Gold Standard

# The Gold Standard Suppressed Demand Small-scale Methodology for Energy Use for the Processing of Agricultural Products

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This methodology was prepared by Perspectives GmbH with input from The Gold Standard Foundation

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## I. Sources

1. This methodology refers to the latest approved versions of the following CDM methodologies, methodological tools and guidelines:

   - UNFCCC "Standard for sampling and surveys in CDM project activities and programme of activities"
   - UNFCCC "General guidance on leakage in biomass project activities"
   - UNFCCC "Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion"
   - UNFCCC "Approved small scale methodology AMS-III.AK"
   - The Gold Standard "Annex C – guidance on project type eligibility"

## II. Applicability

2. This methodology applies to the following applications:
   **Application A1:** Mechanical and/or thermal processing with or without energy efficiency involving complete fuel switch.
   **Application A2:** Mechanical and/or thermal processing with or without energy efficiency involving partial fuel switch.
   **Application B1:** Mechanical and/or thermal processing with only energy efficiency (i.e. no fuel switch).

3. The methodology is applicable under the following conditions:

   - To projects, which provide renewable energy, with or without the implementation of energy efficient technologies, to new or existing users that currently lack adequate access to the national/regional grid (less than 50% grid availability during the daylight hours based on an annual average) for the purpose of processing agricultural products.

   - The processed agricultural products can be sold locally or outside the project boundary[1]. The Local Stakeholder Consultation will enable projects to decide whether they can export the processed products. If demand is established as part of the Local Stakeholder Consultation then it will be compulsory for 75% of the processed products to be supplied within the project boundary. In the case when processed products are exported without meeting local demand, then credits would only be issued for the quantity supplied locally and up to 25% of the total processed product that is exported. In situations where more than 25% of the processed product is exported outside the project boundary, emission reductions can be claimed for the entire amount but only if it can be demonstrated that there was no local demand[2]. The evaluation and related measures, and the procedures will be presented and discussed at the Local Stakeholder Consultation and documented in the Sustainable Development Matrix and the Sustainability Monitoring Plan.

   - The total emission reductions must be less than 60,000 t $CO_2$/yr in each year of the crediting period.

[1] Refer to Boundary section of the methodology for the exact definition of the project boundary
[2] This can be demonstrated for example by carrying out surveys with processed agricultural product retailers in the local area.

- Baseline measures based on co-generation are not applicable under this methodology[3].
- Project activities that involve partial fuel switch from fossil fuel to renewable biomass shall refer to the criteria on fossil fuel co-firing given in Gold Standard "Annex C – guidance on project type eligibility".

**Provisions of electricity and/or mechanical power and/or thermal energy:**

- The electricity and/or mechanical power and/or thermal energy in the project is provided either;
  - by installing a new renewable energy plant at a site where there was no renewable energy plant operating prior to the implementation of the project activity (e.g. photovoltaic, hydropower, tidal/wave, geothermal); or
  - by an addition in capacity due to the use of renewable power sources at a plant powered by fossil fuels and/or non-renewable biomass; or
  - by retrofitting (or rehabilitating/refurbishing)[4] an existing plant powered by fossil fuels and/or non-renewable biomass; or
  - by total or partial replacement of fossil fuels and/or non-renewable biomass by renewable biomass in existing plants or in new plants that would have been built in the absence of the project, e.g. by increasing the share of renewable biomass use as compared to the baseline, by retrofitting an existing plant to use renewable biomass, etc; or
  - from sustainably produced plant-oil (or biodiesel) used in engines/generators.
- If a share of the electricity and/or mechanical power consumed at sites/users is from fossil fuels (e.g. electricity from a fossil fuel based grid; use of diesel in engines or back-up power/generators, etc.) it needs to be clearly distinguished from the renewable energy supplied in the project.
- The power provided must be predominantly used for the mechanical processing of agricultural products (e.g. milling, grinding, shelling, threshing, shelling, oil extraction and separation, etc.).
- In the pre-project situation, users either (i) cannot process inputs locally (e.g. due to the lack of equipment, the energy scarcity, high operational costs) at project service levels or (ii) have to resort to manual processing which is labour-intensive and has a lower productivity/quality.

