

Validation Report

Report for:
Delhi Metro Rail Corporation Limited (DMRC)

Validation of CDM PoA for The MRTS PoA

LRQA Reference	: CDM-MUM-0061935 Version 04.7
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1 Executive Summary

Lloyd's Register Quality Assurance Limited has been contracted by Delhi Metro Rail Corporation Limited, representing the project participant (PP) and the Coordinating and Managing Entity (CME) to undertake validation of the proposed Programme of Activities (PoA) "The MRTS PoA". The validation has been performed through a process of document review based on the PoA design document (PoA-DD) including the generic Component Programme Activity (CPA) Version 01 dated: 07/09/2012 and the specific case CPA design document (CPA-DD), Version 01 dated 07/09/2012 initially submitted for validation and the subsequent revisions, follow-up interviews with the stakeholders, resolution of outstanding issues and issuance of the validation report.

The MRTS PoA will consist of a series of rail based MRTS projects (like Metro Rail, LRT, Monorail etc) implemented across India. Delhi Metro Rail Corporation Limited (DMRC) will act as a Coordinating / Managing Entity (CME) for the PoA and would provide an open platform for different agencies to participate in the PoA developing their own CPA.

As the proposed transportation system is more efficient compared to the traditional means of transport in the baseline, the project activity achieves emission reductions through improved efficiency in the transportation achieved and calculated per passenger-kilometre. MRT system has lower GHG emissions per passenger-kilometre than those used in the absence of the project activity, hence, results in GHG emission reductions.

The fulfilment of the requirements as set forth in Article 12 of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), the modalities and procedures for a CDM (CDM M&P) and relevant decisions of the Conference of the Parties, serving as meeting of the Parties to the Kyoto Protocol (COP/MOP) and the Executive Board of the CDM (CDM-EB) have been evaluated and conformance to the validation requirements were confirmed based on the given information. A risk based approach was taken to conduct the validation and corrective action requests (CARs) and clarifications (CLs) were raised for relevant actions by the PP.

The validation team has found through the validation process 11 CARs and 2 CLs. The PP has taken actions and submitted to LRQA the revised PoA-DD, CPA-DD, emission reduction sheet and other evidences. The validation team is of the opinion that:

- The proposed PoA as described in the PoA design document Version 06.2 dated 14/11/2014, and
- The specific CPA applied to a real case as described in the CPA design document version 06.2 dated 29/09/2014,

complies with all the eligibility criteria specified in the PoA-DD and meet all the relevant UNFCCC requirements for the CDM, as well as the host country's national requirements and if the Specific CPA is implemented as designed, is likely to achieve the emission reductions and contribute to the sustainable development of the host

country. LRQA therefore requests:

- The registration of "The MRTS PoA" to the CDM Executive Board as a CDM programme of activity, and
- The inclusion of the Specific CPA "CPA001: Delhi Metro under MRTS PoA" in the proposed PoA.

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Abbreviations

BE	Baseline emissions
BM	Build Margin
CARs	Corrective action requests
CDM	Clean development mechanism
CDM-EB	Executive board of clean development mechanism
CDM M&P	Modalities and procedures for a clean development mechanism
CEA	Central Electricity Authority
CERs	Certified emission reductions
CLs	Clarification requests
CM	Combined Margin
CME	Coordinating and Managing Entity for a PoA
COP/MOP	Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol
CPA-DD	Component project activity design document
CRRI	Central Road Research Institute
DNA	Designated national authority
DOE	Designated operational entity
DMRC	Delhi Metro Rail Corporation
EF	Emission factor
EIA	Environmental impacts assessment
ERPA	Emissions reduction purchase agreement
FAR	Forward action requests
GHG	Greenhouse gas
GNCTD	Government of National Capital Territory of Delhi
GoIUD	Government of India Urban Development
GSP	Global stakeholders' consultation process
IPCC	Intergovernmental panel on climate change
IRR	Internal rate of return
KP	Kyoto Protocol of the United Nations Framework Convention on Climate Change
kW / kWh	Kilowatt / Kilowatt hour
LE	Leakage emissions
LoA	Letter of approval
LR	Lloyd's Register
LRQA	Lloyd's Register Quality Assurance Limited
MW / MWh	Mega watt / Mega watt hour
MRTS	Mass Rapid Transit System
NCR	National Capital Region
NCV	Net calorific value
NGO	Non governmental organisation
ODA	Official development aid
OM	Operating Margin
PKM	Passenger Kilometer
PoA-DD	Programme of activities design document
PE	Project emissions
PP	Project participant
RfR	Request for registration
tCO ₂ e	Tonnes of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
CDM VVS	CDM Validation and Verification Standard

2 Introduction

The project participant (PP) represented by Delhi Metro Rail Corporation Limited has contracted with Lloyd's Register Quality Assurance Limited (LRQA) to undertake validation of the proposed PoA "The MRTS PoA". This report summarises the findings of the validation process that has been conducted on the validation requirements of the CDM.

The validation has been undertaken by the team formed of the qualified personnel of LRQA as follows:

Archak Pattanaik	LRQA India	Team leader
Ankush Jain	LRQA India	Team member
Arnab Deb	LRQA India	Team member
Aditi Dass	External expert	External sector expert
Imran Ustad	LRQA Ltd	Technical reviewer
Prabodha C Acharya	LRQA Ltd	Technical Reviewer
Pritha Ghosh Chatterjee	External Expert	Sector expert to technical reviewer
Michiaki Chiba	LRQA Ltd	Decision maker

Personnel being engaged in a CDM PoA validation are qualified based on the established procedures of LRQA to assure the resource requirements satisfy all the requirements of competence criteria for an AE/DOE under the competence criteria of the CDM Accreditation Standard for Operational Entities. LRQA is designated as an operational entity and holds the full responsibility of decision-making regarding the validation, in line with the accreditation requirements of the CDM-EB. The certificate of appointment of the team personnel is attached to this report.

2.1 Objective

Validation is the process of an independent third party evaluation of a PoA on the basis of the PoA-DD including the generic CPA and the specific CPA-DD, against the requirements of the CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, subsequent decisions made by the COP/MOP and CDM-EB, and other rules applicable to the proposed project activity including the host country's legislation and its specific requirements for sustainable development. The validation follows the requirements of the current version of the CDM validation and verification standard (CDM VVS) and the CDM Project Standards (PS) to ensure the quality and consistency of the validation work and the report.

2.2 Scope

The scope of validation is an independent and objective review of the PoA design. Review of the PoA-DD and the specific CPA-DD is conducted against the requirements of the Kyoto Protocol, the CDM M&P and relevant decisions of the COP/MOP and the CDM-EB. LRQA follows a risk-based approach in the validation focusing on the identification of significant risks for CPAs implementation and generation of CERs. Validation is not meant to provide any consulting towards the PP, however, the corrective actions requests (CARs) and clarifications (CLs) might provide input for improvement of the project design. A validation conclusion shall become final subject to the decision maker's review by LRQA Ltd.

2.3 GHG Programme Description

The MRTS PoA will consist of a series of Rail based MRTS projects (like Metro Rail, Light Rail Transit, Monorail etc.) implemented across India. Delhi Metro Rail Corporation Ltd (DMRC) will act as a Coordinating / Managing Entity (CME) for the PoA and would provide an open platform for different agencies to participate in the PoA developing their own CPA.

As the proposed transportation system is more efficient compared to the traditional means of transport in the baseline, the project activity achieves emission reductions through improved efficiency in the transportation achieved and calculated per passenger-kilometre. MRT system has lower GHG emissions per passenger-kilometre than those used in the absence of the project activity, hence, results in GHG emission reductions.

The estimated GHG emission reduction for the PoA is 637,440 tCO₂e per annum considering the implementation of CPA001: Delhi Metro under MRTS PoA with total length of metro would be 98.969 km under CPA001.

3 Methodology

3.1 Review of documents

The validation is performed primarily based on the review of the PoA design document (PoA-DD) and the other supporting documentation.

The PoA-DD Version 01 dated 07/09/2012, and the specific CPA-DD Version 01 dated 07/09/2012 were initially reviewed. LRQA requested the PP to present supporting information and documents relating to the project design and such additional information and documents were also reviewed by LRQA.

Through the process of the validation, the PoA-DD including the generic CPA, the Specific CPA-DD and the supporting documents of the same were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by LRQA. The documents reviewed by LRQA are listed in Appendix B. LRQA reviewed the final version of the PoA-DD version 06.2 dated 14/11/2014 and the final version of the specific CPA-DD version 06.2 dated 29/09/2014, to confirm that all changes agreed have been incorporated.

3.2 Site Visit and Follow-up interviews

A site visit and follow-up interviews with the PPs, stakeholders and the CME were conducted as detailed in the schedule as below:

Date	Location/ Address	Party Interviewed	Subjects Covered	Team Members on Site
01/02/2013	Delhi Metro Rail Corporation Ltd (DMRC), Site Office Laxmi Nagar DMRC Ltd, Depot, Shastri Park	Delhi Metro Rail Corporation Limited	<ol style="list-style-type: none"> 1. Introduction 2. Objectives of the assessment 3. Assessment Plan 4. PoA idea 5. CPA idea – Selection of technology 6. Discussion on DPR 7. Discussion on traffic survey 8. Methodology applicability issues/discussions 9. Project boundary issues/discussions 10. Additionality issues/discussions 11. Discussion on baseline and emission reduction 12. Discussion on CPA eligibility criteria 13. Discussion on environmental issues/regulations 14. Discussion on local stakeholders' consultation 15. Review of CME records <ol style="list-style-type: none"> a. Roles and responsibilities b. Monitoring system c. Training system and records d. Qualification system and records e. Team competency f. Procedure for 	Archak Pattanaik Ankush Jain Arnab Deb Aditi Dass

Date	Location/ Address	Party Interviewed	Subjects Covered	Team Members on Site
			<p>inclusion of CPA</p> <p>g. Procedure for technical review</p> <p>h. Procedure to avoid double counting</p> <p>i. Documentation control of each CPA</p> <p>j. Continuous improvement of PoA</p> <p>16. Meeting Invitation process</p> <p>17. Representation by stakeholders in stakeholders'</p> <p>18. consultation meeting</p> <p>19. Minutes of meeting – Comments, action taken</p> <p>20. Discussion on environmental issues related to the project</p> <p>21. activity.</p> <p>22. Project contribution to sustainable development Views on the project activity</p> <p>23. Any other issues of stakeholders</p> <p>24. Summary of assessment</p> <p>25. Discussion on findings</p> <p>26. Discussion on further timelines</p> <p>27. Closing remarks</p>	

A full list of persons interviewed is shown in Appendix C.

For details of all the findings of the desk review and site visit, please refer to the Validation Protocol and Findings in Appendix F.

3.3 Resolution of clarification and corrective action requests

LRQA applies the risk based approach aimed at focusing on high risk issues to the validation results while not omitting any part of the mandatory processes.

Findings identified in the process are indicated under the titles corrective action requests (CARs) and clarification requests (CLs) and forward action requests (FARs). CARs and CLs require the PP to take relevant actions. Criteria for judging items as CAR or CL are as follows:

Corrective action request (CAR):

- the project participant have made mistakes that will influence the ability of the

- project activity to achieve real, measurable additional emission reductions
- the CDM requirements have not been met, or
- there is a risk that emission reductions cannot be monitored or calculated.

Clarification request (CL):

- information is insufficient or not sufficiently clear to determine whether the applicable CDM requirements have been met.

FARs are to be raised to highlight issues related to project implementation that require review during the first verification of the project activity. FARs do not relate to CDM requirements for registration.

CARs and CLs are to be resolved or closed out if the PP modifies the PoA design, rectifies the PoA-DD and the Specific CPA-DD or provides adequate additional explanations or evidence that satisfies the concerns. If this is not completed, the project activity cannot be recommended for registration to the CDM Executive Board.

For details of the nature of the issues raised, the nature of the responses provided the means of validation of such responses and the resulting changes in the PoA-DD and the specific CPA-DD or supporting annexes please refer to the Validation Protocol and Findings in appendix F.

3.4 Internal quality control

A technical review by a qualified person independent from the validation team and a review by an authorised decision maker were conducted before the submission of the validation report to the PP and before requesting the registration of the PoA.

4 Validation protocol and conclusions

This section provides an overview of the validation activities undertaken by LRQA in order to arrive at the final validation conclusions and opinion. It includes general conclusions based on the Clean Development Mechanism Validation and Verification Standard (VVS) version 07.0. Further details in relation to each element of the protocol and each finding are shown in the Validation Protocol and Findings – Appendix F.

The protocol is structured based on the main validation requirements as follows:

- Approval and contribution to sustainable development
- Participation requirements
- MoC
- PoA-DD and CPA-DD
- PoA description
- Baseline and monitoring methodology. Multiple methodologies
 - Applicability of the selected methodology/ies
 - Project boundary
 - Baseline identification
 - Algorithms and/or formula used to determine emission reductions
- Management system
- Start date of a PoA/CPA
- Additionality of a project activity
 - Identification of alternatives
 - Investment analysis
 - Barrier analysis

- Common practice analysis
- Eligibility Criteria for inclusion of CPAs in the PoA
- Monitoring plan
- Local stakeholder consultation
- Environmental impacts.
- Eligibility of the specific CPA

4.1 Approval and contribution to sustainable development

A CDM PoA shall be approved by the Parties involved.

The host Party of the proposed project is India. India ratified the Kyoto Protocol on 26/08/2002. The Designated National Authority (DNA) is National Clean Development Mechanism Authority (NCDMA) established in the Ministry of Environment and Forests (MoEF), Government of India. The information of the DNA has been confirmed by the validation team against the relevant information on the UNFCCC CDM website (<http://cdm.unfccc.int/DNA/index.html>). A letter from approval from the host country, reference number 4/17/2012-CCC dated 12/12/2012 has been received. This letter of approval confirms the contribution of the PoA "The MRTS PoA" to the sustainable development of India.

The PoA has currently been proposed as a unilateral CDM PoA and the Annex I Party has not yet been identified. In line with the provision of paragraph 57 of the 18th meeting of the CDM-EB, registration of a project activity can take place without an Annex I party being involved at the stage of registration.

For details relating to this section, please refer to the Validation Protocol in Appendix F

4.2 Participation requirements

Delhi Metro Rail Corporation Limited is public entity having its registered office in India.

The contact details of the PP are correctly provided in Appendix 1 of the PoA-DD part II, generic CPA, and in Appendix 1 of the Specific CPA-DD.

Participation in the project activity of the PP and coordination of the PoA by the CME has been authorised, as confirmed in the LoA issued by the DNA of the Party concerned. The team confirmed that no entities other than the authorised entity are indicated as project participant in the PoA-DD and in the Specific CPA-DD.

For details relating to this section, please refer to the Validation Protocol in Appendix F

4.3 Modalities of Communication

LRQA confirms that it has performed due diligence on the MoC statement as described in the Validation Protocol in Appendix F.

4.4 PoA and CPA design documents

The PoA-DD and the Specific CPA-DD were checked and confirmed as complete against the guidelines included in the form CDM-PoA-DD-FORM, Version 04.1 and CDM-CPA-DD-FORM Version 03.0, referring to the latest version applicable to the validation.

A valid form of the PoA-DD and the CPA-DD is used that is the current form as available on the CDM website.

For details relating to this section, please refer to the Validation Protocol in Appendix F.

4.5 Programme description

The proposed programme design includes all rail based MRTS. The political boundary of India is chosen as the country/ geographical boundary of the PoA. The CPAs that will be included under the PoA will be within the defined geographical location of the CPA area and follow applicable national and / or sectoral policies and regulations.

The programme would promote the development and use of rail based MRTS in India. In this MRTS, all rail based MRTS such as Light Transit rail, metro rail, monorail etc. are covered. The MRTS would replace passenger transportation from the conventional mode of transportation. The MRTS is more efficient compared to conventional mode of passenger transportation. The MRTS has lower GHG emissions per passenger-kilometre than conventional mode used in the absence of the project activity.

Under this programme, CPA001: Delhi Metro under MRTS PoA, is currently being planned. In this CPA a rail based metro system will be developed and operated at Delhi state in India. The total length of metro planned in this CPA would be 98.969 km which will consist of a total of 62 stations. The proposed corridors consist of standard gauge (1435 mm). Through the proposed metro lines, the conventional mode of transportation would be replaced with the project activity.

As the proposed transportation system is more efficient compared to the traditional means of transport in the baseline, the project activity achieves emission reductions through improved efficiency in the transportation achieved and calculated per passenger-kilometre. MRTS has lower GHG emissions per passenger-kilometre than those used in the absence of the project activity, hence, results in GHG emission reductions.

LRQA confirms that the project description included in the PoA-DD and in the CPA-DD is accurate and complete. This description provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.

The project description was validated by document review including Detailed Project Report, Traffic Survey Report, interview, and the onsite visit.

For details relating to this section, please refer to the Validation Protocol in Appendix F.

4.6 Baseline and monitoring methodology/ies. Multiple Methodologies

Applicability of the selected methodology/ies to the PoA

The PoA applied the approved baseline and monitoring methodology:

- ACM0016: Mass Rapid Transit Projects --- Version 3.0.0. The methodology version is the most recent version at the time of submission of this report and valid for the project activity.

LRQA confirms that the selected methodology is applicable to this PoA. The project applicability was confirmed against each condition in the approved methodology selected. Appendix F includes the list of each applicability condition, the steps taken to

validate each one and the conclusions about its applicability to the proposed project activity.

For details relating to this section, please refer to the Validation Protocol in Appendix F.

Project boundary

The geographical boundary of the programme is India. The PoA-DD further gives guidance on the project boundary. It includes the baseline emission sources related to mobile GHG emissions based on the transport method used in the baseline scenario; project emissions include the emissions from the MRTS and mobile emissions related to means used for origin to boarding station and alighting station to destination; and leakage emissions related to change in load factor of buses, cars and auto-rickshaws.

The geographical boundary of the PoA within which all CPAs will be implemented, has been validated through documentation review of PoA-DD, specifically, Part II Generic CPA and inclusion conditions, applied methodology and management system of the CME. Team further validated that the project boundary has been correctly considered in the first real case CPA submitted along with the PoA. Team confirms the project boundary of first CPA based on the review of the Detailed Project Report, traffic survey report, Government of India Urban Development (GoUD) sanction order for metro rail, interview and field survey that included Contract agreement between Arvind Techno Engineers Pvt. Ltd. and physical site inspection. This information was substantiated via cross check with interview of the PP and publicly available documents on the DMRC website. Through the processes taken, the validation team confirmed that the identified project boundary, the selected sources and the gases were justified for the project activity and they meet the requirements of the approved methodology.

LRQA has determined that the PP has taken into consideration all applicable national and/or sectoral policies and regulations within the chosen boundary, in establishing the project boundary of the PoA.

For details relating to this section, please refer to the Validation Protocol in Appendix F.

For details of whether any discrepancy was identified, and the processes taken, for example, issued CAR or requested clarification of, revision to or deviation from the approved methodology for approval by the CDM-EB before completion of the validation, please refer to the Validation Protocol in Appendix F.

Baseline identification

The baseline scenario identified in the Generic CPA included in the PoA-DD has been assessed against the requirements in the approved methodology ACM0016, Version 03.0.0. LRQA can confirm that the procedure included in this methodology to identify the most reasonable baseline scenario, has been correctly applied.

The steps taken to assess the baseline identification are described in the Validation protocol in Appendix F.

LRQA confirms that:

- All the assumptions and data used by the project participant are listed in the Generic CPA, including their references and sources;
- All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the Generic CPA;
- Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;

- Relevant national and/or sectoral policies and circumstances are considered and listed in the Generic CPA;
- The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM PoA.

Algorithms and/or formula used to determine emission reductions

LRQA has confirmed that the steps taken and the equations applied to calculate project emissions, leakage baseline emissions and emission reductions comply with the requirements of the approved methodology ACM0016, Version 03.0.0.

The steps taken to assess the algorithms and/or formula used to determine emission reductions are described in the Validation protocol in Appendix F.

