

**EAN DEVELOPMENT MECHANISM  
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM  
(CDM-SSC-PoA-DD) Version 01****CONTENTS**

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## NOTE:

- (i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.
- (ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

**SECTION A. General description of small-scale programme of activities (PoA)****A.1. Title of the small-scale programme of activities (PoA):**

Public Utility Jeepney engine modernization program in Metro Manila

**A.2. Description of the small-scale programme of activities (PoA):**

The program is conducted as part of the Philippine Department of Environment and Natural Resources (DENR)'s efforts in mitigating ambient air pollution in Metro Manila.

In Metro Manila, vehicular emissions attribute 70%<sup>1</sup> of the total pollution load and 17%<sup>2</sup> of the coarse particulates pollution load. The transport sector has been identified as the most significant source of PM10 and PM2.5 pollutants. This scenario is expected to continue as the demand for mobility increases, driven by increasing population and urbanization.

Improvements in the the engine's energy efficiency leads to a decrease in the the amount of fuel consumed, allowing for the same amount of service provided while decreasing emissions due to fuel consumption. Furthermore, air pollution from vehicles is caused by inefficient combustion of fuel in the engine. Thus, improving the engine's energy efficiency reduces greenhouse gas emissions, reduce pollution, and allows compliance with vehicular emission standards set in the Clean Air Act (CAA, Republic Act 8749) of 1999.

The CAA is the main program of the government in reducing emissions from transportation. Since the promulgation of the implementing rules and regulations (IRR) of the CAA, DENR is the lead agency in implementing the law. As part of its efforts in the CAA, DENR through its Environmental Management Bureau (DENR-EMB) in its General Program of Action (GPOA) set a 10% reduction in Total Suspended Particles (TSP) concentration in Metro Manila before the end of 2010.

The goal of the PoA is to facilitate to meet this target by exchanging old engines used by Public Utility Jeepney with new engines. These new engines will have lesser fuel consumption while providing the same degree of service; lesser fuel consumption means lesser carbon dioxide and other pollutant emissions.

Public Utility Jeepneys<sup>3</sup> (PUJs) are the most popular form of public transportation in the Philippines. Currently, there are over 200,000 units operating nation wide. A common trait is in the engine used by these vehicles as more than 95% of them utilize surplus or second-hand engines sourced from overseas. The program will target about 60,000 PUJ units operating in Metro Manila.

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<sup>1</sup> Philippine Emission Inventory, 2005

<sup>2</sup> PNRI Air Pollution Source Apportionment Study, 2006

<sup>3</sup> There are two types of Jeepneys operation, Public Utility Jeepney and Private Jeepney. The program targets only those Public Utility Jeepney that operate legally as public transportation with appropriate license.



Photo of the Jeepney

Unlike other means of public transportation, the Jeepneys sector does not have official standard concerning operations and maintenance in place. Therefore, the actual operational practices and behaviours are difficult to grasp. For the purpose of collecting appropriate baseline data on Jeepney sectors, a comprehensive survey was conducted by the University of the Philippines National Center for Transportation Studies (UP-NCTSI) in September 2007 for the duration of 3 months period. The surveyed population across the 17 cities and municipalities in Metro Manila totalled 3,425 which accounts for 5% of recorded population of Public Utility Jeepneys in Metro Manila.

One of the survey results concerning the sources of engines showed that nearly 95% of respondent sourced their engines from second-hand market. The survey also showed that the average age of sampled second-hand engines are estimated at least 10 years old after their first year of registration. Considering the fact that for many cases, engines are at least 4-5 years old when they first come on the market as second-hand, the actual age of these engines from the year of production can be estimated to be over 15 years old.

The program intends to replace these obsolete engines for better fuel efficiency and for lesser pollutant emissions to be compliant with existing law in the Philippines.

**A.3. Coordinating/managing entity and participants of SSC-POA:**

The coordinating entity of this PoA is the U.P. National Center for Transport Study Foundation, Inc. (NCTSI) of the Republic of the Philippines.

Project participants are:

U.P. National Center for Transport Study Foundation, Inc. (NCTSI), Philippines  
Mitsubishi UFJ Securities, Co., Ltd.

**A.4. Technical description of the small-scale programme of activities:**

The programme intends to improve the efficiency of the public transport in Metro Manila. The approach is by a coordinated engine exchange for new engines in operating Public Utility Jeepneys.