**Hydropower:**

- In the case of hydropower, the applicability conditions for hydropower projects found in the latest version of The Gold Standard "Annex C – guidance on project type eligibility" applies and each of the hydro power plants should satisfy the following conditions, if applicable:

[3] Project Proponents are encouraged to submit procedures as revisions to make this methodology applicable to co-generation.

[4] Retrofit (or rehabilitation or refurbishment). A retrofit is an investment to repair or modify an existing power plant/unit, with the purpose to increase the efficiency, performance or power generation capacity of the plant, without adding new power plants or units, or to resume the operation of closed (mothballed) power plants. A retrofit restores the installed power generation capacity to or above its original level. Retrofits shall only include measures that involve capital investments and not regular maintenance or housekeeping measures

- The project activity is implemented in an existing reservoir, where the volume of the reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/$m^2$;
- The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2;

**Plant oil (and/or biodiesel)**

If the project (i) provides plant oil and/or biodiesel to generate power and/or electricity at an existing or new facility the following applies:

- Under this project, emission reductions can only be claimed for the plant oil (and/or biodiesel) consumed in systems delivering electricity/mechanical work to users;
- The other eligibility conditions as per The Gold Standard's Annex C would be applicable

**Suppressed demand**

- The project results in one or more of the following improvements:

(i) Increased quality of the products - due to lack of adequate equipment or due to high operational costs from expensive fuels, the agricultural product processing facility may not be able to process the products to the level of quality achieved in the project scenario. The implementation of the project activity, by introducing renewable energy technology, would enable the desired level of quality for the finished agricultural products to be achieved.

(ii) Decreased manual labour - due to manual labour the agricultural product processing facility may not be able to process the products to the level of quality and/or quantity achieved in the project scenario. The implementation of the project activity, by introducing mechanization using renewable energy technology, would enable the designed level of quality and quantity for finished agricultural products to be achieved.

(iii) Increased production due to, among others, an increased yield (output/input), higher processing capacity (tonnes transformed per day), etc. - due to high operational costs from expensive fuels, the agricultural product processing facility may not be able to process the products to the level of quantity achieved in the project scenario. The implementation of the project activity, by introducing energy efficiency measures, would enable a decrease in fuel costs and help to achieve the designed level of quantity for the finished agricultural products.

**Participants:**

- All users are either farmers/cooperatives/small land owners/Micro, Small and Medium sized Enterprises (SME)[5].
- The project boundary can be clearly identified, and the technologies counted in the project are not included in another voluntary market or CDM project activity.

[5] These categories should be justified as per the host country definitions

- Project activities that involve a large number of farmers, SME, cooperatives or small landowners must provide a clear description of the transfer of carbon credit ownership along the entire investment chain and provide evidence to demonstrate that end-users are aware of and willing to give up their rights on the carbon credits. In the case of cooperatives or SMEs, the decision to grant the transfer of carbon credits can be established at the SME/cooperative level.

## III. Boundary

4. The project boundary includes the area within a 50 km radius of the project installation. Distances farther than 50km can be justified as being part of the project boundary on a case-by-case basis (this shall be discussed as part of the Local Stakeholder Consultation meeting). For example, if raw materials are sourced from distances beyond the normal boundary, the local area can be justified and extended accordingly.

   The project boundary further includes the physical, geographical site(s) of:

   - The facility supplied with energy for the mechanical and/or thermal processing of agricultural products;
   - The project's renewable power generation and distribution systems supplying the users with electricity and/or mechanical work;
   - The geographical area of the cultivation, production and processing of oilseeds (production sites); the areas where the plant oil and/or biodiesel is processed/blended/distributed to the final users (distribution points); where the plant oil is used to generate renewable energy (consumption points); and where any of the biomass and/or waste water generated/used in the cultivation and processing of the oilseeds is stockpiled, disposed or treated.

