Summary of CDM/ JI Feasibility Study Report FY2009

Title of Feasibility Study (FS)

Installing Idling-stop Devices to Public Buses in Jinan city, Shandong Province, China.

Main Implementing Entity

Japan Weather Association

FS Partner(s)

Japan Weather Association	: Management, Evaluation of Co-benefit
Almec Corporation	: Experiment management
Climate Consulting, LLC	: New methodology establishment
Ecomotion Corporation	: Providing and installing idling stop equipment
GE Creation Tech, Inc.	: Arrange and translation
Jinan public transport group company	: Project site
Zhongtong Bus	: Technical adviser (Bus producer)
Weifang diesel engine works	: Technical adviser (Diesel engine producer)

1. Description of Project Activity

The purpose of the small-scale project activity is to reduce GHG emissions from buses operating by Jinan Public Transport Group Company (JPTGC) in Jinan city, Shandong Province, China. The idling stop device was developed in Japan to prevail the idling stop technology for existing/used vehicles. It is possible to ease driving operation to stop idling compare to manual operations of turning the engine off and on by the ignition key. In the project activity, project entities install the post-fit type idling stop devices to total 2,000 numbers of existing/used buses. It is achieved the fuel saving with stop idling, as a result, it is expected average 4,000 tCO2 emission reductions in one year during the project period. The air pollutant emissions such as NOx and PM are also reduced at the same time.

Methodology applied to the project activity

SSC-NM : Transportation Energy Efficiency Activities using Idling Stop Device

2. Study content

(1) Issues on the Study

1) Evaluation of idling stop equipment to regular buses in China

- Possibility installing physically
- Evaluation of affective to the bus
- Evaluation of affective to air pollutants emission (NOx, HC, CO, and PM)
- Evaluation of traffic safety

・Evaluation of energy effectiveness

2) Evaluation of additionality for CDM

Idling stop equipment has technical barriers in China.

(2) Study items

1) Collection of information for PDD

a Abstract of Jinan Public Transport Company (As of 2009)

Workers ：11,000 persons

Buses ：4,000 units

Of which, 600 units comply with EUROIII standards and 3,100 unit is old type. Around 150 units of buses are driven by CNG engine and 150 units are trolley buses. The number of buses meeting with EUROIII standards and equipped with CNG engine will increase to around 1/3 of the total bus fleet. In addition to this the company owns and operates around 600 units of taxi.

Operational distance per day：518,000 km in total

Passengers per day ：220 million

Mode ratio ：21.4%

Operational routes ：186（total length is 3,383 km）

Number of bus stations ：4,615 stations

Number of bus terminals ：77 locations

Operational hour ： 5:00AM to 11:00PM (16 hours)

b Buses

The total number owned and operated by Jinan Public Transport Company is around 4,000 units, of which 825 units complies with EUROIII standards and are operated in the urban area.

c Operation

The bus is operated by two drivers in rotation and run 7 cycles per day in the case of Route No. 36. According to the operation record of regular bus for Route No. 36 as of 20th February 2008 the stopping period of bus accounts almost 25% of the bus operation period for 50 minutes between 7:00 am and 7:50 along the Route No. 36. (Source: Jinan Public Transport Company)

2) Possibility of installing the idling equipment

a Energy saving

The estimation of the emission reduction effects due to the operation of idling stop equipment was carried out and its result is as follows:

b Assumption of emission reduction by application of idling stop operation

・Buses with idling stop equipment： 2,000 buses

・Fuel consumption during idling： Diesel 280cc/10 minutes (0.467cc/sec)

・Cumulative idling period in one year：

Operational hour per day：14 hours/day,

Operational days：365 days,

Stopping ratio during operating：30%,

Idling stop ratio：33%

(Idling stop period ratio in operational hours 30%×33%=10%)

Cumulative idling stop period in one year ： 14 hours×365 days×10%

= 360hours/bus/year

・Idling stop time in year ： 70 times/one bus/day

c Energy saving and emission reduction in one year

2,000×365×((14hours×10%)－70×5/3,600)×1.68＝1,598kL

CO_2 emission reductions 4,155tonCO_2/year

3) Project scheme

The result and outline of the study concerned with the project operation plan is to be referred to Chapter 3.(8) Project Formulation.