**A.4.1. Location of the programme of activities:**

Metro Manila

**A.4.1.1. Host Party(ies):**

Republic of the Philippines

**A.4.1.2. Physical/ Geographical boundary:**

Metro Manila is the greater metropolitan area around the city of Manila. It is composed of the sixteen (16) cities and one (1) municipality of the National Capital Region.

Metro Manila is located at 14°40' N 121°3 E.



Philippines



Metro Manila

**A.4.2. Description of a typical small-scale CDM programme activity (CPA):**

There are numerous PUJ Associations and Cooperatives in Metro Manila and are mostly grouped according to their route since they follow a specific line of operation governed by a route measured capacity (RMC) set by the Department of Transportation and Communications (DOTC).



There are 1013 registered routes in Metro Manila and the operators/drivers usually are grouped according to common routes.

A unit of CPA is one Association/Cooperative/Group with Public Utility Jeepneys that will be fitted with new diesel engines.

In a typical CPA,

- New engines will be installed
- Old engines will be decommissioned to prevent alternative use in other applications
- Soft credit through instalments will be made available from local financial institution to make the exchange affordable
- Promotion shall be conducted through meetings with various Transport Associations/Transport Cooperatives
- Mandatory periodical inspection program will be provided after expiration of manufactures' free warranty and technical support service

The test data from one of the engine manufacturers shows that their brand-new engines can have around double the milage per fuel consumed as compared to the old engines. An old engine can only travel around 5-7 kilometers per liter of fuel consumed where as a new engine, wherein 10-14 kilometers per liter of fuel is possible. Switching to new engines allows lesser fuel consumption for the same distance travelled, resulting in lower emissions. New engines do not need to have lubricating oil added, lowering operation costs. Furthermore, the new engines are compliant to emissions standards up to Euro 4; the old engines have no such emission controls. Under the CAA, all new vehicles are required to pass the EURO 2 standards from 2008.

The introduction of new engine will also facilitate compliance with the Bio-Fuels Law (Republic Act 9367) signed into law early 2007 requiring a minimum blend of 2% bio-diesel by 2009. Biodiesel is a cleaner fuel, but is inappropriate especially for older engines. There is a need to upgrade engines inasmuch as biodiesel degrades natural gasekts and hoses, usually found in vehicles manufactured before 1992. The newer engines are necessary to accommodate the new composition of fuel as required by law.

The CPA will improve the efficiency of public transportation, reducing fuel consumption thus reducing Greenhouse Gas (GHG) emissions.

#### **A.4.2.1. Technology or measures to be employed by the SSC-CPA:**

The CPA will introduce locally available brand new diesel engines that are in compliance with the emission standards set by the DENR with warranty and technical support package. The engine will be a current production model that is capable of powering a typical jeepney.

The UP-NCTSI survey result shows that 91% of Jeepneys operating Metro Manila are diesel-fed and only 9% are gasoline-fed. Among these diesel-fed engines, 82% are Isuzu brand. A tally of the engines encountered in the survey revealed that another brand, Fuso, showed a significant share of 16%. Further observation of the Fuso engine models revealed that the majority are identical to Isuzu. The remaining 2% of engines are divided into 6 brands, each representing less than 0.5% of the general population. The



engine models currently produced by Isuzu are 4JB1 and 4HF1 that are capable of powering a typical Jeepney.

The PoA does not intend to limit the choice of manufacturers. Exact technical specifications of the engine will be determined by the participating organizations.

The replaced old engines will be collected by the manufacture on the spot at the time of installation of new engines. The manufacture will decommission these old engines into small parts so that there will be no further GHG emission by the use of replaced engines.

**A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:**

Criteria for inclusion of a SSC-CPA on the PoA include:

- The proposed CPA must be within Metro Manila
- The proposed CPA must be for Jeepneys used as public utility vehicles
- The proposed CPA must be for Jeepneys with engines that are older than 10 years old from the first year of registrations.
- The proposed CPA has access to the financing channels of the soft credit from local financial institution under the program

**A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):****Investment barrier:**

Second-hand engines that are available in the country are can be around 50,000PHP per engine. Indeed, the survey result shows that around 50% of the respondents<sup>4</sup> obtained their engines at lower than 100,000PHP whereas the brand new engine cost between 300,000-400,000PHP. The brand new engine with body will cost approximately 550,000PHP.

These second-hand engines are considerably cheaper thereby influencing the owners' decision making process in trying to keep investment costs down. The wide discrepancy between the cost of second-hand and brand new engine is a major factor for discouraging drivers from purchasing a new engine.

Due to high investment cost, the installation of new engines in the Jeepney sector will not likely to realize without the program. The utilization of soft credit under the program can facilitate overcoming the investment barrier for individual drivers.

**Technology barrier:**

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<sup>4</sup> For this particular item, responses were obtained from less than 30% of total surveyed population.



There is no local automobile engine manufacturer in the Philippines. Especially for the Jeepney, there is a very limited availability of brand new engine. Isuzu, being one of the major diesel engine providers, only started in 2005 their importation of brand new engines manufactured in Japan and then sold locally. These are the main technical barrier that preventing access to the new engines by the Jeepney owners.

Prevailing practice barrier:

As a general practice, most of the Asian cars have a life expectancy of 5 years or equivalent of more or less 100,000 kilometer run. It is normal that when a vehicle is sold on its 4<sup>th</sup> or 5<sup>th</sup> year after sales, many mechanical problems arise. This is also the time when vehicles are scrapped and replaced with a new one, especially in the advanced economies.

However, in the case of the countries like the Philippines, even more so for Jeepneys, the scenario is different. At the onset, when the Jeepney is first assembled, there is no set of formal standards to follow. Self-repair or in-house repairs are the usual practice. Many of the drivers have also learned indigenous practical solutions for second hand, surplus or even dilapidated engines that are never thought in formal training institutes.

There are many informal shops that provide repair and maintenance service for the engine at low fees in Philippines. Observations show that even scrap materials can be of some use to Public Utility Jeepneys simply because there is no standard to follow concerning technical specifications.

This being common practice in the sector, drivers are hesitant to replace their engines, for many of them have a perception that new engines have high technical specifications requiring expert knowledge.

Regulatory barrier:

The Executive Order No. 782 series of 1982 which ban on importing second-hand engines has been suspended since 1989. Currently, there is no regulation to prohibit continuing importation of second-hand engines from overseas.

This phenomenon has also opened the gates for more second-hand or surplus vehicle parts in the country. In a way the replacement of engines or parts of the second-hand vehicles sold to the public has an after-market support (although very inadequate) despite some conflict in government policies. With these long-standing and unresolved issues at hand, the program on vehicle and engine scrapping is not in the central focus. In reality, the country is becoming a receiver of pre-owned vehicles, auto parts and industrial equipments. Therefore, there are cases that old engines are installed even in newly built jeepneys.

The DOTC issued Department Order No. 2002-30 set on Aug. 2002 setting the age limit of public transport vehicles at 15 years. However, in response to the clamor of the public transport sector, the order is currently under review and the implementation of this order has been put on hold.



**A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):****A.4.4.1. Operational and management plan:**

NCTSI is the coordinating entity of this PoA and will act on behalf of all participating entities in this program.

Each CPA implements the jeepney modernization with their members. The CPAs that are responsible for undertaking the exchange, decommissioning of old engines, and maintenance of the new engines. The CPAs are also responsible for monitoring of their activities and reporting to the coordinating entity.

The operational and management plan established by the coordinating/managing entity for the implementation of the PoA include:

- (i) A record keeping system for each CPA under the PoA, CPA will make annual check of all engines installed or a sample thereof to ensure that these engines are still operating.
- (ii) Ongoing loan repayment will also be checked periodically and be documented and provide evidence for continuing operation of the new engines.
- (iii) The CPA will keep the record of each vehicle exchanged engines by checking the registration number that are unique to each engines to confirm that the SSC-CPA included in the PoA is not debundled component of another (CPA) or PoA.
- (iii) Each CPA has agreed to participate in the program and is aware of their activity being subscribed tot the PoA.

**A.4.4.2. Monitoring plan:**

Detailed monitoring information on the responsibilities and management structure of the program will be provided in each CPA-DD in details. The following are outline of monitoring plan based on the CDM small scale monitoring methodology SSC\_149 “Transport Energy Efficiency Activities using Retrofit Technologies”<sup>5</sup>.

- (i) Monitoring shall track the number of retrofit vehicles operated under the small-scale CDM project activity and the annual units of service for a sample of the vehicles.
- (ii) The quantity of fossil fuel consumed should be monitored for a sample retrofit vehicles.

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<sup>5</sup> The proposed new SSC methodology was discussed at the 14<sup>th</sup> SSC Working Group held in Feb. 11-13, 2008. The methodology received several comments and has not been approved as of March 20, 2008. However, as of now, this particular methodology is the most suited to the proposed PoA and CPA. The author of this PDD will closely watch the next discussion at the next SSC Working Group meeting and make necessary adjustment to complete this PDD.





(iii) 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.

**A.4.5. Public funding of the programme of activities (PoA):**

Public funding is considered for the registered PoA is now under negotiation with relevant international financial institution by the coordinating entity via Department of Environment and Natural Resources (DENR) of the Philippines.

**SECTION B. Duration of the programme of activities (PoA)****B.1. Starting date of the programme of activities (PoA):**

01/07/2008

**B.2. Length of the programme of activities (PoA):**

28 years

**SECTION C. Environmental Analysis****C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:**

Environmental Analysis is done at PoA level

**C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

DENR Administrative Order (DAO) No. 30 Series of 2003 specifies the types of the project that are required to secure Environmental Compliance Certificates (ECCs). According to the categorization of the Article II of the DAO No.30 as shown below, the Project falls under the Category C and is not required the ECC.

Category A: Environmentally critical projects

Category B: Non-environmentally critical but located in an environmentally critical area

Category C: Environmental enhancement of direct mitigation

Category D: Not covered



To confirm this fact, a Certificate of Non-Coverage (CNC) was issued to the Project by the Environmental Management Bureau (EMB) on aa/bb/cccc.

**C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA):**

The host Party laws/regulations, an environmental impact assessment is not required for a typical CPA included in this PoA.

**SECTION D. Stakeholders' comments**

**D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:**

Local stakeholder consultation is done at both PoA level

**D.2. Brief description how comments by local stakeholders have been invited and compiled:**

A consultation meeting was held on November 21, 2007. Attendees included representatives from:

Department of Energy  
Department of Environment and Natural Resources –Environmental Management Bureau  
Department of Transportation and Communication –Office of Transport Cooperatives  
Land Transportation Franchising Regulatory Board  
Land Transportation Office –Motor Vehicle Inspection System  
City of Pasig  
United Transport Federation of Makati, a public utility jeepney association  
Metro Manila Development Authority  
Femanda TSMPC  
University of the Philippines –National Center for Transportation Studies

The DENR-EMB represented by Ms. Jocelyn Goco gave a short briefing and background of the PU study as well as the involvement of the sector in the baseline data gathering. The PUJ Sector was notably very few as many invitees were not able to come.

NCTSI Director Regidor talked about the background of the study with emphasis on the transportation problems in the Philippines then narrowed down to focus on the jeepneys. Activities of the project study were briefly discussed to usher the participants in the developments that will ultimately target the replacement of jeepney engines. (Presentation is attached)



The initial findings of the study were presented by Mr. Manuel J.D. Camagay of NCTSI, as the main topic of the consultation meeting. Basic information derived from the surveys as well as related information from the initial reports were highlighted in the presentation. The derived information presented followed the survey questionnaire categorized into driver's profile, operational aspect and vehicle information.

A forum was facilitated by Dr. Napalang of NCTSI where guide questions were posed before the participants that were divided into two groups. Each group was given about 45 minutes to discuss and 15 minutes to present their collective assessment and ideas.

A recap was made by Mr. Camagay that centered on the refinements of the gathered data, CO<sub>2</sub> estimation and possible engine replacement schemes. A short overview of the proposal from Isuzu Powertrain Group was also cited as take off point to modernizing the current fleet of jeepneys.

### **D.3. Summary of the comments received:**

Respondents were generally in favour of implementing the engine exchange. The main obstacle in making this program happen is the reluctance to spend on the high cost of a new engine. One point was raised on how some might not give up the old engine, supposing an alternative use for the engine which can still run.

Jeepney operator representatives stated that they were willing to spend only up to 4,000 PHP per month (or 200 PHP daily). The respondents think that financial assistance from government or from foreign sources is necessary, as well as accompanying policy from the government. It was also learned from the participants, particularly LTO that there are possible drawbacks with Isuzu's proposal due to the small size of the engine being packaged.

There was also some discussion on using alternative modes of transportation. It was suggested that a replacement to the jeepney itself, and not just the engine, be used.

### **D.4. Report on how due account was taken of any comments received:**

It was clarified that for purposes of the CDM, re-use of the old engine will not be allowed. The only alternative is to scrap the engine.

On the subject of engine size, further consideration may boil down to the establishment of a PUJ size standard in order to save on trips and road space. Currently there are no standards for jeepney construction, but it was determined that the LTO can help in the establishments of such.

Regarding alternative modes of transport, Dr. Napalang explained that solutions must also include the social aspects in order to retain the livelihood of the public utility jeepney sector, in consideration of their population which is nearly quarter of a million. In the meantime, jeepneys would continue to be utilized mode of transport.

**SECTION E. Application of a baseline and monitoring methodology****E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:**

The program applies small scale monitoring methodology SSC\_149 “Transport Energy Efficiency Activities using Retrofit Technologies”<sup>6</sup>.

**E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:**

The program comprises the retrofit of existing/used vehicle(s), of the same type, with technologies that would reduce greenhouse gas emissions.

The CPAs in the program individually do not exceed the SSC threshold, in this case, aggregate energy saving of 60GWh per year.

**E.3. Description of the sources and gases included in the SSC-CPA boundary**

The GHG reduced in the SSC-CPA boundary is carbon dioxide in exhaust from diesel engines.

**E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:**

The baseline scenario is identified by applying small scale monitoring methodology SSC\_149 “Transport Energy Efficiency Activities using Retrofit Technologies”.

The baseline is the energy use per vehicle unit multiplied by the number of vehicle units multiplied by the number average operating time multiplied by the emission coefficient for the fuel used by vehicle.

Liters fuel per day will be basis of the energy use per vehicle unit.

**E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):****E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:**

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<sup>6</sup> The proposed new SSC methodology was discussed at the 14<sup>th</sup> SSC Working Group held in Feb. 11-13, 2008. The methodology received several comments and has not been approved as of March 20, 2008. However, as of now, this particular methodology is the most suited to the proposed PoA and CPA. The author of this PDD will closely watch the next discussion at the next SSC Working Group meeting and make necessary adjustment to complete this PDD.

**Investment barrier:**

The survey result also shows that about 25% of the respondents earn somewhere between PHP 400-500. The main barrier to the implementation of the program is the initial investment cost for new engines. The average cost of new engines is around 300,000PHP which would mean a daily amortization of around 246PHP. At a PoA level meeting with some representatives from Jeepney Transport Association, they indicated that they were willing to pay a maximum of 200PHP per day. Should this activity be considered as CDM, the CDM revenues will be used to subsidized the cost of equipment maintenance. The incentive of after-purchase support, as well as lowered operating costs for the jeepney operator, would encourage the participation of more jeepney operators into the program.

**E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:**

Future SSC-CPAs should demonstrate the additionality based on the following criteria:

- Flexibility or innovativeness of financial mechanisms being used in order to expand the reach and implementation of the jeepney modernization program;
- The use of CDM revenues will be used to subsidize the cost of equipment maintenance.

The above two criteria shall be applied in the following way:

- An explanation of the financing mechanisms available to jeepney operators and the role of the CDM, and
- Demonstration that CDM revenues (whole or in part) play a role in helping to expand the program.

**E.6. Estimation of Emission reductions of a CPA:****E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:**

The program applies small scale monitoring methodology SSC\_149 “Transport Energy Efficiency Activities using Retrofit Technologies”.

**E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:**

The calculation of emission reductions will be based on the CDM small scale baseline methodology SSC\_149 “Transport Energy Efficiency Activities using Retrofit Technologies”<sup>7</sup>.

<sup>7</sup> The proposed new SSC methodology was discussed at the 14<sup>th</sup> SSC Working Group held in Feb. 11-13, 2008. The methodology received several comments and has not been approved as of March 20, 2008. However, as of now, this particular methodology is the most suited to the proposed PoA and CPA. The author of this PDD will closely watch the next discussion at the next SSC Working Group meeting and make necessary adjustment to complete this PDD.