LRQA confirms that:

- All assumptions and data used by the project participant are listed in the PoA-DD and in the Specific CPA-DD, including their references and sources;
- All documentation used by project participant as the basis for assumptions and source of data is correctly quoted and interpreted in the PoA-DD and in the Specific CPA-DD;
- All values used in the PoA-DD and in the Specific CPA-DD are considered reasonable in the context of the proposed CDM PoA;
- The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PoA-DD and in the Specific CPA-DD.

4.7 Management System

LRQA has assessed the elements of the Management System implemented by the CME Delhi Metro Rail Corporation Limited to confirm that the CME has the competencies to check the features of potential CPAs and to ensure that each CPA meets all requirements and eligibility criteria before inclusion in the proposed PoA.

LRQA has confirmed that the CME has developed and implemented a management system that includes the following:

- (a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;
- (b) Records of arrangements for training and capacity development for personnel;
- (c) Procedures for technical review of inclusion of CPAs;
- (d) A procedure to avoid double counting;
- (e) Records and documentation control process for each CPA under the PoA;
- (f) Measures for continuous improvements of the PoA management system;
- (g) Any other relevant elements.

For details relating to this section, please refer to the Validation Protocol in Appendix F.

4.8 Start date of the PoA and CPAs

The Start date of the PoA is the 06/11/2012, the date when the PoA was webhosted for global stakeholder consultation with a length of 28 years.

LRQA has confirmed that the start date of the Specific CPA: 12/02/2013, is not prior to

the commencement of the validation of the PoA which is the date of publication for GSP 06/11/2012.

The Eligibility criteria include a specific condition to check the start date of each CPA that ensures that the starting date of any CPA included in the PoA will not be prior to the commencement of the validation of the PoA.

The steps taken to assess the starting date of the PoA and CPAs are described in the Validation protocol in Appendix F.

4.9 Prior Consideration of the CDM

The PoA start date has been considered from the date of publication of the PoA-DD for global stakeholders' consultation. Therefore, the proposed PoA complies with the requirements of the VVS V07.0 Section 8.5.6.

The steps taken to assess the prior serious consideration of the CDM are described in the Validation protocol in Appendix F

4.10 Additionality of the programme

The PoA additionality was demonstrated by the PP using the Approved consolidated baseline and monitoring methodology ACM0016 "Mass Rapid Transit Projects" Version 03.0.0 and "Tool for the demonstration and assessment of Additionality" Version 7.0.0", by establishing that in the absence of CDM, none of the implemented CPAs would occur.

Identification of alternatives

The list in the Validation Protocol – Appendix F section 9.a, shows the alternatives given in the PoA-DD, and clearly states how LRQA has validated whether these alternatives are credible and complete.

It is the opinion of LRQA that the list of alternatives provided in the PoA-DD are credible and complete considering the technology and circumstances of the proposed Project activity as well as the investor business.

Additionality for the project will be demonstrated based on the steps provided in the approved methodology ACM0016. Stepwise approach provided in the PoA-DD is described below. Further details of these steps are provided in the Appendix F of the validation protocol.

Step 1: Country level assessment

This step aims to determine whether the proposed CDM project activity is common practice in the host country where the project is proposed to be implemented. LRQA confirms that the analysis done by the project participant to assess whether there are less than three cities with MRT systems that started commercial operation in the host country of the proposed CDM project activity prior to the start of the CDM project activity is appropriate and sourced from publicly available documents. Therefore each CPA in the PoA could not satisfy the step and hence has to satisfy step 2 and 3.

Step 2: City level assessment

This step aims to determine whether the proposed project activity is common practice in the host city where the proposed CDM project activity is intended to be implemented.

LRQA confirms that the analysis done by the project participant to assess whether the share of trips realized on the existing public transport system(s) in the host city, which belong to the same public transport category as the proposed CDM programme of activities, is equal or less than 20% of total public transport trips in the host city is appropriate and is sourced from DPR.

Step 3: Project level assessment

Two procedures are provided to demonstrate the additionality of the proposed project activity, depending on whether a commercial entity (ies) covers at least 50% of total capital investment in the project MRT system.

Procedure A is to be followed which requires the PP to assess Additionality using investment analysis (benchmark analysis) outlines that if at least 50% of the total capital investment in the project MRT system is provided by commercial entity(ies) in the form of equity and/or long-term debt.

Procedure B is to be followed which requires PP to analyse the impact of CDM registration by assessing whether CER revenue covers 10% of the annual Operation and maintenance cost.

For the CPA:001, procedure B was followed, by justifying CER revenues covers more than 10% of the annual operation and maintenance (O&M) cost. The O&M cost of the project was determined based on the DPR. The annual O&M cost is INR 1532 Million. The average CER price was determined based on the average of daily closing price at Bluenext for a period of one year prior to start of PoA, i.e. from 01/09/2011 to 31/08/2012. The weighted average CER price is 4.81 Euro; exchange rate is 67.74 INR/Euro. Total number of CERs for a period of 10 years is 6,374,408. Therefore, the estimated revenue from CER is more than 10% of annual O&M cost.

LRQA confirms for CPA:001 that the analysis provided by the PP to assess the step 2 and 3 to be appropriate based on sectoral expertise, site visit, interview and document review. Under step 3 PP has used Procedure B to determine Additionality as DMRC is a Public Company and has no commercial investment in the project.

Common practice analysis

Common practice analysis is confirmed from the step 1 and 2 provided in the approved methodology ACM0016. The step 1 and 2 require a country level assessment and a city level assessment respectively. A separate common practice analysis is not required to be conducted. The methodology also outlines if step 1 is not satisfied then step 2 is to be conducted.

For details about the validation of the country level assessment and city level assessment please refer to the Validation protocol in Appendix F.

4.11 Eligibility Criteria for inclusion of the CPAs in the PoA

The CME has developed a list of eligibility criteria for inclusion of a CPA under the PoA and these criteria are included in the PoA-DD. The generic CPA in Part II of the PoA-DD demonstrates their usability to assess the inclusion of CPAs in the proposed PoA.

LRQA has validated these eligibility criteria to determine that they are sufficiently objective and comprehensive to permit the assessment of the inclusion of CPAs in the PoA.

For details about the assessment of the eligibility criteria, please refer to the Validation Protocol in Appendix F.

4.12 Crediting Period

LRQA confirms that the length of the PoA does not exceed 28 years and the selected crediting period of for the specific CPA of 10 years does not exceed the length of the PoA.

4.13 Monitoring Plan

The generic CPA in Part II of the PoA-DD includes a Monitoring Plan based on the Approved consolidated baseline and monitoring methodology ACM0016 "Mass Rapid Transit Projects" Version 3.0.0 and it is applied correctly in the specific CPA.

LRQA confirms that the Monitoring Plan described in the generic CPA complies with the requirements in the Monitoring Methodology and that the entities/individuals responsible for each CPA and the CME will be able to apply this Monitoring Plan following the monitoring arrangements described in it.

For details about the validation of the Monitoring Plan, please refer to the Validation protocol in Appendix F.

4.14 Local stakeholder consultation

The PPs have chosen to carry out the Local Stakeholder Consultation at the CPA: 001 Delhi Metro under MRTS PoA.

The PoA-DD establishes the level of consultancy required in each single CPA to invite Local Stakeholders to comment on the proposed CPA before its inclusion in the PoA. LRQA has assessed the Local Stakeholder Consultation carried out for the Specific CPA and concluded that it is in line with the PoA-DD. The entity responsible for the specific CPA invited Local Stakeholders to comment on the proposed CPA. The local stakeholder consultation meeting was held in as provided below:

- Janpath, DMRC office
- Amar Jyoti Restaurant, Sarojini Nagar Market
- Star Rock Hotel, opposite IIT Delhi
- Shiv Mandir Dharamshala, Shanti Niketan, near Dhaura Kuan

Among the persons who attended this meeting were residents from nearby place and far off place, Project proponent and other technical people.

LRQA confirms that the stakeholder consultation process targeted stakeholders and was appropriate for identifying stakeholders' opinions about the project and collecting their views.

For details about the steps taken to assess the adequacy of the Stakeholder consultation, please refer to the Validation protocol in Appendix F.

4.15 Environmental impacts

LRQA has confirmed that the host country regulations, i.e. EIA notification 2006 and 2009 amended, does not require EIA clearance for MRTS projects. Thus Environmental Impact Assessment of a MRTS project is not a regulatory requirement in the host country. Hence the MRTS projects under this PoA need not document the Environmental impact at the CPA level.

For details about the document review and determination of whether the PPs have undertaken the analysis of environmental impacts, please refer to the Validation Protocol in Appendix F.

4.16 Eligibility of the Specific CPA

LRQA has determined that the Specific CPA-DD provided by the PPs for this PoA validation is eligible for inclusion in the proposed PoA. LRQA has checked that each eligibility criteria in the PoA-DD is met by the specific CPA if implemented.

For details about the assessment of each of the eligibility criteria in the Specific CPA, please refer to the Validation Protocol in Appendix F.

4.17 Summary of Changes

Significant changes made to the original PoA-DD and CPA-DD published for Global Stakeholder Consultation Process are summarised below. The PoA-DD version 01 dated 07/09/2012 and the CPA-DD version 01 dated 07/09/2012 were modified and several changes occurred due to the result of the validation process. The PoA-DD version 06.2 dated 14/11/2014 and the CPA-DD version 06.2 dated 29/09/2014 includes all these changes.

For details about the results of the responses to CARs and CLs, discussions on revisions to project documentation and the detailed changes to the PoA-DD and the CPA-DD coming from the validation process, please refer to the Validation Findings Log in the Validation Protocol in Appendix F.

Item	Description	Value in PoA-DD or CPA-DD GSP	Value in PoA-DD or CPA-DD RfR	CAR/CL
1.	Road Based MRTS is removed from the PoA framework; it now covers only Rail based MRTS.			CAR 01
2.	Grid emission factor was revised	0.9219tCO ₂ /MWh (NEWNE Grid) 0.8430tCO ₂ /MWh (Southern Grid)	0.9215tCO ₂ /MWh (NEWNE Grid) 0.8426tCO ₂ /MWh (Southern Grid)	CAR 08
3.	Average distance travelled by baseline metro system	16.01km	17km	CAR 08
4.	Emission factor for methane was revised	21	25	CAR 08
5.	Corridor 3: Central Secretariat to Mandi House of 3 km is removed from the CPA and actual length of the metro line was described. Further, the PP has removed the Corridor 4: Badli to Jahangirpuri line	103.05 km	98.969 km	CL 01
6.	Benchmark value, reduced revenues and CER price is not fixed at the PoA level, instead it will be reviewed at the time of inclusion of each CPA.	NA	NA	Information and Reporting check finding

Based on the findings CAR 08, CL01 and removal of Corridor 4 by the PP, the emission reduction figures were changed from 6,322,561 tCO₂e to 6,374,408 tCO₂e for the ten year period in CPA001.

5 Comments by parties, stakeholders and NGOs

In line with the requirement of the Section 4.3 “Publication of project design document” of Project Cycle Procedure, the PoA-DD and the CPA-DD are to be made publicly available for 30 days subject to confidentiality provisions agreed with the PP, to enable comments to be received from Parties, stakeholders, and UNFCCC accredited NGOs on the validation and registration requirements.

The PoA-DD and the CPA-DD were made publicly available in line with the requirements of the procedure for the period of 06/11/2012 – 05/12/2012 as per <http://cdm.unfccc.int/ProgrammeOfActivities/Validation/DB/IOFM64J8NKRLE79RLAD0MLC9ERI1LJ/view.html>.

No comment was received during this period.

6 Validation Opinion

LRQA has undertaken the validation of the proposed PoA “The MRTS PoA” based on the requirements of CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and the other rules applicable to the proposed PoA including the host country’s legislation and its specific requirements for sustainable development.

The MRTS PoA will consist of a series of rail based MRTS projects implemented across India. Delhi Metro Rail Corporation Ltd (DMRC) will act as a Coordinating / Managing Entity (CME) for the PoA and would provide an open platform for different agencies to participate in the PoA developing their own CPA.

As the proposed transportation system is more efficient compared to the traditional means of transport in the baseline, the project activity achieves emission reductions through improved efficiency in the transportation achieved and calculated per passenger-kilometre. MRT system has lower GHG emissions per passenger-kilometre than those used in the absence of the project activity, hence, results in GHG emission reductions.

To arrive at the final validation conclusion and opinion, LRQA carried out review of project documents, assessment of compliance with and application of the approved methodology as well as the approved methodological tools, field survey and physical on site assessment of the project site and interviewing the local stakeholders. There was no project component or issues excluded from the validation.

Through the validation process, the validation team identified 11 CARs and 2 CLs. The PP has taken action on the issues raised and submitted to LRQA the revised PoA-DD, CPA-DD and other supporting evidence.

The validation team is of the opinion that the proposed PoA conforms to all the relevant UNFCCC requirements for the CDM as well as the host country’s national requirement, and if implemented as designed, is likely to contribute to the sustainable development of the host country. Validation team is further, of the opinion that real case CPA meets the eligibility criteria documented in the PoA and if implemented as designed, is likely to achieve the validated emission reductions of 6,374,408 tCO₂e. Therefore, LRQA:

- request the registration of the “The MRTS PoA” to the CDM Executive Board as a CDM PoA.
- request the inclusion of the Specific CPA “CPA001: Delhi Metro under MRTS PoA” in the proposed PoA.

Decision Maker



Michiaki Chiba

Climate Change Manager – Asia & Pacific

17/11/2014

7 Appendices

7.1 Appendix A: Letter of approval for the PoA by the host and investing country DNA

Letter of Approval from India reference no.4/17/2012-CCC dated 12/12/2012.

7.2 Appendix B: List of documents reviewed

Category A documents (documents prepared by the PP)

- PoA-DD version 01 dated 07/09/2012, version 02 dated 11/06/2013, Version 4 dated: 29/11/2013, Version 05 dated: 28/04/2014, Version 06 dated: 12/09/2014, Version 06.1 dated: 23/09/2014 and Version 06.2 dated: 14/11/2014
- CPA-DD version 01 dated 07/09/2012, version 02 dated 11/06/2013, and Version 4 dated: 29/11/2013, Version 4.1 dated: 27/12/2013, Version 05.1 dated: 28/04/2014, Version 06 dated: 12/09/2014, Version 06.1 dated: 23/09/2014 and Version 6.2 dated: 29/09/2014
- Emission Reduction Calculation sheet version 01 dated 07/09/2012 and version 02 dated 11/06/2013, and Version 3 dated: 29/11/2013
- Quantification of benefits achieved from the implementation of Phase I of Delhi Metro by CRR dated 2007
- DPR for corridors of phase III by DMRC dated 2011
- Supreme court of India order on CNG dated 28/07/1998
- The Impact of Delhi's CNG Program on Air Quality dated 2007
- Baseline Traffic survey Report dated July 2012
- Specific fuel consumption of Low floor Delhi transport corporation buses dated 14/03/2012
- Undertaking on Public Funding by DMRC dated 24/01/2013
- Undertaking on double counting by DMRC dated 24/01/2013
- R Adhikari and Co. Chartered Accountant certificate on appropriateness of O&M cost dated 10/05/2013
- North Delhi Power Limited Electricity Bill dated 26/08/2011 to 26/09/2011
- Undertaking on final route length of DMRC CPA dated 29/05/2013
- Undertaking on year wise contribution of maintenance cost to fixed asset by DMRC from 2002-03 to 2010-11 dated 28/05/2013
- Sanction order from Ministry of Urban Development Gol for implementation of Delhi Metro Phase III dated 26/09/2011
- Ministry of Urban Development Gol funding details of Delhi Metro Phase III dated 26/09/2011
- Contract Agreement between Arvind Techno Engineers Pvt. Ltd. With DMRC for construction work dated 12/02/2013 (start date of the CPA:001)
- Contract agreement between Senes Consultant and DMRC for carrying out CDM work dated 15/02/2012
- Benchmark of Manpower Deployment (Non-executive) in O&M division in (Phase I and Phase II); reference no. DMCR/O&M/R&T/MPP dated 22/06/2009.
- Operations & Maintenance Cost Optimization" by Feedback Ventures Limited
- Railways Recruitment 2012 in Delhi Metro Rail Corporation
(<http://hindicareer.com/railways-recruitment-2012-in-delhi-metro-rail-corporation.html>)
- Undertaking from DMRC on average trip distance for Phase-I and Phase-II, dated: 28/11/2013

- Tariff order issued by Delhi Electricity Regulatory Commission during for BSES Rajdhani Power Limited, BSES Yamuna Power Limited, and Tata Power Delhi Distribution Limited during July 2013
- Report of expert committee on the matter of auto-rickshaws fare revision
- Board meeting of DMRC dated: 21/06/2010
- Expert Paper: Social Cost-Benefit Analysis of Delhi Metro, October 2006
- Environmental Impact Assessment Report prepared on August 2011
- Internal note on benchmark for deployment of manpower in O&M division, dated: 22/06/2009
- Survey of professional forecasters report for quarter 3 of 2011-12 published by Reserve Bank of India (India's Central bank).
- Year wise revenue generation statement of DMRC dated: 19/09/2013
- Economic survey of Delhi for the year 2012-13
- Total number of cars in each fuel category data from Delhi Transport Department
- Letter submitted by DMRC for clarification on boundary of CPA001 dated: 19/12/2013, Ref: DMRC/POA/DOE/2013/22A/532

Category B documents (other documents referenced)

- Tool for the demonstration and assessment of additionality Version 07.0.0
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion Version 02.0.0
- Tool to calculate baseline, project and/or leakage emissions from electricity consumption Version 01.0.0
- Approved consolidated baseline and monitoring methodology ACM0016 Version 03.0.0
- Completing the programme design document form for CDM programmes of activities Version 03.1
- Guidelines for completing the component project activity design document form Version 01.0
- Clean development mechanism project standard Version 07.0
- Clean development mechanism validation and verification standard Version 07.0
- Standard: Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities, Version 03

7.3 Appendix C: List of persons interviewed

DMRC

Ashok Kumar Gupta	Planning
S A Verma	AGM, Environment
A Laxminarayan	Advisor
Renu Yadav	Assistant Manager
Priyaranjan R Singh	Junior Engineer, Electrical
K K Sharma	Junior Engineer, Traction

Senes Consultant

Sumit Barat	Head CDM
Gargi Sharma	Executive CDM
Amit Kumar	Executive CDM

Local Commutee

Gajendra Kumar
Bhanu

Niraj

Central Road Research Institute

Naseem Akhtar Senior Scientist

7.4 Appendix D: How due account has been taken to the public input made to the validation requirements

The PoA-DD and the CPA-DD were made publicly available in accordance with the requirements of the Section 4.3 "Publication of project design document" of Project Cycle Procedure, for the period of 06/11/2012 – 05/12/2012 as per <http://cdm.unfccc.int/ProgrammeOfActivities/Validation/DB/IOFM64J8NKRLE79RLAD0MLC9ERI1LJ/view.html>.

No comment was received during this period.

7.5 Appendix E: Certificate of Appointment

Validation of “The MRTS PoA”

We hereby certify that the following personnel have engaged in the validation process that has fully satisfied the competence requirements of the validation of the CDM PoA.

Name of Person	Assigned Roles
Archak Pattanaik	Team Leader
Ankush Jain	Team Member
Arnab Deb	Team Member
Aditi Dass	Sector Expert
Prabodha C Acharya	Technical Reviewer
Imran Ustad	Technical Reviewer
Pritha Ghosh Chatterjee	Sector Expert to Technical Reviewer
Michiaki Chiba	Decision Maker

Signed by
Decision Maker



Michiaki Chiba
Climate Change Manager – Asia & Pacific
17/11/2014

7.6 Appendix F: Validation Protocol and findings log

If LRQA has identified issues requiring corrective action or clarification, make a reference in the 'Conclusion' column, and state details in the section marked 'Findings'.

