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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.S. Introduction of low-emission vehicles/technologies to commercial vehicle fleets*

**Technology/measure**

1. This methodology is for project activities introducing low-greenhouse gas emitting vehicles for commercial passenger (including public transportation), material and freight transport, operating on routes with comparable conditions.[1] Retrofitting of existing vehicles (e.g. switching from high greenhouse gas intensive to low greenhouse gas intensive fossil fuel) is also included in the methodology.

2. Types of low-emission vehicles to be introduced include but not limited to:

- Compressed natural gas (CNG) vehicles;
- Electric vehicles;
- Liquid petroleum gas (LPG) vehicles;
- Hybrid vehicles with electrical and internal combustion motive systems.

3. Types of vehicles covered by the methodology include but not limited to:

- Buses, jeepneys, commuter vans and tricycles for public transport;
- Trucks for freight transport, waste collection or other services with regular routes.

4. Project participants must demonstrate that:

- The project activity is unlikely to change the level of service[2] provided on comparable routes before the project activity;[3]
- The project activity does not include measures to bring about a modal switch (e.g. shift from bus transport to underground train system) in transport.

5. Project participants shall identify the following parameters:

- The routes along which the vehicles operate;

[1] Comparable routes are routes with similar traffic conditions and terrain in the same city or region (e.g. traffic density of the route and average speed of vehicles).

[2] The level of service here refers to the overall level of service of the project activity and differences between the type of baseline and project vehicles are allowable.

[3] That is by showing that the frequency of operations is not decreased by the project activity, the characteristics of the travel route - distance, start and end points and the route itself and/or that the capacity introduced by the project activity is sufficient to service the level of passenger/freight transport previously provided.

- The level of service on each route, for example the average/total number of passengers or tonnage transported and the average distance the passengers or freight was transported on that route on an annual basis.

6. Measures are limited to those that result in emission reductions of less than or equal to 60 kt $CO_2$ equivalent annually.

**Boundary**

7. The project boundary includes the following:

- Fleet to which low emission vehicles are introduced;
- The geographical area covering the physical routes along which these vehicles operate;
- Auxiliary facilities such as fuelling stations, workshops and service stations that are visited by the vehicles in the feet.

The conditions which govern the operation of the fleet (e.g. tariffs, regulations) should be homogeneous within the project boundary.

**Baseline**

8. The baseline vehicles that would have provided the same transportation service level should be identified following the related and relevant requirements for Type II and III Greenfield projects in the "General guidelines to SSC CDM methodologies".

9. The first step to determine the baseline emissions is to calculate a baseline emission factor per passenger or per tonne of goods per kilometre for the baseline vehicle ($BEF_i$). The baseline emission factor is determined by dividing the emissions from the total annual distance travelled by each baseline vehicle before the project begins ($D_i$) by the total annual passengers or volume of goods transported by each baseline vehicle ($P_i$) times the annual average distance of transportation per person or tonne before the project begins.

$$BEF_i = \frac{\sum_j \sum_I D_i * \eta_{BLV\,i} * NCV_j * EF_{CO2,j}}{P_i * dp_i} \quad \textbf{(1)}$$

Where:

| | |
|---|---|
| $BEF_i$ | Baseline emission factor per passenger or ton of goods per kilometre for the baseline vehicle *i* ($tCO_2$/passenger km or $tCO_2$/ton km) |
| $P_i$ | Total annual passengers or tons of goods transported by each baseline vehicle *i* (passengers or tons) |
| $dp_i$ | The annual average distance of transportation per person or tonne of freight by each baseline vehicle *i* (km) |
| $D_i$ | Total annual distance travelled by each baseline vehicle *i* (km) |

$\eta_{BLV\,i}$ Fuel efficiency of baseline vehicle *i* (qty of fuel/km, see paragraph 12)

$NCV_j$ Net calorific value of fuel *j* (MJ/Unit qty of fuel)

$EF_{CO2,j}$ $CO_2$ emission factor of fuel used by baseline vehicle ($tCO_2$/MJ energy content of fuel, country specific data or IPCC default value)

10. In the baseline calculations the remaining lifetime of the vehicles replaced shall be taken into account in accordance to the guidance provided by the CDM Executive Board (the Board) (EB 22, annex 2).

