CLEAN DEVELOPMENT MECHANISM

CDM-MP80-EC02-A01

Draft Small-scale Methodology

SSC-III.XX: Trip avoidance through equipment improvement of freight transport

Version 01.0

Sectoral scope(s): 07

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. A request for a new methodology (SSC-NM103) “Trip avoidance through equipment improvement of cargo transport” was submitted on 31 December 2018 by Atmosphere Alternative SAS and CAIA Ingeniería SAS.

2. Purpose

2. The purpose of this document is to present a new methodology in the transport sector specifically to improve the transportation of freight.

3. Key issues and proposed solutions

3.1. Applicability

3. This new methodology is applicable to projects that use measures for improved freight transportation that result in fuel savings due to avoidance of trips to transport the same quantity of freight. Measures include the design and implementation of new technologies for trailers or similar equipment used to load the freight during the transportation.

3.2. Baseline scenario and emission reductions

4. The baseline scenario is the shipment of freight by road with vehicles that do not incorporate the measures that are part of the project activity.

5. Emission reductions are calculated for each route as the product of (i) the actual quantity of freight transported by the project activity, (ii) the difference between the specific distance that was travelled to deliver a tonne of freight in the baseline and the project, and (iii) the CO_2 emission factor per km travelled.

6. A correction factor is applied to the emission reductions determined for each route to account for changes in the length of the route due to circumstances not under the control of the project participants (e.g. a new straight road replacing a baseline winding road).

4. Impacts

7. The new methodology, if approved, is expected to allow for development of new CDM projects in the transport sector.

5. Subsequent work and timelines

8. The proposed new methodology is recommended by the MP for consideration by the Board at its 104th meeting. No further work is envisaged.

6. Recommendations to the Board

9. The MP recommends that the Board adopt this new methodology, to be effective from the time of the Board's approval.

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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)	Measures that improve the carrying capacity of freight transportation equipment, such as trailers with improved design (e.g. lighter materials, less material in the equipment structure, design for improved loading and/or storage configuration of freight).
Type of GHG emissions mitigation action	Energy efficiency. Reduced CO_2 emissions per unit of freight transported.

2. Scope, applicability, and entry into force

2.1. Scope

2. This methodology is applicable for project activities that reduce the number of vehicle trips needed to transport a given quantity of freight, through improvements in freight transportation equipment, resulting in reduced fuel usage and greenhouse gas emissions per unit of freight transported. Examples of freight transportation equipment are trailers (connected to tractors or motorcycles), rigid trucks, cargo tricycles and vans.

2.2. Applicability

3. The methodology is applicable to design and implementation of new technologies for freight transportation equipment used to load and store the freight during their transportation.

4. Measures applied in the freight transportation equipment, resulting in higher useful freight capacity with the same gross vehicle weight[1], may include: (i) use of lighter materials; (ii) use of less material in the equipment structure; (iii) new design for improved freight loading, e.g. side doors of the trailer that would allow more compact freight loading, avoiding empty spaces; (iv) new design for storage configuration of freight.

5. The methodology does not cover estimation of emission reduction from fuel switching or improvement in fuel efficiency. Similarly, changing the engine of the vehicle hauling the freight is not covered.

6. The methodology is not applicable to modal shift, i.e. a change in the mode of transportation compared to the baseline is not eligible.

7. The following conditions apply with respect to the vehicle fleet that transports the freight:

   (a) The fleet shall be centrally owned or contracted by a single entity, and the use of the improved freight transportation equipment shall be controlled by that entity;

[1] The total mass with standard equipment (e.g. tractor with trailer, rigid truck)

(b) Project fleets may use different energy sources (i.e. fossil fuels and electricity) and engine types (e.g. hybrid vehicles[2]). The composition of the fleet with respect to the energy source and engine types may also change during the crediting period only if it results in additional emission reductions. However, these emission reductions may not be claimed under this methodology;

(c) A project activity may include more than one fleet, provided that each fleet is composed by only one vehicle category. Vehicle categories shall be defined based on the gross vehicle weight and energy source, in accordance with host country regulations. Emissions reductions are calculated for each energy source in each vehicle category;

(d) Vehicles included in the project activity shall meet the host country regulations.

8. The following conditions apply with respect to the transportation route:

(a) The freight shall be transported to one single destination, and the origin and destination shall remain the same throughout the crediting period(s). Distribution services that include different delivery points of fractions of the full freight are not applicable under this methodology;

(b) The project activity may encompass multiple routes, as long as the origin and destination of each route are identified. The origins and destinations for all routes shall remain the same throughout the crediting period(s);

9. Transportation of freight between different countries is not covered under this methodology.

2.3. Entry into force

10. The date of entry into force is the date of the publication of the EB ## meeting report on dd Month 2019.

2.4. Applicability of sectoral scope

11. For validation and verification of CDM projects and programme of activities by a designated operational entity (DOE) using this methodology, sectoral scope 07 is mandatory.