## IV. Baseline identification

5. The baseline scenario is identified as the most realistic combination of technology and fuel, which would have provided the project service level taking into account the local circumstances (e.g. barriers). The actual pre-project situation, which reflects a suppressed demand situation such as energy poverty, cannot be considered as the baseline as it does not allow accounting for satisfied demand.

   Mechanical power: For the supply of mechanical power, the baseline shall be assumed to be an isolated diesel-power generator.

   Thermal processing of agricultural products: The identified baseline is either the existing pre-project situation or the most common combination of technology and fuel for the considered thermal treatment, found in the nearest range of the project area (refer guidance in paragraph 22). For existing facilities, the pre-project situation can be applied as the baseline, taking into account the manufacturer's data on specific power/energy consumption. The baseline fuel type could be used to determine the baseline fuel emission factor if 2-years of historic data is available, otherwise refer to section 22 of the methodology. For existing units in operation for more than 2 years, the emission factor shall be based on the average of the emission factor of all fuels used in that period. In case of Greenfield projects, the guidance on specific power/energy consumption and fuel emission factors as given in section 22 should be followed.

   Improved mechanical or thermal processing: The identified baseline is either the technology used in the pre-project situation or the most common combination of technology and fuel found in the nearest range of the project area (refer guidance in section 22). For existing facilities, the pre-project situation can be

applied as the baseline taking into account the manufacturer's data on Specific Power /energy consumption. The baseline fuel type could be used to determine the baseline fuel emission factor if 2-years of historic data is available, otherwise refer to section 22 of the methodology. For existing units in operation for more than 2 years, the emission factor shall be based on the average of the emission factor of all fuels used in that period. In case of Greenfield projects, the guidance on Specific Power /energy consumption and fuel emission factors as given in section 22 should be followed.

## V. Additionality:

**6.** Additionality shall be demonstrated in line with the additionality requirements listed in The Gold Standard requirements.

## VI. Emission reductions:

**Baseline emissions are calculated as follows:**

**Application A1:**

**Mechanical and/or thermal processing with or without energy efficiency involving complete fuel switch**

7. Baseline emissions for project activities involving complete fuel switch are calculated as follows:

$$BE_y = BE_{power,y} + BE_{heat,y} \quad (1)$$

Where:

| | |
|---|---|
| $BE_y$ | Baseline emissions in year *y* ($tCO_2$/year) |
| $BE_{power,y}$ | Baseline emissions for the use of renewable power in the year y ($tCO_2$/year) |
| $BE_{heat,y}$ | Baseline emissions for the thermal processing of agricultural products ($tCO_2$/year) |

8. The baseline emissions for the production of mechanical power are calculated as follows:

$$BE_{power,y} = \sum_{i,j} \left( Q_{i,j,y} \cdot SPC_{BL,i,j} \cdot EF_{BL,power} \right) \quad \textbf{(2)}$$

Where:

| | |
|---|---|
| $BE_{power,y}$ | Baseline emissions for power consumption of mechanical processing in year *y* ($tCO_2$/year) |
| $Q_{i,j,y}$ | Quantity of agricultural product *i* treated by the mechanical process *j* in the project scenario (tonnes/year) |
| $SPC_{BL,i,j}$ | Specific baseline power consumption for the processing of the agricultural product *i* transformed with the mechanical process *j* (MWh/tonne) taking into account the situation of suppressed demand |
| $EF_{BL,power}$ | Emission factor for captive electricity generation which would have supplied the system in the baseline ($tCO_2e$/MWh). A default factor of 1.1 $tCO_2e$/MWh can be used. Alternative emission factors can be proposed by the project proponent and used for calculating baseline emissions. For instance the project proponent can justify higher emission factors for diesel generator |

systems as proposed in the latest version of CDM Small-Scale Methodology AMS I.F, table I.F.1. The project proponent must provide justification for the choice of emission factor. The Gold Standard Foundation must approve any new emission factors during the validation process of a specific project activity.

