

AMS-I.G

Small-scale Methodology

Plant oil production and use for energy generation in stationary applications

Version 02.0

Sectoral scope(s): 01



United Nations
Framework Convention on
Climate Change

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1. Introduction

1. The following table describes the key elements of the methodology:

Table 1. Methodology key elements

Typical project(s)	Plant oil production that is used for generation of thermal, mechanical and electrical energy in stationary equipment including cogeneration. The plant oil is produced from pressed and filtered oilseeds from plants that are cultivated on dedicated plantations
Type of GHG emissions mitigation action	Renewable energy. Displacement of more-GHG-intensive fossil fuel for combustion in stationary installations

2. Scope, applicability, and entry into force

2.1. Scope

2. This methodology comprises activities involving the cultivation of oilseeds and the production of plant oil to generate thermal/mechanical/electrical energy including cogeneration to displace fossil fuel and/or fossil fuel based technologies. Plant oil in contrast to bio-diesel is not trans-esterified but only pressed and filtered from oilseeds.

2.2. Applicability

3. The methodology is applicable under the following conditions:
- (a) Pure plant oil and blends with fossil fuel above 10 per cent by volume of plant oil shall be used in equipment¹ that is specially built or modified;
 - (b) Plant oil must comply with national quality regulations or in absence of the latter with the quality standards stipulated in Table 2 of the methodology “AMS-III.T.: Plant oil production and use for transport applications”;
 - (c) The retailers, final users and the producer of the plant oil or its blend are bound by a contractual agreement allowing emission reductions to be claimed only by the project proponent;
 - (d) The export of plant oil produced under this category is not allowed;
 - (e) Plant oil is not co-fired with solid fuels;
 - (f) If the project activity utilizes biomass sourced from dedicated plantations, the applicability conditions prescribed in the methodological tool “Project emissions from cultivation of biomass” shall apply.

¹ For internal combustion engines conversion measures include adaptations of fuel supply, combustion and injection mechanisms.

4. The plant oil produced by the project activity may be used as a blend with pure petrodiesel or with petrodiesel that has already been blended with biofuel.² In the latter case baseline emissions only from the petrodiesel fraction shall be calculated, the biofuel content of the primary blend shall be considered as carbon neutral, however, in the calculation of the project emissions, the fuel used for blending (primary blend) shall be considered as pure petrodiesel i.e. 100 per cent petrodiesel fraction. This conservative approach is used because it may not be feasible to determine the upstream emissions associated with the production of the biodiesel used for the primary blending.
5. Project eligibility limits (capacity limits) are in accordance with the guidelines in:
 - (a) AMS-I.C. for thermal energy and cogeneration applications;
 - (b) AMS-I.B. for mechanical energy applications;
 - (c) AMS-I.D., AMS-I.F. or AMS-I.A. as the case may be for electricity applications.

2.3. Entry into force

6. The date of entry into force is the date of the publication of the EB 81 meeting report.

3. Normative references

7. Project participants shall apply the “General guidelines for SSC CDM methodologies” and “Guidelines on the demonstration of additionality of small-scale project activities” provided at <<https://cdm.unfccc.int/Reference/Guidclarif/index.html>> mutatis mutandis.
8. This methodology also refers to the latest approved versions of the following approved methodologies, guidelines³ and tools:
 - (a) “AMS-I.A.: Electricity generation by the user”;
 - (b) “AMS-I.B.: Mechanical energy for the user with or without electrical energy”;
 - (c) “AMS-I.C.: Thermal energy production with or without electricity”;
 - (d) “AMS-I.D.: Grid connected renewable electricity generation”;
 - (e) “AMS-I.F.: Renewable electricity generation for captive use and mini-grid”;
 - (f) “AMS-III.F.: Avoidance of methane emissions through composting”;
 - (g) “AMS-III.G.: Landfill methane recovery”;
 - (h) “AMS-III.H.: Methane recovery in wastewater treatment”;
 - (i) “AMS-III.T.: Plant oil production and use for transport applications”;
 - (j) “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”;

² It is expected that plant oil is blended with pure petrodiesel, however where the project proponent has no access to pure petrodiesel (e.g. due to local regulations requiring sale of blended petrodiesel in the region/country) blended fuel may be used.

³ Please refer to: <<https://cdm.unfccc.int/Reference/index.html>>.

- (k) "Tool to calculate baseline, project and/or leakage emissions from electricity consumption";
- (l) "Project emissions from cultivation of biomass";
- (m) "Project and leakage emissions from transportation of freight".