	Validated situation	Conclusion
SECTION 1. Approval and contribution to sustainable development		
Host Country Approval		
1. Has the Host country DNA provided a written approval?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/> ¹	OK
2. Confirm that the letter has been issued by the Party's DNA and is valid for the proposed CDM PoA under validation	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/> LoA Reference Number 4/17/2012-CCC was issued on 12/12/2012 by the National Clean Development Mechanism Authority (NCDMA) established in the Ministry of Environment and Forests (MoEF) which is the Designated National Authority (DNA) of the host country. http://cdm.unfccc.int/DNA/index.html . The LoA is issued for the proposed PoA is valid.	OK
3. Mention the means of validation employed to assess the authenticity of the Letter of Approval. Indicate the source of the LoA (for example, PP or directly from the DNA)	The LoA was made available by the PP. The authenticity of the LoA was checked by the comparing it with that of similar registered PoA (UNFCCC Reference numbers 6694, 6161, 5787, 6328, and 5588). The validation team confirms the authenticity of the letter of approval.	OK
4. Does the written Letter of Approval confirm the following: (a) The Party is a Party to the Kyoto Protocol (including ratification)? (b) Participation is voluntary? (c) The proposed CDM PoA contributes to the	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/> The LoA confirms: (a) The host country Party ratified the Kyoto Protocol on August 2002. (b) The participation is voluntary. (c) The proposed Programme of Activities (PoA) will assist the host country in achieving sustainable development. (d) The LoA indicates the precise title of the proposed project activity as	OK

¹For each section and question where a YES / NO / NA answer is required, explain your choice.

	Validated situation	Conclusion
sustainable development of the country? (d) It refers to the precise proposed CDM PoA title in the PoA-DD being submitted for registration?	indicated in the PDD.	
5. Is the letter of approval unconditional with respect of (a) to (d) above?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/> The LoA does not add any specific condition to the points stated therein.	OK
6. Does the LoA from the host party acknowledge the bundle activity (if applicable)?	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/> The project is not a bundled activity. Team confirmed it from the review of the PoA-DD and CPA-DD.	OK
7. Confirm that each CPA has only one host Party.	Team confirmed from the review of the CPA-DD, that it has only one host Party, i.e. India.	OK
Annex I Party Approval		
8. Has the Annex I country DNA provided a written approval?	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/> The PoA is currently developed as a unilateral project. Annex 1 participant is not specified at this stage. In line with the provision of paragraph 57 of the 18 th meeting of the CDM-EB, registration can take place without an Annex I party being involved at the stage of registration.	NA
9. Confirm that the letter has been issued by the Party's DNA and is valid for the proposed CDM PoA under validation.	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>	NA
10. Mention the means of validation employed to assess the authenticity of the Letter of Approval. Indicate the source of the LoA (for example, PP or directly from the DNA).	Not applicable	NA
11. Does the written Letter of Approval confirm the following: (a) The Party is a Party to the Kyoto Protocol (including ratification)? (b) Participation is voluntary? (c) It refers to the precise proposed CDM PoA	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>	NA

	Validated situation	Conclusion
title in the PoA-DD being submitted for registration?		
12. Is the letter of approval unconditional with respect of (a) to (c) above?	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>	NA
Host Country and Annex I Party Approval		
<p>13. Do any of the Letters of Approval contain additional specification of the PoA? Like:</p> <ul style="list-style-type: none"> - PoA-DD Version number? - Validation report version number? <p>Make sure that the request for registration is made on the basis of the documents specified in any of the letters.</p> <p>If LRQA is unable to submit the precise version of the validation report as above, one of the following options shall be selected:</p> <p>(a) Insert a statement in the validation report to indicate that the final letter of approval has not been received and that a request for registration will not be submitted until it has been received; or</p> <p>(b) Update the validation report to reflect the receipt of the letter of approval. If this option is selected, the validation report major number shall remain unchanged and the minor number shall be increased. Confirm in the validation report that this is the only change that has been made to the version referred to in the letter of approval.</p>	LoA from the host party DNA does not include any other specification like PoA-DD or Validation report Version number.	NA

		Validated situation		Conclusion
SECTION 2. Authorisation				
1	Confirm that the PPs are listed in a tabular form in section A.4 of the PoA-DD and in section A.6 of the specific CPA, and that this information is consistent with the contact details provided in Appendix 1 of the PoA-DD, Appendix 1 of the specific CPA and with the contact details in the MoC.	Host Party PP name in PoA-DD/A.4	Delhi Metro Rail Corporation Limited (DMRC)	OK
		Host Party PP name in CPA-DD/A.6	Delhi Metro Rail Corporation Limited (DMRC)	
		Host Party PP name in PoA-DD/Appendix 1	Delhi Metro Rail Corporation Limited (DMRC)	
		Host Party PP name in CPA-DD/Appendix 1	Delhi Metro Rail Corporation Limited (DMRC)	
		Host Party PP name in MoC	Delhi Metro Rail Corporation Limited (DMRC)	
		Annex 1 Party PP name in PoA-DD/A.4	NA	
		Annex 1 PP name in CPA-DD/A.6	NA	
		Annex 1 Party PP name in PoA-DD/Appendix 1	NA	
		Annex 1 PP name in CPA-DD/Appendix 1	NA	
		Annex 1 Party PP name in MoC	NA	
2	Confirm that each of the PPs has been approved by at least one Party involved.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/> The PP, Delhi Metro Rail Corporation Limited (DMRC) is approved by India. Host Country Approval reference number 4/17/2012-CCC dated 12/12/2012 confirms the same. The project activity is currently developed as a unilateral project. Annex 1		OK

	Validated situation	Conclusion
	participant is not specified at this stage. The PP, Delhi Metro Rail Corporation Limited (DMRC), is approved by the DNA of India.	
3 Confirm that no entities other than those approved as PPs are included in section A.4 of PoA-DD and in section A.6 of the specific CPA-DD	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/>	OK
4 Ensure that the approval of participation has been issued from the relevant DNA. If in doubt verify this with the corresponding DNA.	The approval by the host Party DNA has been issued by the correct organization. Validation team had also confirmed the LoAs from the similar cases. Please refer above sections for more details.	OK
5 Confirm that the Coordinating/managing entity is identified in the PoA-DD section A.3.	Yes. It states that Delhi Metro Rail Corporation Limited (DMRC) will be coordinating and managing entity.	OK

	Validated situation	Conclusion
SECTION 3. Modalities of communications		
<p>1 Validate the corporate identity of all the PPs and the focal point included in the MoC letter:</p> <ul style="list-style-type: none"> - Validate the signatures - Validate the employment status. <p>To validate this use any of the following options:</p> <ol style="list-style-type: none"> Directly checking with evidence from PPs and the corresponding companies, for example, contracts, personal identity card or passport, HR records. Notarised documentation, e.g power of attorney for signing on behalf of the company and the other PPs. Written confirmation from the PP that all the personal details are valid and accurate. 	<p>Team validated the corporate identity of the PP from the review of Company Identity Cards issued by DMRC and signatures were validated from the review of Contract Agreement signed between LRQA and DMRC.</p> <p>Signature of Mr S A Verma was validated by the above process.</p> <p>Corporate identity and Signature of Mr A J Kurian was validated from the company identity card issued by the DMRC.</p>	OK
<p>2 If a written confirmation (option c) is chosen from the options above, the following issues shall be validated:</p> <ul style="list-style-type: none"> - The PP sending the written confirmation and signing it shall be the one signing the contract with LRQA. - The person signing the written confirmation and the person signing the MoC (if they are different persons) are duly authorised to do so on behalf of all the PPs, that is, they have a signed authorisation from the other PPs and the identity and role of the person who has signed this authorisation has been checked. 	NA	NA
<p>3 Has the MoC been completed as per the latest "Procedures for MoC between the project participant and the Executive Board"?</p> <ul style="list-style-type: none"> - No modifications to the template / form should be made and each document should be clearly dated 	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/></p> <p>MoC dated 13/02/2013 is consistent with the PDD.</p> <p>Validation team confirms that:</p> <ol style="list-style-type: none"> 1. No modification in the template has been made. 2. Dates have been clearly mentioned in the MoC. 3. Title of the project and names of project participant and focal points are fully 	OK

	Validated situation	Conclusion
<ul style="list-style-type: none"> - Title of the project and names of project participant and focal points should be fully consistent with those indicated in all other project documentation - Focal point scopes should be clearly and correctly indicated - Contact details and specimen signatures of focal point entities including those of project participant in Annex 1 should be correctly entered. Only one telephone, fax, email contact should be entered per authorized signatory. In cases where additional contact details are included, only the first indicated information will be taken into account and only the official business address of the proposed entity should be provided on the F-CDM-MOC form. - The Statement of Agreement in Section 3 should be signed by one authorized signatory for each project participant; signatures made available in Section 3 should correspond to those indicated in the related Annex 1 document; focal point entities who are not designated as project participant should not sign Section 3. 	<p>consistent with the PDD. The PP, Delhi Metro Rail Corporation Limited (DMRC), consistent between PDD, and the MoC.</p> <p>4. Focal point scopes are clearly and correctly indicated</p> <p>5. Statement of Agreement in Section 3 is signed by one authorised signatory of project participant.</p>	

	Validated Situation	Conclusion
SECTION 4. PoA-DD and CPA-DD		
1. Is each CPA Small Scale or Normal Scale?	Normal Scale <input checked="" type="checkbox"/> Small Scale <input type="checkbox"/> Bundled Small Scale <input type="checkbox"/> (cross as appropriate)	OK
2. Has the PoA-DD and the specific CPA used the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM Website? Check outputs from the completeness check.	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>It was confirmed that the template CDM-PoA-DD-FORM version 04.1, which is the current versions as applicable and available on UNFCCC website, were used. The form includes the guideline for completion which was used by the team.</p> <p>It was also confirmed that the template CDM-CPA-DD-FORM version 03.0, which are the current versions as applicable and available on UNFCCC website, were used. The form includes the guideline for completion which was used by the team.</p> <p>CAR 11 was raised as the latest CPA-DD and PoA-DD form were not used. The PP has now used all latest forms. The finding was therefore closed.</p>	CAR 11 OK
3. Is the title of the PoA in the specific CPA-DD the same as in the PoA-DD and the title of the CPA is in line with it?	Yes. The PoA title referred in the PoA-DD is same as in the specific CPA-DD.	OK
4. The CME has prepared a generic CPA for each technology/measure, each methodology and each combination thereof, in case more than one is applied?	Yes. The PoA includes the generic CPA-DD for all rail based MRTS technology.	OK

	Validated situation	Conclusion
SECTION 4. Description of PoA		
1. Describe the process undertaken to validate that the description of the proposed CDM programme of activities as contained in the PoA-DD sufficiently covers all relevant elements, is accurate, and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.	<p>The validation team confirmed the goal of the PoA, the established organisational framework for implementation of the programme and the responsibilities of the different parties involved. LRQA confirmed the following:</p> <p>The DMRC has developed “the MRTS PoA” with the objective to increase the penetration of rail based MRTS in India. The MRTS developed under this programme will displace the trips made by the conventional transport means such as two wheelers, cars, buses etc. under the mixed traffic condition.</p> <p>The PoA-DD also confirms that this is a voluntary action taken by the Coordinating and Managing Entity (CME).</p> <p>The programme will contribute to reduction of greenhouse gas emissions by replacing conventional transport system used in India with efficient metro rail transport system.</p> <p>Under the programme, rail based transport system, i.e. metro rail, light rail and/or mono rail system will be installed.</p> <p>The first CPA under this PoA is rail based transport system in the National Capital Region (NCR) in India. This CPA includes both metro rail and mono rail system. The CPA MRTS will be a 98.969 km of transit system having a total of about 62 stations. The metro will run partially underground, partially at grade (at same ground level as compared to conventional transport modes) and partially elevated.</p> <p>Each train will have between 6 and 8 cars and will run at frequencies between 3 and 12 minutes depending on lines, time of the day and passenger demand. Trains will be approximately 2.9/ 3.2 m wide modern rolling stock with stainless steel body. The capacity of a 6 car standard gauge train is 1,574 passengers. The trains will run at an average speed of 32 kmph and maximum speed of 85 kmph.</p>	<p>OK</p> <p>CAR-01</p> <p>CAR-02</p> <p>CL-01</p>

	Validated situation	Conclusion
	<p>During the validation, the PP has removed Corridor 4: Badli to Jahangirpuri line.</p> <p>During the validation process, the validation team conducted review of documents and surveys as indicated in Appendix B to validation report, performed site visit to the proposed site, and the CME's office. Team interviewed the PP, and local stakeholders to confirm the description.</p> <p>The PoA-DD also includes the description of how the proposed PoA contributes to the sustainable development of the host Party.</p> <p>CAR-01 was raised as CPA for the Bus transit system was not submitted. In response to the finding the PP has removed the bust transit system from the PoA-DD. The PoA now consistently mentions the programme as metro rail transit system.</p> <p>CAR-02 was raised as description of the PoA does not include project's scale, type, scenario existing prior to the project activity, demonstration of additionality, application of the methodology, description on environmentally safe and sound technology, and technology transfer. The PoA-DD now clearly describes the project scale, type, scenario existing prior to the project activity, demonstration of additionality, application of the methodology, description on environmentally safe and sound technology, and technology transfer in the Section A.</p>	

	Validated situation	Conclusion									
2. Confirm that the description of the specific CPA includes technologies and/or measures to be used and that the entity/individual responsible for the operation of the CPA is identified with name and contact details.	<p>The validation team confirms that the technical description in section A.7 of the Specific CPA-DD includes a description of the technology to be used. This description was crosschecked with the detailed project report, project planning and interview.</p> <p>During the onsite visit the validation team was able to interview the person directly responsible for the operation of the CPA.</p> <p>The CPA is new metro rail system in Delhi. The metro rail will be 98.969 km long with 62 stations. The proposed metro station will include standard gauge line (1435 mm).</p>	OK									
3. Confirm that the exact physical/geographical boundary of the PoA is provided in the PoA-DD with Geographical coordinates, check the accuracy of them and the format of the notation (Grades, minutes, seconds or decimal indicating latitude N or S and Longitude E or W) Please include here the Geographical coordinates:	The PoA-DD includes the geographical area of the entire host country, i.e. India. The geographical area lies between the latitudes 8° 4' and 37° 6' north, longitudes 68° 7' and 97° 25' east. Validation team confirmed the geographical area from the google website.	OK									
4. Confirm that the geographic reference or other means of identification is provided in the specific CPA. Check that each component/subsystem/measure included in the specific CPA is uniquely identified.	<p>The metro line will include the National Capital Region (NCR) including Delhi, Haryana and Uttar Pradesh. The project lies between the latitudes and longitudes as provided below based on the different routes being constructed. This region lies in between the geographical area marked in the PoA-DD. The team confirmed that the PP will assign unique identification number to each new line based on its records.</p> <p>Corridor 1 Mukundpur to Gokulpuri (Yamuna Vihar): 56.006 km</p> <table border="1"> <tr> <td>Mukundpur</td><td>28°43'0.73"N</td><td>77°10'54.27"E</td></tr> <tr> <td>Yamuna Vihar</td><td>28°42'9.29"N</td><td>77°16'25.17"E</td></tr> <tr> <td>Gokulpuri</td><td></td><td></td></tr> </table> <p>Corridor 2 Janakpuri to Kalindi kunj: 36.593 km</p>	Mukundpur	28°43'0.73"N	77°10'54.27"E	Yamuna Vihar	28°42'9.29"N	77°16'25.17"E	Gokulpuri			OK CAR-04 CL-01
Mukundpur	28°43'0.73"N	77°10'54.27"E									
Yamuna Vihar	28°42'9.29"N	77°16'25.17"E									
Gokulpuri											

	Validated situation			Conclusion
	Janakpuri	28°37'46.04"N	77° 4'39.97"E	
	Kalindi Kunj	28°32'34.07"N	77°18'36.68"E	
	Corridor 3 Mandi House to Kashmiri Gate: 6.37 km			
	Mandi House	28°37'33"N	77°14'05"E	
	Kashmiri Gate	28°40'3.01"N	77°13'41.43"E	
	CAR 04 was raised as the exact geographical coordinates of the region was not presented in the CPA-DD. PP has now included the geographical coordinates according to the different corridors, the team confirmed the coordinates with the help of Google earth, a web based software.			
	CL-01 was raised as total length of metro rail was inconsistent with that in the DPR. Further, the location map of the component programme activity presented in section A.7 of the PDD does not include the proposed metro lines. PP has provided the evidence for total length of metro rail which is found appropriate, details of which is provided in the finding list.			
5. Confirm that the physical site inspection reflects the description in the PoA-DD and in the specific CPA... Describe briefly the physical site inspection: Travel details and installations, facilities and buildings visited.	Team visited the site on 01/02/2013. Team visited the DMRC office, interviewed local stakeholders and the proposed site where new metro will be constructed. Team confirmed the description mentioned in the PoA-DD and the specific CPA-DD from the site visit to be correct.			OK
6. If the team did not undertake a physical site inspection, describe the justification as approved by the CDM Quality Manager. (VVS 07.0: 65-67)	NA			NA
7. If the proposed measures in each CPA involve the	Pre-project	Project activity		OK

	Validated situation		Conclusion
alteration of an existing installation or process, ensure that the project description clearly states the differences resulting from the project activity compared to the pre-project situation.	The project is a Greenfield activity. Prior to the project activity, the passenger transport will be through existing mixed traffic condition prevailing in the city, i.e. Metro rail, suburban rail, two wheelers, three wheelers, taxis, buses and cars.	NA The project is a Greenfield activity. The project activity is MRTS based transport system.	
8. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance (ODA).	Team confirmed that the CPA does not involve diversion of ODA funds from the review of declaration provided by the PP and site visit interviews. The programme, so far, has not involved any Annex I Party. Further, during the validation nothing has come to the attention of the team which indicates that it involves diversion of ODA funding.		OK
9. If the CPAs are small scale ones confirm that they are not a debundled component of a large scale project, in line with the Guidelines for assessment of de-bundling for SSC project activities. Check if there is another registered small scale CPA or project activity or an application to register one. Describe how this has been validated.	NA. The CPAs in this PoA are not small scale.		NA

	Validated situation	Conclusion
SECTION 5. Application of the selected baseline and monitoring methodology applicability		
Application of multiple methodologies		
<p>1. Have the baseline and monitoring methodologies selected by the project participant been previously approved for application to both CDM PoA and CPAs by the CDM Executive Board, that is, does it appear on the methodologies page of the UNFCCC website?</p> <p>Confirm that the CME have listed in the PoA-DD and the generic CPA-DD the combinations of technologies/measures and/or approved methodologies implemented in the PoA.</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/></p> <p>The PP has applied methodology ACM0016, Version 03.0.0 "Mass Rapid Transit Projects"</p> <p>This methodology also refers to the latest approved version of the following tools:</p> <ul style="list-style-type: none"> • "Tool for the demonstration and assessment of additionality", Version 07.0.0 • "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Version 01 	OK
<p>2. If the project activity is a Small Scale one; does it qualify within the threshold of the three possible types of small scale projects? Confirm information provided in the SSC-PoA-DD and in the specific CPA.</p>	NA	NA
<p>3. If the project activity is a Small Scale one; which approved small scale methodologies does the project apply? Confirm that the SSC methodologies are applied with the general guidelines to SSC CDM methodologies.</p>	NA	NA
<p>4. If the CME applies combinations of technologies/measures and/or methodologies for a SSC-PoA confirm that in the PoA-DD and the specific CPA-DD it is demonstrated that there are no cross effects between the technologies/measures applied. Combinations of approved methodologies contained in the General guidelines to SSC CDM methodologies may be applied without further assessment of cross effects</p> <p>Check if the situation for applying combinations of</p>	NA. The PP has applied only ACM0016. The PoA does not apply combination of methodologies.	NA