3. Normative references

12. This methodology is based on the proposed small-scale methodology “SSC-NM103: Trip avoidance through equipment improvement of cargo transport” submitted by CAIA Ingeniería SAS & Atmosphere Alternative SAS.

13. Project participants shall apply the “General guidelines for SSC CDM methodologies” and the “TOOL21: Demonstration of additionality of small-scale project activities” (previously known as attachment A to appendix B) provided at:

[2] Hybrid fuel vehicles are classified according to their fossil fuel engine type. Hybrid plug-in electric vehicles are not eligible under this methodology. Project proponents may propose a revision to include this vehicle type.

<http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> mutatis mutandis.

14. This methodology also refers to the latest approved versions of the following methodologies and tools:

    (a) "TOOL03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion";

    (b) "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation";

    (c) "TOOL17: Baseline emissions for modal shift measures in inter-urban cargo transport";

    (d) "TOOL21: Demonstration of additionality of small-scale project activities".

4. Definitions

15. The definitions contained in the Glossary of CDM terms shall apply.

16. The following definitions apply:

    (a) **Load capacity of vehicles** – difference between the maximum allowable gross weight of the loaded vehicle and the gross weight of the unloaded vehicle (i.e. gross vehicle weight).

    (b) **Route –** defined by point of origin (o) and point of destination (d) of the freight.

    (c) **Trailer -** a transport equipment designed to be pulled by a truck, tractor or motorcycle.

5. Baseline methodology

5.1. Project boundary

17. The project boundary is the physical and geographical location of the vehicles that are part of the project activity. The spatial extent of the project boundary encompasses the geographical area of the trips of these vehicles that incorporate the measures of the project activity.

18. In case of electric vehicles, if electricity is used from an interconnected grid or captive power plant, the project boundary also includes all power plants/units connected physically to the electricity system or the captive power plant that that supplies power to the project.

5.2. Baseline

19. The baseline scenario is the shipment of freight by road with vehicles that do not incorporate the measures that are part of the project activity.

20. The demonstration of the additionality shall apply the latest approved version of the "TOOL21: Demonstration of additionality of small-scale project activities".

5.3. Emissions Reductions

21. The emission reductions are determined based on the actual tonnes transported by the project activity in each route *r*, multiplied by the difference between the specific distance that was travelled to deliver a tonne of freight in the baseline ($SDC_{f,i,x,r,BL}$) and the project ($SDC_{f,i,x,r,y}$) and by the CO_2 emission factor per km.

$$ER_{r,y} = \sum_{x}\sum_{i}\sum_{f}\sum_{r} FT_{f,i,x,r,y} \times SEF_{i,x,y} \times \left[\left(SDC_{f,i,x,r,BL} \times CF_{D,r,y}\right) - SDC_{f,i,x,r,y}\right] \quad \text{Equation (1)}$$

Where:

$FT_{f,i,x,r,y}$	=	Quantity of freight type *f* transported by the project vehicle category *i*, using the energy source *x* through route *r* in the year *y* (t)
$SEF_{i,x,y}$	=	Specific emission factor per km travelled by project vehicle category *i* using the energy source *x* in the year *y* (tCO_2/km).
$SDC_{f,i,x,r,BL}$	=	Specific distance travelled per tonne of freight type *f* transported in the baseline by vehicle category *i* using the energy source *x* through route *r* in the baseline (km/t).
$CF_{D,r,y}$	=	Correction factor for distance changes in the route *r* during the crediting period.
$SDC_{f,i,x,r,y}$	=	Specific distance travelled per tonne of freight type *p* transported in the project by vehicle category *i* using the energy source *x* through route *r* in the project year *y* (km/t).
f	=	Freight type
i	=	Vehicle category
x	=	Different energy sources, i.e. fossil fuels and electricity
r	=	Route

22. If any change in engine type or energy source *x* in vehicle category *i* results in increased specific emission factor per km travelled (i.e. $SEF_{i,x,y}$) under the project case, this parameter shall also be calculated for the baseline situation and the lower of the two values (i.e. specific emission factor in year *y* and specific emission factor in the baseline) shall be used in equation 1.