4. Definitions

- 9. The definitions contained in the Glossary of CDM terms shall apply.
- 10. Furthermore, the following definition applies:
 - (a) **Plant oil**, or **vegetable oil**, is oil of plant origin composing of triglycerides. Although many different parts of the plants may yield oil, most often oil is extracted from the seeds or fruits of the plant. Examples of plant oil are sunflower oil, rapeseed oil and jatropha oil.

5. Baseline methodology

5.1. Project boundary

- 11. The project boundary is the geographical area of the cultivation, production and processing of oil-seeds, disposal of waste products and the areas where plant oil is processed/blended. The boundary also extends to the users where plant oil is consumed in the project equipment to produce thermal/electrical/mechanical energy and the end users of the produced energy.

5.2. Baseline emissions

- 12. The energy baseline and the corresponding baseline emissions for plant oil based renewable energy sources and/or technologies shall be chosen as follows:
 - (a) As per the procedures of AMS-I.A if the project activity is for standalone off-the-grid power systems supplying electricity to households/users included in the boundary;
 - (b) As per the procedures of AMS-I.F. if the project activity displaces electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit;
 - (c) As per the procedures of AMS-I.D. if the project activity supplies electricity to a regional or national grid;
 - (d) As per the procedures of AMS-I.C. if the project activity produces thermal energy and/or cogenerates heat and electricity;
 - (e) As per the procedures of AMS-I.B. if project activity is generating mechanical energy.
- 13. For project activities that involve retrofit of an existing facility and/or capacity addition at an existing facility, the baseline emissions shall be calculated following the applicable principles described in AMS-I.D.

5.3. Project emissions

14. Project emissions include:

- (a) CO₂ emissions from on-site consumption of fossil fuels due to the project activity, calculated using the latest version of the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”, including the consumption of fossil fuels for processing (e.g. pressing and filtering) of plant oil and excluding the consumption of fossil fuels related to the cultivation of oil seeds, if any;
- (b) 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”, including the consumption of fossil fuels for processing (e.g. pressing and filtering) of plant oil and excluding the consumption of fossil fuels related to the cultivation of oil seeds, if any;
- (c) Methane emission from solid waste disposal or waste water calculated as per provisions in AMS-III.G. (landfill); AMS-III.F. (composting) and AMS-III.H. (waste water treatment) in the cases where the waste are disposed in anaerobic conditions;
- (d) Project emissions cultivation of oil seeds are calculated using the latest version of the tool “Project emissions from cultivation of biomass”;
- (e) Project emissions from transportation of oil seeds to the oil production plant are estimated using the latest version of the tool “Project and leakage emissions from transportation of freight”, if the transportation distance is more than 200 km; otherwise they can be neglected.

5.4. Leakage

15. Leakage emissions are calculated as follows:

$$LE_y = -LE_{upstream,y} \quad \text{Equation (1)}$$

Where:

LE_y = Leakage in year y (t CO₂)

$LE_{upstream,y}$ = Negative leakage due to reducing indirect emissions associated with the production of petrodiesel (t CO₂)

5.5. Emission reductions

16. Emission reductions are calculated as follows:

$$ER_y = BE_y - \text{MAX}(PE_y + LE_y, 0) \quad \text{Equation (2)}$$

Where:

ER_y = Emission reductions in year y (t CO₂e)

BE_y = Baseline emissions in year y (t CO₂e)

PE_y = Project emissions in year y (t CO₂e)

LE_y = Leakage emissions in year y (t CO₂e)

17. The emissions from the production of plant oil are compared to the emissions from the production of the petrodiesel, which is avoided by displacing petrodiesel consumption with plant oil and is considered as negative leakage. The project emissions from the production of plant oil may be compensated by this negative leakage. However, project proponents shall not claim emission reductions from this comparison.

6. Monitoring methodology

18. Monitoring parameters shall be as prescribed by the applicable Type I methodology chosen in section 5.2. Project emissions are monitored as per section 5.3. The applicable requirements specified in the “General guidelines for SSC CDM methodologies” (e.g. calibration requirements, sampling requirements) are also an integral part of the monitoring guidelines.
19. The competing uses of biomass shall be monitored and verified.
20. The contracts between the producer of plant oil and the final users and retailers specifying that only the project proponent can claim CERs.
21. If paragraph 3(a) is applicable then the equipment modification or the installation of the new equipment shall be monitored.

7. Project activity under a programme of activities

22. The methodology is applicable to a programme of activities; no additional leakage estimations are necessary other than that indicated under leakage section above.

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Document information

Version	Date	Description
02.0	28 November 2014	EB 81, Annex 15 This revision removes the applicability conditions related to land eligibility and project emission calculations related to the cultivation of biomass, removes the restriction for application of methodology in PoAs in methodologies and includes reference to the approved tools.

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01.0	30 July 2010	EB 55, Annex 28 Initial adoption.
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