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%.

Project Emissions

Project emissions (PE_y) include the following sources:

- CO₂ emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the ‘*Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion*’;
 - There are no emissions associated with the on-site consumption of fossil fuels due to the project activity.
- CO₂ 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*’
 - There is no differential electricity consumption in the project activity compared to the baseline. Electricity is used to drive auxiliary motors but this consumption does not change as a result of the project activity.
- Any other significant emissions associated with the project activity within the project boundary.
 - There are no other significant emission sources associated with the project activity.

Therefore:

$$PE_y = 0$$

Leakage

Leakage emissions shall be calculated as per paragraph 47 and 48 of the methodology. (LE_y) therefore includes the following sources:

- If the energy generating equipment currently being utilised is transferred from outside the boundary to the project activity, leakage is to be considered.
 - No energy generating equipment is transferred from outside the boundary to the project activity. The project uses the same equipment i.e. Dyer #1 and Dryer #4 in the baseline as in the project activity.
- Where the collection/processing/transportation of biomass residues is outside the project boundary, CO₂ emissions from the collection/processing/transportation³⁹ of biomass residues to the project site shall be taken into account as leakage.

³⁹ If biomass residues are transported over a distance of more than 200km due to the implementation of the project activity then this leakage source attributed to the transportation shall be considered.

- If the biomass is processed outside the project boundary and leakage is considered and calculated according to the *'Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories'* Attachment C to Appendix B, *'General guidance on leakage in biomass project activities'* (version 03)⁴⁰.
- In the guidance, *Table 1. Emission source per type of biomass* identifies the activity that needs to be measured for leakage. The renewable biomass will be sourced from croplands and in the absence of the project the land would be abandoned. Therefore, the emissions from biomass generation/cultivation need to be accounted for. The two significant sources from this source are:
 - Fertilizer - No fertilizer is used to grow the biomass.
 - Clearance of land - The land was previously degraded land not in use and therefore there are no emissions from the clearance of land.
- The transportation of the raw materials and the use of fossil fuels to cultivate the plantation is less than/more than 10% of the emission reductions (< 2738 tCO₂ per year) and therefore can be neglected/must be accounted for in the context of a SSC project activity.
- The production of the processes biomass fuel does not yield/does yield emissions in excess of 10% of the emission reductions and therefore any emissions associated with the production of the processed solid biomass fuel will be neglected/will be accounted for.

For each CPA, the quantity of biomass used in the project activity will be assessed in relation to whether is more or less than 25% of the quantity available in the region (e.g. 50km radius). Regarding the collection/ processing/ transportation of biomass from outside the project boundary the following basis will be used when estimating the leakage emissions:

1. Leakage emissions from the processing of biomass by using electricity;
2. Leakage emissions due to the combustion of fossil fuels for the transportation and collection of raw materials to and from the biomass processing site.
3. Leakage emissions due to the combustion of fossil fuels for the transportation of processed biomass to project site.

Leakage emissions from the processing of biomass by using electricity;

Leakage emissions due to processing of biomass by using electricity will be calculated using “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” The leakage emissions will be included in the SSC CPA under the PoA.

$$LE_{EC,y} = EC_{LE,l,y} * EF_{EL,l,y} * (1+TDL_{l,y}) \quad (3)$$

Where:

$LE_{EC,l,y}$	Leakage emissions from electricity consumption in year y (tCO ₂ /yr)
$EC_{EL,l,y}$	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)
$TD_{L,l,y}$	Average technical transmission and distribution losses for providing electricity to source l in year y

Leakage emissions due to the combustion of fossil fuels for the transportation and collection of raw materials to and from the biomass processing site.