23. The specific distance travelled per tonne of freight transported in the baseline by vehicle category *i* using the energy source *x* through route *r* in the baseline is determined as below, and following the guidance in section 5.3.1:

$$SDC_{f,i,x,r,BL} = \frac{D_{f,i,x,r,BL}}{FT_{f,i,x,r,BL}} \quad \text{Equation (2)}$$

Where:

$D_{f,i,x,r,BL}$	=	Total trip distance travelled to transport the freight type *f* by the historical/control group vehicles category *i,* using the energy source *x* through route *r* (if applicable) (km).
$FT_{f,i,x,r,BL}$	=	Total freight type *f* transported by the historical/control group vehicles category *i* using the energy source *x* through route *r* (t)

24. Similarly, the specific distance travelled per tonne of freight transported in the project by vehicle category *i* using the energy source *x* through route *r* in the project is determined as below:

$$SDC_{f,i,x,r,y} = \frac{D_{f,i,x,r,y}}{FT_{f,i,x,r,y}} \quad \text{Equation (3)}$$

Where:

$D_{f,i,x,r,y}$	=	Total trip distance travelled to transport the freight type *f* by the project vehicles category *i,* using the energy source *x* through route *r* in year *y* (if applicable) (km)
$FT_{f,i,x,r,y}$	=	Quantity of freight type *f* transported by the project vehicles category *i* using the energy source *x* through route *r* in year *y* (t)

25. During the crediting period, the length of the route may change due to circumstances not under the control of the project participants (e.g. a new straight road replacing a baseline winding road) although origin and destination remain the same[3]. To avoid overestimation of emission reductions in such situations, the following correction factor shall be applied:

$$CF_{D,r,y} = \frac{D_{r,y}}{D_{r,BL}} \quad \text{Equation (4)}$$

Where:

$D_{r,y}$	=	Length of route *r* in the project year *y* (km)
$D_{r,BL}$	=	Length of route *r* in the baseline (km)

26. For vehicles consuming fossil fuel, $SEF_{i,x,y}$ is determined as follows:

$$SEF_{i,x,y} = SFC_{i,x,y} \times NCV_{x,y} \times \rho_{x,y} \times EF_{CO2,x,y} \times 10^{-9} \quad \text{Equation (5)}$$

Where:

$SFC_{i,x,y}$	=	Specific fuel consumption of the project fleet vehicle category *i* using fuel type *x* in year *y* (L/km)
$NCV_{x,y}$	=	Net calorific value of fuel type *x* in year *y* (TJ/Gg)
$\rho_{x,y}$	=	Density of fuel type *x* in year *y* (g/L)
$EF_{CO2,x,y}$	=	CO_2 emission factor for fuel type *x* in year *y* (tCO_2/TJ)

27. For vehicles consuming electricity, $SEF_{i,x,y}$ is determined as follows

$$SEF_{i,x,y} = \frac{SEC_{i,y} \times EF_{elect,y}}{1{,}000} \quad \text{Equation (6)}$$

[3] The route length shall not increase, unless circumstances not under the control of the project participants require them to change the route, in which case supporting evidence is provided during the verification.

Where:

$SEC_{i,y}$	=	Specific electricity consumption of the project fleet vehicle category *i* in year *y* (kWh/km)
$EF_{elec,y}$	=	CO_2 emission factor of electricity consumed by project fleet vehicle category *i* in year *y* (tCO_2/MWh)

28. The project proponents shall provide an ex-ante estimation of emission reduction including the specific distance travelled per tonne of freight in the baseline and the project. The ex-ante estimations shall be based on published literature, official reports or statistics published by independent third party or studies carried out by project proponents. The ex-ante estimation of emission reduction shall also serve as a cap on the emission reductions determined during the crediting period.

5.3.1. Determination of $SDC_{f,i,x,r,BL}$

29. To avoid crediting emission reductions for external factors not under the control of the project participant, $SDC_{f,i,x,r,BL}$ shall be based on vehicles of the same vehicle category providing similar freight transportation services driving in a comparable situation. This shall be demonstrated based either on historical data or a control group of vehicles, and the fleet used for determining the $SDC_{f,i,x,r,BL}$ shall comply with the following conditions to ensure that it provides similar freight transportation services:

    (a) The vehicles shall belong to the same vehicle category *i* as the project fleet;

    (b) The vehicles shall transport the same type of freight as the project fleet, in line with freight types defined in Table 3 of "TOOL17: Baseline emissions for modal shift measures in inter-urban cargo transport";

    (c) The freight may be of a single type or a mix of freight types. For projects involving the transportation of a mix of freight types, the types of freight and the annual average ratio of the different freight types to the total freight shall be the same between the control/historical fleet and the project fleet;

    (d) The annual average percentage of useful loading capacity (determined as the ratio between the freight loaded and the load capacity of the vehicle) of the project shall be the same or lower than the control/historical group.;

    (e) The annual average ratio between the gross vehicle weight with freight loading and the permitted gross vehicle weight with freight loading shall be the same between the control/historical group fleet and the project fleet, in order to ensure that the motor efficiency remains the same.

