Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

TYPE III - OTHER PROJECT ACTIVITIES

Project participants shall take into account the general guidelines to SSC CDM methodologies, Information on Additionality, Acronyms, Abbreviations and Units of Measure, and General Guidance on Leakage in Biomass Project Activities provided at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>.

III.AP. Transport energy efficiency activities using post - fit Idling Stop device

Technology/measure

1. This methodology comprises demand side activities associated with the installation of post-fit type Idling Stop devices[1] in passenger vehicles used for public transport (e.g. buses), in order to reduce fossil fuel consumption and GHG emissions.

2. For the purpose of this methodology, the following definitions apply:

(a) Idling: Refers only to situations in which a vehicle engine continues running while the vehicle is stopped at traffic lights in traffic jams or at bus stops when passengers are boarding or alighting. Only vehicle stoppages up to a maximum of 3 minutes qualify under this definition and longer duration stoppages (e.g. at the depot, or fueling stops) are excluded. Under this methodology, Idling only includes stoppages that occur:

- When the vehicle is in-service for public transportation; and
- After a vehicle has already been in motion and following which the vehicle will recommence motion; in other words, the vehicle has to be in motion before the Idling Stop period starts and the vehicle has to be in motion after the Idling Stop period ends.

(b) Idling Stop: Refers to the action of turning off the vehicle engine and thus preventing Idling (as specifically defined above) and the associated fuel consumption that would otherwise have occurred while Idling, in absence of the project activity.

Applicability

3. The methodology is applicable to the following types of vehicles.

(a) Vehicles used for public transportation, such as buses that are centrally owned and managed by a single entity and are driven by contractors or employees of the central entity;

(b) Vehicles using gasoline or petrodiesel as fuel; and

(c) Vehicles in which it is possible to install post-fit Idling Stop device.

[1] Post-fit Idling Stop devices enable drivers to stop engine idling, without turning off the ignition, simply by shifting into the neutral gear position and releasing the clutch pedal when the vehicle stops.

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III.AP. Transport energy efficiency activities using idling stop device (cont)

4. All project vehicles shall be equipped with electronic equipment that continuously measures and electronically records the data required for calculating Idling Stop events and their duration, e.g. vehicle motion status and engine on/off times. The electronic equipment shall also be able to identify and exclude data associated with engine stops that do not meet the definition of Idling Stops as indicated in paragraph 2.

5. This methodology is applicable only to:

(a) Installation of Idling Stop devices in in-service, operational vehicles; or

(b) Installation of Idling Stop devices in new vehicles only if it can be demonstrated that at the time of new vehicle acquisition there are no vehicles, of a type similar to those in the baseline or project activity, available for sale in the country of the project activity, that are sold with automatic Idling Stop devices installed as a standard feature.

6. This methodology is not applicable to vehicles using LPG or CNG as fuel, hybrid vehicles with electrical and internal combustion systems, electric vehicles, or vehicles using biofuel or blended biofuel, as methods to estimate emissions reduction in those cases are not currently included in this methodology.

7. This methodology is not applicable to:

(a) Private vehicles or taxis;

(b) Vehicles that have electronic push-button starters or automatic Idling Stop devices installed prior to the project activity;

(c) Project activities promoting manual Idling Stop, i.e. turning the ignition key off and on;

(d) Project activities in locations where there are government regulations in place that prohibit Idling of the type of vehicles involved in the project activity, or where the transport company involved has an existing anti-idling policy.

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

9. The project design document shall include documentation of procedures to eliminate any potential double counting of emission reductions from, for example, manufacturers, wholesale providers or others claiming credit for emission reductions from the project, or due to the same vehicles participating in other CDM projects or Programmes of Activities.

Boundary

10. The project boundary is the physical, geographical location of the vehicles in which the Idling Stop devices are installed. The spatial extent of the project boundary encompasses the geographical area of the trips of these project vehicles.

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III.AP. Transport energy efficiency activities using idling stop device (cont)

Baseline

11. The baseline scenario is the scenario where, in the absence of the project activity, the majority of project vehicles will continue Idling.