	Validated situation	Conclusion
technologies/measures and/or methodologies is eligible in accordance with the Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities		
5. If the CME applies combinations of large scale methodologies for PoAs or combination of large scale with SSC methodologies, confirm that only combinations explicitly permitted in the methodologies have been applied. Otherwise pre-approval from the EB is required.	NA. The PP has applied only ACM0016. The PoA does not apply combination of methodologies.	NA
6. Determine whether the methodologies selected are applicable to the PoA including that the used versions are valid. Describe steps taken to assess the relevant information contained in the PoA-DD and in the specific CPA in the table below. Do this for each methodology in case of application of multiple methodologies.	The applicability of the methodology ACM0016 has been discussed below. CAR 07 was raised as Applicability conditions of the applied tools are not presented in the B.2 section of PoA-DD and D.2 section of CPA-DD. PP has now added the relevant tools in the applicability conditions. CAR 10 was raised as CPA inclusion criteria presented in section B.2 of the PoA-DD, does not include the criteria related to local stakeholders' consultation. PP has included LSC in eligibility criteria of the generic CPA-DD. Details is provided in the finding logs.	CAR 07 CAR 10 OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the PoA-DD	Steps taken to assess PoA-DD information	Conclusion
1	This methodology applies to project activities that establish and operate an MRTS.	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.	Objective of the PoA is to promote (establish and operate) rail based MRTS. DPR or similar document that presents the project technology will be used to confirm technology/measure. Validation team confirmed the above information from the interview of the CME, review of the DPR for CPA001. Team also confirmed from the interview	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the PoA-DD	Steps taken to assess PoA-DD information	Conclusion
			<p>of CME that intention of the PoA is promotion of new rail MRTS system in India.</p> <p>Validation team also checked that this is included as eligibility criteria (condition 2) for inclusion of CPA in the PoA.</p>	
2	For BRTs with feeder plus trunk routes the methodology AM0031 is more suitable. AM0031 is for BRTs where passengers can realize their entire trip on the project system. BRTs without feeder lines, i.e. passengers realize their trip partially on the project system and partially on conventional buses cannot use AM0031 but can use this methodology.	<p>Not Applicable</p> <p>The PoA is applicable only for rail-based MRTS and no BRT. Hence this applicability condition is not required to be assessed for the CPAs to the PoA.</p>	The validation team confirmed the situation based on interviews with CME, visit to the site of CPA001 and review of documents and records. Thus, it was confirmed that the intention of the PoA is construction of new rail based MRTS. Validation team also checked that this is included as eligibility criteria (condition 3) for inclusion of CPA in the PoA.	OK
3	<p>The project constructs a new rail-based infrastructure or segregated bus lanes.</p> <ul style="list-style-type: none"> For rail systems, the project needs to involve the construction of a new infrastructure (new rail lines); For BRTs, the project can be based on existing road infrastructure, but which separates physically bus lanes from mixed traffic. 	<p>a) This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.</p> <p>b) The PoA does not include BRT, hence applicability condition 2 (b) is not required to be assessed for the CPAs under the PoA</p>	The validation team confirmed the situation based on interviews with CME, visit to the site of CPA001 and review of documents and records. Thus, it was confirmed that the intention of the PoA is construction of new rail based MRTS. Validation team also checked that this is included as eligibility criteria (condition 3) for inclusion of CPA in the PoA.	OK
4	The segregated BRT bus lanes or the rail-based MRTS replaces existing bus routes (e.g. through scrapping units or through closing or re-scheduling existing bus routes) operating	This PoA is not applicable for BRT. The rail-based MRTS replacing the existing bus routes would be confirmed from publicly available information/DPR or evidences provided by PP in CPA-DD	The Objective of the PoA is to promote rail based MRTS. BRT system is not included in the PoA. It is expected that the rail based system included in this programme will replace the existing bus	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the PoA-DD	Steps taken to assess PoA-DD information	Conclusion
	under mixed traffic conditions		<p>routes operating under mixed traffic condition.</p> <p>The validation team confirmed from the interview of the CME. This condition is also included as eligibility criteria (condition 4) for inclusion of CPA in the PoA.</p>	
5	The methodology is not applicable for operational improvements (e.g. new or larger buses) of an already existing and operating bus lane or rail-based MRTS;	Only those MRTS system that adds new lines / stations shall be considered. This would be confirmed from project specific documents like DPR/ feasibility report etc.	<p>The objective of the programme is to promote new rail based MRTS and does not include only operational improvements.</p> <p>Validation team confirmed it based on the interview of CME. This condition is also included as eligibility criteria (condition 5) for inclusion of CPA in the PoA.</p>	OK
6	The methodology is not applicable for bus lanes replacing an existing rail-based system i.e. the existing urban or suburban rail infrastructure must remain fully (in its full length) operational;	Not Applicable to the PoA as only rail based MRTS are under the scope of the PoA. Hence this applicability condition is not required to be assessed for the CPAs to this PoA	The objective of the programme is to promote rail based MRTS and does not include bus based MRTS. Therefore, no bus lanes will be constructed in this programme.	OK
7	The methodology is applicable for passenger transport only;	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.	The programme envisages passenger transportation only. Validation team confirmed it from the interview of the CME. This condition is also included as eligibility criteria (condition 6) for inclusion of CPA in the PoA.	OK
8	Any fuels including (liquified) gaseous fuels or biofuel blends, as well as electricity can be	Since BRT is not considered under the scope of this PoA the condition is not applicable to the PoA	The programme envisages rail based MRTS, and does not include bus based	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the PoA-DD	Steps taken to assess PoA-DD information	Conclusion
	<p>used in the baseline or project case. The following condition apply:</p> <p>For biofuels, project buses must use the same biofuel blend (same percentage of biofuel) as commonly used by conventional comparable² urban buses in the country i.e. the methodology is not applicable if project buses use higher or lower blends of biofuels than those used by conventional buses. In addition, the project buses shall not use a significantly higher biofuel blend than cars and taxis</p>		MRTS. Therefore, this applicability criteria is not relevant to the PoA.	
9	The methodology is not applicable for the implementation of air and water-based transport systems;	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document or evidence provided by project operator in CPA-DD.	The programme envisages rail based MRTS, and does not include any air and water based transport system. . Validation team confirmed it from the interview of the CME. This condition is also included as eligibility criteria (condition 7) for inclusion of CPA in the PoA.	OK
10	The methodology is applicable for urban or suburban trips. It is not applicable for inter-urban transport.	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document or evidence provided by project operator in CPA-DD.	The programme envisages urban or suburban trips and does not include inter-urban transport. Validation team confirmed it from the interview of the CME. This condition is also included as eligibility criteria (condition 8) for inclusion of CPA in the PoA.	OK
11	The methodology is applicable if the most plausible baseline scenario is the continuation	This would be identified from the justification given in CPA-DD.	The validation team confirms baseline scenario will checked at CPA level.	OK

² Comparable means of the same fuel type e.g. project buses using diesel are compared with conventional buses using diesel etc. The comparison is made for each year of monitoring based on official fuels sold. The term commonly used refers to the majority of units.

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the PoA-DD	Steps taken to assess PoA-DD information	Conclusion
	of the use of current modes of transport.			
12	Applicability conditions of “Tool for the demonstration and assessment of additionality”, Version 07.0.0	The applicability of this tool will be determined at CPA level. The tool for demonstration and assessment of additionality is applicable only when at least 50% of the total capital investment of the project MRT system is provided by commercial entity(ies) in the form of equity and/or long-term debt.	The validation team confirms that the applicability of the tool for the demonstration and assessment of Additionality will be checked at CPA level.	OK
	Applicability conditions under “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 01			
13	This tool provides procedures to estimate the baseline, project and/or leakage emissions associated with the consumption of electricity. The tool may, for example, be used in methodologies where auxiliary electricity is consumed in the project and/or the baseline scenario. The tool can also be applied in situations where electricity is only consumed in the baseline or in the project or as leakage source.	This will be confirmed from DPR	The validation team confirms that electricity is consumed only in the project case and therefore tool will be applicable and will be checked at CPA level.	OK
14	The tool is only applicable if one out of the following three scenarios applies to the sources of electricity consumption: Scenario A: Electricity consumption from the grid. Scenario B: Electricity consumption from (an)	This will be confirmed from the DPR	The validation team confirms that electricity will be consumed from grid only based on review of electricity bills of existing Phase I and II of MRTS of the same PP. However, it will also be checked at CPA level.	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the PoA-DD	Steps taken to assess PoA-DD information	Conclusion
	off-grid fossil fuel fired captive power plant(s). Scenario C: Electricity consumption from the grid and (a) fossil fuel fired captive power plant(s).			
	Applicability conditions under <i>“Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”</i> Version 02			
15	This tool provides procedures to calculate project and/or leakage CO ₂ emissions from the combustion of fossil fuels. It can be used in cases where CO ₂ emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties.	This will be confirmed from DPR	The validation team confirms that no direct emission due fossil fuel based combustion will take place however indirect emission due to fossil fuel based combustion will be monitored which will arise as passenger may use different mode to reach from origin to the project activity and then from there to their destination. The assumption will be based on the traffic survey reports and DPR. It will also be checked at the CPA level.	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD	Steps taken to assess CPA-DD information	Conclusion
1	This methodology applies to project activities that establish and operate an MRTS.	<u>Applicable and Fulfilled</u> The proposed project activity is establishment and operation of a metro which is one type of MRTS.	The validation team confirms the project activity is a rail based MRTS project. Evidence referred: <ul style="list-style-type: none"> • DPR • MoU between EPC and DMRC • Sanction letter from Govt of India 	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD	Steps taken to assess CPA-DD information	Conclusion
2	The project constructs a new rail-based infrastructure or segregated bus lanes. <ul style="list-style-type: none"> For rail systems, the project needs to involve the construction of a new infrastructure (new rail lines); 	<u>Applicable and Fulfilled</u> The project activity is construction of a new rail based infrastructure (Metro), which can be evidenced from the Detailed Project Report (DPR).	The validation team confirms that the project activity is a green field project. Evidence referred: <ul style="list-style-type: none"> DPR MoU between EPC and DMRC Sanction letter from Govt of India 	OK
3	The segregated BRT bus lanes or the rail-based MRTS replaces existing bus routes (e.g. through scrapping units or through closing or re-scheduling existing bus routes) operating under mixed traffic conditions	<u>Applicable and Fulfilled</u> The proposed metro rail project replaces passenger trips by the existing bus operations partially under mixed traffic conditions. ³	The validation team confirms that metro rail project replaces passenger trips by existing bus operations partially under mixed traffic condition based on host country and technical expertise.	OK
4	The methodology is not applicable for operational improvements (e.g. new or larger buses) of an already existing and operating bus lane or rail-based MRTS;	<u>Applicable and Fulfilled</u> The project is a new rail based system and is not an operational improvement to the existing infrastructure. The project DPR clearly evidences the same.	The validation team confirms that the project is a new rail based system and is not an operational improvement to the existing infrastructure. Evidence: <ul style="list-style-type: none"> DPR MoU between EPC and DMRC Sanction letter from Govt of India 	OK
6	The methodology is applicable for passenger transport only;	<u>Applicable and Fulfilled</u> The project is designed and proposed for transportation of passenger in NCR). The DPR and project design evidence the same.	The project is designed and proposed for transportation of passenger in Delhi NCR confirmed from the DPR, site visit and interview of the PP.	OK
7	Any fuels including (liquified) gaseous fuels or	<u>Applicable and Fulfilled</u>	The project activity uses electricity from	OK

⁵³ Chapter 3: Positive Impacts; EIA Report of Phase III prepared by RITES

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD	Steps taken to assess CPA-DD information	Conclusion
	biofuel blends, as well as electricity can be used in the baseline or project case. The following condition apply:	<p>The project activity uses only electricity for its operations. Whereas in the baseline case, the usage of three fuels has been identified for different modes of transportation used by the passengers, Such as, CNG for passenger cars, buses, taxis and auto rickshaws, diesel for cars, petrol for cars and motorcycles, electricity by other phases of metro lines in the city.</p> <p>The project activity uses only electricity for its operations, whereas, the baseline modes of transport uses different types of fuels, including gaseous fossil fuels (CNG). However, as there is no other fuel consumption, except the traction energy (electricity by the project activity, as evident from the DPR, there is no possibility of more consumption of gaseous fossil fuels by project activity. Hence, the condition, usage of more gaseous fossil fuel in the project case is not applicable.</p>	the grid for its operation confirmed during site visit, interview of the PP, technical expertise and DPR.	
8	The methodology is not applicable for the implementation of air and water-based transport systems;	<p><u>Not Applicable</u></p> <p>As evident from the project documents (DPR), there is no air and/or water based transport involved in the project activity.</p>	The validation team confirms that the project activity is a rail based transport system as confirmed from the DPR and site visit.	OK
9	The methodology is applicable for urban or suburban trips. It is not applicable for inter-urban transport.	<p><u>Applicable and Fulfilled</u></p> <p>The project activity is meant for urban transport in NCR. The purpose of metro line is to connect the various zones of NCR. Metro line map clearly indicates the project operations are restricted for urban trips only.</p>	The validation team confirms that the project activity is limited to Delhi NCR and is meant for urban transport only. The same was confirmed from site visit, interview of the PP and location Map provided along with the DPR.	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD	Steps taken to assess CPA-DD information	Conclusion														
10	The methodology is applicable if the most plausible baseline scenario is the continuation of the use of current modes of transport.	Applicable and Fulfilled The identified baseline scenario of the project is continuation of current public transport system, as described and justified in 'Assessment of baseline options' under section D.4	The validation team confirms that the most plausible scenario is continuation of current public transport system based on sectoral expertise and as justified under assessment of baseline options.	OK														
11	Applicability conditions of “Tool for the demonstration and assessment of additionality”, Version 07.0.0	Not Applicable The tool for demonstration and assessment of additionality is applicable only when at least 50% of the total capital investment of the project MRT system is provided by commercial entity(ies) in the form of equity and/or long-term debt. In case of the present CPA, the following applies ⁴ : <table border="1"><thead><tr><th>Sources</th><th>Percentage of the amount in Total Investment</th></tr></thead><tbody><tr><td>Own accruals</td><td></td></tr><tr><td>Property development by DMRC</td><td>4.50%</td></tr><tr><td>Loans</td><td></td></tr><tr><td>JICA loan</td><td>40%</td></tr></tbody></table>	Sources	Percentage of the amount in Total Investment	Own accruals		Property development by DMRC	4.50%	Loans		JICA loan	40%	Team checked the funding institution for all the investments: DMRC is a state owned company with equity participation from the Government of India and the Government of National Capital Territory of Delhi. This was confirmed based on the review of its website at http://www.delhimetrorail.com/about_us.aspx#Introduction . Investment made by the government can be considered as non-commercial investment. Further, the investment made in the project as confirmed from the review of official government letter, and the type of investment is as below. <table border="1"><tbody><tr><td>DMRC</td><td>As discussed above investment by DMRC can be considered non-commercial. This is 4.5% of the total investment.</td></tr><tr><td>JICA Loan</td><td>JICA or Japan International Cooperation Agency is</td></tr></tbody></table>	DMRC	As discussed above investment by DMRC can be considered non-commercial. This is 4.5% of the total investment.	JICA Loan	JICA or Japan International Cooperation Agency is	OK
Sources	Percentage of the amount in Total Investment																	
Own accruals																		
Property development by DMRC	4.50%																	
Loans																		
JICA loan	40%																	
DMRC	As discussed above investment by DMRC can be considered non-commercial. This is 4.5% of the total investment.																	
JICA Loan	JICA or Japan International Cooperation Agency is																	

⁴ Based on GOI Ministry of Urban Development (MRTS Cell) Order No. K-14011/4/2009-MRTS dated 26th September 2011

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD		Steps taken to assess CPA-DD information	Conclusion												
		<table><tr><td>Loan from IIFCL (India Infrastructure Finance Company Ltd)</td><td>15.50%</td></tr><tr><td>Government Equity/Subsidy/Grant</td><td></td></tr><tr><td>Equity by GOI and GNCTD</td><td>21.27%</td></tr><tr><td>Interest free subordinate debt for land and central taxes by GOI and GNCTD</td><td>14.47%</td></tr><tr><td>Grant by Delhi Development Authority</td><td>4.26%</td></tr><tr><td>Total</td><td>100%</td></tr></table>	Loan from IIFCL (India Infrastructure Finance Company Ltd)	15.50%	Government Equity/Subsidy/Grant		Equity by GOI and GNCTD	21.27%	Interest free subordinate debt for land and central taxes by GOI and GNCTD	14.47%	Grant by Delhi Development Authority	4.26%	Total	100%		<p>funding agency of Japan government to assist social and economic growth in developing countries. Therefore, it can be considered as non-commercial investment. This is 40% of total investment. Above information was confirmed based on the review of its website at http://www.jica.go.jp/english/about/index.html</p>	
Loan from IIFCL (India Infrastructure Finance Company Ltd)	15.50%																
Government Equity/Subsidy/Grant																	
Equity by GOI and GNCTD	21.27%																
Interest free subordinate debt for land and central taxes by GOI and GNCTD	14.47%																
Grant by Delhi Development Authority	4.26%																
Total	100%																
		<p>JICA (Japan International Cooperation Agency) is a Government agency of Japan providing foreign assistance to poor and developing countries.</p> <p>GNCTD(Government of National Capital Territory of Delhi) and Delhi Development Authority (DDA) are both government of India (GOI) organisation.</p> <p>Thus it is evident that there is no commercial investment (of atleast 50%) in the CPA.</p> <p>Hence the tool for additionality demonstration and analysis is not applicable to the present CPA.</p>	<p>IIFCL Loan</p>	<p>IIFCL is a government of India enterprise for providing loan to infrastructure projects. However, the company website also describes that it provide loan to private companies along with commercial banks. Therefore, this investment may not be considered as a non-commercial investment. It has made 15.50% of investment. Above information was confirmed based on the review of its website at http://www.iifcl.org/Content/Gensis.aspx http://www.iifcl.org/Content/i</p>													

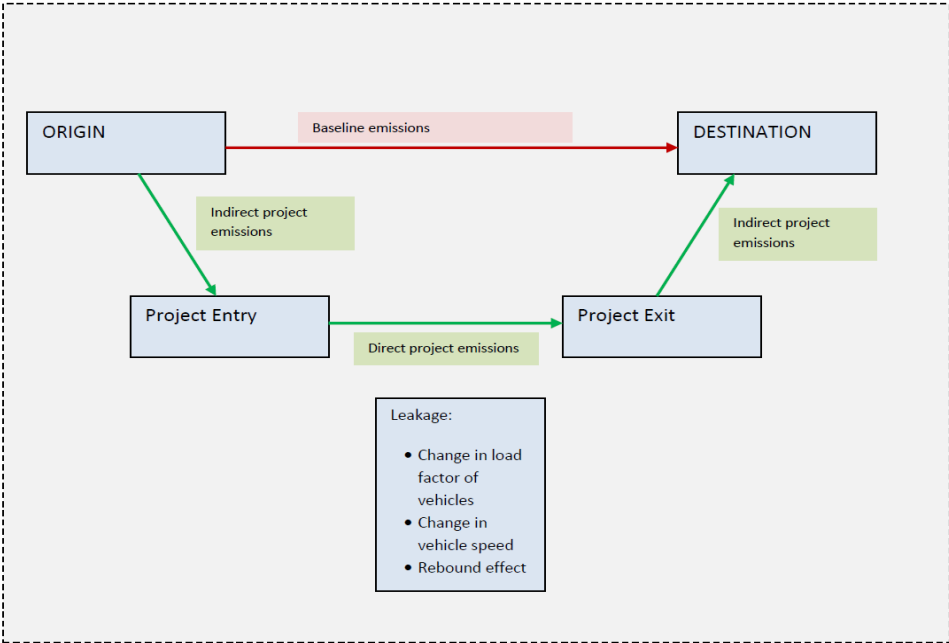
No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD	Steps taken to assess CPA-DD information		Conclusion
				index.aspx	
			Other investment	<p>Remaining investment has been made by Government of India and Government of National Capital Territory of Delhi (GNCTD), through direct equity participation, interest free debt.</p> <p>Delhi Development Authority is a part of GNCTD which has given grant to the project.</p> <p>Therefore, these can be considered as non-commercial investment. These investments are about 40% of total investment</p>	
			<p>From the above analysis it can be concluded that the project has more than 50% of non-commercial investment. Therefore, additionality has been demonstrated following the procedure B, i.e. revenue from CER is more than 10% of annual O&M expense.</p> <p>The validation team confirms that the percentage of the amount in Total Investment clearly shows that commercial investment in the project is zero and therefore the tool for demonstration and assessment of</p>		

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD	Steps taken to assess CPA-DD information	Conclusion
			Additionality is not applicable for CPA001. The validation team confirmed the same from the DPR and sanction letter from Government of India MoUD available publicly and after interview with the PP.	
12	Applicability conditions under “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 01			
	This tool provides procedures to estimate the baseline, project and/or leakage emissions associated with the consumption of electricity. The tool may, for example, be used in methodologies where auxiliary electricity is consumed in the project and/or the baseline scenario. The tool can also be applied in situations where electricity is only consumed in the baseline or in the project or as leakage source.	<p><u>Applicable and Fulfilled</u></p> <p>The project activity will consume electricity to maintain traction energy for propulsion of metro. This is evident from the DPR. Traction system is 25kV ac 50Hz single phase. The power supply will be sourced from grid sub stations.</p> <p>Thus, the tool is used to calculate direct project emissions from consumption of electricity.</p>	The project activity is consuming electricity from grid for running the trains, the same was verified during site visit, sectoral expertise review of electricity bill for previous year of Phase I and Phase II MRTS and interview of the PP.	OK
13	<p>The tool is only applicable if one out of the following three scenarios applies to the sources of electricity consumption:</p> <p>Scenario A: Electricity consumption from the grid.</p> <p>Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s).</p>	<p>The project activity applies to Scenario A, where electricity will be consumed from the grid to maintain traction energy for the metro line. This is evident from the DPR. Traction system is 25kV ac 50Hz single phase. The power supply will be sourced from grid sub stations.</p>	The project activity is consuming electricity from grid for running the trains, the same was verified during site visit of existing Phase I and Phase II MRTS, sectoral expertise and interview of the PP.	OK

No.	Applicability conditions in the ACM0016, Version 03.0.0	Information in the CPA-DD	Steps taken to assess CPA-DD information	Conclusion
	Scenario C: Electricity consumption from the grid and (a) fossil fuel fired captive power plant(s).	Hence scenario A is applicable.		
	Applicability conditions under <i>"Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion"</i> <i>Version 02</i>			
14	This tool provides procedures to calculate project and/or leakage CO ₂ emissions from the combustion of fossil fuels. It can be used in cases where CO ₂ emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties.	<u>Not Applicable</u> The project activity does not involve combustion of fossil fuel. Indirect project emission such as the use of other modes of transportation (gasoline and diesel vehicles) by the passengers using the project activity has been calculated according to Annex 4 of the methodology. Hence this tool is not applicable.	The validation team confirms that there is no direct project emission due to combustion of fossil fuel whereas in line with methodology the CPA has included calculation of indirect emission which will result due to mixed travel pattern of a passenger from origin to destination. Calculations of the same were also verified based on traffic survey report.	OK

	Validated situation	Conclusion
7. Confirm that any specific guidance provided by the CDM Executive Board in respect to an approved methodology has been correctly applied.	The CDM-EB does not provide any specific guidance for the applied methodology.	OK
8. If a determination regarding the applicability of the selected methodologies to the proposed CDM PoA cannot be made, request clarification of the methodology in line with the guidance provided by the CDM Executive Board. Describe the clarification request and response.	NA	NA

	Validated situation	Conclusion
<p>9. If the Validation Team determines that the proposed CDM PoA and/or the specific CPA does not comply with the applicability conditions of the methodologies, the Team may proceed by means of requesting revision to or deviation from the methodology in line with the guidance provided by the CDM Executive Board.</p> <p>Describe the request for revision or deviation and approval by the CDM Executive Board.</p>	NA	NA

	Validated situation	Conclusion
SECTION 6a. Project boundary		
<p>1. Does the project boundary include physical, geographical site of the industrial facility, processes, or equipment that are affected by the PoA?</p> <p>Check that the project boundary of the PoA covers the whole territory within all CPAs included in the PoA will be implemented.</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/></p> <p>Project boundary of the PoA will include any MRTS project inside the geographical boundary of the country. Present CPA boundary is covered under the PoA boundary.</p>  <p>CAR-05 was raised as flow diagram was not presented in the PoA-DD and CPA-DD. In response to the finding the PP has included the flow diagram in the PoA-DD and CPA-DD. Team confirmed the flow diagram from the project design after</p>	<p>CAR-05 OK</p>

	Validated situation	Conclusion
	site visit following with interview with the PP.	
2. If the proposed PoA has both Afforestation/Reforestation (A/R) and non-A/R components, to avoid double counting of emission sources, LRQA shall confirm that the emissions associated with the A/R activity will be accounted for and documented by the A/R project activity.	NA. The project activity does not have any A/R component.	NA
3. Determine whether in establishing the project boundary of the PoA, PPs have taken into consideration all applicable national and/or sectoral policies and regulations within that chosen boundary.	The validation team confirmed that there are no Host Country specific policies on implementation of rail based MRTS.	OK
4. If there are any GHG emissions occurring within the specific CPA boundary, which are not addressed by the applied methodologies and which are expected to contribute more than 1% of the overall expected average annual emissions reductions of each CPA as a result of their implementation, LRQA shall request clarification of, revision to, or deviation from the methodologies as appropriate.	NA	OK
5. Confirm that all sources and GHGs required by the methodologies have been included within the project boundary of the specific CPA. Describe here if any emission source that will be affected by the PoA and is not addressed by the approved methodologies, has been identified. In such case request clarification of, revision to or deviation from the specific methodology affected in accordance with EB guidance. Use the table below for this purpose. In case of application of multiple technologies/measures and/or	All sources and GHGs as required by the methodology have now been included in the project boundary. There is no emission source that is affected and not considered by the project activity and not addressed by the methodology.	OK

	Validated situation	Conclusion
methodologies use a table for each one if necessary.		

Gases and Sources Included In the specific CPA for methodology: ACM0016, Version 03.0.0						
	Source	Gas	Inc./Exc. Pdd	Justification specific CPA-DD	Steps Taken To Assess CPA Justification	Conclusion
BASELINE	Mobile source emissions of different modes of transport due to the trips made by the passengers using the MRTS	CO ₂	Yes	Major emission source	The validation team confirms that CO ₂ is a major emission source due to combustion of fuels by different mode of transport used in baseline scenario.	OK
		CH ₄	No	Included only if gaseous fuels are used. Vehicle tailpipe CH ₄ emissions are excluded for liquid fuels. Combined CH ₄ and N ₂ O emissions make less than 2% of total CO ₂ eq emissions in diesel/gasoline vehicles. Its omittance in baseline as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the project.	The validation team confirms the situation that omitting the CH ₄ and N ₂ O from both baseline and project emission is conservative and therefore acceptable.	OK
		N ₂ O	No	Combined CH ₄ and N ₂ O emissions make less than 2% of total CO ₂ eq emissions in diesel/gasoline vehicles. Its omittance in baseline as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the project.	The validation team confirms the situation that omitting the CH ₄ and N ₂ O from both baseline and project emission is conservative and therefore acceptable.	OK
PROJECT	Mobile source emissions of the project transport system (MRTS) due to the	CO ₂	Yes	Major emission source	The validation team confirms that CO ₂ is a major emission source as electricity is imported from the Grid (which is dominated by fossil fuel) for propulsion of the metro trains.	OK
		CH ₄	No	Included only if gaseous fuels are used. Vehicle tailpipe CH ₄ emissions are excluded for liquid fuels. Combined CH ₄ and N ₂ O emissions make less than 2% of total CO ₂ eq emissions in diesel/gasoline vehicles. Its omittance in baseline	Validation team confirmed from the review of the project design and its sectoral expertise that the project does not use any gaseous fuel.	OK

Gases and Sources Included In the specific CPA for methodology: ACM0016, Version 03.0.0						
	Source	Gas	Inc./Exc. Pdd	Justification specific CPA-DD	Steps Taken To Assess CPA Justification	Conclusion
	trips made by the passengers using it			as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the project.		
		N ₂ O	No	Combined CH ₄ and N ₂ O emissions make less than 2% of total CO ₂ eq emissions in diesel/gasoline vehicles. Its omission in baseline as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the project.	Validation team confirmed from the review of the project design and its sectoral expertise that the project does not use any gaseous fuel.	OK
	Mobile source emissions of different modes of transport due to the trips made by the passengers using the MRTS, from their trip origin to the MRTS and from the MRTS to their trip destination	CO ₂	Yes	Major emission source	The validation team confirms that CO ₂ is a major emission source due to combustion of fuels by different mode of transport used in to reach the MRTS from origin and also later from MRTS to the destination	OK
		CH ₄	No	Included only if gaseous fuels are used. Vehicle tailpipe CH ₄ emissions are excluded for liquid fuels. Combined CH ₄ and N ₂ O emissions make less than 2% of total CO ₂ eq emissions in diesel/gasoline vehicles. Its omission in baseline as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the project.	Validation team confirmed from the review of the project design and its sectoral expertise that the project activity does not use any gaseous fuel. However, combined emission of CH ₄ and N ₂ O will take place indirectly due to project activity. Removing the same in baseline as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the project.	OK
		N ₂ O	No	Combined CH ₄ and N ₂ O emissions make less than 2% of total CO ₂ eq emissions in diesel/gasoline vehicles. Its omission in baseline as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the project.	Validation team confirmed from the review of the project design and its sectoral expertise that the project activity does not use any gaseous fuel. However, combined emission of CH ₄ and N ₂ O will take place indirectly due to project activity. Removing the same in baseline as well as project emissions is conservative as fuel consumption and thus also CH ₄ emissions are reduced through the	OK

Gases and Sources Included In the specific CPA for methodology: ACM0016, Version 03.0.0						
	Source	Gas	Inc./Exc. Pdd	Justification specific CPA-DD	Steps Taken To Assess CPA Justification	Conclusion
					project.	
LEAKAGE	Emissions due to changes in the load factors of taxis and conventional buses; and due to congestion change (incl. change in vehicle speed and induced traffic (rebound effect))	CO ₂	Yes	Major emission source	The validation team confirms that CO ₂ is a major emission source due to combustion of fuels by different mode of transport which will be due to changes in the load factors of taxis and conventional buses; and due to congestion change (incl. change in vehicle speed and induced traffic (rebound effect)).	OK
		CH ₄	Yes	Included only if gaseous fuels are used. See argument above	The validation team confirms the situation that omitting the CH ₄ and N ₂ O from both baseline and project emission is conservative and therefore acceptable.	OK
		N ₂ O	No	See argument above	The validation team confirms the situation that omitting the CH ₄ and N ₂ O from both baseline and project emission is conservative and therefore acceptable.	OK

	Validated situation	Conclusion
SECTION 6b. Baseline scenario identification and description.		
1. Determine whether the PoA-DD and the Specific CPA provides a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM PoA.	The Specific CPA in the PoA-DD describes the baseline scenario as below. The baseline scenario is defined as the most likely scenario in the absence of the proposed CDM project activity. As per approved methodology, ACM0016, Version 03.0.0, <i>"If the project activity is deemed to be additional, then the baseline scenario is assumed to be the continuation of the use of current modes of transport provided that the project participant can provide an explanation showing that the existing transport system would be sufficient to meet the transportation demand that will be met by the project system."</i>	OK
2. Confirm that any procedure contained in the methodologies to identify the most reasonable baseline scenario, has been correctly applied.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/> The baseline scenario has been prescribed by the applied methodology.	OK
3. Check each step in the procedure described in the PoA-DD to identify the baseline scenario against the requirements of the methodologies. (Note that if the methodologies require use of tools, that is, such as the tool for the demonstration and assessment of additionality and the combined tool to identify the baseline scenario and demonstrate additionality, the guidance in the methodologies shall supersede it in the tool.)	<p>The PP has followed the stepwise approach as described in the applied methodology ACM0016.</p> <p>The steps help in evaluating the Additionality for the project and in the end confirms the baseline scenario:</p> <p>Step 1: Country level assessment</p> <p>The step helps identifying that whether the CDM project activity is a common practice in the host country. In order to satisfy the step the PP has to provide evidence that there are less than 3 cities with rail based MRTS commercially operational.</p> <p>If the step is not satisfied in other words there are more than 3 cities with MRTS then PP has to satisfy step 2 and 3 or otherwise only step 3.</p> <p>PP has conducted country level assessment at PoA level and more than 3 operational MRTS were found. This includes Delhi Metro Phase I, Bangalore Metro, Kolkata Metro, Mumbai suburban, Chennai suburban etc. Therefore, country level assessment is not met. City level and project level assessment will be conducted by the PP to satisfy additionality.</p>	CL-02 OK

	Validated situation	Conclusion
	<p>Step 2: City level assessment</p> <p>This step helps in identifying that whether the CDM project activity is a common practice in the host city. For this purpose, project it shall be assessed whether the share of trips realized on the existing public transport system(s) in the host city, which belong to the same public transport category as the proposed CDM project activity, is equal or less than 20% of total public transport trips in the host city.</p> <p>If the project activity is implemented in the host city is the only rail based MRTS then the project activity clears the step automatically.</p> <p>This PoA has included the conformance of the city level assessment as an eligibility criterion (condition 12). It requires all the CPA to demonstrate that if non CDM public transport system of the same category exists, then the share of trips realised is equal to or less than 20% of the total public trips realised in the host city.</p> <p>The host city of the CPA001 identified is New Delhi. The project activity falls under 'metro' sub category of public transport category. In New Delhi region, Delhi Metro Phase-I and Phase-II is operational. Delhi Metro Phase-II is a CDM registered project (UNFCCC Ref: 4463) for modal shift; Delhi Metro Phase-I is also a CDM registered project (UNFCCC Ref: 1351) for regenerative braking system. Though Delhi Metro Phase-I is a CDM registered project, it has still been included in the analysis as it is not clearly falling in the category of modal transportation shift. This is conservative for additionality assessment. Further, Delhi Metro Phase-I and Phase-II is criss-crossing each other, therefore, it is difficult to segregate Phase-I and Phase-II in the traffic survey. For conservative analysis, the PP has included both Phase-I and Phase-II in this analysis. This is justified as below.</p> <p>Based on the traffic survey the total trips classified as public transport category based on the list provided in the step 2 of additionality procedure on page 7, the public transport categories identified in CPA:001 are conventional bus system</p>	

	Validated situation	Conclusion
	<p>(48.2%), Metro (3.7%), and suburban rail (0.6%). The total share of metro trips in public transport trips is $3.7\% / (48.2\% + 3.7\% + 0.6\%)$ or 7.05%. This is less than 20%, therefore, this step was satisfied by the CPA:001</p> <p>From the above the total share of metro rail in public transportation trips is $3.7\% / (48.2\% + 3.7\% + 0.6\%)$ or 7.05%. The 3.7% share of metro rail trips arising from Metro Phase-I and Phase-II. If these were to be excluded, the share would have been nil. Therefore, including both Phase-I and Phase-II of the metro is conservative.</p> <p>Validation team confirmed the share of trips from the review of baseline traffic survey report, and interview of the agency involved in traffic survey.</p> <p>Step 3: Project level assessment</p> <p>In this step which is to be satisfied even if step 1 and step 2 are both satisfied, PP requires to satisfy either procedure A or procedure B. The PP is required to provide evidence of the breakup of project funding. If at least 50% of the project capital investment is provided by commercial entity(ies) in form of equity or debt, then the PP has to follow Procedure A and conduct an investment analysis (benchmark analysis) otherwise Procedure B is to be followed where PP needs to demonstrate the impact of CDM registration. In procedure B the PP needs to calculate with evidence the annual O&M cost and annual CER revenue realised. 10% of the O&M cost calculated should be less than the annual CER revenue realised to satisfy step 3 and additionality. This requirement of additionality has been included as eligibility criteria 13.</p> <p>The PoA describes that all the input values for investment analysis to be sourced from project report or similar documents. Team confirmed from its sectoral expertise that input values are highly dependent upon the technology employed, therefore, needs to be assessed for each individual activity separately. The basic approach is provided in the CPA-DD.</p> <p>The benchmark for each CPA will be calculated using the default values</p>	

	Validated situation	Conclusion																												
	<p>presented in the latest version of Guidelines on the assessment of investment analysis available at the time of inclusion. The default value applied for the current CPA-DD in real terms is 12.75%. Further, to convert the values in nominal terms, inflation will be included. The inflation rate to be sourced from the either data provided by Central Bank for the duration of crediting period, target inflation rate or data for next five years provided by International Monetary Fund (IMF) or World Bank. The CPA-DD uses 5.9% from the inflation forecast provided by the Reserve Bank of India (India's central bank).</p> <p>PoA-DD further, describes the process to estimate reduced revenues and include it in investment analysis. The reduced revenues will be estimated using the latest data available at the time of submission of the CPA-DD.</p> <p>For the CPA001, the CME has estimated reduced revenues of upto 70% based on the review of existing MRTS operational projects, i.e. Delhi Metro Phase I and Phase II. The percentage reduction in fare box revenues is as below:</p> <table><tr><th>Year</th><th>Estimated revenue (INR million)</th><th>Actual Revenue (INR million)</th><th>Percentage reduction in revenue</th></tr><tr><td>2005</td><td>15052</td><td>723</td><td>95%</td></tr><tr><td>2006</td><td>17152</td><td>4489</td><td>74%</td></tr><tr><td>2007</td><td>19407</td><td>5428</td><td>72%</td></tr><tr><td>2008</td><td>21826</td><td>5044</td><td>77%</td></tr><tr><td>2009</td><td>24421</td><td>7238</td><td>70%</td></tr><tr><td>2010</td><td>33762</td><td>7379</td><td>78%</td></tr></table>	Year	Estimated revenue (INR million)	Actual Revenue (INR million)	Percentage reduction in revenue	2005	15052	723	95%	2006	17152	4489	74%	2007	19407	5428	72%	2008	21826	5044	77%	2009	24421	7238	70%	2010	33762	7379	78%	
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Validated situation					Conclusion
	2011	37112	16079	57%	
	2012	41057	22478	45%	
	Average			70%	
	<p>The PP has considered average value of 8 year period, from 2005-2012. The team based on this host country and sectoral expertise confirms that at the time of publication of this PoA-DD/CPA-DD, there were three operational metro rail projects in India. Kolkata metro was operational from 1984, which is more than 20 years and need not be considered as per the applied methodology. The Delhi metro project was operational from 2002; a data from 2005 was considered appropriate after stabilisation of its operations, the team confirmed it from its sectoral expertise. Lastly, Bangalore metro is operational from 2011; a data of less than one year is available which will not be suitable for comparison. Therefore, team confirmed the suitability and appropriateness of the data used to estimate reduced revenues. However, Procedure B has been applied in the current CPA, therefore, reduced revenues is not being used.</p> <p>At CPA level for Procedure A, Project Participant needs to include factors as provided in the approved methodology and latest “tool to assessment of additionality”.</p> <p>For Procedure B, PP has to determine an <i>ex-ante</i> assessment of the revenues from CERs per year expected to be generated by the proposed project activity. PP also has to determine the operating and maintenance costs as well as passenger demand for the year when the MRT system is expected to reach its planned stable operation. All data will be checked at the time of CPA validation. It may also be noted that few metro lines were removed by the CME during validation; the emission reduction estimate was reduced based on the commuter information mentioned in the DPR. The O&M cost was not revised by the CME after reduction in metro line which is conservative for additionality and justified as</p>				

	Validated situation	Conclusion
	<p>below.</p> <p>The additionality is demonstrated using procedure B, where it needs to be demonstrated that revenue from CER is more than 10% of total O&M cost. The PP has used total O&M cost of the lines covered in the DPR which includes all the lines covered in the CPA and few additional lines. Therefore, O&M cost for the lines in the CPA will always be lower than that covered in the DPR. Therefore, if CME can demonstrate additionality, i.e. CER revenues is more than 10% of total O&M cost in DPR, this will also be true of O&M cost for the lines covered in this CPA.</p> <p>The CER price to be determined for each CPA at the time of submission of CPA-DD. The prices can be considered either from ERPA or publicly available CER price.</p> <p>For CPA001 the CER price considered is 4.81 Euro. This price is the average secondary CER price for the full year prior to the submission of the CPA-DD for validation, i.e. from 01/09/2011 to 31/08/2012. The data has been considered from the exchange Bluenext. Team validated the CER prices from the screenshot of the Bluenext website. The exchange rate considered by the PP from Euro to Indian rupees was considered 67.74Euro/INR. The exchange rate at the time of webhosting of PoA/CPA001 was 69.76 Euro/INR⁵, therefore, that considered by the PP is conservative. The annual CER estimate for the CPA001 is 637,440 tCO₂e. Therefore, average revenues from CER with the above assumptions are 207.70 Million INR.</p> <p>The O&M costs for the PoA comprises of fixed operating costs and variable operating costs. The fixed operating costs comprise of manpower costs; variable operating costs comprises of traction energy costs and maintenance costs. The PoA gives further guidance on estimation of these costs.</p>	

⁵ http://eur.fx-exchange.com/inr/2012_11_06-exchange-rates-history.html

	Validated situation	Conclusion												
	<table><tr><th>Item</th><th>Unit of accounting in cost calculations</th></tr><tr><td colspan="2">Fixed operating costs</td></tr><tr><td>Total Manpower Cost⁶</td><td>Total number of personnel Annual Salary</td></tr><tr><td colspan="2">Variable operating costs</td></tr><tr><td>Rails (traction energy) electricity charges</td><td>Units</td></tr><tr><td>Maintenance Cost</td><td>% of rolling stock cost</td></tr></table>	Item	Unit of accounting in cost calculations	Fixed operating costs		Total Manpower Cost ⁶	Total number of personnel Annual Salary	Variable operating costs		Rails (traction energy) electricity charges	Units	Maintenance Cost	% of rolling stock cost	
	Item	Unit of accounting in cost calculations												
	Fixed operating costs													
	Total Manpower Cost ⁶	Total number of personnel Annual Salary												
	Variable operating costs													
	Rails (traction energy) electricity charges	Units												
	Maintenance Cost	% of rolling stock cost												
	<u>Fixed operating costs:</u>													
	<p><u>Manpower cost:</u> Total manpower cost is the product of total number of personnel in each category and their annual salary. The PoA describes that total manpower cost will be estimated based on the data provided in the project report or similar document. The PoA further provides guidance on cross-checking the manpower cost based on the number of personnel employed and their salaries in the PoA.</p>													
	<p>PoA describes important factors for estimation of manpower required in Operations of rail based MRTS project. Validation team confirmed these factors based on the note prepared by Feedback Ventures Limited, a third party consultancy, dated: 22/06/2009 on benchmark of manpower Ref: DMRC/O &M/R &T/MPP.</p>													
<p>PoA describes the benchmark salaries of personnel at each level. The salaries for the year 2012 for Delhi Metro were confirmed based on the job portal website. Delhi Metro, being a government entity, has transparency on the salary band at each level. For the assessment, the CME has chosen average of the range. Further, to estimate salaries after 2012, the PoA describes that inflation in salaries to be accounted based on the Consumer Price Index for industrial workers as available at http://labourbureau.nic.in/indnum.htm.</p>														

⁶ Detailed in Appendix 3II.

Validated situation				Conclusion
The summary of benchmark salaries and number of personnel benchmarks is presented below.				
Type of personnel	Annual Salary (in INR)	No. of personal (Per train/per hour/per station)	Total salary (Annual salary*No. of personal)	
Train Operator (TO)	216,000.0	26 TO per 100 hours		
Customer Relationship Assistant (CRA)	174,000.0	3.5 per Station/per crew control		
Crew Controller	168,000.0	4.05 per station/per crew control		
Assistant line supervisor(ALS)	168,000.0	1 for each train operator		
Station Manager (SM)	192,000.0	1 for stations having ridership more than 50,000 0.5 SM for more than 25000 0.33 SM for less than 25000		
Assistant Station Controller/Junior Station Controller	120,000.0	1.35 for every 1 lakh ridership Or 1 for every 15 parking lot		
Assistant Traffic Controller	168,000.0	1 for lines having upto 25 2 for lines with more than stations		

Validated situation				Conclusion
Time Table controller	168,000.0	1 in morning shift and 1 in evening shift		
Chief Controller	192,000.0	1 in each shift		
JE	240,000.0	4.58 per route km		
Maintainer	132,000.0	1.57 per route km		
Stores	168,000.0	0.41 per route km		
Manager finance	480,000.0	0.30 per 100 employer		
Manager HR	480,000.0	0.50 per 100 employer		
Total				
<p>Team confirms that above approach gives a process of reasonably checking the operations cost of the MRTS as described in project report.</p> <p>Team also confirms that CME has applied similar cross check mechanism in CPA001. At CPA001, the total manpower cost has been correctly calculated following the procedure described in the PoA. The summary is presented as below:</p>				
Type of personnel	Annual Salary(in INR)	No. of personal	Rounded off	Total salary (in Million INR)
Train Operator (TO)	216000	650.0	650.0	140.4
Customer	174000	234.5	235.0	40.9

Validated situation						Conclusion
	Relationship Assistant (CRA)					
	Crew Controller	168000	271.4	272.0	45.7	
	Assistant line supervisor(ALS)	168000	43.3	44.0	7.4	
	Station Manager (SM)	192000	24.8	25.0	4.8	
	Assistant Station Controller/Junior Station Controller	120000	25.7	26.0	3.1	
	Assistant Traffic Controller	168000	5.0	5.0	0.8	
	Time Table controller	168000	2.0	2.0	0.3	
	Chief Controller	192000.0	2.0	2.0	0.4	
	JE	240000	622.9	623.0	149.5	
	Maintainer	132000	1573.5	1574.0	207.8	
	Stores	168000	55.8	56.0	9.4	
	Manager finance	480000	10.5	11.0	5.3	
	Manager HR	480000	17.6	18.0	8.6	
	Total Manpower				624.5	
<p>The total manpower cost estimate for the project report of CPA001 is 624.5 Millions/annum which is consistent with the procedure described in the PoA. Therefore, team confirmed the suitability of this value.</p> <p>Variable operating costs:</p> <p><u>Electricity cost:</u> The PoA does not give any guidance on estimation of electricity costs. The electricity tariff is different in different states. The electricity consumed by the rail based MRTS is different for different type of rail based MRTS (e.g. it will be different for metro, LRT, monorail etc.). Therefore, it will be assessed for</p>						

	Validated situation	Conclusion
	<p>each CPA at the time of inclusion.</p> <p>For CPA001, the total electricity consumed for traction energy was estimated to be 154,703 kWh/annum. Team confirmed the value based on the review of DPR, interview of the PP and sectoral expertise of the team. The validation team confirms that the electricity charges assumed by the PP sourced from DPR are conservative. As a matter of crosscheck the validation team viewed last 2 years electricity bill of DMRC for their other MRTS service, the electricity rate as provided in the electricity bill is INR 3000/MWh whereas the DPR assumes a rate of INR 3800/MWh. The total electricity cost estimated ex-ante was 588 Million INR. Therefore the validation team confirms the electricity rate assumed in the DPR to be conservative and appropriate. The annual electricity consumption charges is estimated to be 588 Million.</p> <p><u>Maintenance costs:</u> The maintenance cost has been assumed to be 0.1% of the total project cost. The validation team has checked the percentage of Maintenance cost against fixed cost from FY 2002-03 to 2010-11 for other 2 phases of Delhi Metro project already operational, the average of which is calculated to be 0.09%. Therefore PP's assumption of 0.1% is deemed to be conservative and hence appropriate.</p> <p>For CPA001, the maintenance cost has been taken as 0.1% of the total project cost which is 320 Million.</p> <p>Total annual O&M cost from the above comes out to 1532 Million/annum (i.e. 624+320+588) and annual expected CER revenues is 207 Millions. 10% of O&M cost is 153.2 Million which is less than the CER revenues.</p> <p>CL 02 was raised to justify the suitability of Operation and maintenance cost. The PP has provided justification along with evidence to support the assumption. Details of which is provided in the finding log section of this report.</p>	

	Validated situation	Conclusion
4. Based on financial expertise and local and sectoral knowledge, determine whether all scenarios that are considered by the project participant and are supplementary to those required by the methodologies, are reasonable in the context of the proposed CDM PoA and that no reasonable alternative scenario has been excluded. Use the table below for this purpose:	The baseline scenario is defined as the most likely scenario in the absence of the proposed CDM project activity. As per approved methodology, ACM0016, Version 03, <i>"If the project activity is deemed to be additional, then the baseline scenario is assumed to be the continuation of the use of current modes of transport provided that the project participant can provide an explanation showing that the existing transport system would be sufficient to meet the transportation demand that will be met by the project system."</i>	OK

Alternative Scenario Ref.	Description in the PoA-DD	Cross-checked with	Validation Opinion
1	Continuation of existing conventional transport system which includes buses, taxis, cars, or two wheelers	Team confirmed the suitability of the existing transport system through the review of transport survey and from its local expertise.	This scenario is consistent with that described in the applied methodology.
2	MRTS transport system	This is the project case and confirmed from the DPR and is in line with the approved methodology.	This scenario is consistent with that described in the applied methodology.

<p>5. Determine whether the baseline scenario identified is reasonable by validating the assumptions, calculations and rationales used, as described in the PoA-DD Section II Generic CPA. It shall be ensured that documents and sources referred to in the Generic CPA are correctly quoted and interpreted. Cross check the information provided in the PoA-DD Section II Generic CPA with other verifiable and credible sources, such as local expert opinion. The table above may be used for this purpose.</p>	<p>The baseline scenario is defined as the most likely scenario in the absence of the proposed CDM project activity. As per approved methodology, ACM0016, Version 03, <i>"If the project activity is deemed to be additional, then the baseline scenario is assumed to be the continuation of the use of current modes of transport provided that the project participant can provide an explanation showing that the existing transport system would be sufficient to meet the transportation demand that will be met by the project system."</i></p> <p>The validation team confirms the Additionality of the project based on the steps provided in section 5b above.</p> <p>The baseline scenario was considered reasonable from the review of the survey conducted by the PP. Team further confirmed the suitability of the baseline scenario from its sectoral and host country expertise.</p>	<p>OK</p>
<p>6. Is the identified baseline scenario in line with regulatory or legal requirements and does it take into account relevant national and/or sectoral policies?</p>	<p>Identified baseline scenario, i.e. use of conventional mode for urban transport, is in line with regulatory and legal requirement of the host country. It may also be noted that conventional mode of transport will be operational in the project scenario as well.</p>	<p>OK</p>
<p>7. If applicable, identify the type of national and/or sectoral policies:</p> <ul style="list-style-type: none"> - E+: Those adopted after the adoption of the Kyoto Protocol (11 December 1997) shall not be taken into account in identifying the baseline scenario. Please describe how the baseline scenario refers to the hypothetical situation without these national and or sectoral policies. - E-: Those adopted after the adoption of the M&P for a CDM (11 November 2001) shall not be taken into account in identifying the baseline scenario. Please describe the hypothetical situation without these national and/or sectoral regulations being taken into account for the baseline identification. 	<p>No such sectoral policies, which could be classified as E+ or E-, are identified for the project activity.</p>	<p>OK</p>

<p>8. Is this identification supported by official and/or verifiable documents (for example, studies, web pages, certificates, etc)?</p>	<p>The identification of the baseline scenario is supported by the baseline traffic survey report which is prepared by Senes Consultants India Private Limited. The traffic survey was conducted following the requirements in the applied methodology.</p>	<p>OK</p>
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	Validated situation	Conclusion
SECTION 6c. Algorithms and/or formulae used to determine emission reductions		
<p>1. Compare the equations and parameters in the PoA-DD and the specific CPA to those in the selected approved methodologies and determine if they have been correctly applied to calculate project emissions, baseline emissions, leakage, and emission reductions.</p> <p>Confirm that adequate justification has been provided for selection between different options.</p>	<p>The PP has applied the methodology ACM0016, Version 03.0.0. The applied methodology has been correctly used for calculation of the baseline emissions, project emissions, leakage emissions and emission reduction. The summary of the validation is as below:</p> <p>Baseline Emissions</p> <p>Baseline emissions include the emissions that would have happened due to conventional passenger transport system existed in absence of the project activity.</p> <p>In the baseline determination section, it was identified that a similar MRTS project (UNFCCC Ref: 4463) exists in the host city. Existence of this Metro was considered during the baseline emissions to avoid any chances of double counting. The existing metro has been identified as baseline mode of transportation existing in the host city. Therefore, emissions from the existing metro are correctly accounted as baseline emissions.</p> <p>Baseline emissions are calculated as the summation of the product of individual baseline emissions per surveyed passenger and individual expansion factor, and by scaling it up to the total number of passengers surveyed. Baseline emissions are calculated as follows:</p> $BE_y = \frac{P_y}{P_{SPER}} \sum_p (BE_{p,y} \cdot FEX_{p,y})$ <p>Where:</p> <p>BE_y Baseline emissions in year y (tCO₂)</p> <p>$BE_{p,y}$ Baseline emissions per surveyed passenger p in year y (tCO₂)</p> <p>$FEX_{p,y}$ Expansion factor for each surveyed passenger p surveyed in year y (each surveyed passenger has a different expansion factor)</p>	<p>CAR-06 OK</p>

	Validated situation	Conclusion								
	<div><div><div><div>P_y</div><div>Total number of passengers in year y</div></div><div><div>P_{SPER}</div><div>Number of passengers in the time period of the survey (1 week)</div></div><div><div>p</div><div>Surveyed passenger (each individual)</div></div><div><div>y</div><div>Year of the crediting period</div></div></div><div>The methodology provides stepwise approach for calculation of these emissions. Validation of the stepwise approach followed by the PP is described below:</div><div>Step 1: The PP has conducted traffic survey, following the procedures presented in Annex 4 of the applied methodology. The survey result includes the trip distance per transport mode that would have taken place in the baseline is determined for each passenger surveyed. To confirm the survey procedures following the applied methodology validation team checked the following parameters as below:</div><table><tr><th>Methodology requirement</th><th>Validation Opinion</th></tr><tr><td>Target population is aged above 12 years</td><td>Yes. Team confirmed that the traffic survey methodology includes that all people aged above 12 years were considered. Team also confirmed this from the interview of the agency involved with the traffic survey.</td></tr><tr><td>Passenger flow in all stations of MRTS</td><td>Yes. During the survey the project had not started. Therefore, the survey was conducted at the station of the existing Metro stations which falls within 1km radius of the metro line included in first CPA. A total of 51 such stations were identified.</td></tr><tr><td>Sample design to include stratified simple random sampling</td><td>The sample design includes all stations as a part of strata. Stations of the</td></tr></table></div>	Methodology requirement	Validation Opinion	Target population is aged above 12 years	Yes. Team confirmed that the traffic survey methodology includes that all people aged above 12 years were considered. Team also confirmed this from the interview of the agency involved with the traffic survey.	Passenger flow in all stations of MRTS	Yes. During the survey the project had not started. Therefore, the survey was conducted at the station of the existing Metro stations which falls within 1km radius of the metro line included in first CPA. A total of 51 such stations were identified.	Sample design to include stratified simple random sampling	The sample design includes all stations as a part of strata. Stations of the	
Methodology requirement	Validation Opinion									
Target population is aged above 12 years	Yes. Team confirmed that the traffic survey methodology includes that all people aged above 12 years were considered. Team also confirmed this from the interview of the agency involved with the traffic survey.									
Passenger flow in all stations of MRTS	Yes. During the survey the project had not started. Therefore, the survey was conducted at the station of the existing Metro stations which falls within 1km radius of the metro line included in first CPA. A total of 51 such stations were identified.									
Sample design to include stratified simple random sampling	The sample design includes all stations as a part of strata. Stations of the									

Validated situation		Conclusion
		<p>existing metro line were divided based on its passenger flow into: high, medium and low. Further, sub-strata was build based on time of day to peak and off-peak. Intervals 8AM to 11AM and 3PM to 7PM are peak hours; and 5AM to 8AM, 11AM to 3PM and 7PM to 11 PM are off-peak hours.</p> <p>A two-stage probabilistic design was correctly applied in the survey. In first stage, simple random sampling was conducted based on the stations identified. In second stage, systematic sampling based on passenger flow per station was done.</p>
	Survey was conducted with global level of precision, i.e. between 5% and 10%. Results are obtained based on 90/10 confidence/precision level.	The sample size for the survey was estimated based on coefficient of variation of 5%-10%. The estimated sample size was 4000 based on Sarndal methodology used in the survey.
	Survey to cover the region where MRTS operates.	Survey was conducted at the existing metro in National Capital Region (NCR). NCR is the boundary of the first CPA.
	Population size estimation	Population size was estimated based on the passenger flow data available at the DMRC for the existing stations surveyed. A total of 4943784 passengers for seven days (period when survey was conducted) were found.
	Sample size	A sample size of 4000 was estimated

Validated situation		Conclusion
	for coefficient of variation of 5% - 10%. In the traffic survey 6709 samples were taken. After removing the redundant or incorrect entries a total of 5839 samples were considered.	
Information to be collected based on face-to-face application of the established questionnaire on random base	Team confirmed from the review of traffic survey report, interview of the survey team, and a mock demonstration during site visit, that face-to-face interview was conducted randomly.	
Consistency check using Cronbach's alpha	Team confirmed from the review of traffic survey report, that data consistency was checked during the survey. A value of over 0.7 confirms consistency check. The cronbach's alpha for the traffic survey was found to be 0.72, within the prescribed range. Therefore, it can be concluded that the survey results were reasonably consistent.	
<p>Step 2: The PP has calculated the individual baseline emissions for each surveyed passenger as per below equation.</p> <p>The baseline emissions per surveyed passenger p are calculated based on the mode used, the trip distance per mode and the emission factor per mode:</p> $BE_{p,y} = \sum_i BTD_{p,i,y} \cdot EF_{PKM,i,y} \times 10^{-6}$ <p>Where:</p> <p>$BE_{p,y}$ Baseline emissions per surveyed passenger p in year y (tCO₂)</p> <p>$EF_{PKM,i,y}$ Emission factor per passenger-kilometre of mode i in year y</p>		

	Validated situation	Conclusion
	<p>(gCO₂/PKM)</p> <p>BTD_{p,i,y} Baseline trip distance per surveyed passenger <i>p</i> using mode <i>i</i> in year <i>y</i> (PKM)</p> <p><i>p</i> Surveyed passenger (each individual)</p> <p><i>i</i> Relevant vehicle category</p> <p><i>y</i> Year of the crediting period</p> <p>The PoA requires all CPAs to carry out traffic survey and identify the vehicle categories operational at that time. For CPA:001, a traffic survey was carried out and broad vehicle categories are identified. The relevant vehicle categories identified in the baseline survey for CPA:001 are:</p> <ul style="list-style-type: none"> • Conventional Bus system • Passenger Car • Taxis • Two-wheeler • Existing Metro • Suburban Train • Auto rickshaw (three wheeled Motorised vehicle) • Non-motorized, i.e. Travel by puller rickshaw, bicycle, or walk • Other categories <p>If some vehicle does not fit in categories identified at the CPA then, following the methodological requirements, its baseline emissions are counted as 0 and indirect project emissions as the highest factor of all categories.</p> <p>Determination of the emission factor per passenger-kilometre ($EF_{PKM,i,y}$)</p> <p>Passenger-kilometre (PKM) is defined as the average passenger trip distance multiplied by the number of passengers. The emission factors per PKM are determined ex ante for each vehicle category. Any change in the occupancy rate of taxis and buses influencing the corresponding emission factors is monitored</p>	

	Validated situation	Conclusion
	<p>as leakage. The emission factor per PKM is calculated as follows:</p> <p><i>Emission factor per PKM for electricity-based transport systems (Existing metro rail):</i></p> $EF_{PKM,i,y} = \frac{TE_{EL,i,y}}{P_{EL,i,y} \cdot TD_{EL,i}} \times 10^6$ <p>Where:</p> <p>$EF_{PKM,i,y}$ Emission factor per passenger-kilometre for electricity-based vehicle category i for year y (gCO₂/PKM)</p> <p>$TE_{EL,i,y}$ Total emissions from the electricity-based vehicle category i for year y (tCO₂)</p> <p>$P_{EL,i,y}$ Total passengers transported per year by the electricity-based vehicle category i for year y (passengers)</p> <p>$TD_{EL,i}$ Average trip distance travelled by passengers using the electricity-based vehicle category i prior to project start (km)</p> <p>The total emissions from the existing metro rail category i, $TE_{EL,i,y}$, is calculated, using the 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption'. When applying the tool, the parameter $EC_{BL,k,y}$ in the is taken as the amount of electricity used by the electricity-based vehicle category i for year y, consistent with the transportation of $PE_{L,i,y}$ passengers along the average distance $TD_{EL,i}$.</p> <p>For fuel-based vehicle categories identified above (bus/taxi/passenger car/Auto rickshaw/motorcycle), the emission factor per PKM is calculated as follows:</p>	

	Validated situation	Conclusion
	$EF_{PKM,i,y} = \frac{EF_{KM,i,y}}{OC_i}$ <p>Where:</p> <p>$EF_{PKM,i,y}$ Emission factor per passenger-kilometre of vehicle category i in year y (gCO₂/PKM)</p> <p>$EF_{KM,i,y}$ Emission factor per kilometre of vehicle category i in year y (gCO₂/km)</p> <p>OC_i Average occupation rate of vehicle category i prior to the project start (passengers)</p> <p>i Relevant vehicle category</p> <p>y Year of the crediting period</p> <p><i>Determination of the average occupation rate (OC_i)</i></p> <p>The average occupation rate of vehicle category i were determined based on visual occupation study for all vehicle categories i. In the case of taxis and auto rickshaws, the driver is not included in the study.</p> <p>The occupation studies have been conducted as per the guidance provided under Annex 1, and 3 of the methodology. For buses, the occupation rate is based on an average trip distance of bus passengers, total passengers and total distance driven by buses, using the following equation:</p> $OC_B = \frac{PBL_B \cdot TDBL_{P,B}}{DD_B}$ <p>Where:</p> <p>OC_B Average occupation rate of buses prior to the project start (passengers)</p>	

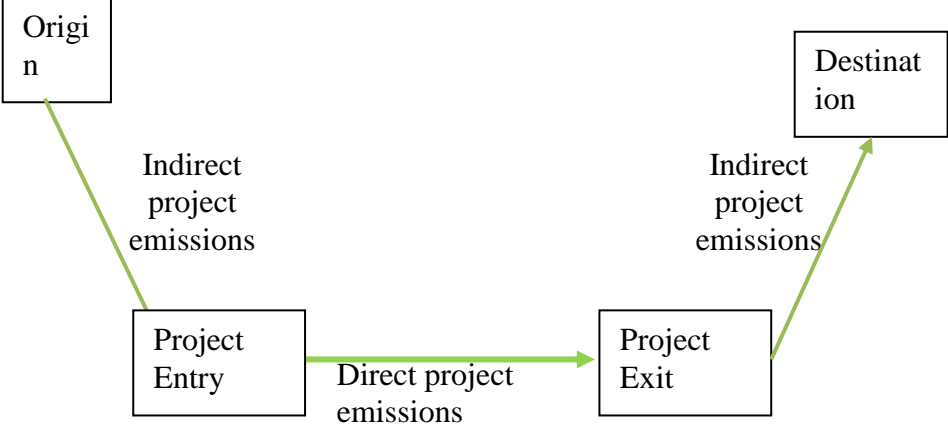
	Validated situation	Conclusion
	<p>PBL_B Passengers transported by baseline buses prior to the project start (passengers)</p> <p>TDBL_P Average trip distance travelled by passengers using baseline buses prior to the project start (kilometre)</p> <p>DD_B Total distance driven by all buses prior to the project start (kilometre)</p> <p>For CPA:001, the occupation rate for buses has been determined based on visual occupation study.</p> <p><u>Occupancy rate of taxis/motorcycles or passenger cars:</u></p> <p>Load factor studies for taxis/motorcycles or passenger cars are carried out through visual occupation as per Annex 3 of ACM0016. The actual number of passengers excluding the driver of taxis is counted in a given point within a given time period.</p> <p>The procedures to establish visual occupation:</p> <ol style="list-style-type: none"> (1) Locations, days and times for field study were defined, avoiding days immediately after or before a holiday. (2) Field data is collected. Coverage of the occupation counts should be higher than 95% of the number of taxis that cross the checkpoint. One hundred per cent coverage is desired. To control this outcome a separate vehicle count is advised. Data can be adjusted with the actual count (3) Occupation is the number of passengers using the vehicle. The driver is not counted for taxis. Taxis without passengers were counted as no (zero) occupation; (4) The total number of vehicles and the total number of passengers was reported. The average occupation rate of vehicles is the total number of passengers divided by the total number of vehicles in which counts were performed; (5) The study is realized in different locations of the larger urban zone of 	

	Validated situation	Conclusion
	<p>the city</p> <p>The field data for taxi/motorcycles or passenger cars were also collected at nine locations whereby simultaneously vehicular count was being carried out by separate data collectors. It was found that in all the locations (survey points), coverage of occupation points has been higher than 95% of the vehicular count at those survey points.</p> <p>This procedure is in accordance with the applied methodology.</p> <p>Step 3: The PP has applied an individual expansion factor to the surveyed passenger in accordance with the survey sample design (as defined in Annex 4 of the applied methodology). The results has been summarised for calculation of the total baseline emissions of the period (week) surveyed. To calculate the annual baseline emissions the baseline emissions of the surveyed period (week) are calculated per passenger of the period (week) and multiplied with the total passengers transported per year (or monitoring period), as per equation 1 below.</p> <p>Step 4: The PP has correctly taken the lower limit of the 95% confidence interval as total baseline emissions in accordance with the procedures described in Annex 4 of the applied methodology.</p> <p><u>Determination of the emission factors per kilometre ($EF_{KM,i,y}$)</u></p> <p>Relevant fuel types, for each vehicle category, have to be identified. The emission factor per kilometre is re-calculated annually based on the recorded (last available official records) share of fuels per category. In case biofuel blends are used, the biofuel share of the blend should be accounted for with zero emission factor ($EF_{CO_2,x,y}$).</p> <p>The emission factor per kilometre is not constant, but annually updated. Two options can be used to calculate $EF_{KM,i,y}$. For each vehicle category the project can choose which option to take. During the crediting period the project cannot change between one and the other option, i.e. the decision is fixed for the crediting period. Rail-based vehicles must monitor annually their electricity</p>	

	Validated situation	Conclusion
	<p>consumption plus passengers transported (see equation 3).</p> <p><u>Option 1: Annual monitoring of the specific fuel consumption (SFC) of the respective vehicle category i:</u></p> $EF_{KM,i,y} = \frac{\sum_x (SFC_{i,x,y} \cdot NCV_{x,y} \cdot EF_{CO_2,x,y} \cdot N_{x,i})}{N_i}$ <p>Where:</p> <p>$EF_{KM,i,y}$ Emission factor per kilometre of vehicle category i in year y (gCO₂/km)</p> <p>$SFC_{i,x,y}$ Specific fuel consumption of vehicle category i using fuel type x in year y (mass or volume units of fuel/km)</p> <p>$NCV_{x,y}$ Net calorific value of fuel type x in year y (J/mass or volume units of fuel)</p> <p>$EF_{CO_2,x,y}$ Carbon emission factor for fuel type x in year y (gCO₂/J)</p> <p>N_i Number of vehicles of category i prior to the project start (units)</p> <p>$N_{x,i}$ Number of vehicles in vehicle category i using fuel type x prior to the project start (units)</p> <p>y Year of the crediting period</p> <p><u>Option 2: Use of a fixed technology improvement factor (IR) for the respective vehicle category i:</u></p> $EF_{KM,i,y} = (IR_i)^{t+y} \cdot \frac{\sum_x (SFC_{i,x} \cdot NCV_{x,y} \cdot EF_{CO_2,x,y} \cdot N_{x,i})}{N_i}$ <p>Where:</p> <p>$EF_{KM,i,y}$ Emission factor per kilometre of vehicle category i in year y (g CO₂/km)</p>	

	Validated situation	Conclusion						
	<p>$SFC_{i,x}$ Specific fuel consumption of vehicle category i using fuel type x prior to the project start (mass or volume units of fuel/km)</p> <p>$NCV_{x,y}$ Net calorific value of fuel x in year y (J/mass or volume units of fuel)</p> <p>$EF_{CO_2,x,y}$ Carbon emission factor for fuel type x in year y (g CO₂/J)</p> <p>N_i Number of vehicles of category i prior to the project start (units)</p> <p>IR_i Technology improvement factor for vehicle category i per year $t+y$ (ratio)</p> <p>Number of vehicles in vehicle category i using fuel type x prior to the project start (units)</p> <p>t Years of annual improvement (dependent on age of data per vehicle category)</p> <p>y Year of the crediting period</p> <p>PP has fixed option 2 for calculation of emission factor per kilometre, i.e. using fixed technology improvement factor, at the PoA level. The fixed technology improvement factor is being sourced from the applied methodology.</p> <p>Technology improvement factors are listed in the following table of the applied methodology:</p> <p>Default Technology Improvement Factors (per annum)</p> <table><tr><th>Vehicle Category</th><th>Technology Improvement Factor (IR)</th></tr><tr><td>Buses</td><td>0.99</td></tr><tr><td>Passenger cars</td><td>0.99</td></tr></table>	Vehicle Category	Technology Improvement Factor (IR)	Buses	0.99	Passenger cars	0.99	
Vehicle Category	Technology Improvement Factor (IR)							
Buses	0.99							
Passenger cars	0.99							

Validated situation		Conclusion
Taxis	0.99	
	Motorcycles (incl. tricycles)	
<p>Baseline emissions cover the entire emissions which would have been caused by the project passenger in absence of the project from his trip origin to his trip destination:</p> <p>The origin and destination of the trip are assumed to be equal for the baseline as for the project case with an exception of induced traffic included only as project but not as baseline trips;</p> <p>The trip distance and the modes used between O (origin) and D (destination) are however different in the baseline than in the project case;</p> <p>The trip distance may vary as some passengers using the project MRTS may be willing e.g. to make detours due to the higher speed of the MRTS versus conventional bus transport.</p> <p>To fully capture all potential changes the methodology compares emissions per O-D trip of the baseline with emissions per O-D trip of the project. The data to determine O-D mode(s) and distances per mode are derived from a representative survey of project passengers realized annually. Total baseline emissions are calculated thereafter annually based on these parameters, the emissions per PKM and the amount of passengers transported by the project.</p> <p>Project Emissions</p> <p>Project emissions are based on the fuel and/or electricity consumed by the MRTS (direct project emissions) plus emissions caused by project passengers from their trip origin to the entry station of the project and from the exit station of the project to their final destination (indirect project emissions), as described below.</p>		

	Validated situation	Conclusion
	<div data-bbox="943 316 1888 742">  </div> <p data-bbox="943 802 1543 831">Figure 2: Direct and Indirect Project Emissions</p> <p data-bbox="943 842 1458 871">Project emissions are calculated as follows:</p> $PE_y = DPE_y + IPE_y$ <p data-bbox="943 943 1032 971">Where:</p> <p data-bbox="943 986 1451 1018">PE_y Project emissions in year y (tCO₂)</p> <p data-bbox="943 1032 1523 1064">DPE_y Direct project emissions in year y (tCO₂)</p> <p data-bbox="943 1078 1541 1110">IPE_y Indirect project emissions in year y (tCO₂)</p> <p data-bbox="943 1125 1559 1157">Determination of direct project emissions (DPE_y)</p> <p data-bbox="943 1168 1713 1197"><i>Case 1: Use of fossil fuels in the project activity transport system</i></p> <p data-bbox="943 1208 1888 1329">If the project transport system uses fossil fuels, the latest version of the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” shall be used. However, for the rail based metro system no fossil fuel will be used for traction energy. <i>Case 2: Use of electricity in the project activity transport system</i></p> <p data-bbox="943 1340 1872 1369">If the project activity involves electricity-based transport systems (e.g. electrical</p>	

	Validated situation	Conclusion
	<p>railway systems), the emissions from electricity consumption are based on the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". The parameter $PE_{EC,y}$ in the tool corresponds to the direct project emissions from the project transport system in year y (DPE_y). Only electricity consumed for train propulsion should be included in rail-based MRTS.</p> $PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$ <p> $PE_{EC,y}$ Project emissions from electricity consumption in year y (tCO₂/yr) $EC_{PJ,j,y}$ Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr) $EF_{EL,j,y}$ Emission factor for electricity generation for source j in year y (tCO₂/MWh) $TDL_{j,y}$ Average technical transmission and distribution losses for providing electricity to source j in year y j Sources of electricity consumption in the project </p> <p>The grid emission factor used above has been fixed ex-ante by the PP following the "Tool to calculate emission factor for an electricity system". The PP has used Since electricity for train propulsion will be imported from grid, hence the baseline emission factor has been considered from the "CO₂ Baseline Database (Version 07, January 2012)" published by Central Electricity Authority. The emission factor so calculated from the data sources published by CEA for the latest year is based on combined margin approach.</p> <p><u>Calculation of the emission factor</u> The baseline emission factor is calculated as a Combined Margin (CM) consisting of Operating Margin (OM) and Build Margin (BM) factors based on data from an official source publicly available. The CM emission factor (EF) for the displaced electricity was calculated based on the 'Tool to calculate the emission factor for an electricity system' Version 03 (hereinafter referred to as "the tool"), in accordance with the applied methodology. This is the currently</p>	

	Validated situation	Conclusion			
	<p>active version of the tool.</p> <p>The PP uses the EF for the grid electricity as calculated in CO₂ Baseline Database for the Indian Power Sector published by the Central Electricity Authority (CEA), Ministry of Power, Government of India. The CEA publishes on an annual basis the General Review and the Performance Review of Thermal Power Stations which is used by the majority of CDM project promoters. The database for baseline estimation issued by the CEA has been developed consistently with the availability of data in India. The database is an official publication of the Government of India for the purpose of CDM baselines. The CEA Database Version 7.0 has been applied as it was current at the time of submission of the PoA-DD for validation. The step wise estimation of Combined Margin Emission Factor is provided as below:</p> <p>Step 1 of the <i>tool</i> requires identification of the relevant electric power system. In line with the requirements specified in the tool, the PP has selected the regional grid based on the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity. The Indian electricity system is divided into two grids, the Integrated Northern, Eastern, Western, and North-Eastern regional grids (NEWNE) and the Southern Grid. Each grid covers several states. The PoA-DD covers both the NEWNE Grid as well as Southern Grid. Therefore, the validation team confirmed the applicability of Step 1 of the <i>tool</i>.</p> <p>Step 2 of the <i>tool</i> gives the PP an option to include off-grid power plants in the project electricity system. The PP has chosen only grid power plants for analysis.</p> <p>Step 3 of the <i>tool</i> requires selection of a method for estimation of operating margin. Of the four methods provided in the <i>tool</i> for calculating the operating margin ($EF_{grid,OM,y}$), the PP has selected simple OM method since the low-cost/must-run resources constitute less than 50% of total grid generation on average of the five most recent years, i.e from 2006-07 to 2010-11.</p> <table border="1"> <tr> <td>Year</td><td>NEWNE</td><td>Southern</td></tr> </table>	Year	NEWNE	Southern	
Year	NEWNE	Southern			

	Validated situation			Conclusion															
	<table><tr><td>2006-07</td><td>18.46%</td><td>28.3%</td></tr><tr><td>2007-08</td><td>19.04%</td><td>27.1%</td></tr><tr><td>2008-09</td><td>17.41%</td><td>22.8%</td></tr><tr><td>2009-10</td><td>15.94%</td><td>20.6%</td></tr><tr><td>2010-11</td><td>17.64%</td><td>21.0%</td></tr></table>			2006-07	18.46%	28.3%	2007-08	19.04%	27.1%	2008-09	17.41%	22.8%	2009-10	15.94%	20.6%	2010-11	17.64%	21.0%	
	2006-07	18.46%	28.3%																
	2007-08	19.04%	27.1%																
	2008-09	17.41%	22.8%																
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	Low operating cost/must run resources include hydro and nuclear.																		
	The tool provides two options – (i) ex-ante option and (ii) ex-post option in calculating the simple OM. The PP has chosen the ex-ante option for determining the OM. This choice of ex-ante option which is based on a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PoA-DD to the DOE for validation, was found acceptable in view of the availability of the requisite data vintages.																		
	<p>Step 4 of the <i>tool</i> requires the calculation of the operating margin emission factor according to the Simple OM method chosen as per Step 3 above. In validating Step 3, LRQA confirmed the calculations with respect to the OM emission factor for the last three years for the NEWNE Grid and arrived at the following summary:</p>																		
	NEWNE Grid:																		
<table><tr><th>Year</th><th>Absolute emissions (including imports) (tCO₂)</th><th>Net generation (including imports) (GWh)</th><th>Specific emissions (tCO₂/MWh)</th></tr><tr><td>2008-09</td><td>430,502,442</td><td>427,700</td><td>1.00655</td></tr><tr><td>2009-10</td><td>453,067,520</td><td>463,384</td><td>0.97774</td></tr><tr><td>2010-11</td><td>468,438,871</td><td>482,597</td><td>0.97066</td></tr></table>			Year	Absolute emissions (including imports) (tCO ₂)	Net generation (including imports) (GWh)	Specific emissions (tCO ₂ /MWh)	2008-09	430,502,442	427,700	1.00655	2009-10	453,067,520	463,384	0.97774	2010-11	468,438,871	482,597	0.97066	
Year	Absolute emissions (including imports) (tCO ₂)	Net generation (including imports) (GWh)	Specific emissions (tCO ₂ /MWh)																
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	Validated situation	Conclusion																
	<p>$EF_{gridOM} = (430,502,442 + 453,067,520 + 468,438,871) / (427,700 + 463,384 + 482,597) \times 1000$</p> <p>= 0.9842 tCO₂/MWh</p> <p>Southern Grid:</p> <table><tr><th>Year</th><th>Absolute emissions (including imports) (tCO₂)</th><th>Net generation (including imports) (GWh)</th><th>Specific emissions (tCO₂/MWh)</th></tr><tr><td>2008-09</td><td>117880640.1</td><td>127797.1945</td><td>0.97292</td></tr><tr><td>2009-10</td><td>126786214.7</td><td>135773.9722</td><td>0.94150</td></tr><tr><td>2010-11</td><td>129093635.8</td><td>145076.4566</td><td>0.94188</td></tr></table> <p>$EF_{gridOM} = (117880640.1 + 126786214.7 + 129093635.8) / (127797.1945 + 135773.9722 + 145076.4566) \times 1000$</p> <p>= 0.9514 tCO₂/MWh</p> <p>Step 5 of the <i>tool</i> requires calculation of the build margin emission factor. The CEA database provides a BM value for the NEWNE grid as 0.8588. As part of validation of Step 5 of the tool, LRQA confirmed the BM for the year 2010-11 as per the following summary:</p> <p>NEWNE Grid</p>	Year	Absolute emissions (including imports) (tCO ₂)	Net generation (including imports) (GWh)	Specific emissions (tCO ₂ /MWh)	2008-09	117880640.1	127797.1945	0.97292	2009-10	126786214.7	135773.9722	0.94150	2010-11	129093635.8	145076.4566	0.94188	
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Validated situation					Conclusion															
Year	Absolute emissions (tCO ₂)	Net Generation (GWh)	Specific emissions (tCO ₂ /MWh) BM																	
2010-11	101,146,601	117,779	0.8588																	
Southern Grid																				
Year	Absolute emissions (tCO ₂)	Net Generation (GWh)	Specific emissions (tCO ₂ /MWh) BM																	
2010-11	25,882,886	35,268	0.7338																	
<p>Step 6 of the <i>tool</i> requires calculation of the combined margin emission factor as per the following equation:</p> $EF_{CO_2,grid,y} = EF_{91grid,OM,y} \times w_{OM} + EF_{91grid,BM,y} \times w_{BM}$ <p>According to the guidance on selecting alternative weights in the tool, the default weights applicable for the MRTS projects will be $w_{OM} = 0.5$ and $w_{BM} = 0.5$.</p> <p>The combined emission factor for electricity consumption has been fixed <i>ex ante</i> as follows:</p> <table><tr><td></td><td>Unit</td><td>Value</td></tr><tr><td>NEWNE Grid</td><td>tCO₂/MWh</td><td>0.9219</td></tr><tr><td>Southern Grid</td><td>tCO₂/MWh</td><td>0.8430</td></tr></table> <table><tr><td>Traction Energy</td><td>Emission factor</td><td>TDL_y</td><td>DPE_y</td></tr><tr><td>x</td><td>y</td><td>z</td><td>x*y*(1+_z)</td></tr></table>						Unit	Value	NEWNE Grid	tCO ₂ /MWh	0.9219	Southern Grid	tCO ₂ /MWh	0.8430	Traction Energy	Emission factor	TDL _y	DPE _y	x	y	z
	Unit	Value																		
NEWNE Grid	tCO ₂ /MWh	0.9219																		
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Traction Energy	Emission factor	TDL _y	DPE _y																	
x	y	z	x*y*(1+_z)																	