3. RESULT

(1) Baseline scenario and Project boundary setting

The baseline scenario of the proposed project is “Continuation of current practice: Idling stop will not be implemented”. The buses, which will be installed with the idling stop devices, will continue idling at stoplights or other situations in the absence of the proposed project activity.

The project boundary includes roads where the buses installed with the equipment will be driven, bus terminal, intersections and bus stops etc.

1) Application of a baseline and monitoring methodology

a Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity

SSC-NM：Transportation Energy Efficiency Activities using Idling Stop Device

b Justification of the choice of the project category

The proposed project activity meets the applicability conditions of the methodology as follows, therefore the methodology is applicable to the proposed project.

Para.	Applicability conditions	The proposed project
5. a)	Vehicles using gasoline and diesel as fuel	The device will be installed into buses whose fuel is diesel oil.
5. b)	Mechanically possible to install post-fit type idling stop device	It is possible to install post-fit type idling stop device to these buses, and this is already

		confirmed with field driving tests.
5. c)	Automatically possible to record periods and times of idling stop by post-fit type idling stop device	It is possible to record periods and times of idling stop by post-fit type idling stop device, and this is already confirmed with field driving tests.
6	The methodology is not applicable to: (a) Vehicles using biofuel or blended biofuel as fuel; (b) Electric vehicles; (c) Hybrid vehicles with electrical and internal combustion motive systems; (d) Vehicles using natural gas and liquefied petroleum gas (LPG) as fuel.	The buses use diesel oil.

Baseline emissions

$BEF_i = FC_{IS,i} \times D_j \times NCV_j \times EF_{CO2,j} \times 10^3$

$= 0.467 \times 10^{-3} \times 0.8397 \times 42{,}652 \times 72.6 \times 10^{-6} \times 10^3 = 1.21$

Where:

BEF_i: Baseline CO_2 emission factor per second for the baseline vehicle i (gCO_2/second)

$FC_{IS,i}$: Fuel consumption at idling condition of buses (liter/second) (In the PDD, same consumptions for all the buses are assumed. Entire measurement or sample measurement are planned to be implemented after the approval of the new methodology and before the validation starts.)

D_j : Density of diesel (kg/liter)

NCV_j : Net calorific value of diesel (MJ/t)

$EF_{CO2,j}$: CO_2 emission factor of diesel (tCO_2/MJ)

$BE_y = \Sigma(BEF_i \times T_{i,y} \times 10^{-6})$

Where:

BE_y : Total baseline emissions in the year y (tCO_2/year)

$T_{i,y}$: Cumulative idling period of vehicle i in the year y (second/year)

$T_{i,y}$

		2012	2013～
Operation period	hour/day	14	14
Ratio of idling time	%	10	10
Number of operation days	day/year	365	365
Number of buses installing the post-fit type idling stop device	buses	(Ave.)1,000	2,000
Accumulated idling period	Million sec/year	1,839.6	3,679.2

BE_y

			2012	2013～
BE_y	Total baseline emissions in the year y	tCO_2/year	2,226	4,452

T	Cumulative idling period of vehicle i in the year y	Million sec /year	1,839.6	3,679.2

Project emissions

$PE_y = \Sigma(N_{i,y} \times PEF_{IS,i} \times 10^{-6})$

Where:

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

$N_{i,y}$: Total times of stop-idling of vehicle i in the year y (times/year)

$PEF_{IS,i}$: Project emission factor per one time of stop-idling for vehicle i (gCO_2/time)

$N_{i,y}$

			2012	2013～
n	Idling stop times	time/bus・day	70	70
	Operational days per year	day/year	365	365
	Number of buses with idling device	buses	(Ave.) 1,000	2,000
N	Total times of idling-stop of vehicle i in the year y	million times /year	25.55	51.1

$PEF_{IS,i} = BEF_i \times T_{PJ,i}$

$= 1.21 \times 5 = 6.05$

Where:

$T_{PJ,i}$: Effective time. Idling stop period in second compensates fuel consumption in restarting the engine right after each idling stop. The most conservative value is 5 seconds in the methodology.