12. Annual baseline emissions are the summation of the annual cumulative Idling Stop period times the baseline emission factor for each vehicle, multiplied by a Baseline Idling Stop default Factor or BIF (i.e. the estimated percentage of vehicles that in the baseline would manually turn off their engines.) The BIF is revised annually using an Annual Escalation Factor (AEF) that reflects the estimated annual increase in the number of baseline vehicles that manually turn off their engines.

$$BE_y = \sum_i \left(BEF_i \times CIP_{i,y} \times 10^{-6} \right) \times BIF_y \quad \textbf{(1)}$$

$$BIF_y = BIF_1 \times AEF^{y-1} \quad \textbf{(2)}$$

Where:

BE_y	Total baseline emissions in the year *y* (tCO_2/year)
$CIP_{i,y}$	Cumulative Idling Stop period for all vehicles of type *i* in the year *y* (seconds/year) (see paragraph 17)
BIF_1	Baseline Idling Stop Factor in year 1 (see paragraph 18)
AEF	Annual Escalation Factor (Use default value of 0.98)
BEF_i	Baseline Emission Factor when Idling for vehicle type *i* (gCO_2/second) (see paragraph 13)

13. The Baseline Emission Factor when Idling (BEF_i) for each type of project vehicle *i* is determined as:

$$BEF_i = FCR_i \times D_j \times NCV_j \times EF_{CO2\,j} \times 10^3 \quad \textbf{(3)}$$

Where:

j	Fuel type for vehicle type i, determined from engine specifications
FCR_i	Fuel Consumption Rate at Idling condition of baseline vehicle *i* (litres/second), determined as per paragraph 14
D_j	Density of fuel *j* (kg/litre), determined from national or international values

NCV_j	Net Calorific Value of fuel *j* (MJ/t), determined from reliable local or national data shall be used. IPCC default values (lower value of 95% CI) shall be used only when country or project specific data are not available or demonstrably difficult to obtain. Values shall be updated if national values or IPCC values change
$EF_{CO2\,j}$	CO_2 emission factor of fuel *j* (tCO_2/MJ), determined from reliable local or national data shall be used. IPCC default values (lower value of 95% CI) shall be used only when country or project specific data are not available or demonstrably difficult to obtain. Values shall be updated if national values or IPCC values change

14. The parameter Fuel Consumption Rate at Idling for vehicle category *i* (FCR_i) shall be determined by either of the two following options:

Option (1): Measurement of all project vehicles. Measure the actual fuel consumption rate of all vehicles in which the project devices are installed;

Option (2): Sample measurement. Measure the actual fuel consumption rate of a representative sample of vehicles, for each vehicle category in which the project device is installed. Vehicle categories shall be determined conservatively and be based on the fuel type used, the vehicle size, engine displacement, engine model year, 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 Fuel Consumption Rate. If Option (2) is chosen, then BEF_i and BE_y shall be calculated for each vehicle category associated with the project activity.

15. If the proposed project activity includes retrofitting of additional existing vehicles and/or new vehicles purchased subsequent to the beginning of the crediting period, fuel consumption rates of the affected vehicles shall be measured by applying Option (1) or Option (2) as described above, in order to take into account technological change of project activity vehicles.

16. Fuel Consumption Rate at Idling condition of baseline vehicle category *i* (FCR_i) shall be measured using direct measurements, e.g. using calibrated fuel flow meters. Fuel consumption rate shall be conservatively measured with engines running at normal operating temperatures and with any operational auxiliary equipment that increase fuel consumption rate, such as air conditioners, turned off.

17. Cumulative Idling Period (*CIP*) is determined for each vehicle, using data collected and recorded by the electronic data storage device installed in each vehicle. *CIP* only includes Idling Stop periods that prevent Idling, as defined in paragraph 2. $CIP_{i,y}$ is therefore determined as the annual sum of the *CIP* of all vehicles of vehicle type *i.*

18. The parameter "Baseline Idling Factor in Year 1 (BIF_1)" shall be determined as either:

(a) The default value 0.95; or

(b) A calculated value resulting from a third party survey conducted before the start of the crediting period of the project activity.