⁴⁰ EB 47, Annex 28

$$LE_{\text{collection},y} = N_{c,y} * AVD_{c,y} * EF_{\text{km},CO2} \quad (4)$$

Where:

$LE_{\text{collection},y}$	Leakage Emissions due to transportation of collection of biomass to biomass processing site
$N_{c,y}$	Number of truck trips for collecting loose biomass during the year y
$AVD_{c,y}$	Average round trip distance between the biomass fuel supply sites and biomass collection site during the year y
$EF_{\text{km},CO2}$	Average CO2 emission factor for the trucks measured during year y

Leakage emissions due to the combustion of fossil fuels for the transportation of processed biomass to the project site.

$$LE_{\text{transportation},y} = N_{y} * AVD_{,y} * EF_{\text{km}, CO2} \quad (5)$$

Where:

$LE_{\text{transportation},y}$	Leakage Emissions due to transportation of processed biomass to Project site
N_{y}	Number of truck trips during the year y
$AVD_{,y}$	Average round trip distance (from and to) between the biomass fuel supply sites and the site of the Project plant during year y (km)
$EF_{\text{km},CO2}$	Average CO2 emission factor for the trucks measured during the year y (tCO2/km)

The leakage emissions due to biomass transportation will be considered whenever the renewable biomass (including the raw materials to the processing site) is transported over a distance of more than 200 km due the implementation of project activity under a PoA. If the distance is less than 200km, the leakage source attributed to the transportation of the renewable biomass can be neglected.

$$LE_y = LE_{EC,y} + LE_{\text{collection},y} + LE_{\text{transportation},y} \quad (6)$$

Emission reduction calculations:

The emission reductions have been calculated as per paragraph 49 of the methodology i.e.:

$$ER_y = BE_y - PE_y - LE_y$$

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

B.7.1. Data and parameters to be monitored by each generic CPA

Data / Parameter	OP_{cont}
Unit	
Description	Continuous operation of the equipment/system
Source of data	Physical inspection
Value(s) applied	
Measurement methods and procedures	Annual check of all appliances or a representative sample thereof to ensure that they are still operating or are replaced by an equivalent in service appliance. Project participants shall describe how the annual check is conducted and/or the sampling procedures.
Monitoring frequency	Daily
QA/QC procedures	
Purpose of data	Calculation of baseline emissions
Additional comments	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later.

Data / Parameter	EF_{CO₂,i}
Unit	tCO ₂ e/GJ
Description	CO ₂ emission factor of fossil fuel type <i>i</i>
Source of data	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(s) applied	
Measurement methods and procedures	Procedures as described in AMS-I.D to be used which may include the calculation of the grid emission factor using the latest version of the ' <i>Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion</i> '.
Monitoring frequency	Annually
QA/QC procedures	Compare the measurements with IPCC default values.
Purpose of data	Calculation of baseline emissions
Additional comments	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later.



Data / Parameter	SA _k
Unit	%
Description	Surplus availability of Biomass within 50 km radial distance
Source of data	Published literature/official reports/independent Survey report/ public domain document at the beginning of crediting period
Value(s) applied	
Measurement methods and procedures	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.
Monitoring frequency	Continuous monitoring aggregated annually.
QA/QC procedures	
Purpose of data	Calculation of leakage emissions
Additional comments	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later.

Data / Parameter	EF _{km,CO2}
Unit	tCO ₂ /km
Description	Average CO ₂ emission factor for the trucks measured during the year y
Source of data	
Value(s) applied	
Measurement methods and procedures	Density of diesel (CO ₂ database; Net Calorific value – IPCC default value; CO ₂ emission factor of diesel (IPCC default value)
Monitoring frequency	Continuous monitoring aggregated annually.
QA/QC procedures	
Purpose of data	Calculation of leakage emissions
Additional comments	This data will be archived up to 2 years after the completion of crediting period or last issuance whichever is later.



Data / Parameter	EG_{electrical}
Unit	MWh
Description	Quantity of electricity generated/supplied
Source of data	Calibrated meters
Value(s) applied	
Measurement methods and procedures	In the case where the project activity is exporting electricity to other facilities, the metering shall be carried out at the recipient's end. In the case where the simplified baseline is based on the energy produced multiplied by an emission coefficient a sample of the systems may be monitored.
Monitoring frequency	Continuous monitoring, integrated hourly and at least monthly recording.
QA/QC procedures	In the case were the project is exporting electricity to other facilities, the results shall be cross checked with records for sold/purchased electricity.
Purpose of data	Calculation of baseline emissions
Additional comments	This parameter is only applicable for monitoring purposes where the system or equipment is a cogeneration system/equipment.