The basic formula used to calculate emission reduction through the replacement of existing engines is the following:

$$ER = BE - PE - \text{Leakage}$$

Where

- ER = total emissions reductions in tCO<sub>2</sub>e/yr
- BE = baseline emissions in tCO<sub>2</sub>e/yr
- PE = project emissions in tCO<sub>2</sub>e/yr

**Baseline Emission**

**Step 1. Estimating apparent fuel consumption at a common energy unit (TJ)**

$$FC_{base} = m_{fuel} * CF \quad (1)$$

Where

- FC<sub>base</sub> Baseline energy consumption of retrofit vehicle per year (TJ / year)
- CF Conversion Factor of fuel (TJ/103ton)
- m<sub>fuel</sub> Annual consumed fuel mass (tons/year)

$$m_{fuel} = v_{fuel} * \rho * T * 1\text{ton}/1000\text{kg} \quad (2)$$

Where

- m<sub>fuel</sub> Annual consumed fuel mass (tons/year)
- v<sub>fuel</sub> Volume of fuel consumed per day (li/hour)
- T number of operational hours in a year (hours/yr)
- ρ Fuel Density (kgfuel/liter)

**Step 2. Multiply energy consumption by carbon emission factor to calculate carbon content.**

$$\text{Carbon content} = FC_{base} \text{ (TJ/year)} * CEF \text{ (tC/TJ)} \quad (3)$$

- CC Carbon conten of fossil fuel used (tC/TJ)

**Step 3. Converting to CO<sub>2</sub> emissions**

$$BE_y = \text{carbon content} * \text{mole ratio} * N \quad (4)$$

Where

- BE<sub>y</sub> baseline emissions on year y
- Carbon content carbon content of fuel consumed per year
- Mole ratio mole ratio of carbon to carbon dioxide (44/12)



N number of retrofit vehicles

**E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:**

<b>Data / Parameter:</b>	$\rho$
Data unit:	kg <sub>fuel</sub> /liter
Description:	Fuel density
Source of data used:	Default data for diesel
Value applied:	0.85
Justification of the choice of data or description of measurement methods and procedures actually applied :	No country specific data is available
Any comment:	-

<b>Data / Parameter:</b>	$V_{\text{fuel-base}}$
Data unit:	li/day
Description:	Volume of fuel consumed per day
Source of data used:	Survey data by University of the Philippines. National Center for Transportation Studies Foundation Inc.
Value applied:	20.0li/day
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

<b>Data / Parameter:</b>	<b>CF</b>
Data unit:	TJ/10 <sup>3</sup> ton
Description:	Conversion Factor (43TJ/10 <sup>3</sup> ton )
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol2 Tab1.2
Value applied:	43.0 TJ/10 <sup>3</sup> ton
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	





<b>Data / Parameter:</b>	<b>Carbon Content</b>
Data unit:	tC/TJ
Description:	Carbon content
Source of data used:	IPCC 2006 default data for gasoline table 1.3
Value applied:	20.2
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

**E.7. Application of the monitoring methodology and description of the monitoring plan:**

**E.7.1. Data and parameters to be monitored by each SSC-CPA:**

<b>Data / Parameter:</b>	<b>Total number of vehicles retrofitted</b>
Data unit:	N
Description:	Number of vehicles retrofitted
Source of data to be used:	Record
Value of data applied for the purpose of calculating expected emission reductions in section B.5	units
Description of measurement methods and procedures to be applied:	Records shall be kept as to how many Jeepneys have been retrofitted
QA/QC procedures to be applied:	Data will be collected using standard procedures and will be stored for the crediting period and an additional 2 years
Any comment:	

<b>Data / Parameter:</b>	$V_{fuel}$
Data unit:	Li/day
Description:	Volume of fuel consumed per day
Source of data to be used:	The coordinating entity through individual CPA
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Variables to be considered at the time of calculation



Description of measurement methods and procedures to be applied:	The coordinating entity through individual CPA will collect fuel purchase receipt by individual Jeepney owners with new engine unit.
QA/QC procedures to be applied:	Data will be collected using standard procedures and will be stored for the crediting period and an additional 2 years
Any comment:	n/a