11. If electricity is used by the vehicles, the associated emissions shall be estimated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

12. The total baseline emissions are calculated on an annual basis using the monitored data as below.

$$BE_y = \sum P_{i,y,k} * BEF_i * dp_{i,y} \quad \textbf{(2)}$$

Where:

$P_{i,y,k}$ Total annual passengers or tons of goods transported by each project vehicle *i* in year *y* on route *k* taking into account provisions of paragraph 20

$BE_y$ Total baseline emissions in year *y* ($tCO_2$/yr)

$dp_{i,y}$ Annual average distance of transportation per passenger or tonne of goods by project vehicle *i* in year *y* (km) taking into account the provisions of paragraph 20

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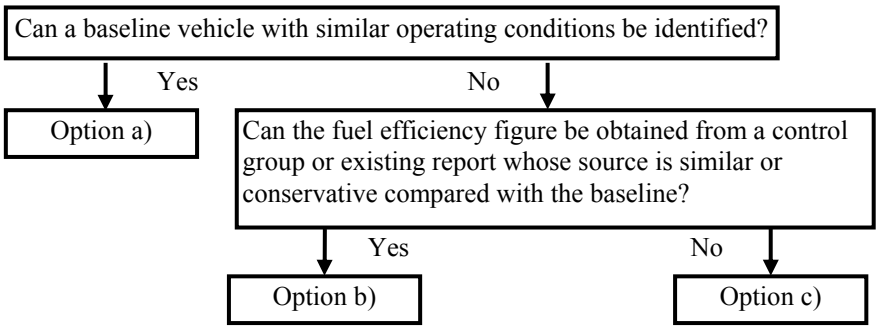
*III.S. Introduction of low-emission vehicles to commercial vehicle fleets (cont)*

13. The baseline vehicle fuel efficiency ($\eta_{BLV}$) is determined as follows (in order of preference):




(a) When a specific baseline vehicle can be identified, i.e. a vehicle used along the same route and therefore with similar operating conditions and this vehicle will not be replaced over the life of the project, the following applies: $\eta_{BLV}$ is determined from average operational data of the vehicle under baseline operating conditions, using at least one year of operational data, if that data is available. Otherwise data on fuel efficiency can be obtained from manufacturer's specification, if it can be demonstrated that the value is conservative given the operating conditions of the baseline vehicles.

Such cases may include the situations where the project activity is the introduction of new vehicles, and the baseline vehicle is also new and of the same capacity;

(b) If no specific baseline vehicle can be identified or appropriate operational data is not available, then fuel efficiency should be obtained through a statistically significant control group or existing statistics. Such group or the source of data must have similar or conservative characteristics with respect to vehicle age (equal or newer), traffic conditions (equal or better), and air conditioning. The choice of such control group will be, in descending order:

- Fleet of the same company operating simultaneously with the project activity;
- Fleet of company with similar operations operating simultaneously with the project activity;
- Host country statistics;
- IPCC or other international data.

Under this option fuel efficiency is monitored throughout the project crediting period thus gradual efficiency improvements of the fleet or gradual deterioration of driving conditions would automatically be incorporated into the project efficiency levels;

(c) Other cases. Where neither option (a) or (b) is not feasible then baseline fuel efficiency is determined by using the fuel efficiency of top 20% of the fleet before project activity, as determined according to travel distance of each vehicle for the previous three years or according to manufacturers' specifications of the comparable new baseline vehicles. If no data exists for the time period, a shorter period can be chosen, with a minimum period of one year.

Note that under all options (a) till (c), if the identified baseline vehicle does not have air conditioning then the data used should also be from vehicles without air conditioning.

**Project activity emissions**

14. Project emissions are determined by monitoring the consumption of fuel or energy consumed by the vehicles introduced, according to the following formula:

$$PE_y = \sum_j \sum_i FC_{i,j,y} * NCV_j * EF_{CO2,j,y} \quad \textbf{(3)}$$

Where:

| | |
|---|---|
| $PE_y$ | Total project emissions in year *y* ($tCO_2$/yr) |
| $FC_{i,j,y}$ | Consumption of fuel *j* by vehicle *i* in year *y* (quantity of fuel) |
| $NCV_j$ | Net calorific value of fuel *j* (as obtained by country specific data or IPCC default value) |
| $EF_{CO2,j,y}$ | $CO_2$ emission factor of fuel used by vehicle ($tCO_2$/energy content of fuel, country specific data or IPCC default value) |

15. For electric vehicles, the emissions from the production of electricity used will constitute the project emissions. This will be determined as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

16. For hybrid vehicles that can run on fossil fuels and electricity, the emissions resulting from the fossil fuel use should also be included in the direct emissions, in addition to emissions from electricity used. The emissions from fossil fuel consumption shall be as per the "Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion".

17. In the case where electric vehicles consuming grid electricity are introduced project activity emissions are calculated as follows:

$$PE_y = \sum_i EC_{i,y} * EF_{elec} \quad \textbf{(4)}$$

Where:

$PE_y$ Total project emissions in year $y$ ($tCO_2$/yr)

$EC_{i,y}$ Consumption of electricity by vehicle $i$ in year $y$

$EF_{elec}$ $CO_2$ emission factor of electricity, as determined as per the methods of AMS-I.D

18. In project activities where the project vehicles have air conditioning whereas the baseline vehicles do not, then leakage of HFC shall be taken into account. If data is available this should be calculated for the specific AC units and operating conditions of the vehicles in questions. Otherwise a default value of 400 kg of $CO_2$e/year should be used for each vehicle.