Data / Parameter	Q_{htf}
Unit	Nm ³ /hr
Description	Quantity of hot air
Source of data	Calibrated meters or spot measurements
Value(s) applied	
Measurement methods and procedures	In the case where the project activity is exporting heat to other facilities, the metering shall be carried out at the recipient's end. Where it is not feasible to continuously monitor, spot measurements can be used through sampling with a 90% confidence level and 10% precision.
Monitoring frequency	Continuous monitoring, integrated hourly and at least monthly recording.
QA/QC procedures	In the case were the project is exporting heat to other facilities, the results shall be cross checked with records for sold/purchased heat.
Purpose of data	Calculation of baseline emissions
Additional comments	This parameter only need be monitored where heat/hot air is the thermal energy produced by the equipment.



Data / Parameter	Q_{steam}
Unit	Nm ³ /hr
Description	Quantity of hot air
Source of data	Calibrated meters or spot measurements
Value(s) applied	
Measurement methods and procedures	In the case where the project activity is exporting steam to other facilities, the metering shall be carried out at the recipient's end.
Monitoring frequency	Continuous monitoring, integrated hourly and at least monthly recording
QA/QC procedures	In the case the project is exporting heat to other facilities, the results shall be cross checked with records for sold/purchased steam.
Purpose of data	Calculation of baseline emissions
Additional comments	This parameter only need be monitored where steam is the thermal energy produced by the equipment.

Data / Parameter	EG_{thermal}
Unit	TJ
Description	Net quantity of thermal energy supplied by the project activity during the year y
Source of data	Monitored parameters
Value(s) applied	
Measurement methods and procedures	Thermal generation is determined as the difference of the enthalpy of the steam or hot fluid and/or gases generated by the heat generation equipment and the sum of the enthalpies of the feed-fluid and/or gases blow-down and if applicable any condensate returns. In the case where the project activity is exporting heat to other facilities, the metering shall be carried out at the recipient's end.
Monitoring frequency	Continuous monitoring aggregated annually.
QA/QC procedures	In the case that the project is exporting heat to other facilities, the results shall be cross checked with records for sold/purchased thermal energy.
Purpose of data	Calculation of baseline emissions
Additional comments	This parameter only need be monitored where steam is the thermal energy produced by the equipment.



Data / Parameter	$FC_{i,y}$
Unit	Mass/volume
Description	Quantity of fossil fuel type <i>i</i> combusted in year <i>y</i>
Source of data	
Value(s) applied	
Measurement methods and procedures	Calculated as per the relevant procedures detailed in the ‘ <i>Tool to calculate project or leakage CO2 emissions from fossil fuel combustion</i> ’.
Monitoring frequency	Continuously or in batches and estimate using annual mass/energy balance
QA/QC procedures	
Purpose of data	Calculation of baseline emissions
Additional comments	Where the fossil fuel is a solid e.g. coal, the appropriate unit of measurement is mass based (e.g. tons or kgs). Where the fossil fuel is a liquid e.g. diesel, the appropriate unit of measurement is volume based (e.g. litres or m ³)

Data / Parameter	$B_{\text{biomass},k,y}$
Unit	mass
Description	Net quantity of biomass type <i>k</i> consumed in year <i>y</i>
Source of data	Purpose built weighing equipment as per Section B.7.2 below
Value(s) applied	
Measurement methods and procedures	Adjust for moisture content in order to determine the quantity of dry biomass.
Monitoring frequency	Continuously or in batches and estimate using annual mass/energy balance
QA/QC procedures	Cross check the measurements with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data	Calculation of baseline emissions
Additional comments	



Data / Parameter	$B_{\text{moisture},k,y}$
Unit	%
Description	Moisture content of biomass type k (wet basis)
Source of data	Biomass Supplier laboratory analysis or other appropriately equipped laboratory
Value(s) applied	
Measurement methods and procedures	Moisture content of biomass of homogenous quality shall be monitored for each batch of biomass and the weighted average then calculated for each monitoring period and used in the calculations. Where emissions are calculated based on biomass energy input on-site measurements are required.
Monitoring frequency	Per batch of biomass
QA/QC procedures	
Purpose of data	Calculation of baseline emissions
Additional comments	In the case of dry biomass, monitoring of this parameter is not necessary.

