

VCS MODULE VMD0030

ESTIMATION OF EMISSIONS FROM POWER EQUIPMENT

Version 1.0

16 November 2012

Sectoral Scope 14



Document Prepared by: The Earth Partners LLC.

Table of Contents

1	SOURCES.....	2
2	SUMMARY DESCRIPTION OF THE MODULE	2
3	DEFINITIONS.....	2
4	APPLICABILITY CONDITIONS	2
5	PROCEDURES.....	2
6	PARAMETERS.....	3
7	REFERENCES AND OTHER INFORMATION	5

1 SOURCES

CDM methodology *AR-AM0004 Reforestation or afforestation of land currently under agricultural use*

2 SUMMARY DESCRIPTION OF THE MODULE

This module provides the equations, references and constants needed to calculate emissions of GHGs from power equipment used for project activities both within and outside of the project area.

3 DEFINITIONS

Directly Attributable: The change or effect occurs as result of a chain of causal events linking the change or effect to an event, or to the actions of an agent. Each of the causal events or conditions in the chain must be primarily and directly caused by the previous event in the chain. Analysis of the linkages in the chain should show that for each one, the previous event is at least 75% responsible for the next event. For this reason, the relationship between an event, or the actions of an agent, and the directly attributable effect, typically consist of not more than a few causal linkages.

Emission Factor: The average emission rate of a given pollutant for a given source, relative to the intensity of a specific activity.

Power Equipment: Equipment or tool powered by a combustion engine running on fossil fuels including vehicles.

4 APPLICABILITY CONDITIONS

None

5 PROCEDURES

GHG emissions may occur as a result of activities either within or outside of the project area due to burning of fossil fuels in powered equipment used for treatments, management, transportation of supplies.

Step 1: Monitor and/or estimate the type and amount of fossil fuels consumed in activities directly attributable to the project activity.

When this module is used in an ex-post situation (under project conditions, or baseline conditions in the case of a monitored baseline) the amounts of fuels used must be tracked on an ongoing basis based on fuel invoicing. If invoicing does not provide complete information, fuel use may be estimated based on average fuel use per hour or distance traveled for a given piece of machinery.

Under ex-ante conditions, the amounts of fuels used by type must be estimated using the module *VMD0019 Methods to Project Future Conditions*.

Step 2: Choose the most appropriate emission factors. There are three possible sources of emission factors:

- Regional emission factors;
- National emission factors: These emission factors developed by national programs such as national GHG inventory;
- IPCC default emission factors provided that a careful review of the consistency of these factors with the country conditions has been made. IPCC default factors may only be used when no other information is available.

Step 3: Estimate GHG emissions resulting from the burning of fossil fuel during activities directly attributable to the project activity. Although some non-CO₂ GHG (CO, CH₄, NMVOCs) may be released during combustion process, all the released carbon are accounted as CO₂ emissions based on the Revised 1996 IPCC Guidelines for energy:

$$E_{ff} = (CSP_{diesel,t} \cdot EF_{diesel} + CSP_{gasoline,t} \cdot EF_{gasoline}) \cdot 10^{-3} \quad (14.1)$$

Where:

E_{ff}	=	Emissions from the burning of fossil fuels, tCO ₂ yr ⁻¹
$CSP_{diesel,t}$	=	Amount of diesel consumption, liter (l) yr ⁻¹ in year t
$CSP_{gasoline,t}$	=	Amount of gasoline consumption, l yr ⁻¹ in year t
EF_{diesel}	=	Emission factor for diesel, kg CO ₂ l ⁻¹
$EF_{gasoline}$	=	Emission factor for gasoline, kg CO ₂ l ⁻¹
10^{-3}	=	Conversion kg to tonnes

6 PARAMETERS

Data Unit / Parameter:	E_{ff}
Data unit:	kg CO ₂ /year
Description:	Estimated GHG emissions
Source of data:	Calculated
Justification of choice of data or description of measurement methods and procedures applied:	Estimated GHG from fuel burning
Any comment:	

Data Unit / Parameter:	<i>CSPdiesel,</i>
Data unit:	Liter (l)
Description:	Amount of diesel consumption
Source of data:	Inventory of diesel consumption (ex-post), or estimation of diesel consumption using the module <i>VMD0019 Methods to Project Future Conditions</i> (ex-ante).
Justification of choice of data or description of measurement methods and procedures applied:	Amount of diesel consumption
Any comment:	

Data Unit / Parameter:	<i>CSPgasoline,</i>
Data unit:	Liter (l)
Description:	Amount of gasoline consumption (ex-post) or estimation of future gasoline consumption using the module <i>VMD0019 Methods to Project Future Conditions</i> (ex-ante)
Source of data:	Inventory of fuel use
Justification of choice of data or description of measurement methods and procedures applied:	Amount of gasoline consumption
Any comment:	

Data Unit / Parameter:	<i>EFdiesel</i>
Data unit:	kg CO ₂ l ⁻¹
Description:	Emission factor for diesel
Source of data:	IPCC
Justification of choice of data or description of measurement methods and procedures applied:	Emission factor for diesel
Any comment:	

Data Unit / Parameter:	<i>EFgasoline</i>
Data unit:	kg CO ₂ l ⁻¹
Description:	Emission factor for gasoline
Source of data:	IPCC
Justification of choice of data or description of measurement methods and procedures applied:	Emission factor for gasoline
Any comment:	

7 REFERENCES AND OTHER INFORMATION

UNFCCC, EB50. CDM AR-AM0004 Reforestation or afforestation of land currently under agricultural use <http://cdm.unfccc.int/UserManagement/FileStorage/KYBDLQFMI6R20X58OGH3Z71N9TSU4A> (Last visited 13-09-2011).

IPCC. 1996. Revised Guidelines for National Greenhouse Gas Inventories, <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html> (Last visited 14-09-2011).

DOCUMENT HISTORY

Version	Date	Comment
v1.0	16 Nov 2012	Initial version released