9. The baseline emissions for the thermal processing of agricultural products are calculated as follows:

$$BE_{heat,y} = \sum_{k,m}(Q_{k,m,y} * SEC_{BL,k,m} * WB_{BL,k,m} * f_{NRB,y} * EF_{fuelwood} \div NCV_{fuelwood}) + \sum_{n}(Q_{k,m,y} * SEC_{BL,k,m} * FF_{BL,k,m,n} * EF_{BL,ff,k,m,n}) \quad \textbf{3)}$$

Where:

| | |
|---|---|
| $BE_{heat,y}$ | Baseline emissions for the thermal processing of agricultural products in year y ($tCO_2$/year) |
| $Q_{k,m,y}$ | Quantity of agricultural product *k* treated by the thermal process *m* in the project scenario (tonnes/year) |
| $SEC_{BL,k,m}$ | Specific baseline energy consumption for the processing of the agricultural product *k* treated by the thermal process *m* (TJ/tonne) taking into account the situation of suppressed demand |
| $WB_{BL,k,m}$ | Share of woody biomass for the processing of the agricultural product *k* treated by the thermal process *m* observed in the baseline based on the total energy consumption (TJ/TJ) |
| $FF_{BL,k,m,n}$ | Share of fossil fuel *n* for the processing of the agricultural product *k* treated by the thermal process *m* observed in the baseline based on the total energy consumption (TJ/TJ) |
| $f_{NRB,y}$ | Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non-renewable biomass using survey methods as per the guidance as provided by "Annex 1: Non-Renewable Biomass (NRB) Assessment" of The Gold Standard methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" following either the quantitative NRB Assessment or the qualitative NRB Assessment or using most recently approved default values as published by UNFCCC[6] |
| $EF_{fuelwood}$ | 2.202 $tCO_2$/t wood (this includes both $CO_2$ and non-$CO_2$ emissions) |
| $EF_{BL,ff,k,m}$ | Emission factor of the fuel used in the baseline for the processing of the agricultural product *k* by the process *m* ($tCO_2$/TJ) |
| *NCVfuelwood* | Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton) |

**Application A2:**

**Mechanical and/or thermal processing with or without energy efficiency involving partial fuel switch**

10. Baseline emissions are calculated following the procedures as presented under Application A1 above.

[6] http://cdm.unfccc.int/DNA/fNRB/index.html

**Application B1:**

**Mechanical and/or thermal processing with only energy efficiency (i.e. no fuel switch)**

11. Emissions reductions for project activities that implement efficiency measures without any fuel switch are calculated as follows:

$$ER_y = ER_{power,EE,y} + ER_{heat,EE,y}$$

**(4)**

Where:

| | |
|---|---|
| $ER_y$ | Emissions reductions in year *y* ($tCO_2$/year) |
| $ER_{power,EE,y}$ | Emissions reductions for energy efficiency measures for mechanical treatment in year y ($tCO_2$/year) |
| $ER_{heat,EE,y}$ | Emissions reductions for energy efficiency measures for thermal treatment in year y ($tCO_2$/year) |

12. The emission reductions for improved energy efficiency of mechanical treatment are calculated as follows:

$$ER_{power,EE,y} = \sum_{i,j} Q_{i,j,y} \cdot \left(SPC_{BL,i,j} - SPC_{PJ,i,j}\right) \cdot EF_{BL,power,EE,i,j} \quad \textbf{(5)}$$