<b>Data / Parameter:</b>	<b>T</b>
Data unit:	days /year
Description:	Days of operation by jeepney units with new engines in one year
Source of data to be used:	The coordinating entity through individual CPA
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Variables to be considered at the time of calculation
Description of measurement methods and procedures to be applied:	The coordinating entity through individual CPA will collect fuel purchase receipt by individual Jeepney owners with new engine unit.
QA/QC procedures to be applied:	Data will be collected using standard procedures and will be stored for the crediting period and an additional 2 years.
Any comment:	n/a

**E.7.2. Description of the monitoring plan for a SSC-CPA:**

Detailed monitoring information on the responsibilities and management structure of the program will be provided in each CPA-DD in details. The following are outline of monitoring plan based on the approved CDM small scale monitoring methodology SSC\_149 “Transport Energy Efficiency Activities using Retrofit Technologies”.<sup>8</sup>

- (i) Monitoring shall track the number of retrofit vehicles operated under the small-scale CDM project activity and the annual units of service for a sample of the vehicles.
- (ii) The quantity of fossil fuel consumed should be monitored for a sample retrofit vehicles.
- (iii) The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond

<sup>8</sup> The proposed new SSC methodology was discussed at the 14<sup>th</sup> SSC Working Group held in Feb. 11-13, 2008. The methodology received several comments and has not been approved as of March 20, 2008. However, as of now, this particular methodology is the most suited to the proposed PoA and CPA. The author of this PDD will closely watch the next discussion at the next SSC Working Group meeting and make necessary adjustment to complete this PDD.



with each other.

**E.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)**

Date of completion: 31/03/2008

Clean Energy Finance Committee, Mitsubishi UFJ Securities Co., Ltd.  
Marunouchi Building, 2-4-1 Marunouchi, Chiyoda-ku, Tokyo 100-6317, Japan  
Tel: +81-3-6213-6860 Fax: +81-3-6213-6175

Mitsubishi UFJ Securities is the CDM advisor to the Project.

**Annex 1****CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and  
PARTICIPANTS IN THE PROGRAMME of ACTIVITIES****Coordinating/Managing Entity and Participant**

Organization:	U.P.National Center for Transportation Studies
Street/P.O.Box:	
Building:	NCTS Building, U.P. Diliman
City:	Quezon City
State/Region:	Metro Manila
Postfix/ZIP:	1101
Country:	Philippines
Telephone:	+(632) 928-8305
FAX:	+(632) 928-8305 (if NCTS)
E-Mail:	<a href="mailto:up.ncts@gmail.com">up.ncts@gmail.com</a>
URL:	<a href="http://www.ncts.upd.edu.ph/">http://www.ncts.upd.edu.ph/</a>
Represented by:	
Title:	Associate Professor or Director
Salutation:	Dr.
Last Name:	REGIDOR
Middle Name:	Fajardo
First Name:	Jose Regin
Department:	National Center for Transportation Studies
Mobile:	+(63918) 406-8766
Direct FAX:	+(632) 928-8305
Direct tel:	+(632) 928-8305
Personal E-Mail:	<a href="mailto:r.regin@gmail.com">r.regin@gmail.com</a>

**Participant**

Organization:	Mitsubishi UFJ Securities Co., Ltd. (CDM Advisor)
Street/P.O.Box:	2-4-1 Marunouchi, Chiyoda-ku
Building:	Marunouchi Building, 26 <sup>th</sup> Floor
City:	Tokyo
State/Region:	
Postfix/ZIP:	100-6317
Country:	Japan
Telephone:	+81 3 6213 8500
FAX:	+81 3 6213 6175
E-Mail:	
URL:	<a href="http://www.sc.mufg.jp/english/e_cefc/">http://www.sc.mufg.jp/english/e_cefc/</a>
Represented by:	
Title:	Chairman, Clean Energy Finance Committee
Salutation:	Mr.



Last Name:	Hatano
Middle Name:	
First Name:	Junji
Department:	Clean Energy Finance Committee
Mobile:	
Direct FAX:	+81 3 6213 6175
Direct tel:	+81 3 6213 6860
Personal E-Mail:	<a href="mailto:hatano-junji@sc.mufg.jp">hatano-junji@sc.mufg.jp</a>

**Annex 2****INFORMATION REGARDING PUBLIC FUNDING**

Information provided in Section A.4.5.

**Annex 3****BASELINE INFORMATION**

Information provided in Section E.

**Annex 4****MONITORING INFORMATION**

Information provided in Section E.

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