Data / Parameter	T
Unit	Degrees Celsius
Description	Temperature
Source of data	
Value(s) applied	
Measurement methods and procedures	Measured using calibrated meters.
Monitoring frequency	Continuous monitoring, integrated hourly and at least monthly recording.
QA/QC procedures	
Purpose of data	Calculation of baseline emissions
Additional comments	



Data / Parameter	P
Unit	kg/cm ³
Description	Pressure
Source of data	
Value(s) applied	
Measurement methods and procedures	Measured using calibrated meters.
Monitoring frequency	Continuous monitoring, integrated hourly and at least monthly recording.
QA/QC procedures	
Purpose of data	Calculation of baseline emissions
Additional comments	This parameter only needs to be monitored in the case where the thermal energy generation is superheated steam.

Data / Parameter	NCV_{i,y}
Unit	GJ/mass or volume unit
Description	Net Calorific Value of fossil fuel type <i>i</i>
Source of data	Fuel supplier or other appropriately equipped laboratory
Value(s) applied	
Measurement methods and procedures	Calculated as per the relevant procedures detailed in the ' <i>Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion</i> '.
Monitoring frequency	Determine once in the first year of the crediting period based on quarterly measurements of at least 3 samples for each measurements. Measurements must be done on dry biomass.
QA/QC procedures	
Purpose of data	Calculation of baseline emissions
Additional comments	Where the fossil fuel is a solid e.g. coal, the appropriate unit of measurement is mass based (e.g. tons or kgs). Where the fossil fuel is a liquid e.g. diesel, the appropriate unit of measurement is volume based (e.g. litres or m ³)

Data / Parameter	NCV _k
Unit	GJ/mass or volume unit
Description	Net Calorific Value of biomass type <i>k</i>
Source of data	Laboratory analysis
Value(s) applied	
Measurement methods and procedures	Determine once in the first year of the crediting period based on quarterly measurements of at least 3 samples for each measurements. Measurements must be done on dry biomass.
Monitoring frequency	Quarterly
QA/QC procedures	Compare the measurements with IPCC default values.
Purpose of data	Calculation of baseline emissions
Additional comments	The measurement procedure as described above should be repeated if the source of biomass changes.

B.7.2. Description of the monitoring plan for a generic CPA

>>

Each CPA will implement adequate monitoring equipment necessary to monitor all the parameters as required by the methodology and dependent upon the type of system/project equipment. The following approaches may be adapted to suit a specific process in so far as the monitoring requirements of the methodology are met. The below diagram provides an illustrative summary of the monitoring process and plan.