Where:

| | |
|---|---|
| $ER_{power,EE,y}$ | Emission reductions for energy efficiency measures for mechanical treatment in year y ($tCO_2$/year) |
| $Q_{i,j,y}$ | Quantity of agricultural product *i* treated by the mechanical process *j* in the project scenario (tonnes/year) |
| $SPC_{BL,i,j}$ | Specific baseline power consumption for the processing of the agricultural product transformed with the mechanical process *i* or *j* (MWh/tonne) taking into account the situation of suppressed demand |
| $SPC_{PJ,i,j}$ | Specific project power consumption for the processing of the agricultural product *i* transformed with the mechanical process *i* or *j* (MWh/tonne) |
| $EF_{BL,power,EE,i,j}$ | Emission factor for captive electricity generation, which would have supplied the system in the baseline ($tCO_2e$/MWh). A default factor of 1.1 $tCO_2e$/MWh can be used. Alternative emission factors can be proposed by the project proponent and used for calculating baseline emissions. For instance the project proponent can justify higher emission factors for diesel generator systems as proposed in the latest version of CDM Small---Scale Methodology AMS I.F, table I.F.1. The project proponent must provide justification for the choice of emission factor. The Gold Standard Foundation must approve any new emission factors during the validation process of a specific project activity. For renewable sources $EF_{power,EE,i,j}$ it shall be zero. |

13. The emission reductions for improved energy efficiency of thermal treatment are calculated as follows:

$$ER_{heat,EE,y} = \sum_{k,m} Q_{k,m,y} \cdot \left(SEC_{BL,k,m} - SEC_{PJ,k,m}\right) \cdot EF_{BL,heat,EE,k,m} \quad (6)$$

Where:

| | |
|---|---|
| $ER_{heat,EE,y}$ | Emission reductions for energy efficiency measures for thermal treatment in year y ($tCO_2$/year) |
| $Q_{k,m,y}$ | Quantity of agricultural product *k* treated by the thermal process *m* in the project scenario (tonnes/year) |
| $SEC_{BL,k,m}$ | Specific baseline energy consumption for the processing of the agricultural product *k* transformed with the thermal process *m* (GJ/tonne) taking into account the situation of suppressed demand |
| $SEC_{PJ,k,m}$ | Specific project energy consumption for the processing of the agricultural product k transformed with the thermal process *m* ( (GJ/tonne) |
| $EF_{BL,heat,EE,k,m}$ | Emission factor for heat generation which would have supplied the system in the baseline ($tCO_2e$/GJ). For renewable sources $EF_{heat,EE,k,m}$ it shall be zero |

**Project emissions:**

14. Generally, under Applications A1 and A2, small amounts of startup fuels can be used, but can comprise of no more than 5% of the total fuel use, on an energy basis. If this condition can be demonstrated for a specific year of the crediting period, project emissions from the use of fossil fuels do not need to be taken into account. If this condition is not met for a specific year of the crediting period, project emissions shall be calculated as described below in section 16.

15. Generally, under Application A2, fossil fuels can be used for co-firing, but can comprise of no more than what is outlined under the related applicability conditions within The Gold Standard Annex C. If this condition is not met for a specific year of the crediting period, no emission reductions shall be claimed for that year.

16. Project emissions are calculated for Applications A1 and A2 as follows:

$$PE_y = PE_{power,y} + PE_{heat,y} + PE_{CC,y} + PE_{PP,k,y} + PE_{MeOH,y} + PE_{CH4,y} \quad (6)$$

Where:

| | |
|---|---|
| $PE_y$ | Project emissions in year *y* ($tCO_2$/year) |
| $PE_{power,y}$ | Project emissions from mechanical treatment in year y ($tCO_2$/year); If the system for the mechanical processing of agricultural products is solely based on dedicated renewable power sources or plant oil (or biodiesel), it can be assumed that $PE_{power,y}$= 0. If fossil fuels are used, project emissions shall be calculated according to the latest version of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion"[7] |
| $PE_{,heat}$ | Project emissions for the thermal processing of agricultural products ($tCO_2$) |

[7] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

| | |
|---|---|
| $PE_{cc,y}$ | Emissions from cultivation of crops for oilseeds in year y ($tCO_2e$); this item shall be accounted for following the procedures in AMS-III.AK |
| $PE_{PP,y}$ | Emissions from biodiesel production using oilseeds type k in year y ($tCO_2e$); this item shall be accounted for following the procedures in AMS-III.AK |
| $PE_{MeOH,y}$ | Emissions from fossil fuel carbon in methanol used in the trans-esterification process in year y ($tCO_2e$); this item shall be accounted for following the procedures in AMS-III.AK |
| $PE_{CH4,y}$ | Where applicable project emissions of $CH_4$ from solid waste and/or waste water in year y ($tCO_2e$); this item shall be accounted for following the procedures in AMS-III.AK; if the production of crop for oilseeds does not lead to the anaerobic storage of bio wastes, then $PE_{CH4,y}$ can be neglected. |