PE_y

			2012	2013～
T_{PJ}	Effective time	sec/times	5	5
PEF	Project CO_2 emission factor per one time of stop-idling for bus i	gCO_2/one time	1.21	1.21
PE	Total project emissions in the year y	tCO_2/year	154	309

Leakage

No leakage calculation is required.

(3) Monitoring plan

1) Data and parameters monitored

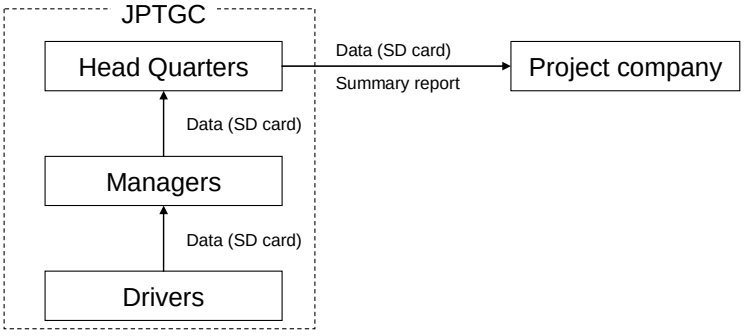
Data / Parameter:	$T_{i,y}$
Data unit:	Second/year
Description:	Cumulative idling period of vehicle i in the year y
Source of data to be used:	Record on the idling stop equipment
Value of data	1,839,600 (=511×60×60)
Description of measurement methods and procedures to be applied:	Signals of vehicle speed and engine on/off will be electronically collected by the post-fit type idling stop device (ECO STARTER), and each idling stop period will be calculated automatically. Cumulative idling period is calculated by summing up each idling stop period in one year.
QA/QC procedures to	Data will be collected using reliable software every month and

be applied:	will be stored for crediting period and additional 2 years.
Any comment:	accumulated idling period = operation hour × number of operation days × ratio of idling stop to operation time = 14×365×10% = 511hours/vehicle/year operation time ：14hours/day number of operation days：365days/year ratio of idling time：30% executing rate of idling stop：33% ratio of idling stop to operation time：10% (= 30% × 33%)

Data / Parameter:	$N_{i,y}$
Data unit:	times/year
Description:	Total times of stop-idling of vehicle i in the year y
Source of data to be used:	Record on the idling stop equipment
Value of data	25,550 (=70×365)
Description of measurement methods and procedures to be applied:	Signals of vehicle speed and engine on/off will be electronically collected by the post-fit type idling stop device (ECO STARTER), and number of idling stop will be counted automatically.
QA/QC procedures to be applied:	Data will be collected using reliable software every month and will be stored for crediting period and additional 2 years.
Any comment:	-

Data / Parameter:	Information of vehicles installing the post-fit type idling stop device, i.e. fuel types, vehicle types, engine displacements, engine model year, with or without air conditioner.
Data unit:	-
Description:	-
Source of data to be used:	Bus ledger of Jinan Public Transport Group Company (JPTGC)
Value of data	-
Description of measurement methods and procedures to be applied:	Necessary information shall be collected and aggregated in a database.
QA/QC procedures to be applied:	-
Any comment:	-

2) Monitoring structure



3) Monitoring equipment

The monitoring equipment is SD card writer to be attached to idling-stop device.