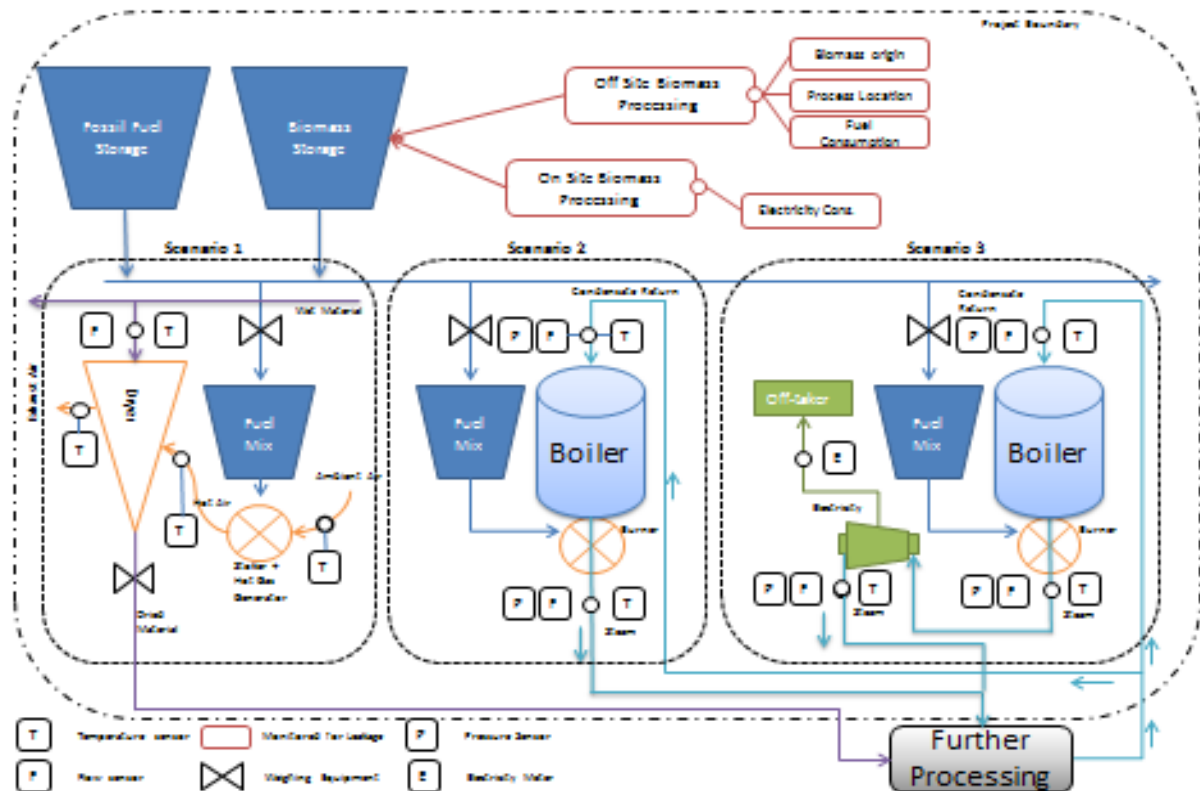


Figure 4: Monitoring plan process diagram

The parameters listed below may be used interchangeably to adequately monitor a multi-product process such as a combined heat and power application utilising biomass as a fuel.

Table 10: Parameters to be monitored in Scenario 1

Param. No.	Parameters	Measuring Instrument
H1	Final temperature of heat transfer fluid (HTF)	Independent or integrated temperature sensor
H2	Initial temperature of heat transfer fluid (HTF)	Independent or integrated temperature sensor
H3	Mass of heat transfer fluid (HTF)	Weighing equipment
H4	Electrical energy consumption	Electricity meter
H5	Fuel weighing	Weighing equipment

Table 11: Parameters to be monitored in Scenario 2

Param. No.	Parameters	Measuring Instrument
B1	Steam flow	Flow meter
B2	Steam temperature	Directly measured by separate temperature measuring instrument or integrated with flow or pressure instrument
B3	Steam pressure	Directly measured by separate pressure measuring instrument or integrated with flow or temperature instrument
B4	Feed water temperature	Directly measured by separate temperature measuring instrument or integrated with flow or pressure instrument
B5	Electrical energy consumption	Electricity meter
B6	Fuel weighing	Weighing equipment

Table 12: Parameters to be monitored in Scenario 3

Param. No.	Parameters	Measuring Instrument
E1	Quantity of electricity generated/supplied	Electricity meter
E2	Electrical energy consumption	Electricity meter
E3	Fuel weighing	Weighing equipment

The following sub-systems will be monitored and recorded during the implementation of the Project Activity, where applicable.

The following monitoring approaches are recommended, however, SSC CPAs may propose their own approached provided that the requirements of the methodology AMS-I.C are met.

Thermal Energy produced by the system

Boilers

The steam flow generated from the biomass is measured using a mass flow meter. The thermal energy generated from the biomass fired boiler is calculated as the differential value between the thermal energy at the outlet of the main steam stop valve and the thermal energy of the feed water measured at the inlet of the boiler.