17. The project emissions for the thermal processing of agricultural products are as follows:

$$PE_{heat,y} = \sum_{k,m} B_{k,m,y} \cdot f_{NRB,y} \cdot EF_{fuelwood} + PE_{FC,k,m,y} \quad (7)$$

Where:

| | |
|---|---|
| $PE_{heat,y}$ | Project emissions for the thermal processing of agricultural products in year y ($tCO_2$/year) |
| $B_{k,m,y}$ | Quantity of woody biomass used to treat the agricultural product *k* by the thermal process *m* (tonnes/year) |
| $f_{NRB,y}$ | Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non-renewable biomass using survey methods as per the guidance as provided by "Annex 1: Non-Renewable Biomass (NRB) Assessment" of The Gold Standard methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" following either the quantitative NRB Assessment or the qualitative NRB Assessment or using most recently approved default values as published by UNFCCC[8] |
| $EF_{fuelwood}$ | 2.202 $tCO_2$/t wood (this includes both $CO_2$ and non-$CO_2$ emissions) |
| $PE_{FC,k,m,y}$ | $CO_2$ emissions from fossil fuel combustion for treatment of agricultural product *k* in process *m* during the year *y*. These emissions shall be calculated according to the latest version of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" |

18. Project emissions for Applications B1 are already accounted for.

**Leakage**

19. Leakages to be taken into account, among others, are:

- The deforestation resulting from small hydro reservoirs or power lines (to be accounted for as per the approved *"General guidance on leakage in biomass project activities for small-scale project activities"*);

[8] http://cdm.unfccc.int/DNA/fNRB/index.html

- The project emissions from transportation of oil seeds to the oil production plant in year y ($tCO_2e$). If the transportation distance is less than 200 km, these emissions can be neglected. In other cases, this item shall be accounted for following the procedures for calculating $PE_{TT,y}$ in AMS-III.AK;
- If the energy generating equipment is transferred from another activity, leakage is to be considered;
- Displacement of currently used plant oil or fuel (to be assessed based on the guidance in Annex C)

**Emission reductions:**

20. Emissions reductions are calculated for all possible applications as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (8)$$

Where:

$ER_y$ = Emission reductions in year *y* ($tCO_2$)

$BE_y$ = Baseline emissions in year *y* ($tCO_2$)

$PE_{,y}$= Project emissions in year *y* ($tCO_2$)

$LE_y$ = Leakage emissions in year *y* ($tCO_2$)

## VII. Monitoring

21. Data and parameters not monitored –

Application A1 and A2

| Data/ Parameter | $SPC_{BL,i,j}$ |
|---|---|
| Data Unit: | MWh/tonne |
| Description: | Specific baseline power consumption for the processing of the agricultural product *i* transformed with the mechanical process *j* |
| Source of data: | |
| Any comment: | Refer to section 22 of the methodology |

| Data/ Parameter | $EF_{BL,power}$ |
|---|---|
| Data Unit: | $tCO_2e$/MWh |
| Description: | Emission factor for captive electricity generation which would have supplied the system in the baseline |
| Source of data: | |
| Any comment: | A default factor of 1.1 $tCO_2e$/MWh can be used |

| Data/ Parameter | $SEC_{BL,k,m}$ |
|---|---|
| Data Unit: | TJ/tonne |
| Description: | Specific baseline energy consumption for the processing of the agricultural product *k* treated by the thermal process *m* |
| Source of data: | |
| Any comment: | Refer to section 22 of the methodology |