Once a value for BIF_1 is established via option (a) or (b) it will remain fixed for the full crediting period.

The survey for determining BIF_1 shall be conducted by an independent, third party survey organisation. This survey shall be conducted once *ex ante* on a randomly selected representative sample of vehicles and drivers within the project transport system, e.g. the bus company. The sample size is determined so as to result in a value for BIF_1 with a minimum 90% confidence interval and 10% error margin. The lower bound of the 95% confidence interval shall be chosen as a conservative estimate of BIF_1.

The survey shall be conducted during a conservative period of the year, i.e. a period in which drivers are most likely to manually turn off their engines (manual Idling Stop), for example, a mild season with minimal need for using the bus air conditioners or heaters (spring or autumn).

Leakage

19. No leakage calculation is required.

Project activity emissions

20. Project emissions are the emissions from fuel consumed in restarting the engine immediately after each Idling Stop.

$$PE_y = \sum_i \left(NT_{i,y} \times PEF_i \times 10^{-6} \right) \quad \textbf{(4)}$$

Where:

PE_y Total project emissions in the year y (tCO_2/year)

$NT_{i,y}$ Total number of Idling Stops of all vehicles of type i in the year y (times/year)

PEF_i Project Emission Factor per Idling Stop for vehicle type i (gCO_2/time), determined as per paragraph 21

21. Project Emission Factor per Idling Stop (PEF_i) is calculated according to the equation below:

$$PEF_i = BEF_i \times ST_i \quad \textbf{(5)}$$

Where:

ST_i Start-up compensation time. Idling Stop period in seconds to compensate for fuel consumed in restarting the engine after each Idling Stop (seconds/Idling Stop). A default value of 10 seconds shall be used

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Emissions reduction

22. The emission reduction achieved by the project activity shall be calculated as the below

$$ER_y = BE_y - PE_y \quad \textbf{(6)}$$

Where:

ER_y Emission reductions in year y (tCO_2e)

Monitoring

23. Parameters monitored.

Table 2: Parameters monitored

Parameters	Item	Monitoring method	Frequency
$CIP_{i,y}$	Cumulative Idling Period of all vehicles of type i in year y	The electronic equipment in each vehicle collects data signals such as vehicle speed, and engine stops and engine starts to enable determination of vehicle status e.g. elapsed time of each stop and cumulative number of engine starts are recorded. By analyzing these data, each Idling Stop period will be calculated. Cumulative Idling Stop period is calculated by summing up all Idling Stop periods in a year y. Any Idling Stop not complying with the definitions in paragraph 2 are excluded	Annually
$NT_{i,y}$	Total number of times of Idling Stop of vehicle i in the year y	Total number of times of Idling Stop is calculated by summing up the recorded cumulative number of Idling Stop periods that comply with the definitions in paragraph 2	Annually

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III.AP. Transport energy efficiency activities using idling stop device (cont)

Parameters	Item	Monitoring method	Frequency
Other	Information regarding the project vehicles installing the Idling Stop devices, i.e. fuel types, vehicle types, engine displacements, engine model year, with or without air conditioner	Necessary information shall be aggregated in an electronic database	Annually

24. QA/QC: The Idling Stop devices installed in the vehicles shall be subjected to regular maintenance and calibration as per the manufacturer´s recommendation to ensure appropriate performance. After installing the Idling Stop devices, the devices should be subjected to an operational check, including a test drive, according to an appropriate check sheet to ensure proper operation. The driving data shall be recorded by a data logger and be protected such that it cannot be modified artificially. The logged data should be analyzed at least monthly to check for any irregular data by comparing it with previous data or data from other vehicles.

25. In order to ensure that the output values are reliable and not manipulated, the Idling Stop periods and Idling Stop frequencies recorded by the electronic devices shall be cross checked with another measurement method, such as manual on-board measurement. This cross check should be done once a year for a sample of project vehicles.

Project activity under a programme of activities

26. The methodology is applicable to programme of activities.

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History of the document

Version	Date	Nature of revision
01	EB 58, Annex # 26 November 2010	To be considered at EB 58.
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		