Calculation method:

$$EG_{\text{thermal}} = Q_{\text{steam}} * (H_s - H_w) * 4.2193^{41}$$

Where:

EG_{thermal}	Net quantity of heat supplied by the project activity (kJ)
Q_{steam}	Quantity of steam supplied (kg)
H_s	Specific enthalpy of steam at corresponding temperature and pressure (kJ/kg)
H_w	Specific enthalpy of feed water at corresponding temperature (kJ/kg)

Heaters/Dryers

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

The mass of heat transfer fluid to be heated or dried may be monitored directly using weighing equipment or it may be monitored indirectly by measuring the volumetric flow and the density, the product of which is equal to the mass.

Calculation methods:

In the case of direct measurement of the mass of heat transfer fluid:

$$EG_{\text{thermal}} = Q_{\text{htf}} * (T_1 - T_0) * 4.2193^{41}$$

Where:

EG_{thermal}	Net quantity of heat supplied by the project activity (kJ)
Q_{htf}	Quantity of heat transfer fluid (kg)
T_1	Specific enthalpy of steam at corresponding temperature and pressure (K)
T_0	Specific enthalpy of feed water at corresponding temperature (K)

In the case of volumetric flow and density monitoring of heat transfer fluid:

$$EG_{\text{thermal}} = Q_{\text{flow}} * C_{p_{\text{out}}} * \rho_{\text{out}} * (T_1 - T_0)$$

Where:

EG_{thermal}	Net quantity of heat supplied by the project activity (kJ)
Q_{flow}	Quantity of heat transfer fluid (m^3)
$C_{p_{\text{out}}}$	The specific heat of heat transfer fluid at T_1 temperature (kJ/kg, K)
ρ_{out}	Density of heat transfer fluid at T_1 temperature (kg/m^3)
T_1	Specific enthalpy of steam at corresponding temperature and pressure (K)
T_0	Specific enthalpy of feed water at corresponding temperature (K)

⁴¹ Specific heat (C_p) of water in KJ/kg K at 100°C & 10⁵Pa, pg 109, Janssen & Warmoeskerken (1991) Transport phenomena data companion, Delftse Uitgevers Maatschappij b.v. Delft.

Electrical Energy produced by the system

The electricity produced by the project ($EG_{\text{electrical}}$) shall be monitored utilising an appropriately specified electricity meter design for this purpose.

Measurement of electrical energy consumed

Electricity meters shall be installed to monitor the electricity consumption of the auxiliary equipment in the case that the biomass is processed on site.

If however the biomass is procured from outside the project boundary the electricity consumed shall be recorded as the declared electricity consumption per ton of processed biomass taken from the fuel technical specification supplied by the fuel producer.

Measurement of biomass input

Option A: If a weighbridge is available at the Project site, each type of biomass must be weighed and recorded in the Project logbook or electronic monitoring system

Option B: If a weighbridge is not available at the Project site, each type of biomass must be weighed at the suppliers or third party's weighbridge and the original weighbridge certificate shall be retained for the monitoring period.

Option C: Irrespective of the availability of a weighbridge, the biomass may be weighed by an appropriate weighing device, such as a hopper equipped with load cells, as the biomass is loaded into the project equipment. The weighing device should be appropriately calibrated for this purpose.

Monitoring fuel input into the boiler, heater or dryer

Where either *Option A* or *B* is chosen, the following approach should be implemented in order to ensure a conservative value is applied in the calculations:

Step 1: The stored biomass of type i is measured at the Project site on the starting date of the monitoring period. This is the opening balance, recorded as $Q_{ob,k}$.

Step 2: Each new delivery of biomass within the monitoring period will have an associated weighbridge certificate from which the supply of biomass ($Q_{sb,k,n}$) is determined.

Step 3: The stored biomass of type i is measured at the Project site on the end date of the monitoring period. This is the closing balance, recorded as $Q_{cb,k}$.

Step 4: The consumption of biomass of type i ($B_{\text{biomass},y,k}$) in year y is determined by:

$$B_{\text{biomass},y,k} = (Q_{cb,k} - Q_{ob,k}) + \sum(Q_{sb,k,n})$$

When *Option C* is chosen the consumption of biomass of type i ($B_{\text{biomass},y,k}$) in year y is monitored directly.