| Data/ Parameter | $WB_{BL,k,m}$ |
|---|---|
| Data Unit: | TJ/TJ |
| Description: | Share of woody biomass for the processing of the agricultural product *k* treated by the thermal process *m* observed in the baseline based on the total energy consumption |
| Source of data: | |
| Any comment: | |

| Data/ Parameter | $FF_{BL,k,m,n}$ |
|---|---|
| Data Unit: | TJ/TJ |
| Description: | Share of fossil fuel *n* for the processing of the agricultural product *k* treated by the thermal process *m* observed in the baseline based on the total energy consumption (TJ/TJ) |
| Source of data: | |
| Any comment: | |

| Data/ Parameter | $f_{NRB}$ |
|---|---|
| Data Unit: | Unitless |
| Description: | Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non-renewable biomass. |
| Source of data: | |
| Any comment: | Use survey methods as per the guidance as provided by "Annex 1: Non-Renewable Biomass (NRB) Assessment" of The Gold Standard methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" following either the quantitative NRB Assessment or the qualitative NRB Assessment or using most recently approved default values as published by UNFCCC |

| Data/ Parameter | $EF_{fuelwood}$ |
|---|---|
| Data Unit: | tCO2/T wood |
| Description: | Emission factor of fuelwood |
| Source of data: | |
| Any comment: | Use default of 2.202 $tCO_2$/t wood (this includes both $CO_2$ and non-$CO_2$ emissions) |

| | |
|---|---|
| Data/ Parameter | $NCV_{fuelwood}$ |
| Data Unit: | TJ/Tonne |
| Description: | Net calorific value of fuelwood |
| Source of data: | |
| Any comment: | Use default of 0.015 TJ/tonne |

| | |
|---|---|
| Data/ Parameter | $EF_{BL,ff,k,m}$ |
| Data Unit: | $tCO_2/TJ$ |
| Description: | Emission factor of the fuel used in the baseline for the processing of the agricultural product *k* by the process *m* |
| Source of data: | |
| Any comment: | Refer to section 22 of the methodology |

Application B1 –

| | |
|---|---|
| Data/ Parameter | $SPC_{BL,i,j}$ |
| Data Unit: | MWh/tonne |
| Description: | Specific baseline power consumption for the processing of the agricultural product transformed with the mechanical process *i* or *j* |
| Source of data: | |
| Any comment: | Refer to section 22 of the methodology |

| | |
|---|---|
| Data/ Parameter | $EF_{BL,power,EE,i,j}$ |
| Data Unit: | $tCO_2e/MWh$ |
| Description: | Emission factor for captive electricity generation, which would have supplied the system in the baseline. |
| Source of data: | A default factor of 1.1 $tCO_2e/MWh$ can be used. |
| Any comment: | Alternative emission factors can be proposed by the project proponent and used for calculating baseline emissions. For instance the project proponent can justify higher emission factors for diesel generator systems as proposed in the latest version of CDM Small---Scale Methodology AMS I.F, table I.F.1. The project proponent must provide justification for the choice of emission factor. The Gold Standard Foundation must approve any new emission factors during the validation process of a specific project activity. For renewable sources $EF_{power,EE,i,j}$ shall be zero |

1.

| | |
|---|---|
| Data/ Parameter | $SEC_{BL,k,m}$ |
| Data Unit: | GJ/Tonne |
| Description: | Specific baseline energy consumption for the processing of the agricultural product *k* transformed with the thermal process *m* |
| Source of data: | |
| Any comment: | Refer to section 22 of the methodology |

| | |
|---|---|
| Data/ Parameter | $EF_{BL,heat,EE,k,m}$ |
| Data Unit: | $tCO_2e/GJ$ |
| Description: | Emission factor for heat generation, which would have supplied the system in the baseline. |
| Source of data: | |
| Any comment: | Refer to section 22 of the methodology |

