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TYPE III - OTHER PROJECT ACTIVITIES

Project participants shall apply the general guidelines to SSC CDM methodologies and information on additionality (attachment A to Appendix B) provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> *mutatis mutandis*.

III.C. Emission reductions by electric and hybrid vehicles

Technology/measure

1. This methodology is for project activities introducing new electric and/or hybrid[1] vehicles that displace the use of fossil fuel vehicles in passenger and freight transportation.

2. Project activities that involve a switch from fossil fuels to biofuels in transportation applications are not covered under this methodology; those project activities shall consider using another Type III methodology (e.g. AMS-III.T, AMS-III.AK[2]).

3. In cases where the project vehicles use a replaceable, chargeable battery there must be documented measures in place to ensure that vehicle owners have access to replacement batteries of comparable quality.

4. The project design document shall explain the proposed approach for introducing/distributing the electric/hybrid vehicles, which shall allow for tracking of the project vehicles. It shall also explain how the proposed project activity will:

(a) Demonstrate that the baseline vehicles being displaced are those consuming fossil fuels.[3] This can be done, for example, through documentation of the market share per fuel type per vehicle category in the project region (e.g. based on representative sample surveys or official data or peer reviewed literature);

(b) Ensure compliance with prevailing regulations pertaining to battery use and disposal.

5. The project design document shall include minimum performance specifications for the batteries to be used such as: depth of discharge, battery cycles, distance travelled per charge, lifetime.

6. Emission reductions may be claimed by the manufacturers of electric/hybrid vehicles, retailers, and/or owners of the vehicles, as long as it is ensured that double counting of emission reductions will not occur e.g., via a contractual agreement or unique identification of the vehicles.

7. Types of hybrid/electric vehicles to be introduced include but are not limited to cars, buses, trucks, jeepneys, commuter vans, taxis, motorcycles and tricycles.

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[1] Hybrid vehicles combine an internal combustion engine and one or more electric motors.

[2] AMS-III.T "Plant oil production and use for transport applications" and AMS-III.AK "Biodiesel production and use for transport applications"

[3] If any biofuel blends are used, blends up to 20% by volume are eligible and emission reductions shall be discounted by the percentage of biofuel in the blend (e.g. 20% in the case of B20).

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III.C. Emission reductions by electric and hybrid vehicles (cont)

8. Project participants shall demonstrate that the project and baseline vehicles are comparable, using the following means:

(a) Project and baseline vehicles belong to the same vehicle category e.g. motorcycle, bus, taxi, truck, tricycle;

(b) Project and baseline vehicles categories have comparable passenger/load capacity and power rating with a ~~of~~ variation of not more than +/- 20 % (comparing the baseline vehicle with the respective project vehicle of same category).

9. Measures are limited to those that result in emission reductions of less than or equal to 60 $ktCO_2$ equivalent annually.

Additionality

10. For the specific case of this methodology, additionality is demonstrated using one of the options below:

Option 1:

Demonstrate that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in attachment A of Appendix B of 4/CMP.1 Annex II <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>. The barrier(s) can be demonstrated for buyers/users of the electric vehicles even if the manufacturer or retailer of the electric vehicles is implementing the project.

Option 2:

Demonstrate *ex ante* that the market share of project electric/hybrid vehicles is equal to or smaller than 5% of the vehicles of the same category (e.g. if project vehicles are electric scooters, market share of electric two wheelers is equal to or smaller than 5% of all motorized two wheelers, irrespective of the manufacturer) in the region.

Boundary

11. The project boundary includes the electric and hybrid vehicles that are part of the project activity and the electricity supply source (e.g. a grid).

Baseline

12. The baseline scenario is the operation of the comparable vehicles (the comparability of baseline and project vehicles to be demonstrated as per indicators in paragraph 8) that would have been used to provide the same transportation service.

13. The baseline emissions are the energy use per unit of service for the baseline vehicle times the average annual units of service per vehicle times the number of vehicles affected times the emission coefficient for the fuel used by the baseline vehicle calculated as per the equation below:

$$BE_y = \sum_i EF_{BL,km,i} * DD_{i,y} * N_{i,y} * 10^{-6} \quad \textbf{(1)}$$

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III.C. Emission reductions by electric and hybrid vehicles (cont)

Where:

BE_y	Total baseline emissions in year *y* (tCO_2)
$EF_{BL,km,i}$	Emission factor for baseline vehicle category *i* (gCO_2/km)
$DD_{i,y}$	Annual average distance travelled by project vehicle category *i* in the year *y* (km)
$N_{i,y}$	Number of operational project vehicles in category *i* in year *y*

$$EF_{BL,km,i} = SFC_i * NCV_{BL,i} * EF_{BL,i} * IR^t \quad \textbf{(2)}$$

Where:

SFC_i	Specific fuel consumption of baseline vehicle category *i* (g/km)
$NCV_{BL,i}$	Net calorific value of fossil fuel consumed by baseline vehicle category *i* (J/g)
$EF_{BL,i}$	Emission factor of fossil fuel consumed by baseline vehicle category *i* (gCO_2/J)
IR^t	Technology improvement factor for baseline vehicle in year *t*. The improvement rate is applied to each calendar year. The default value of the technology improvement factor for all baseline vehicle categories is 0.99
t	Year counter for the annual improvement (dependent on age of data per vehicle category)

14. The specific fuel consumption for vehicle category *i* (SFC_i) shall be determined using either of the two following options:

Option (1): Sample measurement

Measure the actual fuel consumption rate of a representative sample of vehicles, for each vehicle category identified for highway driving. Vehicle categories shall be determined conservatively and be based on the fuel type used, the vehicle category, engine model year, power rating, passengers/load capacity auxiliary equipment (e.g. with and without air conditioners) and other relevant factors to distinguish vehicles with different fuel consumption rates. Sample vehicles shall be randomly chosen in accordance with the latest version of the "General guidelines for sampling and surveys for small-scale CDM project activities" using a 90% confidence interval and a +/- 10% error margin to determine the sample size. The lower bound of 95% confidence interval shall be used as the Specific Fuel Consumption.

Option (2): Top 20% of the comparable vehicles used for public/private transportation

The specific fuel consumption for comparable vehicles is estimated by using the specific fuel consumption for highway driving obtained from manufacturer's specification of the top 20% of

vehicles operated/used for public/private transportation in the project region. The $EF_{BL,km,i}$ and BE_y shall be calculated for each vehicle category associated with the project activity.

Project Emissions

15. Project emissions include the electricity and fossil fuel consumption associated with the operation of project vehicles and shall be calculated as follows:

$$PE_y = \sum_i EF_{PJ,km,i,y} * DD_{i,y} * N_{i,y} \quad \textbf{(3)}$$

Where:

PE_y	Total project emissions in year y (tCO_2)
$EF_{PJ,km,i,y}$	Emission factor per kilometre travelled by the project vehicle type i (tCO_2/km)
$N_{i,y}$	Number of operational project vehicles in category i in year y
$DD_{i,y}$	Annual average distance travelled by the project vehicle category i in the year y (km)

16. The emission factor of the project vehicles shall be established as follows:

$$EF_{PJ,km,i,y} = \sum_i SEC_{PJ,km,i,y} * EF_{elect,y} / \left(1 - TDL_y\right) * 10^{-3} + \sum_i SFC_{PJ,km,i,y} * NCV_{PJ,i} * EF_{PJ,i} * 10^{-6} \quad \textbf{(4)}$$

Where:

$SEC_{PJ,km,i,y}$	Specific electricity consumption by project vehicle category i per km in year y in urban conditions (kWh/km)
$EF_{elect,y}$	CO_2 emission factor of electricity consumed by project vehicle category i in year y ($kgCO_2$/kWh)
$SFC_{PJ,km,i,y}$	Specific fossil fuel[4] consumption by project vehicle category i per km in year y in urban conditions (g/km)
$EF_{PJ,i}$	CO_2 emission factor of fossil fuel consumed by project vehicle category i in year y (gCO_2/J)
$NCV_{PJ,i}$	Net calorific value of the fossil fuel consumed by project vehicle category i in year y (J/g)
TDL_y	Average technical transmission and distribution losses for providing electricity in the year y

[4] For electric vehicle the values is 0.00.

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III.C. Emission reductions by electric and hybrid vehicles (cont)

Leakage

17. No leakage calculation is required.

Emission reductions

18. Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad \textbf{(5)}$$

Where:

ER_y Emission reductions in year y (tCO_2e)

BE_y Baseline emissions in year y (tCO_2e)

PE_y Project emissions in year y (tCO_2e)

LE_y Leakage emissions in year y (tCO_2e)

Monitoring

19. The following shall be monitored:

Abbr.	Item, unit	Monitoring method/item
$DD_{i,y}$	Annual average distance driven by project vehicle i in year y (km/yr)	Measure the annual average distance driven by the project vehicles through: Option (A): monitoring of all vehicles or Option (B): representative sample survey of vehicles for each vehicle category. Sample vehicles shall be chosen in accordance with the latest version of the "General guidelines for sampling and surveys for small-scale CDM project activities" using a 90% confidence interval and a +/- 10% error margin to determine the sample size. The lower bound of 95% confidence interval shall be used as the annual distance travelled
TDL_y	Average technical transmission and distribution losses for providing electricity in the year y	As per the procedures of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"

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III.C. Emission reductions by electric and hybrid vehicles (cont)

Abbr.	Item, unit	Monitoring method/item
$SEC_{PJ,km,i,y}$ $SFC_{PJ,km,i,y}$	Consumption of specific fossil fuel/electricity consumption per km per project vehicle category *i* in year *y* (g/km and kWh/km)	Measure the specific electricity/fossil fuel consumption through: Option (A): monitor consumption of all project vehicles or Option (B): measure the amount of electricity/fossil fuels consumed per km travelled for a representative sample of each vehicle category. Sample vehicles shall be randomly chosen using a 90% confidence interval and a +/- 10% error margin to determine the sample size. The upper bound of 95% confidence interval shall be used for the specific fuel/electricity consumed. Cross-checked against vehicle specifications (kWh/km) for urban conditions provided by the manufacturers and use the most conservative of the two values
$NCV_{BL,i}$ $NCV_{PJ,i}$	Net calorific value of fuel *i* (J/g)	Country specific data or IPCC default value
$EF_{BL,i}$ $EF_{PJ,i}$	CO_2 emission factor of fuel used by vehicles category *i* (gCO_2/J)	Country specific data or IPCC default value
EF_{elect}	CO_2 emission factor of electricity used by project vehicle ($kgCO_2/kWh$)	As per procedures of AMS-I.D/AMS-I.F[5]

[5] AMS-I.D "Grid connected renewable electricity generation" and AMS-I.F "Renewable electricity generation for captive use and mini-grid"

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III.C. Emission reductions by electric and hybrid vehicles (cont)

Abbr.	Item, unit	Monitoring method/item
$N_{i,y}$	Number of project vehicle in operation in year *y*	Establish the number of the project vehicles in operation through: Option (A): based on annual sales records or official data on registered project vehicles cross-checked against the results from a representative sample survey vehicles to determine the percentage of vehicles in use or Option (B): based on annual sales records or official data for registered project vehicles, multiplied by the default factor 0.9^t, where *t* is year counter for the number of years since the vehicle was introduced (for example: if *n* vehicles are sold in year 1, in year 2 the number of vehicles still in operation are assumed to be equal to $n*0.9$, and in year 3, $n*0.9^2$ etc)

Project activity under a Programme of Activities

20. The methodology is applicable for a programme of activities.

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History of the document*

Version	Date	Nature of revision
13	EB 61, Annex 19 3 June 2011	• Include specific guidance for demonstrating additionality; • Elaborate procedures for calculating baseline, project emissions and monitoring parameters.
12	EB 55, Annex 31 30 July 2010	• Clarify that the methodology is applicable for electric and hybrid vehicles; • Under the PoA section leakage provisions pertaining to project activities involving fossil fuel switch measures has been excluded.
11	EB 33, Annex 31 27 July 2007	Expand for application under a programme of activities (PoA).
10	EB 28, Para 54 15 December 2006	Remove the interim applicability condition i.e. 25 $ktCO_2e/yr$ limit from all Type III categories.
9	EB 25, Annex 30 21 July 2006	Introduce provisions on the treatment of project emissions and include the respective monitoring requirements.

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III.C. Emission reductions by electric and hybrid vehicles (cont)

8	EB 24, Para, 64 12 May 2006	Introduce the interim applicability condition i.e. 25ktCO_2e/yr limit for all Type III categories.
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		

* This document, together with the 'General Guidance' and all other approved SSC methodologies, was part of a single document entitled: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities until version 07.

History of the document: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities

Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities contained both the General Guidance and Approved Methodologies until version 07. After version 07 the document was divided into separate documents: 'General Guidance' and separate approved small-scale methodologies (AMS).		
Version	**Date**	**Nature of revision**
07	EB 22, Para. 59 25 November 2005	References to "non-renewable biomass" in Appendix B deleted.
06	EB 21, Annex 22 30 September 2005	Guidance on consideration of non-renewable biomass in Type I methodologies, thermal equivalence of Type II GWhe limits included.
05	EB 18, Annex 6 25 February 2005	Guidance on 'capacity addition' and 'cofiring' in Type I methodologies and monitoring of methane in AMS-III.D included.
04	EB 16, Annex 2 22 October 2004	AMS-II.F was adopted, leakage due to equipment transfer was included in all Type I and Type II methodologies.
03	EB 14, Annex 2 14 June 2004	New methodology AMS-III.E was adopted.
02	EB 12, Annex 2 28 November 2003	Definition of build margin included in AMS-I.D, minor revisions to AMS-I.A, AMS-III.D, AMS-II.E.
01	EB 7, Annex 6 21 January 2003	Initial adoption. The Board at its seventh meeting noted the adoption by the Conference of the Parties (COP), by its decision 21/CP.8, of simplified modalities and procedures for small-scale CDM project activities (SSC M&P).
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		