**Leakage**

19. No leakage calculation is required.

**Monitoring**

20. The following shall be monitored:

| Abbr. | Item, unit | Monitoring method/item |
|---|---|---|
| $DT_{PJ,i,y,k}$ | Total distance travelled by vehicle $i$ in year $y$ on route $k$ (km/yr) | Driver logs and route maps, confirmed by odometer reading |
| $\eta_{BLVi}$ | Efficiency of baseline vehicle (quantify of fuel/km) | As detailed in paragraph 12 |
| $FC_{i,j,y}$<br>$EC_{i,y}$ | Consumption of fuel $j$ (or electricity) by vehicle $i$ in year $y$ (quantity of fuel or electricity consumed) | Purchase or consumption records, whose higher value is taken to ensure conservativeness |
| $NCV_j$ | Net calorific value of fuel $j$ (energy content of fuel/quantity of fuel) | Country specific data or IPCC default value |
| $EF_{CO2,j,y}$ | $CO_2$ emission factor of fuel used by project vehicles ($tCO_2$/energy content of fuel) | As per the "Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion" |
| $EF_{CO2,j}$ | $CO_2$ emission factor of fuel used by baseline vehicles ($tCO_2$/energy content of fuel) | Country specific data or IPCC default value |
| $EF_{elec}$ | $CO_2$ emission factor of grid electricity used by project vehicle ($tCO_2$/MWh) | As per AMS-I.D procedure and "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" |
| $P_i$ | Total annual passengers or goods transported by each baseline vehicle | Monitored data before project begins |
| $P_{i,y,k}$ | Total annual passengers or goods transported by each project vehicle $i$n year $y$ on route $k$ | Monitored data during the project e.g. driver logs and route maps, plus sales receipts |

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*III.S. Introduction of low-emission vehicles to commercial vehicle fleets (cont)*

| Abbr. | Item, unit | Monitoring method/item |
|---|---|---|
| $D_i$ | Total annual distance travelled by each baseline vehicle | Monitored data before project begins |
| $dp_i$ | Annual average distance of transportation per person or tonne of freight by each baseline vehicle *i* | Monitored through company/operators records |
| $dp_{i,y}$ | Annual average distance of transportation per person or tonne of freight by each project vehicle *i* | Monitored through company/operators records |
| $D_{k,y}$ | Distance of route *k* in year *y* | Monitored through company/operators records |
| $SL_{k,y}$ | Service level in terms of total passengers or volume of goods on route *k* in year *y* | Monitored for each route, from company/operators records, e.g. driver logs and route maps, plus sales receipts |
| $SL_{BL,k}$ | Service level in terms of total passengers or volume of goods carried on route *k* before the beginning of project | Determined from company/operators records, e.g. driver logs and route maps, plus sales receipts |

21. Service level determined by number of passengers or volume of goods times the average distance of transportation per person or tonne of freight ($SL_{k,y}$) shall be capped at baseline level ($SL_{BL,k}$). Emission reductions beyond this level will not be counted.

**Project activity under a programme of activities**

The following conditions apply for use of this methodology in a project activity under a programme of activities:

22. In case the project activity involves fossil fuel switching measures leakage resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary shall be considered. The guidance provided in the leakage section of ACM0009 shall be followed in this regard.

23. In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.

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*III.S. Introduction of low-emission vehicles to commercial vehicle fleets (cont)*

**History of the document**

| Version | Date | Nature of revision |
|---|---|---|
| 03.0 | EB 66, Annex 60<br>2 March 2012 | • To clarify the requirements on the level of service and simplify the requirements on operation of route;<br>• To include the reference to "General guidelines to SSC CDM methodologies" for identification of the baseline vehicles for Greenfield projects;<br>• To allow the use of manufacturers' specifications as an option to determine baseline fuel efficiency of the comparable new baseline vehicles. |
| 02 | EB 55, Annex 32<br>30 July 2010 | • To include retrofitting of vehicles, further elaboration of types of vehicles covered, to replace fixed route requirements with conditions to prove comparability of routes featuring in baseline and project scenarios;<br>• Under the PoA section leakage provisions pertaining to project activities involving fossil fuel switch referring to ACM0009 procedures have been retained while the textual guidelines in the methodology pertaining to the same topic has been excluded to avoid redundancies. |
| 01 | EB 36, Annex 23<br>30 November 2007 | Initial adoption. |
| **Decision Class**: Regulatory<br>**Document Type**: Standard<br>**Business Function**: Methodology | | |