Data and parameters monitored –

| | |
|---|---|
| Data/ Parameter | $Q_{i,j,y}$ |
| Data Unit | Tonne/year |
| Description | Quantity of agricultural product i treated by the mechanical process j in project scenario |
| Source of data | Measurement through direct weighing or derived by calculation from the quantities sold |
| Monitoring frequency: | Continuous |
| QA/QC procedures: | |
| Any comment: | |

| | |
|---|---|
| Data/ Parameter | $Q_{k,m,y}$ |
| Data Unit | Tonne/year |
| Description | Quantity of agricultural product k treated by the thermal process m in project scenario |
| Source of data | Measurement through direct weighting or derived by calculation from the quantities sold |
| Monitoring frequency: | Continuous |
| QA/QC procedures: | |
| Any comment: | |

| Data/ Parameter | $B_{k,m,y}$ |
|---|---|
| Data Unit | Tonne/year |
| Description | Quantity of woody biomass used to treat the agricultural product k by the thermal process m |
| Source of data | Measurement through direct weighting |
| Monitoring frequency: | Continuous |
| QA/QC procedures: | |
| Any comment: | |

| Data/ Parameter | $SPC_{PJ,i,j}$ |
|---|---|
| Data Unit: | MWh/tonne |
| Description: | Specific project power consumption for the processing of the agricultural product transformed with the mechanical process *i* or *j* |
| Source of data: | |
| Monitoring frequency: | 'Once ex-post' in case of individual project activities and 'continuous' in case of activities under a PoA |
| QA/QC procedures: | |
| Any comment: | Refer to section 23 of the methodology |

| Data/ Parameter | $SEC_{PJ,k,m}$ |
|---|---|
| Data Unit: | GJ/Tonne |
| Description: | Specific project energy consumption for the processing of the agricultural product *k* transformed with the thermal process *m* |
| Source of data: | |
| Monitoring frequency: | 'Once ex-post' in case of individual project activities and 'continuous' in case of activities under PoA |
| QA/QC procedures: | |
| Any comment: | Refer to section 23 of the methodology |

22. Specific guidance for the determination of the parameters $SPC_{BL,i,j}$; $SEC_{BL,k,m}$; $WB_{BL,k,m}$; $EF_{BL,ff,k,m}$; $EF_{BL,heat,EEk,m}$; $FF_{BL,k,m,n}$

If available, data from publicly available literature relevant for the host country shall be used. Otherwise a survey/sampling method shall be applied taking into account the following guidance:

- The survey shall be conducted within the nearest range of where the project is located;
- At least 5 existing plants/processes/facilities that have similar circumstances - for the type of treatment of agricultural products - resulting in the same or similar quantity (+/- 20% of the designed capacity) and quality of output, shall be included;
- Values shall be determined for the treatment processes based on the following options:
  - Manufacturer/designer information; OR

  - Independent third party/expert information; OR
  - Measurements applying national or international norms or standards, if available;
- The average of all available data shall be used;
- The result (i.e. the average) shall be multiplied by 0.89 to account for associated uncertainties;
- Furthermore, the guidance for sampling as described below shall be taken into account.

23. Specific guidance to the determination of the parameters $SPC_{PJ,i,j}$; $SEC_{PJ,k,m}$
Values shall be determined for the treatment processes as follows:
    - Measurements based on national or international norms or standards, if available
    - Measurements shall be conducted during representative processing (i.e. typical operational parameters as per design specification compared to the operation over a complete year)

24. The applicable requirements specified in the 'General Guidelines to SSC CDM methodologies' are also an integral part of the monitoring guidelines specified below and therefore shall be referred to by the project participants.

25. In addition, the monitoring provisions in the tools referred to in this methodology apply.

**Representative sampling methods**

26. A statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographic differences can be used to determine parameter values used to determine emission reductions, as per the relevant requirements for sampling in the "General guidelines for sampling and surveys for small-scale CDM project activities". When biennial inspection is chosen, a 95% confidence interval and a 5% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/5 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey.

**Project activity under a programme of activities**

27. This methodology can be applied in the context of a Programme of Activities as long as the project energy (heat and/or electricity) consumption is continuously monitored.