Where the biomass is processed offsite:

The source of the biomass should be noted for each delivery. This information if obtained from the delivery note and contracts with biomass suppliers. The following information must be available for all deliveries of biomass from off-site:

- A. Location of the source of unprocessed renewable biomass
- B. Location of the biomass processing plant
- C. The renewable biomass will be sourced from croplands and in the absence of the project the land would be abandoned. Therefore, the emissions from biomass generation/cultivation need to be accounted for. The two significant sources from this source are:
 - Fertilizer - No fertilizer is used to grow the biomass.
 - Clearance of land - The land was previously degraded land not in use and therefore there are no emissions from the clearance of land.
- D. The transportation of the raw materials and the use of fossil fuels to cultivate the plantation is expected to be less than 10% of the emission reductions and therefore can be neglected in the context of a SSC project activity. (SSC CPAs need to demonstrate that transport emissions are < 10% of total emission reductions)
- E. The production of the processed biomass fuel is also not expected to yield emissions in excess of 10% of the emission reductions but this will be monitored in the project activity and any emissions associated with the production of the processed solid biomass fuel will be accounted for. (SSC CPAs need to demonstrate that transport emissions are < 10% of total emission reductions)

Where the biomass is processed onsite:

If and when biomass is to be processed on site the following parameters should also be monitored as per 'General guidance on leakage in biomass project activities' (version 03).

- A. Electricity consumption of the biomass processing equipment
- B. Fertilizer use
- C. Clearance of land

Measurement of fossil fuel input

Option A: If a weighbridge is available at the Project site, each type of fossil fuel must be weighed and recorded in the Project logbook or electronic monitoring system

Option B: If a weighbridge is not available at the Project site, each type of fossil fuel must be weighed at the suppliers or third party's weighbridge and the original weighbridge certificate shall be retained for the monitoring period.

Option C: Irrespective of the availability of a weighbridge, the fossil fuel may be weighed by an appropriate weighing device, such as a hopper equipped with load cells, as the fossil fuel is loaded into the project equipment. The weighing device should be appropriately calibrated for this purpose.

Monitoring fuel input into the boiler, heater or dryer

Where either option A or B is chosen, the following approach should be implemented in order to ensure a conservative value is applied in the calculations:

Step 1: The stored fossil fuel of type *i* is measured at the Project site on the starting date of the monitoring period. This is the opening balanced, recorded as $Q_{of,i}$.

Step 2: Each new delivery of fossil fuel within the monitoring period will have an associated weighbridge certificate from which the supply of fossil fuel ($Q_{sf,i,n}$) is determined.

Step 3: The stored fossil fuel of type i is measured at the Project site on the end date of the monitoring period. This is the closing balance, recorded as $Q_{cf,i}$.

Step 4: The consumption of fossil fuel of type i ($FC_{i,y}$) in year y is determined by:

$$FC_{i,y} = (Q_{cf,I} - Q_{cf,i}) + \sum(Q_{sf,i,n})$$

When option C is chosen the consumption of fossil fuel of type i ($FC_{i,y}$) in year y is monitored directly.

Scrapping of equipment

If the Project activity involves replacement of equipment resulting in the scrapping of old equipment the procedure for the monitoring of scrapping will be the following:

An independent third party will be appointed to monitor that the equipment was scrapped. This should include checking whether the number of scrapped installations corresponds to the number of rebuild Project installations. For this purpose scrapped equipment shall not be disposed of until the appoint party has made such a check.

Specifically, the appoint agency will check:

- a) The number of Project installations that required scrapping is equal to the number of scrapped installations; and
- b) The scrapped equipment has capacity equal to, or less than, the new Project equipment.

If these conditions are satisfied the agency shall issue a certificate stating compliance with these conditions and which shall be retained by the CPA operator.

(B) DESCRIPTION OF THE TYPICAL MONITORING SYSTEM FOR A CPA

All the necessary instruments required for monitoring the Project activity will be installed on the heat generating system. The source of data collection, frequency of data collection and calibration frequency will be as per section B.7. All monitoring instruments will be monitored under one of the following strategies:

B.1 Manual Recording:

In the absence of an electronic process control system, the equipment parameters shall be manually recorded, as indicated previously, by the equipment operator's plant staff in a CDM logbook. The logbook shall be duly maintained, checked and signed by the site CDM controller. The logbook shall be scanned periodically and submitted to the CME for archival as well as being archived on site.