30. The historical/control group of vehicles can be defined based on one of the options below. The option shall be selected based on data availability, accuracy and conservativeness, according to the project specific context, and be in compliance with the criteria for similar freight transportation services defined in paragraph 28 (c) to (e) above:

    (a) Option 1 (Control Group): When the owner or manager of the project fleet has a group of vehicles in which the project activity measures have not been implemented, parameter $SDC_{f,i,x,r,BL}$ may be determined based on the annual distance travelled and the quantity of freight transported by that group of vehicles

(or control group) for each year of the crediting period. The routes and distances travelled shall be the same for the project and control groups;

(b) Option 2 (Historical Group): When historical data from the own fleet is available for at least one year before the project start date, parameter $SDC_{f,i,x,r,BL}$ may be determined ex-ante based on the distance travelled and freight transported during the year prior the start date of the project activity;

(c) Option 3: When none of the above options are feasible, a baseline campaign may be undertaken using the fleet prior to implementing the project measures. Measurements of freight and distance travelled shall be carried out through at least one full week of operation of the fleet. All requirements pertaining to freight, route and vehicle fleet from paragraphs 7, 8 and 28(c) to (e) above shall be met.

31. If Option 1 is selected, $SDC_{f,i,x,r,BL}$ shall be determined yearly. If Option 2 or Option 3 is selected, $SDC_{f,i,x,r,BL}$ shall be determined afresh at the beginning of each crediting period (e.g. new campaign) and the parameter will remain fixed throughout the crediting period.

5.4. Leakage

32. No other leakage emissions are considered.

6. Monitoring methodology

33. In addition to the parameters listed in the tables below, the procedures contained in the tools referred to in this methodology also apply.

6.1. Data and parameters monitored

Data / Parameter table 1.

Data / Parameter:	$FT_{f,i,x,r,y}$
Data unit:	t
Description:	Quantity of freight type *f* transported by the project vehicle category *i* using the energy source *x* through route *r* in the year *y*
Source of data:	Project vehicles operational data
Measurement procedures (if any):	Monitored for all vehicle categories, throughout the crediting period for the vehicles in the project group. The freight transported is recorded for each vehicle at least on a monthly basis.
Monitoring frequency:	Monthly and aggregated annually
QA/QC procedures:	The freight transported shall be cross-checked for consistency against commercial / contractual information for the transport service.
Any comment:	-

Data / Parameter table 2.

Data / Parameter:	$D_{f,i,x,r,BL}$
Data unit:	km

Description:	Total trip distance travelled to transport the freight type *f* by the historical/control group vehicles category *i,* using the energy source *x* through route *r*
Source of data:	Fleet operations data
Measurement procedures (if any):	Monitored for all vehicle categories, throughout the crediting period for the vehicles in the historical/control group.
Monitoring frequency:	Monthly and aggregated annually
QA/QC procedures:	The monitored distance shall be checked against fuel use and typical vehicle fuel efficiency for consistency.
Any comment:	• The monitoring of this parameter is only required when Option 1 (section 5.3.1) is selected. For Option 2 (section 5.3.1) and Option 3 (section 5.3.1), this parameter is determined ex-ante and remains fixed throughout the crediting period; • The distance driven may be measured using devices such as Global Positioning System(GPS), odometer reading, contract-defined route distance with measurement of trips per route.

Data / Parameter table 3.

Data / Parameter:	$FT_{f,i,x,r,BL}$
Data unit:	t
Description:	Total annual freight type *f* transported by the historical/control group vehicles category *i* the energy source type *x* through route *r*
Source of data:	Fleet operations data
Measurement procedures (if any):	Monitored for all vehicle categories, throughout the crediting period for the vehicles in the historical/control group.
Monitoring frequency:	Monthly and aggregated annually
QA/QC procedures:	The freight transport amount shall be checked for consistency against commercial / contractual information for the transport service.
Any comment:	The monitoring of this parameter is only required when Option 1 (section 5.3.1) is selected. For Option 2 (section 5.3.1) and Option 3 (section 5.3.1), this parameter is determined ex-ante and remains fixed throughout the crediting period;

Data / Parameter table 4.

Data / Parameter:	$D_{f,i,x,r,y}$
Data unit:	Km
Description:	Total trip distance travelled to transport the freight type *f* by the project vehicles category *i,* using the energy source *x* through route *r* in year *y*
Source of data:	Fleet operations data
Measurement procedures (if any):	Monitored for all vehicle categories, throughout the crediting period for the vehicles in the project group.
Monitoring frequency:	Monthly and aggregated annually
QA/QC procedures:	The monitored distance shall be checked against fuel use and typical vehicle fuel efficiency for consistency.

Any comment:	The distance driven can be measured using devices such as GPS, odometer reading, contract-defined route distance with measurement of trips per route.

Data / Parameter table 5.

Data / Parameter:	$D_{r,y}$
Data unit:	Km
Description:	Length of route *r* in the project year *y*
Source of data:	Vehicles data
Measurement procedures (if any):	Monitored for all vehicle categories, throughout the crediting period for the vehicles in the project group.
Monitoring frequency:	Monthly and aggregated annually
QA/QC procedures:	-
Any comment:	The distance driven can also be measured using devices such as GPS, odometer reading, contract-defined route distance with measurement of trips per route. Cross-checked against maps.

Data / Parameter table 6.

Data / Parameter:	$D_{r,BL}$
Data unit:	Km
Description:	Length of route *r* in the baseline
Source of data:	Fleet operations data
Measurement procedures (if any):	Determined once for the crediting period(s)
Monitoring frequency:	N/A, this parameter is determined once and remains fixed through the crediting period(s)
QA/QC procedures:	The distance driven can be measured using devices such as GPS, odometer reading, contract-defined route distance with measurement of trips per route.
Any comment:	-

Data / Parameter table 7.

Data / Parameter:	$SFC_{i,x,y}$
Data unit:	L/km
Description:	Specific fuel consumption of the project fleet vehicle category *i* using fuel type *x* in year *y*
Source of data:	Project vehicles operational data
Measurement procedures (if any):	Determined using monitored fuel consumption and monitored distance travelled by project vehicles during the year.
Monitoring frequency:	Monthly and aggregated annually
QA/QC procedures:	Monitored values shall be checked against national transport sector data and/or manufacturer information for consistency.

Any comment:	The specific fuel consumption may change over time due to inter alia the replacement of tractor units, fuel efficiency measures or increasing age of tractor units in the fleet operating with the project trailers.

Data / Parameter table 8.

Data / Parameter:	$NCV_{x,y}$
Data unit:	GJ/t
Description:	Net calorific value of fuel type x in year y
Source of data:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Measurement procedures (if any):	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Monitoring frequency:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
QA/QC procedures:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Any comment:	When applying the TOOL03, the monitoring requirements of the parameter "$NCV_{i,y}$" shall be followed.

Data / Parameter table 9.

Data / Parameter:	$\rho_{x,y}$
Data unit:	t/m^3
Description:	Density of fuel type *x* in year *y*
Source of data:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Measurement procedures (if any):	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Monitoring frequency:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
QA/QC procedures:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Any comment:	When applying the TOOL03, the monitoring requirements of the parameter "$\rho_{i,y}$" shall be followed.

Data / Parameter table 10.

Data / Parameter:	$EF_{CO2,x,y}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor for fuel type *x* in year *y*
Source of data:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Measurement procedures (if any):	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Monitoring frequency:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

QA/QC procedures:	As per the provisions from the "TOOL03 : Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
Any comment:	When applying the TOOL03, the monitoring requirements of the parameter "$EF_{CO2,i,y}$" shall be followed.

Data / Parameter table 11.

Data / Parameter:	$SEC_{j,y}$
Data unit:	kWh/km
Description:	Specific electricity consumption of the project fleet vehicle category *i* in year *y*
Source of data:	Project vehicles operational data
Measurement procedures (if any):	Determined using monitored electricity consumed to recharge the battery and monitored distance travelled by project vehicles during the year.
Monitoring frequency:	Monthly and aggregated annually
QA/QC procedures:	Monitored values shall be checked against national transport sector data and/or manufacturer information for consistency.
Any comment:	-

Data / Parameter table 12.

Data / Parameter:	$EF_{elect,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of electricity consumed by project fleet vehicle category *i* in year *y*
Source of data:	As per the "TOOL05 : Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"
Measurement procedures (if any):	As per the "TOOL05 : Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"
Monitoring frequency:	As per the "TOOL05 : Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"
QA/QC procedures:	As per the "TOOL05 : Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"
Any comment:	When applying the TOOL05, the monitoring requirements of the parameter "$EC_{PJ,j,y}$" shall be followed.

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Document information

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