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

CONTENTS

Annexes

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):

Nittsu Fuel Efficiency Improvement Programme with Digital Tachograph Systems on Road Freight Transportation in Malaysia

Version 01.3
Date of completion 06/01/2012

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

General operating and implementing framework of the PoA

The PoA is for installing digital tachograph systems in freight vehicles of Nippon Express Group, operating on a number of identified traceable routes.

Policy/measure or stated goal of the PoA

The purpose of the PoA is to improve fuel efficiency through the use of digital tachograph systems. The digital systems monitor and record the engine revolutions per minute (RPM), acceleration, braking, and idling.

A digital tachograph provides to the driver feedback against inefficient driving, and thus encouraging efficient driving which results in improved vehicle fuel efficiency of the fleet system, thus reduces GHG emissions associated with fossil fuel combustion in freight transport.

The Project contributes to the sustainable development of Malaysia in the following aspects:

Economic

- More efficient use of fossil fuel
- Transfer from Japan of environmentally sound technology, cooperation and capacity-building

Environmental

- Reduced GHG emissions from decreased consumption of fossil fuels
- Reduced pollution (e.g. particulates)

Social

- Increase in road safety (i.e. steadier driving speeds)

Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity

The PoA is a voluntary action coordinated by Nippon Express Group. There is no mandatory policy/regulation in Malaysia requiring the use of digital tachograph systems in freight vehicle fleets.

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

Coordinating/managing entity

Nippon Express Group.

Participants

Name of Party involved [(host) indicates a host party]	Private and/or public entities PoA participants	The Party involved wishes to be considered as PoA participant
Malaysia (host)	Nittsu Transport Service (M) Sdn.Bhd. (“NTS”)	No
	Nippon Express (Malaysia) Sdn.Bhd.	
Japan	Nippon Express Co.,Ltd. (“Nittsu”)	No
	Nippon Express Capital Co., Ltd.	
	Nittsu Research Institute and Consulting, Inc.	

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

A.4.1. Location of the programme of activities:

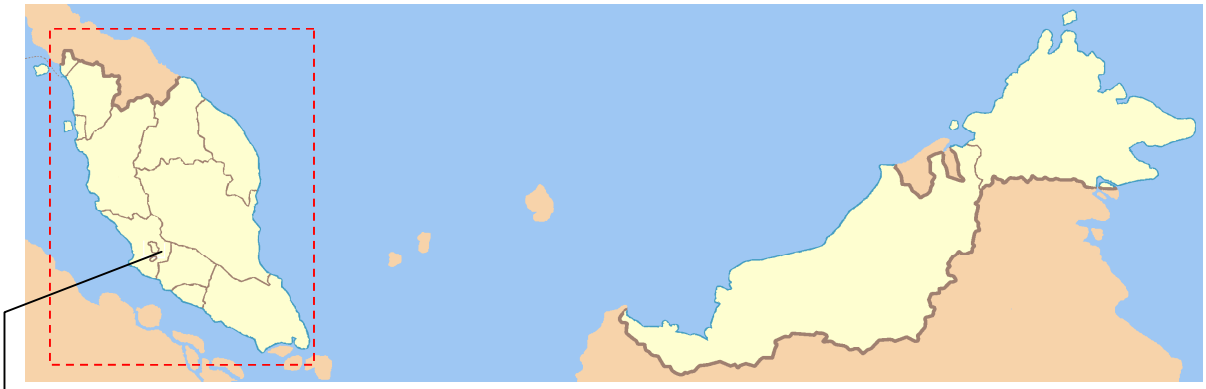
A.4.1.1. Host Party(ies):

Malaysia

A.4.1.2. Physical/ Geographical boundary:

The boundary for the PoA includes the 11 states and 2 federal territories in Peninsular Malaysia, within which all SSC-CPAs included in the PoA will be implemented.

States		*Federal territories*
Perlis	Pahang	Kuala Lumpur
Kedah	Selangor	Putrajaya
Penang	Negeri Sembilan	
Perak	Malacca	
Kilantan	Johor	
Terengganu		



Some freight is between Peninsular Malaysia and Singapore, or between Peninsular Malaysia and Thailand. Singapore is outside the geographical boundary of the PoA, so emission reductions will only be claimed for the section of trip that occurs in Malaysia. For freight to/from Thailand however, the trucks do not cross into Thailand; the trucks unload the freight at the Malaysia-Thailand border and return, thus the travel for these trucks still occur wholly within Malaysia.

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

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

A CPA introduces digital tachograph systems for road freight transport operating on traceable routes in Malaysia. The participant, under the direction of Nippon Express Co., Ltd. ("Nittsu"), will import from Japan the tachograph systems.

The purpose of the PoA is to improve fuel efficiency through the use of digital tachograph systems. Efficient driving means having to consume the optimum amount of fuel in propelling a truck, depending on the power (torque) required from the engine at a certain time. Conversely, inefficient driving occurs when there is an imbalance between the speed and the selected gear. The following are examples of inefficient driving:

- Abrupt startup and acceleration,
- High speed while at low gear,
- Irregular driving speeds (i.e. alternating between acceleration and braking),
- Long idling.

The digital tachograph systems will be installed to the fleet of freight trucks in order to make driving more efficient. The system monitors and records the engine's revolutions per minute (RPM), acceleration, braking, and idling. The system also links to the operations center and receives defined parameters for efficient driving (e.g. maximum rate of acceleration/deceleration, maximum period for idling, etc.) The system is equipped with an instant feedback mechanism (e.g. beeps, voice reminders, etc.) that is activated in instances where the parameters for efficient driving are violated.

Furthermore, the collected data is exported to the operations center and represented as a graphical report of the driver's performance whether economical driving was achieved. Examples of these summaries are as follows:

- Summary of the speed difference distribution—a concentration around ±0 means driving was conducted at a steady speed, as opposed to a wide spread which means driving speed was irregular,
- Summary of the RPM distribution—concentration below a specified threshold means that the engine was not revved unnecessarily,
- Summary of gear ratio distribution—economical driving is generally achieved if high gear is used more often than low gear,
- Tally of instant feedback activation (i.e. incidences of inefficient driving).

The periodic feedback based on data summaries (Figs. 2 to 5) serve as a complement to the instant feedback by providing an indicator of further improvements in efficiency through correct driving. The following are monitored as markers of efficiency improvement:

- The concentration/shift of peaks in the distribution graphs (i.e. speed difference, RPM, gear ratio) towards what is indicated as economical driving;
- Reduction of the tallied incidences in activation of instant feedback mechanism.

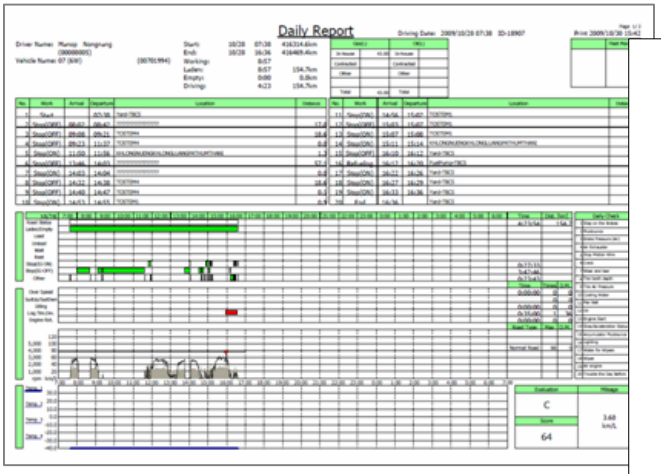


Figure 2: Daily Driving Report (per driver)

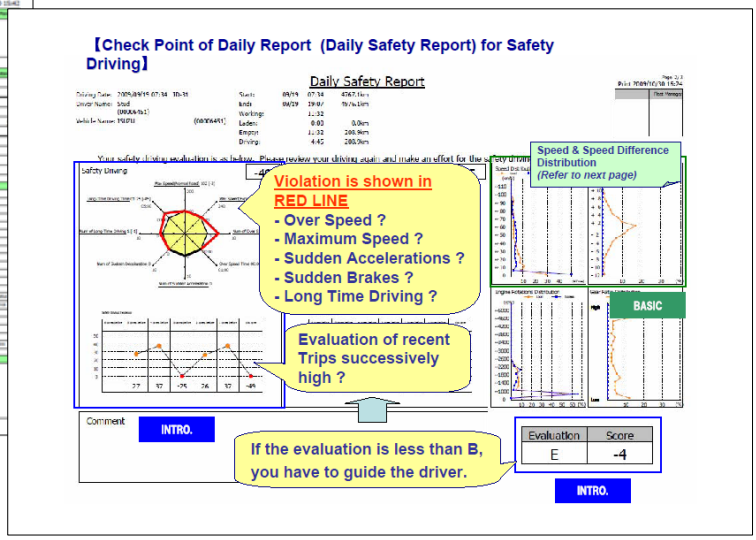


Figure 3: Daily Safety Report (per driver)

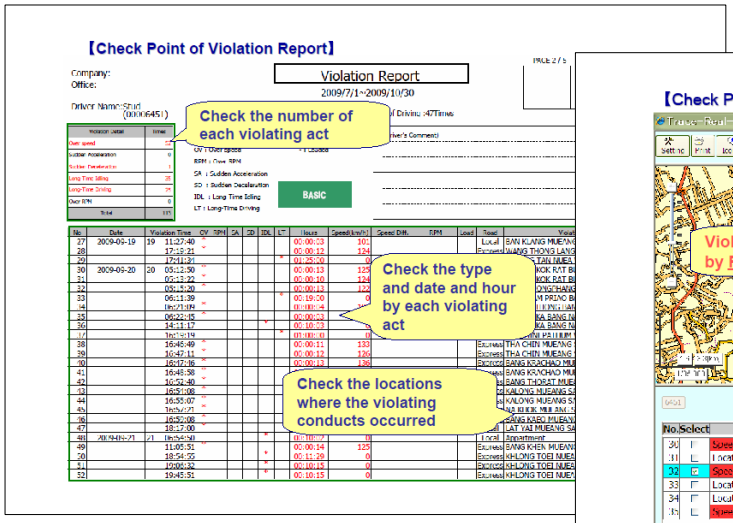


Figure 4: Violation Report (per driver)

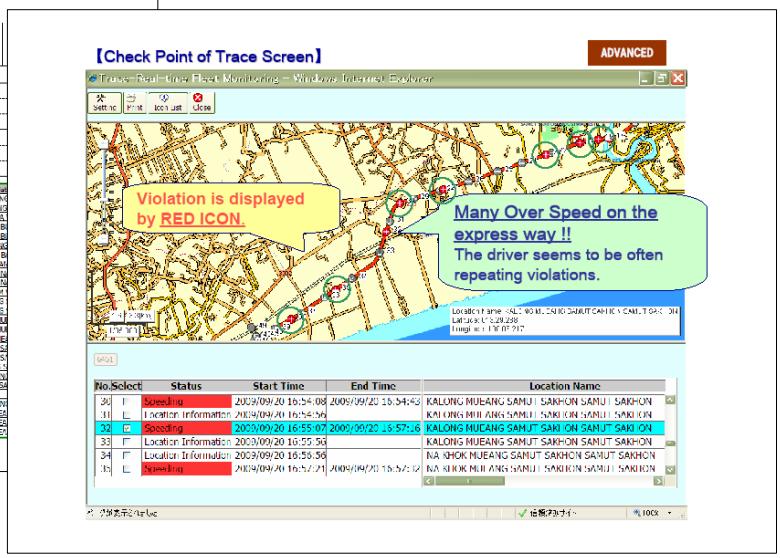


Figure 5: Tracing violation: real time monitoring system

The tachograph data will be used in conjunction with GPS data. The GPS data will enable route tracing and monitoring of the distances travelled.

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

An SSC-CPA is eligible for enrolling in the PoA under the following criteria:

(a) The geographical boundary of the SSC-CPA including any time-induced boundary consistent with the geographical boundary set in the PoA, that is Peninsular Malaysia;
(b) Unique identifications of digital tachographs and freight trucks avoid double counting of emission reductions;
(c) The specifications of technology/measure employed by a SSC-CPA comply with requirements of AMS-III.AT (Version 01);
(d) The start date of the SSC-CPA, which is the date the feedback mechanisms of the digital tachograph systems are implemented, is recorded in the monitoring system and determined to be on or after the PoA start date;
(e) An SSC-CPA complies with applicability and other requirements of AMS-III.AT (Version 01) applied by the SSC-CPA;
(f) The SSC-CPA meets the requirements pertaining to the demonstration of additionality from all the relevant requirements of the Attachment A to Appendix B of the “Simplified modalities and procedures for small-scale CDM project activities”;
(g) Conditions related local stakeholder consultations and environmental impact analysis are consistent with the PoA;
(h) The SSC-CPA involves direct installation of digital tachograph systems to commercial freight transport vehicles;

(i) The SSC-CPA in aggregate meets the small-scale threshold criteria that the emission reductions every year will not go beyond the limit of 60 ktCO_2e/y and remain within this threshold throughout the crediting period of the SSC-CPA;
(j) Each of the independent subsystems/measures (i.e., digital tachograph system) included in the SSC-CPA of a PoA is no larger than 1% of the small-scale threshold defined by the methodology applied, therefore the SSC-CPA is exempted from performing de-bundling check;
(k) Funding from Annex I parties, if any, does not result in a diversion of official development assistance.

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):

The proposed PoA is a voluntary coordinated action of Nippon Express Group. The installation of digital tachograph systems in their commercial fleet of freight trucks would not be implemented in the absence of the PoA. It is noted that at the time of conception of the project idea, the participants developed a CDM methodology specifically for this activity, that has been approved by the Executive Board as AMS-III.AT.

Prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions, that is, freight trucks without digital tachograph systems. Without the feedback mechanisms made possible by the digital tachograph systems, trucks remain to be driven inefficiently.

As mentioned previously in Section A.4.2.1, efficient driving means having to consume the optimum amount of fuel in propelling a truck, depending on the power (torque) required from the engine at a certain time. Conversely, inefficient driving occurs when there is an imbalance between the speed and the selected gear. The following are examples of inefficient driving:

- Abrupt startup and acceleration,
- High speed while at low gear,
- Irregular driving speeds (i.e. alternating between acceleration and braking),
- Long idling.

The digital tachographs will be installed to the fleet of freight trucks in order to make driving more efficient. The digital tachograph system monitors and records the engine's revolutions per minute (RPM), acceleration, braking, and idling. The tachographs also link to the system and receives defined parameters for efficient driving (e.g. maximum rate of acceleration/deceleration, maximum period for idling, etc.) The onboard terminal of the digital tachograph is equipped with an instant feedback mechanism (e.g. beeps, voice reminders, etc.) that is activated in instances where the parameters for efficient driving are violated.

- Furthermore, the collected data is exported to the operations center and represented as a graphical report of the driver's performance whether economical driving was achieved.

From the driver's point of view, it would be difficult to ascertain whether one is driving economically—the speed difference distribution, RPM distribution, and gear ratio distribution cannot be known using the common vehicle dashboard instruments. Without the driving feedback made possible by the project activity technology, drivers will conduct the operation of their trucks in the current inefficient manner.

There are no laws in Malaysia to compel installation of digital tachograph in the commercial fleets. Thus, the existing regulatory or policy requirements would have maintained the prevailing practice which leads to higher emissions. The CPAs in the Programme will not be carried out in the course of regular business, and is therefore considered additional.

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

A.4.4.1. Operational and management plan:

Monitored parameters and experiment results will be recorded using software as per instructed by the provider of the digital tachograph systems. To ensure the proper operation and maintenance of the project activity, training to the Administrative Staff and Drivers will be provided to the supervisors by the technology providers.

(i) Each CPA under the PoA can be uniquely identified in the records of the monitoring system.
(ii) To avoid double accounting, each vehicle in a CPA will be given a unique identifier and it will be confirmed that the vehicles comprising a CPA are not part of any activity that has been already registered either as a CDM project activity or as a CPA of another PoA.
(iii) Each of the independent subsystems/measures (i.e., digital tachograph system) included in the SSC-CPA of a PoA is no larger than 1% of the small-scale threshold defined by the methodology applied, therefore the SSC-CPA is exempted from performing de-bundling check.
(iv) Nippon Express (Malaysia) or its affiliates or subsidiaries such as NTS will be operating each CPA, under the direction of Nippon Express Co., Ltd. ("Nittsu"). All are aware that their activity is being subscribed to the PoA.

A.4.4.2. Monitoring plan:

The unique identifiers for each vehicle in a CPA allows for verification of each CPA (whether in groups or not, with different or identical verification periods) in a transparent system that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA.

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

No public funding from Annex 1 Parties is involved.

SECTION B. Duration of the programme of activities (PoA)

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

01/12/2011 (Date of installation of digital tachograph units)

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

28 years 00 months from the date of Registration

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:

1. Environmental Analysis is done at PoA level ☑
2. Environmental Analysis is done at SSC-CPA level ☐

The technology does not vary considerably from location to location within the geographical area of the PoA, thus the environmental impacts as well do not vary.

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

Environmental impacts of the project
The installation of digital tachograph systems does not alter the road freight operations. The technology does not emit any added pollutants, even during the process of installation. The technology does not require the construction of any new buildings or special facilities.

The use digital tachograph systems lead to more efficient driving patterns that curb fossil fuel consumption, and decrease emission of pollutants such as particulates. Ultimately the project reduces greenhouse gas emissions due to combustion of fossil fuels for road freight transport.

The host Party does not require an EIA for road freight transport projects.

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),:

An environmental impact assessment is not required for a typical SSC-CPA included in the PoA.

SECTION D. Stakeholders' comments

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

1. Local stakeholder consultation is done at PoA level ☑
2. Local stakeholder consultation is done at SSC-CPA level ☐

The technology does not vary considerably from location to location within the geographical area of the PoA, thus impacts to stakeholders as well do not vary.

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

The Road Transport Department (JPJ)[1] is a sole authority responsible over the jurisdiction of the proposed Project. JPJ is an administrative body of registration and licensing of all types of motor vehicles in Malaysia. The ministry is also responsible for enforcing and administering traffic laws in tandem with road laws and regulations.

In addition, the project participant conducted a hearing from Malaysian Green Technology Corporation[2] (formerly Malaysia Energy Centre "PTM"). MGTC is a non-profit company providing energy-related researches and information. MGTC is also the Secretariat of the Technical Committee on Energy for the Malaysian DNA approval process[3].

D.3. Summary of the comments received:

Both MGTC and JPJ provided positive comments to the proposed Project. They both mentioned the high public interest in introducing GHG emission mitigation measures for the transportation sector. They also commented on the uniqueness of the Project, since there has not been any specific solutions provided for the freight transport industry. They mentioned the possible additional positive impact on road safety by introducing this Project. MGTC remarked that this Project has a potential to become a "showcase" for the GHG emission reduction project for the transportation sector.

MGTC took a particular note on the training aspect of the Project and commented on a possibility of applying the similar training method to drivers of the public transportation.

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

No negative comments are provided to be taken into account.

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:

***AMS-III.AT. Transportation energy efficiency activities installing digital tachograph systems to commercial freight transport fleets* /Version 01**

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

AMS-III.AT (Version 01) applicability condition	*SSC-CPA*
1. This methodology is for project activities that install digital tachograph systems in freight	An SSC-CPA included in the PoA will employ digital tachograph systems installed in freight

[1] http://portal.jpj.gov.my/index.php?option=com_content&view=category&layout=blog&id=11&Itemid=9&lang=en

[2] http://www.greentechmalaysia.my/

[3] http://cdm.eib.org.my/subindex.php?menu=7&submenu=33

vehicles operating on a number of identified traceable routes. A digital tachograph system reduces GHG emissions associated with fossil fuel combustion in freight transport by providing to the driver feedback against inefficient driving, and thus encouraging efficient driver behaviour which results in improved vehicle fuel efficiency.	vehicles, operating on a number of identified traceable routes. Information on the vehicles and the routes will be included in Annex 3 of the SSC-CPA-DD.
2. The functions of the digital tachograph system to be installed include, but are not limited to: (a) Provide instant feedback during instances of inefficient driving, following which the driver must adjust to a more efficient driving pattern in order to deactivate the instant feedback; (b) Continuously record the freight truck's operation (e.g. position, speed, acceleration, RPM, etc.) over a period of time; (c) Provide a graphical representation of a driver's performance based on recorded data in order to further improve driving efficiency.	The digital tachograph system to be installed has functions as listed in the applicability condition of AMS-III.AT (Version 01). These functions are explained in detail in SSC-PoA-DD Section A.4.2.1.
3. This methodology applies to freight truck fleets that are centrally controlled and managed by a single entity and are driven by contractors or employees of the central entity, and where this central entity (and not the drivers) is responsible for the cost of fuel.	The freight truck fleets are centrally controlled and managed by Nippon Express (Malaysia) and NTS. These entities, and not the drivers, are responsible for the cost of fuel.
4. Project participants must demonstrate that: (a) The project activity is unlikely to change the level of service provided before the project activity; (b) The project activity does not include measures to bring about a modal shift (e.g. a shift from truck to rail) in transport; (c) The project activity does not involve a fuel switch in existing vehicles, except for an optional switch to biofuel blends where the blending ratio is not greater than 20% by volume, in which case emission reductions shall be discounted by the percentage of biofuel in the blend (e.g. 20% in the case of B20).	An SSC-CPA installs digital tachograph systems in freight vehicles; condition 4(b) and 4(c) are outside the scope of the SSC-CPA. The SSC-CPA is unlikely to change the level of service provided before the project activity, and the level of service will be monitored to check.
5. This methodology is not applicable to project activities in locations where the installation of digital tachograph systems is mandatory by law and the existing mandatory policy/regulation has a high level of enforcement.	The host country Malaysia does not mandate the installation of digital tachograph systems.
6. Project participants shall identify the following parameters: (a) The traceable routes along which the	These parameters are identified and information on the vehicles and the routes will be included in Annex 3 of the SSC-CPA-DD.

vehicles operate; (b) The characteristics of those routes; (c) The level of service on each route; (d) The vehicles that are in use on each traceable route before and after project implementation. These vehicles should not be part of another CDM project activity.	
7. Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.	Emission reductions will be less than or equal to 60 kt CO_2 equivalent annually, and will be shown in detail in SSC-CPA-DD Section B.5.3.
8. The project design document shall include documentation of procedures to eliminate any potential double counting of emission reductions from, for example, the same vehicles participating in other CDM projects or Programmes of Activities.	Procedures to eliminate potential double counting are shown in SSC-PoA-DD Section A.4.4.1.

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

The project boundary includes the following:

- Fleet to which digital tachograph systems are introduced;
- The geographical area covering the traceable physical route along which these vehicles operate (start to end point);
- Auxiliary facilities such as fuelling stations and workshops and service stations that are visited by the vehicles in the fleet.

Nippon Express (Malaysia) and NTS have fleets of trucks operating out of Peninsular Malaysia. The trucks serve various delivery routes within Peninsular Malaysia.

The sources of greenhouse gas emissions within the project boundary are as follows:

	Source	Gas	Inclusion	Justification/Explanation
Baseline	Fossil fuel consumption for road transport of freight in the business as usual (BAU) scenario	CO_2	Yes	Main source of emissions.
		CH_4	No	Negligible. This is conservative.
		N_2O	No	Negligible. This is conservative.
Project activity	Fossil fuel consumption for the transport of freight in trucks installed with digital tachograph systems	CO_2	Yes	Main source of emissions.
		CH_4	No	Negligible. This is conservative.
		N_2O	No	Negligible. This is conservative.

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

As per the approved baseline and monitoring methodology applied AMS-III.AT (Version 01), the baseline scenario is wherein fossil fuel consumption in freight transport is greater due to inefficient driving (e.g. revving the engine, long idling, abrupt acceleration/braking).

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:

This section provides an explanation to show that a SSC-CPA would not have occurred anyway due to one of the barriers listed in "Attachment A of Appendix B of the Simplified modalities and procedures for small-scale CDM project activities".

A typical SSC-CPA would not have occurred anyway due to **prevailing practice:** prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions, that is, commercial freight trucks without digital tachograph systems. Without the feedback mechanisms made possible by the digital tachograph systems, trucks remain to be driven inefficiently.

As mentioned previously in Section A.4.2.1, efficient driving means having to consume the optimum amount of fuel in propelling a truck, depending on the power (torque) required from the engine at a certain time. Conversely, inefficient driving occurs when there is an imbalance between the speed and the selected gear. The following are examples of inefficient driving:

- Abrupt startup and acceleration,
- High speed while at low gear,
- Irregular driving speeds (i.e. alternating between acceleration and braking),
- Long idling.

The digital tachograph systems will be installed to the fleet of freight trucks in order to make driving more efficient. The system monitors and records the engine's revolutions per minute (RPM), acceleration, braking, and idling. The system also links to the operations center and receives defined parameters for efficient driving (e.g. maximum rate of acceleration/deceleration, maximum period for idling, etc.) The system is equipped with an instant feedback mechanism (e.g. beeps, voice reminders, etc.) that is activated in instances where the parameters for efficient driving are violated.

Furthermore, the collected data is exported to the operations center and represented as a graphical report of the driver's performance whether economical driving was achieved. Examples of these summaries are as follows:

- Summary of the speed difference distribution—a concentration around ±0 means driving was conducted at a steady speed, as opposed to a wide spread which means driving speed was irregular,
- Summary of the RPM distribution—concentration below a specified threshold means that the engine was not revved unnecessarily,
- Summary of gear ratio distribution—economical driving is generally achieved if high gear is used more often than low gear,

- Tally of instant feedback activation (i.e. incidences of inefficient driving).

From the driver's point of view, it would be difficult to ascertain whether one is driving economically—the speed difference distribution, RPM distribution, and gear ratio distribution cannot be known using the common vehicle dashboard instruments. Without the driving feedback made possible by the project activity technology, drivers will conduct the operation of their trucks in the current inefficient manner.

The SSC-CPA will not be carried out in the course of regular business, and is therefore considered additional.

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

As per the *"Non-binding best practice example to demonstrate additionality for SSC project activities"*, an SSC-CPA is additional under the following criteria:

(a) There is no regulatory or policy requirement for the implementation of the Programme technology of digital tachograph systems;
(b) The use of digital tachograph systems for transport efficiency is not the prevailing practice for road freight transport.

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:

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

The baseline fuel efficiency (η_{BLVi}) for vehicles added to the fleet after the start of the project activity and already installed with the project digital tachograph system is determined using one of the following options:

(a) When a specific baseline vehicle can be identified from existing vehicles, i.e. a vehicle used along the same route and with similar operating conditions, the following applies: the baseline fuel efficiency (η_{BLVi}) is determined using baseline operational data from that existing vehicle as described in paragraph 10 of AMS-III.AT (Version 01);

(b) The baseline fuel efficiency (η_{BLVi}) for added vehicles is estimated by using the fuel efficiency of top 20% of similar type vehicles in the fleet before the project activity, as determined according to travel distance of each vehicle for the previous three years. If no data exists for the time period, a shorter period can be chosen, with a minimum of one year. 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 vehicles in the baseline;

(c) Taking one year of real data before implementing the feedback mechanisms, as is described in paragraph 10 of AMS-III.AT (Version 01).

Once measured, the baseline vehicle fuel efficiency will be fixed throughout the crediting period.

The vehicles have air conditioning in the baseline. Seepage of HFC shall not be taken into account.

Service level determined by weight of goods times the average distance of transportation tonne of freight (SL_y) shall be capped at baseline level (SL_{BL}). Emission reductions beyond this level will not be counted.

Considering that many other factors may impact fuel saving (e.g. expansion of road lanes, use of other fuel saving devices, more efficient tyres, etc), if annual emissions reductions are greater than 10% of baseline emissions in year *y*, then this must be appropriately justified as feasible based on relevant studies (i.e. studies of the potential emissions reductions from tachograph systems).

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

Baseline

The first step to determine the baseline emissions is to calculate a baseline emission factor per tonne of goods per kilometre for the baseline vehicle (BEF_i). For existing vehicles, 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 weight of goods transported by each baseline vehicle (P_i), times the annual average distance of transportation per tonne (dp_i), before the project begins, based on at least one year of historical data, but preferably three years. Vehicle fuel efficiency for existing vehicles is determined as the average annual fuel consumption (*FC*) divided by the average distance travelled (*D*) by each vehicle based on at least one year of historical data and preferably three years.

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

Where:

BEF_i	Baseline emission factor per tonne of goods per kilometre for vehicle *i* under baseline conditions (tCO_2/t-km)
P_i	Total annual weight of goods transported by each vehicle *i* under baseline conditions (t)
dp_i	The annual average distance of transportation per tonne of freight by each vehicle *i* under baseline conditions (km)
D_i	Total annual distance travelled by each vehicle *i* under baseline conditions (km)
η_{BLVi}	Fuel efficiency of vehicle *i* under baseline conditions (l/km)
NCV_j	Net calorific value of fuel *j* (TJ/l)
$EF_{CO2,j}$	CO_2 emission factor of fuel *j* used by vehicle (tCO_2/TJ)

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

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

Where:

BE_y	Total baseline emissions in year *y* (tCO_2/yr)
$P_{i,y}$	Total annual weight of goods transported by each project vehicle *i* in year *y* on each traceable route (t)
BEF_i	Baseline emission factor per tonne of goods per kilometre for vehicle *i* (tCO_2/t-km) under baseline conditions
$dp_{i,y}$	Annual average distance of transportation per tonne of goods by project vehicle *i* in year *y* (km)

Leakage

No leakage calculation is required, even when applying to a CPA under a programme of activities.

Project activity emissions

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

$$PE_y = \sum_j \sum_i FC_{i,j,y} * NCV_j * EF_{CO2,j} \quad \textbf{(2)}$$

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* (l)
NCV_j	Net calorific value of fuel *j* (TJ/l)
$EF_{CO2,j}$	CO_2 emission factor of fuel *j* used by vehicle *i* under baseline conditions (tCO_2/TJ)

Fixed parametric values

Data / Parameter:	$\eta_{BLV,i}$
Data unit:	(l/km)
Description:	Efficiency of vehicle *i* under baseline conditions
Source of data used:	Fuel depot data and truck distance data
Value applied:	Left blank on purpose
Justification of the choice of data or description of measurement methods and procedures actually applied :	Procedures are described in SSC-PoA-DD Section E.6.1. Fuel consumed and distances travelled while trucks are in Singapore are discounted.
Any comment:	Left blank on purpose

Data / Parameter:	P_i
Data unit:	(t)
Description:	Total annual goods transported by each vehicle under baseline conditions
Source of data used:	Delivery data
Value applied:	Left blank on purpose
Justification of the choice of data or description of measurement methods and procedures actually applied :	Goods transported while the trucks are in Singapore are discounted.
Any comment:	Left blank on purpose

Data / Parameter:	D_i
Data unit:	(km)
Description:	Total distance travelled by each vehicle under baseline conditions
Source of data used:	GPS route tracing data
Value applied:	Left blank on purpose
Justification of the choice of data or description of measurement methods and procedures actually applied :	Distances travelled while trucks are in Singapore are discounted.
Any comment:	Left blank on purpose

Data / Parameter:	dp_i
Data unit:	(km)
Description:	Average distance of transportation per tonne of freight by each vehicle *i* under baseline conditions
Source of data used:	Calculated through company records
Value applied:	Left blank on purpose
Justification of the choice of data or description of measurement methods and procedures actually applied :	The annual average distance of transportation per tonne of freight is calculated using the formula: $dp_i = \frac{D_i^2}{\sum_{m=1}^{\infty} d_i \times p_i}$ Distances travelled and goods transported while trucks are in Singapore are discounted.
Any comment:	Left blank on purpose

Data / Parameter:	SL_{BL}
Data unit:	(t-km)
Description:	Service level in terms of volume of goods times the average distance of transportation per tonne of freight before the beginning of the project

Source of data used:	Determined from company/operators records, e.g. driver logs and route maps, plus delivery receipts
Value applied:	Left blank on purpose
Justification of the choice of data or description of measurement methods and procedures actually applied :	Goods transported while the trucks are in Singapore are discounted.
Any comment:	Service level determined by weight of goods times the average distance of transportation tonne of freight ($SL_{k,y}$) shall be capped at baseline level ($SL_{BL,k}$). Emission reductions beyond this level will not be counted.

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

Data / Parameter:	NCV_i
Data unit:	(TJ/l)
Description:	Net calorific value of fuel
Source of data to be used:	Country specific data or IPCC default value
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Left blank on purpose
Description of measurement methods and procedures to be applied:	The value is checked annually from fuel suppliers.
QA/QC procedures to be applied:	Left blank on purpose
Any comment:	Left blank on purpose

Data / Parameter:	$EF_{CO2,i}$
Data unit:	(tCO_2/TJ)
Description:	CO_2 emission factor of fuel used by vehicle
Source of data to be used:	Country specific data or IPCC default value
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Left blank on purpose
Description of measurement methods and procedures to be applied:	Left blank on purpose

QA/QC procedures to be applied:	Left blank on purpose
Any comment:	Left blank on purpose

Data / Parameter:	SL_y
Data unit:	(t-km)
Description:	Service level in terms of volume of goods times the average distance of transportation per tonne of freight in year *y*
Source of data to be used:	Monitored for each truck class, from company/operators records, e.g. driver logs and route maps, plus delivery receipts
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Left blank on purpose
Description of measurement methods and procedures to be applied:	Goods transported while the trucks are in Singapore are discounted.
QA/QC procedures to be applied:	
Any comment:	Left blank on purpose

Data / Parameter:	-
Data unit:	-
Description:	Annual monitoring to check if tachograph systems have become a mandatory practice, or that highly-enforced anti-idling policies or legislation have been put into place
Source of data to be used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Tachograph systems are not mandatory practice
Description of measurement methods and procedures to be applied:	-
QA/QC procedures to be applied:	-
Any comment:	Left blank on purpose

Data / Parameter:	-
Data unit:	-
Description:	Monitoring to ensure that all tachograph and feedback systems are operating correctly and have not been disabled

Source of data to be used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Tachograph and feedback systems are operating correctly and have not been disabled
Description of measurement methods and procedures to be applied:	-
QA/QC procedures to be applied:	
Any comment:	If any tachograph system installed in a project vehicle is not operating correctly, no emissions reductions can be attributed to that vehicle for the period that the system has not been operating correctly

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:

Data / Parameter:	$DT_{i,y}$
Data unit:	(km/yr)
Description:	Total distance travelled by each vehicle *i* in year *y*
Source of data to be used:	Driver logs and route maps, recorded by GPS tracking system
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Left blank on purpose
Description of measurement methods and procedures to be applied:	The data are periodically checked on annual basis and recorded electronically Distances travelled while trucks are in Singapore will be discounted.
QA/QC procedures to be applied:	
Any comment:	Left blank on purpose

Data / Parameter:	*i*
Data unit:	-
Description:	The trucks identified based on the age, characteristics and load capacity and availability of historical data
Source of data to be used:	Company records
Value of data applied for the purpose of	Left blank on purpose

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	The data are periodically checked on annual basis and recorded electronically
QA/QC procedures to be applied:	
Any comment:	Left blank on purpose

Data / Parameter:	$dp_{i,y}$
Data unit:	(km)
Description:	Annual average distance of transportation per tonne of freight by each project vehicle *i*
Source of data to be used:	Company records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Left blank on purpose
Description of measurement methods and procedures to be applied:	Distances travelled and goods transported while the trucks are in Singapore will be discounted.
QA/QC procedures to be applied:	
Any comment:	Left blank on purpose

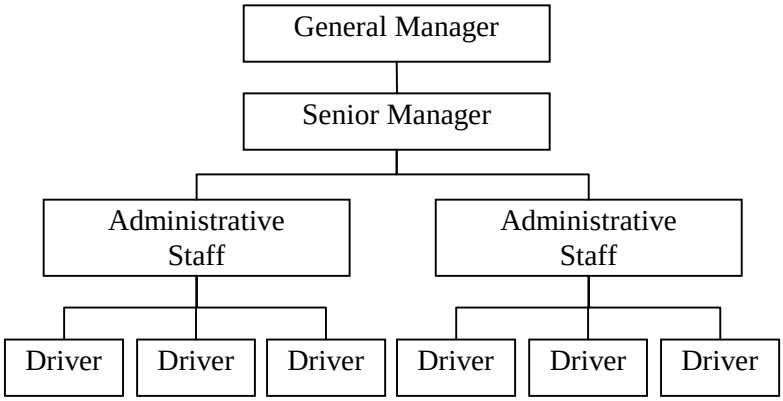
Data / Parameter:	$FC_{i,j,y}$
Data unit:	(l)
Description:	Consumption of fuel *j* by vehicle *i* in year *y*
Source of data to be used:	Fuel depot records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Left blank on purpose
Description of measurement methods and procedures to be applied:	Higher value between is taken to ensure conservativeness Fuel consumed while the trucks are in Singapore will be discounted.
QA/QC procedures to be applied:	
Any comment:	Left blank on purpose

Data / Parameter:	$P_{i,y}$
Data unit:	(t)
Description:	Total annual goods transported by each project vehicle in year *y*
Source of data to be used:	Monitored data during the project e.g. driver logs, plus delivery receipts
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Left blank on purpose
Description of measurement methods and procedures to be applied:	Goods transported while the trucks are in Singapore will be discounted.
QA/QC procedures to be applied:	
Any comment:	Left blank on purpose

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

The monitoring scheme will be implemented following below structure:

NITTSU TRANSPORT SERVICE



The General Manager will be the authority that is responsible for the management and operation of the project activity which includes the monitoring of the parameters, as listed in section B.7.1, required for the emission reduction calculation.

The Senior Manager will be responsible for the management of the team of Administrative Staff. The Senior Manager's responsibilities include:

- To review and approve the monthly monitoring report
- To review and approve the regular training plan
- To ensure the corrective actions for erroneous measurements and uncertainty

The Administrative Staff will be responsible for the supervision of the Drivers and the review of the monitored parameters. Administrative Staff's responsibilities include:

- To review the daily recorded parameters and report aggregated data to the Senior Manager on a monthly basis
- To prepare/conduct the personalised training plans for the drivers
- To initiate the corrective actions for any erroneous measurement and uncertainty found
- To compile and archive data for at least two years

All data are transmitted by the digital tachographs to the operations center.

Monitored parameters and experiment results will be recorded using software as per instructed by the provider of the digital tachograph systems. To ensure the proper operation and maintenance of the project activity, training to the Administrative Staff and Drivers will be provided to the supervisors by the technology providers.

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)

Baseline study completed 06/01/2012 by:

Clean Energy Finance Committee
Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.
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Mitsubishi UFJ Morgan Stanley Securities Co., Ltd. is the CDM advisor to the project (not a project participant).

Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from Annex 1 Parties is involved.

Annex 3

BASELINE INFORMATION

Left blank on purpose.

Annex 4

MONITORING INFORMATION

Left blank on purpose.