B.2 (Semi) Automated parameter recording

The monitoring equipment will be connected to an electronic system recording system wherein data will be acquired, recorded and transmitted to the CME. The data will be archived by the CPA operator and/or the CME.

(C) EMERGENCY PREPAREDNESS PLAN



The CPA operator shall compile a plan for the total or partial loss of the monitoring system that prevents the loss of monitoring information. As a minimum the plan shall include preparations for the following events:

- In the case of a boiler
 - Steam flow measurement system failure
 - In the event that the steam flow measurement system fails, the thermal energy supplied by the project activity will be estimated based on the most conservative approach theoretically possible.
 - Failure of RTD/Temperature sensors
 - The temperature gauge shall be calibrated as per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specifications are not available, it will be as per international standard, but at least once in 3 years;
 - In the case of the failure of the RTD/ Temp sensors, the boiler operational staff (CPA operator) will manually record the reading on an hourly basis in the log book from the temperature gauge already installed on feed water/steam line of the boiler.
 - Failure of pressure sensor
 - In the case of the failure of the pressure sensor, the pressure shall be manually noted from the installed pressure gauges and this data shall be considered for calculation of emission reductions.
 - Like the RTD/Temperature sensors the pressure sensor shall be calibrated as per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specifications are not available, it will be as per international standard, but at least once in 3 years;
 - Failure of electricity meter (if applicable)
 - In case the electricity meter fails, the CPA operator will record the failure period of the meter. The energy (kWh) consumed in the absence of meter will be calculated considering failure hours and the auxiliary electrical connected load of the boiler i.e. Failure hours*Electrical connected load*Grid/Diesel Generator (DG) emission factor.
 - The time lost in correcting, repairing or replacing the meter will be recorded in a log book and this data shall be considered when calculating emission reductions.
- In the case of a heater/dryer
 - Heat flow measurement system failure
 - In the case of heat flow measurement system failure, the heat will be estimated based on the most conservative approach theoretically possible.
 - Failure of RTD/Temperature sensors on the heater/dryer
 - In the event that the RTD/ Temperature sensors fail, the heater operational staff (CPA operator) will manually record the reading on an hourly basis in the log book from the temperature gauge already installed on inlet and outlet line of the heater/dryer.
 - The temperature gauge shall be calibrated as per local/national standard or as per manufacturer's specifications. If local/national standards and manufacturer's specifications are not available, it will be as per international standard, but at least once in 3 years.



- Failure of electricity meter on the heater/dryer (if applicable)
 - In case the electricity meter fails, the CPA operator will record the failure period of the meter. The energy (kWh) consumed in the absence of meter will be calculated considering failure hours and the auxiliary electrical connected load of the heater or dryer i.e. Failure hours*Electrical connected load*Grid/Diesel Generator (DG) emission factor.
 - The time lost in correcting, repairing or replacing the meter will be recorded in a log book and this data shall be considered when calculating emission reductions.

- In the case of electricity production
 - Failure of electricity meter
 - In case the electricity meter fails, the CPA operator will record the failure period of the meter. The energy (kWh) consumed in the absence of meter must be calculated considering failure hours.
 - The time lost in correcting, repairing or replacing the meter will be recorded in a log book and this data shall be considered when calculating emission reductions.

- In all cases
 - Failure of data transmission system
 - Loss of site data records

**Appendix 1: Contact information on entity/individual responsible for the PoA**

Organization	K2011/117952/07 South Africa (Pty) Ltd trading as African Sustainability Initiative
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**Appendix 2: Affirmation regarding public funding****Appendix 3: Application of methodology(ies)****Appendix 4: Further background information on ex ante calculation of emission reductions****Appendix 5: Further background information on the monitoring plan**

History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities" (EB 66, Annex 13).
01	EB33, Annex43 27 July 2007	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration		