REVISIONS TO AM0090 TO INCLUDE MODAL SHIFT FROM OFF-HIGHWAY TO CONVEYOR BELT TRANSPORTATION

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Relationship to Approved or Pending Methodologies

This methodology is a revision of the AM0090 methodology "Modal shift in transportation of cargo from road transportation to water or rail transportation", version 1.1.0, approved under the CDM on its Executive Board meeting 61 and issued on 3 June 2011.

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1 SOURCES

This methodology revision is based on the following documents:

- CDM methodology AM0090 "Modal shift in transportation of cargo from road transportation to water or rail transportation", version 1.1.0

2 SUMMARY DESCRIPTION OF THE METHODOLOGY REVISION

Additionality	Project Method
Crediting Baseline	Project Method

This methodology revision aims at expanding the scope of the methodology AM0090, "Modal shift in transportation of cargo from road transportation to water or rail transportation", version 1.1.0, approved under the CDM on its Executive Board meeting 61 and issued on 3 June 2011. Project proponents shall reference the most recent version of the underlying methodology when applying this revision.

The CDM methodology AM0090 was developed for the specific situation where the owner of the cargo transports it from point A to point B, using mainly road transportation and plans to shift to water or rail transportation. Despite its current narrow applicability scope, the methodology is based on an emission factor (g CO_2 per tonne.km) that provides the opportunity to expand it to several other situations involving cargo transportation emission reduction projects.

The methodology is not applicable to projects' baseline scenarios that consider a transportation mode different from road transportation or multiple origin and destination points (e.g. transportation from point A to points B and C or transportation from points A and B to point C). Moreover, despite the similarities between rail and conveyor belt greenhouse gases (GHG) emissions, the methodology is not clear about the applicability of conveyor belt transportation in the project activity.

This revision aims at expanding the methodology applicability scope in order to allow the use of off-highway transportation and multiple origin and destination points in the baseline scenario, as well as the installation of conveyor belt transportation in the project activity.

There are three main points reconsidered under this methodology revision. The first revision point proposes to allow off-highway transportation in the baseline scenario. In order to do so, the procedures to calculate the baseline emission factor were amended. Moreover, in order to overcome the issue of lack of default off-highway emission factors potentially faced by the project proponent, the option to conservatively calculate the baseline emission factor based on historical trip routes different from the project activity was included, as it might be the best source of information for hypothetical future GHG emissions. The second revision point proposes to allow multiple origin and destination points in the baseline. In order to do so, it was required that the transportation facilities and infrastructure are dedicated solely to the project activity to avoid that the project activity's infrastructure attracts new users which were outside the initial baseline analysis, having an uncertain impact on emissions. The third revision point proposes to add conveyor belt transportation as a project activity option.

3 DEFINITIONS

Revision - The following definitions have been added:

Cargo	Any type of material such as products, byproducts or waste loaded on a truck, off-highway truck, ship, aircraft, rail or conveyor belt;
Off-highway truck	A vehicle capable of driving off paved surfaces, usually used for transporting heavy materials.

4 APPLICABILITY CONDITIONS

Revision - The revisions made to the applicability conditions follow in red. The last bullet point has been revised in order to avoid that the project activity's infrastructure attracts new users which were outside the initial baseline analysis, having an uncertain impact on emissions.

This methodology is applicable to project activities that result in modal shift in transportation of a specific cargo (excluding passengers) from road transportation using trucks or off-highway trucks to water transportation using barges or ships or rail or conveyor belt transportation. The methodology is applicable under the following conditions:

- The owner of the cargo is one of the project participants. If the entity investing in the CDM project activity is not the owner of the cargo, it should also be a project participant;
- The project participants should have made at least one of the below listed new investments:
  - Direct investment in new infrastructure, including facilities (new ports, handling areas) and/or equipments[1] (ships, barges, etc.) for water transportation;
  - Direct investment in new infrastructure, including facilities (new ports, handling areas, railway track)[2] and/or equipments[1] (trains, wagons, etc) for rail transportation;
  - Direct investment in new infrastructure, including facilities and/or equipments[1] for conveyor belt transportation;
  - Refurbishment/replacement of existing water and rail transportation infrastructure or equipments, with transport capacity expansion.
- The transport infrastructure/equipment in which these new investments are made is at least 50% used by the cargo transported under the project activity, i.e. the cargo transported under the project activity constitutes at least 50% of the cargo transported annually by/with this infrastructure/equipment;
- With respect to fuels, the following conditions[3] apply:

[1] Investment on intermodal containers is not considered as investment in this case.

[2] Not necessarily the whole railway track, but a part of the track can be built (for example, from the industrial facility to a nearest connecting point).

[3] No provisions to calculate upstream emissions from the production of the fuels are provided in order to keep the methodology simple. Therefore, in order to ensure that the calculated emission reductions are conservative, this applicability condition aims to limit the use of the methodology to cases where the upstream emissions under the project activity are likely to be equal or lower than in the baseline scenario. Note that other methodologies involving fuel switch situations usually require the consideration of upstream emissions. Note also that as this methodology is about a switch from road transportation using trucks to water transportation using barges or ships or rail transportation, most

- In the case of gaseous fossil fuels, the methodology is applicable if it can be demonstrated that equal or more gaseous fossil fuels are used in the baseline scenario than in the project activity. The methodology is not applicable in its current form if more gaseous fossil fuels are used in the project activity compared to the baseline scenario;[4]
- In the case of biofuels, the methodology is applicable if it can be demonstrated that equal or more biofuels are used in the baseline scenario than in the project activity. The methodology is not applicable in its current form if more biofuels are used in the project activity compared to the baseline scenario.

- The project transportation mode is defined in the CDM-PDD at the validation of the project activity and no change of transportation mode is allowed thereafter;
- The cargo is transported from the same origin (point A) to the same destination (point B) throughout the whole crediting period. The inclusion of multiple origins and destinations are applicable only when the transportation facilities and infrastructure are dedicated solely to the project activity. In both cases, the origin and destination ~~These two~~ points and transportation routes are defined in the CDM-PDD at the validation of the project activity and are fixed along the crediting period;
- Under the project activity, the route from origin to destination may combine the different transportation modes: Trucks, ships, barges and/or rail but a part of the route must consist of either ships, barges, ~~or~~ rail or conveyor belt;
- Both in the baseline and project activity, only one type of cargo, owned by the project participants, is transported and no mix of cargo is permitted (this condition does not apply to the return trip cargo). More than one type of cargo will be permitted only when all different types of cargo have similar density[5] and transportation conditions. The cargo types of the project activity is defined in the CDM-PDD at the validation of the project activity and is fixed along the crediting period;
- The railway infrastructure or waterway has enough capacity to accommodate new transportation demand under the project activity and will not displace other existing transportation demand due to limited capacity of infrastructure.
- In addition, the applicability conditions included in the tools referred to above apply.
- Finally, this methodology is only applicable if the most plausible baseline scenario, as identified per the section "Selection of the baseline scenario and demonstration of additionality" hereunder, is M1 (Road or off-highway[6] transportation).

5 PROJECT BOUNDARY

Revision - No revisions have been made to this section.

project activities can comply with these requirements. If required, project participant may submit a request for revision to this methodology.

[4] Project participants wishing to consider a higher consumption of gaseous fuels in the project activity than in the baseline may propose a revision of this methodology by adding the relevant upstream emission terms that a fuel switch towards gaseous fuels entails, taken e.g. from ACM0009.

[5] Density difference within cargo types not higher than 15%.

[6] In cases where road transportation is not applicable.

6 PROCEDURE FOR DETERMINING THE BASELINE SCENARIO

Revision - The revisions made to the procedure for determining the baseline scenario follow in red.

The following likely scenarios of transportation modes shall be assessed, *inter alia*:

M1: Road or off-highway transportation;

M2: Rail transportation;

M3: Water transportation;

M4: Other transportation modes (e.g. air transportation, pipelines, ~~electric~~ conveyor~~s~~ belts, ropeway, if relevant).

7 PROCEDURE FOR DEMONSTRATING ADDITIONALITY

Revision - No revisions have been made to this section.

8 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

8.1 Baseline Emissions

Revision - Added the determination of cargo type for off-highway transportation

Step 1: Determination of the cargo type transported

At the validation stage, project participants should clearly identify and describe in the CDM-PDD the type of cargo transported under the project activity, including to which category in Table 2 the cargo belongs to. In case of off-highway transportation or when cargo type is not listed in Table 2, cargo relevant characteristics may be described (e.g. usage, density).

Revision - Added the opportunity of project proponents to use reliable emission factors related to off-highway transportation.

Option A: Conservative default values

Where the project activity refers to off-highway transportation, the project proponents shall use a reliable source of default emission factor for off-highway transportation as specific as possible to the project specificities. These sources may include: IPCC, Defra, EPA, among others. If different sources of emission factor are available, the most specific and conservative value must be applied.

Revision - Added the use of comparable historical data for building the Baseline emission factor. This emission factor may be used for new demand of cargo as well.

Option B: Historical data~~7~~

The baseline emission factor (EF_{BL}) is calculated based on historical data on the amount of fuels consumed for transportation of the cargo, the net calorific values and CO_2 emission factors of the fuel types used, the amount of cargo transported, the distance of the ~~baseline~~ historical trip route and a factor to account for non-empty return trips. This option can be applied only if:

~~7 This option is not applicable if the demand for the transportation of cargo is new.~~

- The cargo was transported in dedicated trucks which were not used for other purposes than transportation of cargo; and
- Data on the amount of cargo transported, the amount of fuel consumed and the fuel types used is available for the trucks dedicated to the transportation of the type of cargo (see Table 2); and
- The transportation characteristics (e.g. type of transportation, cargo, fuel, fleet) of the historical data are similar and comparable to the baseline.
- The historical emission factor is more conservative than the "conservative default value" (option A).

Revision - Added the concept of historical loaded travel.

Modifications on baseline emission factor formula:

- AD changed to "ADx"
- ∑ added on denominator

The baseline emission factor is calculated as follows:

$$EF_{BL} = \frac{\sum_{i}(FC_{BL,i,x} \cdot NCV_{i,x} \cdot EF_{CO2,i,x} \cdot F_{RT,BL})}{\sum(T_x \cdot AD_x)} \quad (3)$$

Where:

EF_{BL}	=	Baseline emission factor for transportation of cargo (g CO_2 per tonne.km)
$FC_{BL,I,x}$	=	Amount of fuel i consumed by the trucks in year x (liter or m^3)
$EF_{CO2,i,x}$	=	CO_2 emission factor of fuel i consumed by the trucks in year x (g CO_2/GJ)[8]
$NCV_{i,x}$	=	Average net calorific value of fuel i consumed by the trucks in year x (GJ per liter or m^3)
$F_{RT,BL}$	=	Factor to account for non-empty return trips in the baseline scenario (fraction)
T_x	=	Amount of cargo transported in trucks in year x (tonne)
AD_x	=	Historical loaded travel distance of the baseline trip route (km)
x	=	Year (365 days) prior to the implementation of the project activity

Determination of $F_{RT,BL}$

The factor to account for non-empty return trips in the baseline scenario ($F_{RT,BL}$) is calculated based on the one year of historical data on the number of empty return trips. In cases where project participants can demonstrate that all the return trips in year *x* were empty, $F_{RT,BL}$ is 1. In cases where there are non-empty return trips in year *x*, $F_{RT,BL}$ is determined as follows:

$$F_{RT,BL} = \frac{T_x \cdot AD_x}{T_x \cdot AD_x + T_{RT,x} \cdot RTD_x} \quad (4)$$

Where:

[8] If the fuel is blended with biofuel, the emission factor of the blend shall be calculated assuming an emission factor of zero for the biofuel.

$F_{RT,BL}$ = Factor to account for non-empty return trips in the baseline scenario (fraction)
T_x = Amount of cargo transported in trucks in year x (tonne)
AD_x = Historical loaded travel distance of the baseline trip route (km)
$T_{RT,x}$ = Amount of cargo transported in trucks in the return trips in year x (tonne)
RTD_x = Distance of the return trip route in year x (km)
x = Year (365 days) prior to the implementation of the project activity

8.2 Project Emissions

Revision - No revisions have been made to this section.

8.3 Leakage

Revision - No revisions have been made to this section.

8.4 Summary of GHG Emission Reduction and/or Removals

Revision - No revisions have been made to this section.

9 MONITORING

9.1 Data and Parameters Available at Validation

Revision - Revisions made as below:

Data Unit / Parameter:	AD_x
Data unit:	km
Description:	Loaded travel distance of the historical trip route
Source of data:	Historical data from the project proponents.
Justification of choice of data or description of measurement methods and procedures applied:	-
Any comment:	-

9.2 Data and Parameters Monitored

Revision - Expanded applicability condition to allow multiple origin and destination points in the baseline. Revision requires that the transportation facilities and infrastructure are dedicated solely to the project activity to avoid that the project activity's infrastructure attracts new users which were outside the initial baseline analysis, having an uncertain impact on emissions. Revisions made as below:

Data Unit / Parameter:	OD_y
Data unit:	
Description:	The origin and destination point and transportation route of the cargo transported by the project transportation mode in year *y*
Source of data:	Onsite records by project participants
Description of measurement methods and procedures to be applied:	The project participants will record the origin and destination point and transportation route in each trip. The verifying DOE will check the records for confirmation
Frequency of monitoring/recording:	Each trip
QA/QC procedures to be applied:	-
Any comment:	The origin and destination points and the transportation routes of the cargo transported by the project transportation mode in year *y* should be the same origin and destination points and transportation route as defined in the CDM-PDD at the validation of the project activity. This monitored parameter is required in order to comply with the following applicability condition: • The cargo is transported from the same origin (point A) to the same destination (point B) throughout the whole crediting period. Multiple origin and destination points are applicable, only when the transportation facilities and infrastructure are dedicated solely to the project activity. In both cases, the origin and destination points and transportation routes are defined in the CDM-PDD at the validation of the project activity and are fixed along the crediting period.

9.3 Description of the Monitoring Plan

Revision - No revisions have been made to this section.

10 REFERENCES AND OTHER INFORMATION