4) Data collection

The project operator who employs the idling stop equipment shall prepare the inventory of equipment installation that is composed of following for monitoring and controlling the operation effectively:

- Serial number of the idling stop equipment
- Date of installation of the idling stop equipment
- Date of dismantling the idling stop equipment
- Any data and information concerned to troubles
- Data of operation control office
- Data and information concerned to the bus that is equipped with the idling stop equipment
- Data and information concerned to the drivers

If and when any trouble occurs after the installation and operation of idling stop equipment the driver responsible shall report such trouble to the management office. The management of operation office shall report such incident to the vehicle management division of the headquarters that shall be composed of information concerned to the equipment, probable reason of trouble, date and time that trouble occurred, and the vehicle management division of headquarter shall record such data and information properly.

The management division of bus depot shall collect all SD cards attached to the idling stop equipment at the date for collecting monthly fuel consumption data and new SD cards shall be delivered to the drivers. The data contained in the SD cards collected shall be recorded and filed in electronic-file the data of idling stop operation shall be compiled aiming at computing the saving of energy consumption and reduced emission volume. After assessment and analysis on those data the analytical report shall be prepared for each bus respectively on monthly basis as a monthly report. Then, those analytical reports shall be transferred to the vehicle management division of the headquarters together with the copy of those original data collected. The vehicle management division of the headquarters shall prepare the annual report based on compilation of data compiled and analyzed monthly. Then, the Monitoring Report shall be prepared by excerpting necessary section and data of such annual report for submission to the DOE.

5) QA/QC

DOE shall visit the Jinan Public Transport Company each year for checking the inventory of idling stop equipment, data collected by SD card, preparation and storing of monthly reports, so as to recommend a necessary revision to the manager of vehicle management division in the headquarters if such revision is deemed necessary. At the same time the implementation method for measuring fuel consumption volume during the idling stop operation shall be confirmed.

6) Data management

The personnel computer which is used exclusively for management and recording the data concerned with the idling stop operation shall be installed in the vehicle management division in the headquarters so as to store the inventory of idling stop equipment, data contained in SD card and monthly reports and prepare a necessary index system for reference. Those data stored shall be restored periodically as to back-up the system and data.

(4) Estimated amount of emission reductions over the chosen crediting period

Years	Estimations of annual emission reductions in tonnes of CO_2e
2012	2,072
2013	4,143
2014	4,143
2015	4,143
2016	4,143
2017	4,143
2018	4,143
2019	4,143
2020	4,143
2021	4,143
Total estimated reductions (tons of CO_2e)	39,359
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tons of CO_2e)	3,936

(5) Duration of the project activity/ crediting period

1) Duration of the project activity

a Starting date of the project activity

Starting date of the project activity is whichever later the CDM registration date or 1/1/2012.

b Expected operational lifetime of the project activity

10 years

2) Choice of the crediting period and related information

The project activity will use fixed crediting period.

a Fixed crediting period

a) Starting date

1/1/2012

b) Length

10 years and 0 month

(6) Environmental impacts

It is thought that there is no negative environmental effect or that it is avoidable that the idling stop device can avoid the waste fuel consumption during the signal waiting. By contrast, the system can contribute to improve the air pollutants in the project area because it reduces the emission NOx, CO, PM, and THC when vehicle stops for a certain period of time.

(7) Stakeholders' comments

The Study team collected stakeholders' comments. Expected stakeholders are as follows:

Jinan Public Transport Group Company

Zhongtong Bus

CDM Project Center of Shandong Province

Bus passengers

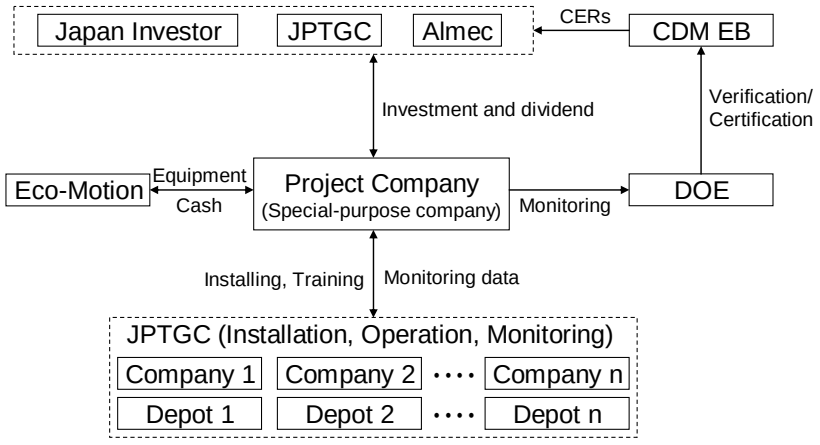
(8) Project Formulation

1) Project participants

Jinan Public Transport Group Company：Project site, Project investor

Almec Corporation：Project investor, CDM consulting

Other investor from Japan (Under consideration)：Idling stop technological service, Project investor



(9) Financial plan

The total initial capital investment cost is estimated at US$ 300,000 and its rough cost breakdown is as follow:

Cost of equipment (Purchase of body, installation and operation training) US$ 500.00 per unit

Initial investment cost: US$ 500.00 × 2,000 units = US$ 1,000,000.

(10) Economic analysis

The projected Profit Loss Statement and Balance Sheet of the project operator are prepared based on the assumptions mentioned below. The expected annual revenue from the Carbon Credit estimated based on the estimated emission reduction volume of CO_2 is presented as well.

・The introductory period of the idling stop equipment and operation

1st January 2012 ~ 31st December 2012 for 2,000 units of standard buses

・Initial capital investment cost

Cost of equipment (Purchase of body, installation and operation training) US$ 500.00 per unit

Initial investment cost: US$ 500.00 × 2,000 units = US$ 1,000,000. (Excluding banking interest during the period of introduction)

Project Period: 10-years including the first year as an introductory period

Depreciation: Straight method for 10-years period with no residual value considered

Emission Reduction Volume: 2,072tCO_2 / 2.6tCO_2/kL =797kL in 2012

4,143tCO_2 / 2.6tCO_2/kL =1,594kL in 2013 and beyond

Expenditure: Annual expenditure US$ 100,000 excluding depreciation cost

Table 1 Projection of Profit Loss of the Project Operator

Unit: US$

Calendar Year	2012	2013	2014	2015	2016
Revenue	239,100	478,200	478,200	478,200	478,200
Expenditure	239,100	239,100	239,100	239,100	239,100
Depreciation cost	0	100,000	100,000	100,000	100,000
Financial cost	0	0	0	0	0
Calendar Year	2017	2018	2019	2020	2021
Revenue	478,200	478,200	478,200	478,200	478,200
Expenditure	239,100	239,100	239,100	239,100	239,100
Depreciation cost	100,000	100,000	100,000	100,000	100,000
Financial cost	0	0	0	0	0

Table 2 Projected Balance Sheet of the Project Operator

Unit: US$

Calendar Year	2012	2013	2014	2015	2016
Revenue before tax	0	139,100	139,100	139,100	139,100
Corporate tax	0	34,775	34,775	34,775	34,775

Revenue after tax	0	104,325	104,325	104,325	104,325
Cash	0	204,325	408,650	612,975	817,300
Fixed assets	1,000,000	900,000	800,000	700,000	600,000
Total of Asset	1,000,000	1,104,325	1,208,650	1,312,975	1,417,300
Liability	0	0	0	0	0
Capital	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Surplus	0	104,325	208,650	312,975	417,300
Total of Liability and Debt	1,000,000	1,104,325	1,208,650	1,312,975	1,417,300
Calendar Year	**2017**	**2018**	**2019**	**2020**	**2021**
Revenue before tax	139,100	139,100	139,100	139,100	139,100
Corporate tax	34,775	34,775	34,775	34,775	34,775
Revenue after tax	104,325	104,325	104,325	104,325	104,325
Cash	1,021,625	1,225,950	1,430,275	1,634,600	1,838,925
Fixed assets	500,000	400,000	300,000	200,000	100,000
Total of Asset	1,521,625	1,625,950	1,730,275	1,834,600	1,938,925
Liability	0	0	0	0	0
Capital	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Surplus	521,625	625,950	730,275	834,600	938,925
Total of Liability and Debt	1,521,625	1,625,950	1,730,275	1,834,600	1,938,925

Table 3 Projection of Carbon Credit Revenue

Unit: US$

Calendar Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Annual Emission Reduction Volume	2,072	4,143	4,143	4,143	4,143	4,143	4,143	4,143	4,143	4,143
Carbon Credit Revenue	10,360	20,715	20,715	20,715	20,715	20,715	20,715	20,715	20,715	20,715

Note: The expected value of Carbon Credit is assumed at US$ 5 per ton- CO_2

(11) Additionality

To identify the baseline scenario and demonstrate additionality, the following steps have been applied;

Step 1. Identification of alternative scenarios including consistency with mandatory applicable laws and regulations

Step 2. Barrier analysis

Step 3. Evaluation of alternative scenarios

Step 1. Identification of alternative scenarios:

There are four (4) plausible alternative scenarios for the proposed project. These scenarios all comply with mandatory and regulations of China and Shandon province.

Scenario 1: Continuation of current practice

Scenario 2: Implementation of manual idling stop by behavioral changes not using the post-fit type device

Scenario 3: Introduction of new buses with pre-installed idling stop device

Scenario 4: Implementation of the proposed project without CDM

Step 2. Barrier analysis:

Among four (4) barriers in the Attachment A to Appendix B of "The simplified modalities and procedures for small-scale CDM project activities", the proposed project faces the following barriers

Technological barriers:

The post-fit type idling stop device was invented by ECO-MOTION, Ltd of Japan, and is considered to be state-of-the-art technologies based upon the experience and know-how obtained from more than ten years use in Japan. Since the device is connected to vehicle electronic control unit (ECU), very high and sensitive skills and knowledge are required to keep vehicle operation safely and smoothly. The post-fit type idling stop device has not been introduced in China, and this is the first project to introduce the device in China. In installing the device to accommodate buses in China, not only reading the installation manual but special skills and know how are required. JPTGC has no local staff with enough knowledge and experience to properly install the device. In the operation phase, training of the driver is also needed to understand the skills how to drive safely preventing any influences or damages on buses. These local staff training and education programs for them will be implemented in the project activity by Japanese side. Before implementing the proposed project, not only JPTGC, but also JPTGC Institute of science and technology and the bus company who provides buses to JPTGC are also participate to install the devices to the buses, and find out problems and issues in the installation and operation phase, and also analyze the effect such as reduction of fuel consumptions and impact to the engine or battery. These tests have been implemented with the technical support by Japanese side including ECO-MOTION, Ltd.

From above reasons, without the technology transfer from the Japanese side, it is impossible to implement the proposed project.

Barrier due to prevailing practice:

Currently, JPTGC has no plan to stop idling manually or automatically in their current practice. They have no plan to introduce new type of buses with pre-installed idling stop system. As for post-fit type idling stop device, it is first time for JPTGC to access and test the device, and this was realized by the proposal from Japanese side for this CDM project. Moreover, this type of equipment is first of its kind in China. There is no regulation or mandatory of Chinese government or Shandon province or Jinan city to stop idling for vehicles driving in cities. In addition, JPTGC had been misunderstood that the post-fit type idling stop devices can not apply to Chinese buses and had a negative perception to introduce the devices.

Therefore, the buses of JPTGC will continue idling at stoplights or other situations in the absence of the proposed project activity.

From above considerations, there exist technological barrier and barrier due to

prevailing practice.

Step 3. Evaluation of alternative scenarios

Each scenario identified in Step 1 was assessed as follows.

Scenario 1: Continuation of current practice

The scenario do not install any devices, therefore it requires minimal investment and operational costs. It is no need to establish training programs for drivers, and there are no additional skills required for drivers.

Scenario 2: Implementation of manual idling stop by behavioral changes not using the post-fit type device

There is no regulation or mandatory in China or Shandon province or Jinan city for motor vehicles to stop idling manually at stoplights or other situations. There are also no measures or plans to promote stop idling in JPTGC. It is said that manual idling stop may not be spread widely, because it needs engine on and off by turning ignition key manually. These manual operations may have potential to cause operation mistakes and delay of start moving, and may also affect smooth and safe drive. Therefore, his scenario can not be the baseline scenario.

Scenario 3: Introduction of new buses with pre-installed idling stop device

JPTGC has no plan to introduce new type of buses with pre-installed idling stop system. Moreover, bus manufacturers who provide buses to JPTGC do not have any plan to produce buses with pre-installed idling stop system. Therefore, this scenario can not be the baseline scenario.

Scenario 4: Implementation of the proposed project without CDM

As elaborated in Step 2, the proposed project faces technological barrier and barrier due to prevailing practice. Therefore, this scenario can not be the baseline scenario.

From the above analysis, the baseline scenario is identified as Scenario 1, continuation of current practice. As elaborated in Step 2, the proposed project faces technological barrier and barrier due to prevailing practice. Therefore, the proposed project is considered as additional.

(12) Vision to CDM

In March 2010, the JPTC expressed their expectation that the study will be continued to make sure of the effects of the system and agreed to apply the methodology prepared as a new CDM methodology on small scale project.

4. EX-ANTE CALCULATION OF CO-BENEFIT

(1) Co-benefit evaluations in host country

1) Evaluation item

・Saving fuel

・Air pollutants (NOx and PM)

2) Baseline/Project scenario

a Baseline scenario

The baseline scenario of the proposed project is the situation where, in the absence of the project activity, idling will be continued at stoplights or other situations without post-fit type idling stop equipment.

b Project scenario

The project scenario of the proposed project is the situation where idling will be stopped at stoplights or other situations with post-fit type idling stop equipment.

3) Procedures of baseline evaluation and monitoring plan

Data and parameters for co-benefit evaluations of the project are as follows;

Table 4 Data and parameters for co-benefit evaluations

	Items	**Monitoring method**
Data and parameters for baseline scenario emissions	Idling stop period in operating	Record on the idling stop equipment
	Emission factor of air pollutants with idling	Monitored or Literature
	Fuel consumption with idling	Measured on target vehicle types
Data and parameters for project scenario emissions	Idling stop period during bus operating	Record on the idling stop equipment
	Effective time: Idling stop period in second compensates fuel consumption and air pollutant emission in restarting the engine right after each idling stop.	Monitored or Literature

4) Ex-ante calculation of co-benefit

Expected co-benefit of the project is shown in the following table.

The formula of both baseline emissions and project emissions is the same as GHG case.

Table 5 Ex-ante calculation of co-benefit

Year	**Fuel saving (kL/year)**	**NOx emission reduction (tNOx/year)**	**PM emission reduction (tPM/year)**
2012	799	9.1	8.8
2013	1,599	18.3	17.6
2014	1,599	18.3	17.6
2015	1,599	18.3	17.6
2016	1,599	18.3	17.6
2017	1,599	18.3	17.6
2018	1,599	18.3	17.6

2019	1,599	18.3	17.6
2020	1,599	18.3	17.6
2021	1,599	18.3	17.6

5. Contribution to sustainable development in host country

The application and use of the post-fit type idle stopping device to a large number of vehicles will contribute to save the fuel consumption thereby reduce the volume of fossil fuel consumption as well as to reduce the air pollutants at the same time.

The installation of post-fit type idle stopping device to a large number of vehicles will push up the technical standards level of electronic technology of China concerned to automobile industry in general and automobile repair and maintenance industries in particular, thereby, the promotion of vehicle navigation system as well as ETC can be accelerated. In such a way, the project will possible to contribute to sustainable development of concerned industries in China.