	Validated situation	Conclusion								
	<p>The traction energy will vary for each CPA and depend on the estimated value from DPR or project feasibility report.</p> <p>In some MRTS system, the Receiving Substation (RSS) supplies electricity to various lines of the MRTS system (both project and non-project lines) In the event, the RSS supplies dedicatedly to the CPA MRTS line, then the total reading of the meter for traction energy will be monitored and used for the calculation of direct project emissions. In case the RSS supplies electricity to other lines of the MRTS system along with the CPA line, then the following formula will be used to calculate traction energy used by CPA/project MRTS line during the monitoring period:</p> $TE_{CPA,y} = TE_{Total-RSS,y} * \frac{Car - km_{CPA-MRTS,y}}{Car - km_{RSS-Total,y}}$ <p>Where,</p> <table> <tr> <td>TE_{CPA,y}</td> <td>Traction energy consumed by CPA MRTS line in year y</td> </tr> <tr> <td>TE_{Total-RSS, y}</td> <td>Total traction energy supplied by RSS in year y</td> </tr> <tr> <td>Car-km_{CPA-MRTS,y}</td> <td>Total car-km of CPA MRTS line in year y</td> </tr> <tr> <td>Car-km_{RSS-Total,y}</td> <td>Total car-km supplied traction energy by the RSS in year y</td> </tr> </table> <p>Determination of indirect project emissions (IPE_y)</p> <p>Indirect project emissions are those caused by passengers from their trip origin up to the project activity entry station, and from the project activity exit station up to the trip final destination.</p> <p>The survey realized identifies the origin, project entry station, project exit station and final destination of the passenger plus the modes used between the different points, e.g. bike from origin to project entry station and taxi from project exit station to final destination;</p>	TE _{CPA,y}	Traction energy consumed by CPA MRTS line in year y	TE _{Total-RSS, y}	Total traction energy supplied by RSS in year y	Car-km _{CPA-MRTS,y}	Total car-km of CPA MRTS line in year y	Car-km _{RSS-Total,y}	Total car-km supplied traction energy by the RSS in year y	
TE _{CPA,y}	Traction energy consumed by CPA MRTS line in year y									
TE _{Total-RSS, y}	Total traction energy supplied by RSS in year y									
Car-km _{CPA-MRTS,y}	Total car-km of CPA MRTS line in year y									
Car-km _{RSS-Total,y}	Total car-km supplied traction energy by the RSS in year y									

	Validated situation	Conclusion
	<p>The distances between origin and entry and between exit and destination are calculated based, e.g. on public transit routes, electronic maps and GPS (identical to baseline trip determination);</p> <p>The emission factors per passenger-kilometre used for indirect project emissions are identical to the baseline passenger-kilometre factors ($EF_{PKM,i,y}$).</p> <p>The next steps should be followed to determine indirect project emissions:</p> <p>Step 1: Conduct a survey, following the procedures presented in Annex 4, in which for each surveyed passenger the trip distance per transport mode used to/from the MRTS is determined.</p> <p>Step 2: Calculate indirect project emissions for each surveyed passenger, as per equation 13 below.</p> <p>Step 3: Apply to each surveyed passenger an individual expansion factor in accordance with the survey sample design (as defined in Annex 4), and summarize these to get the total indirect project emissions for the survey period (week). To get the annual (or monitoring period) indirect project emissions the indirect project emissions of the surveyed period (week) are calculated per passenger of the survey period (week) and multiplied with the total passengers transported per year (or period), as per equation 12 below.</p> <p>Step 4: Apply the upper 95% confidence interval to the total indirect project emissions (see Annex 4).</p> $IPE_y = \frac{P_y}{P_{SPER}} \sum_p (IPE_{p,y} \cdot FEX_{p,y}) \times 10^{-6}$ <p>Where:</p> <p>IPE_y Indirect project emissions in year y (t CO₂)</p> <p>$IPE_{p,y}$ Indirect project emissions per surveyed passenger p in year y (g CO₂)</p> <p>$FEX_{p,y}$ Expansion factor for each surveyed passenger p in year y</p> <p>P_y Total number of passengers in year y</p>	

	Validated situation	Conclusion
	<p> P_{SPER} Number of passengers in the time period of the survey (1 week) p Surveyed passenger (each individual) y Year of the crediting period </p> <p>The indirect project emissions per surveyed passenger are calculated based on the transport mode used, trip distance per mode and emission factor per mode.</p> $IPE_{p,y} = \sum_i IPTD_{p,i,y} \times EF_{PKM,i,y}$ <p>Where:</p> <p> $IPE_{p,y}$ Indirect project emissions of surveyed passenger p in year y (gCO₂) $EF_{PKM,i,y}$ Emission factor per passenger-kilometre of mode i in year y (gCO₂/PKM) $IPTD_{p,i,y}$ Indirect project trip distance of surveyed passenger p using mode i in year y (km) </p> <p>Based on the surveyed passenger and the survey design, the corresponding expansion factors are applied to calculate total indirect project emissions. Total indirect project emissions are determined based on the upper limit of the 95% confidence interval as results are based on a sample/survey.</p> <p>Leakage</p> <p>Leakage emissions include the following sources:</p> <ul style="list-style-type: none"> Emissions due to changes of the load factor of taxis and buses of the baseline transport system due to the project (LE_{LFB,y} and LE_{LFT,y}), and Emissions due to reduced congestion on affected roads, provoking higher average vehicle speed, plus a rebound effect. (LE_{CON,y}), and Upstream Emissions of Gaseous Fuels (LE_{UP,y}). <p>The impact on traffic (additional trips) induced by the new transport system is included as project emissions and thus is not part of leakage. This is addressed by including, as project emissions, the emissions from the trips of passengers</p>	

	Validated situation	Conclusion
	<p>who would not have travelled in the absence of the project. Leakage emissions are calculated as follows:</p> $LE_y = LE_{LFB,y} + LE_{LFT,y} + LE_{CON,y} + LE_{UP,y}$ <p>Where:</p> <p>LE_y Leakage emissions in year y (tCO₂)</p> <p>$LE_{LFB,y}$ Leakage emissions due to change of load factor of buses in year y (tCO₂)</p> <p>$LE_{LFT,y}$ Leakage emissions due to change of load factor of taxis in year y (tCO₂)</p> <p>$LE_{CON,y}$ Leakage emissions due to change in congestion in year y (tCO₂)</p> <p>$LE_{UP,y}$ Leakage emissions due to upstream emissions of gaseous fuels in year y (tCO₂)</p> <p>As a conservative approach, it is assumed that for each components $LE_{LFB,y}$, $LE_{LFT,y}$, $LE_{CON,y}$, and $LE_{UP,y}$, only the positive value (leading to net emissions) is considered.</p> <p>Determination of emissions due to a change in load factor of buses ($LE_{LFB,y}$)</p> <p>The project could have a negative impact on the load factor of the conventional bus fleet. Load factor changes are monitored for the entire larger urban zone of the city as the potential impact is not necessarily in the proximity of the project MRTS (buses can be used in other parts of the larger urban zone of the city). The load factor of buses is monitored in the years 1 and 4 and of the crediting period. Leakage from load factor change of buses is only included if the load factor of buses has decreased by more than 10 percentage points comparing the monitored value with the baseline value, and are calculated as:</p> $LE_{LFB,y} = \max \left\{ \frac{1}{10^6} \cdot N_{B,y} \cdot AD_B \cdot EF_{KM,B,y} \cdot \left(1 - \frac{OC_{B,y}}{OC_B} \right); 0 \right\}$	

	Validated situation	Conclusion
	<p>Where:</p> <p>$LE_{LFB,y}$ Leakage emissions due to a change in load factor of buses in year y (tCO₂)</p> <p>$N_{B,y}$ Number of baseline buses in year y (buses)</p> <p>AD_B Average annual distance driven by baseline buses (km/bus)</p> <p>$EF_{KM,B,y}$ Emission factor per kilometre for baseline buses in year y (gCO₂/km)</p> <p>$OC_{B,y}$ Average occupancy rate of baseline buses in year y (passengers)</p> <p>OC_B Average occupancy rate of baseline buses prior to the project start (passengers)</p> <p>The occupancy rate of buses is monitored through boarding-alighting or through visual occupation studies or by other means to be described in the CPA-DD. The same monitoring method should be used for monitoring the baseline load factor before the project start and the load factor during the project execution. The detailed procedures concerning visual occupation studies and boarding-alighting studies are presented in Annexes 1 of the applied methodology.</p> <p>Determination of emissions due to a change in load factor of taxis ($LE_{LFT,y}$)</p> <p>The project could have a negative impact on the load factor of taxis. Taxis can include cars as well as motorized rickshaws providing taxi services. If both types of services exist, the load factor change is monitored separately for these two taxi categories. Load factor changes are monitored for the entire larger urban zone of the city as taxis operate all over the larger urban zone of the city and are not confined to deliver their services in certain areas. The load factor of taxis is monitored in the years 1 and 4 of the crediting period. This leakage is calculated as follows:</p>	

	Validated situation	Conclusion
	$LE_{LFT,y} = \max \left\{ N_{T,y} \cdot AD_T \cdot EF_{KM,T,y} \cdot \left(1 - \frac{OC_{T,y}}{OC_T} \right) \cdot \frac{1}{10^6}; 0 \right\} \quad (3)$ <p>Where:</p> <p>$LE_{LFT,y}$ Leakage emissions due to a change in load factor of taxis in year y (tCO₂)</p> <p>$N_{T,y}$ Number of baseline taxis in year y (taxis)</p> <p>AD_T Average annual distance driven by baseline taxis (km/taxi)</p> <p>$EF_{KM,T,y}$ Emission factor per kilometre for baseline taxis in year y (gCO₂/km)</p> <p>$OC_{T,y}$ Average occupancy rate of baseline taxis in year y (passengers)</p> <p>OC_T Average occupancy rate of baseline taxis prior to the project start (passengers)</p> <p>The maximum change in load factor attributed to taxis is the emission reductions due to passengers switching from taxis to the project (calculated by the emission factor per passenger-kilometre for taxis, trip distance and number of passengers transported by the project, which would have used taxis in absence of the project). This maximum condition is established as load factors might worsen citywide also due to factors external to the project and leakage from a change in load factor of taxis due to the project can at maximum be according to the number of passengers transported by the project which in absence of the latter would have taken a taxi.</p> <p>The occupancy rate of taxis is monitored through visual occupation studies counting the number of passengers. The detailed procedures concerning visual occupation studies for taxis are presented in Annex 3.</p> <p>The parameter emission factor per kilometre for baseline taxis in year y ($EF_{KM,T,y}$) is calculated using the equation for $EF_{KM,i,y}$ presented in the baseline emissions section, substituting i for T (taxis).</p> <p>Determination of emissions due reduced congestion ($LE_{CON,y}$)</p>	

	Validated situation	Conclusion
	<p>The project activity may reduce the number of remaining buses and potentially other vehicles on roads used by mixed traffic and, thus, also reduce congestion. On the other hand, MRTS project activities may also reduce the road space available for conventional buses and individual transport modes. Therefore, two effects resulting from reduced congestion are considered:</p> <ul style="list-style-type: none"> • Induced traffic effect (or rebound effect), i.e. more trips of passenger cars on the “affected roads”; • Changes in vehicle speed effect, i.e. change of emissions due to a reduced or increased speed of cars on “affected roads”. <p>In the case that the implementation of the project activity leads to a reduction of road capacity available for individual motorised transport modes, the impact of changes in congestion shall be monitored in the year 1 and 4 of the crediting period. In other cases (e.g., the project provides a new road infrastructure not taken from the existing road space in the city), monitoring of these changes is not required.⁷ This change in road capacity available for individual motorised transport modes may result from the reduction of road space due to the implementation of MRTS and/or a potential reduction of traffic flow due to the withdrawal of conventional public transport units as a result of the project activity. To determine whether road capacity is reduced the following procedure shall be applied:</p> <p>Step a): Determination of the additional road capacity available to motorised transport modes</p> <p>The following equation determines the additional road capacity, available to the transport modes remaining in operation, as a result of the implementation of project activity in the year when the project MRT system is intended to reach its planned capacity:</p> $ARS_y = \sum_y \frac{BSCR_y}{N_B} \times SRS - \frac{RS_{BL} - RS_{PJ}}{RS_{BL}} \quad (4)$	

⁷ Emission reductions due to the speed increase of the traffic flow generally overweight the increase in emissions resulting from the traffic induction of passenger cars as a result of reduced congestion.

	Validated situation	Conclusion
	<p>Where:</p> <p>ARS_y Additional road capacity available to individual motorised transport modes in year y when the project MRT system is intended to reach its planned capacity (in percentage)</p> <p>$BSCR_y$ Bus units retired as a result of the project in year y</p> <p>N_B Number of buses in use in the baseline (units)</p> <p>SRS Share of road space used by public transport in the baseline (in percentage)</p> <p>RS_{BL} Total road space available in the baseline (lane-kilometers)</p> <p>RS_{PJ} Total available road space in the project (= RSB minus kilometre of lanes that where reduced due to dedicating bus lanes to the project activity) (lane-kilometers)</p> <p>The following equation shall be used to determine SRS if no recent and good quality study is available which has calculated this parameter:</p> $SRS = \frac{TD_B \times 2.5}{TD_B \times 2.5 + TD_T + TD_C} \quad (5)$ <p>Where:</p> <p>SRS Share of road space used by public transport in the baseline (in percentage)</p> <p>TD_B Total distance driven by public transport buses in the baseline (kilometers)</p> <p>TD_T Total distance driven in kilometers by taxis in the baseline (kilometers)</p> <p>TD_C Total distance driven in by passenger cars in the baseline (kilometers)</p>	

	Validated situation	Conclusion								
	<p>It is assumed that one bus occupies 2.5 times more road space than a personal car or a taxi.</p> <p>For all distance variables the same vintage of data, the same spatial scope and the same time-span (e.g., one month or one year) is required.</p> <p>If ARS_y is negative, leakage emissions due to increased congestion as a result of the reduced road capacity due to the project activity shall be quantified as per Step b) below. If ARSy is positive, $LE_{CON,y}$ is assumed to be zero.</p> <p>The PoA covers only rail-based MRTS, the implementation of which has no effect on the road capacity of the urban zone. Apart from that as a result of implementation of the MRTS, few number of bus units are to be retired in the route of the MRTS. Thus, $BSCR_y$ is positive, hence ARS_y is positive. Thus $LE_{CON,y}$ is assumed to be zero.</p> <p>Upstream Emissions from Gaseous Fuels ($LE_{UP,y}$)</p> <p>Upstream leakage of gaseous fuels shall be only included if the project vehicles consume more gaseous fuels than baseline vehicles. In this case, and in order to simplify the calculations, the calculation of upstream leakage emissions is based only on the gaseous fuels used under the project activity. The projects under the PoA involve only rail-based MRTS which do not use gaseous fuels. Hence this leakage is not to be considered.</p> <p>CAR 06 was raised as the Section D.6 of CPA-DD does not specify what means are used to determine the occupancy rate. The CPA-DD was revised to state that occupancy rate was determined based on baseline traffic survey. Detail of the finding is provided in the finding log.</p>									
<p>2. Verify the justification given in the PoA-DD and the specific CPA for the choice of data and parameters used in the equations to determine estimated emission reductions.</p> <p>If data and parameters will not be monitored throughout the</p>	<table><tr><th>Data/Parameter title:OC_B</th><th>Comments</th></tr><tr><td>Value</td><td>Yes, 37.1</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/></td></tr></table>	Data/Parameter title: OC_B	Comments	Value	Yes, 37.1	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>	OK
Data/Parameter title: OC_B	Comments									
Value	Yes, 37.1									
Title in line with methodology?	Yes									
Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>									

	Validated situation		Conclusion
<p>crediting period and will remain fixed, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM PoA and will result in a conservative estimate of the emission reductions.</p> <p>If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, confirm that the estimates provided in the PoA-DD and the specific CPA-DD for these data and parameters are reasonable.</p> <p>List all data and parameters provided in the PoA-DD and in the specific CPA in the tables in next column.</p>	Fixed throughout the crediting period?	Yes	
	Data unit correctly expressed?	Yes, passengers	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes	
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology	
	Has this value been verified?	Yes, from the survey report	
	Choice of data correctly justified?	Yes,	
	Measurement method correctly described?	NA	
	Data/Parameter title: OC_c	Comments	
	Value	Yes, 1.91	
	Title in line with methodology?	Yes	
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>	
	Fixed throughout the crediting period?	Yes	
	Data unit correctly expressed?	Yes, passengers	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes	
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology	
	Has this value been verified?	Yes, from the survey report	
	Choice of data correctly justified?	Yes	
	Measurement method correctly described?	NA	
	Data/Parameter title: OC_T	Comments	
	Value	Yes, 2.31	

Validated situation		Conclusion
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, passengers
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology
	Has this value been verified?	Yes, from the survey report
	Choice of data correctly justified?	Yes
	Measurement method correctly described?	NA
	Data/Parameter title: OC_M	Comments
	Value	Yes, 1.37
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, passengers
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology
	Has this value been verified?	Yes, from the survey report
	Choice of data correctly justified?	Yes
	Measurement method correctly described?	NA

	Validated situation		Conclusion																								
	<table><tr><th>Data/Parameter title: OC_{MR}</th><th>Comments</th></tr><tr><td>Value</td><td>Yes, 1.65</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/></td></tr><tr><td>Fixed throughout the crediting period?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, passengers</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Value provided is considered reasonable?</td><td>Yes, based on survey report which is based on the procedure described in the applied methodology</td></tr><tr><td>Has this value been verified?</td><td>Yes, from the survey report</td></tr><tr><td>Choice of data correctly justified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>		Data/Parameter title: OC_{MR}	Comments	Value	Yes, 1.65	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>	Fixed throughout the crediting period?	Yes	Data unit correctly expressed?	Yes, passengers	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology	Has this value been verified?	Yes, from the survey report	Choice of data correctly justified?	Yes	Measurement method correctly described?	NA	
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	Value	Yes, 1.65																									
	Title in line with methodology?	Yes																									
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	Fixed throughout the crediting period?	Yes																									
	Data unit correctly expressed?	Yes, passengers																									
	Appropriate description of parameter?	Yes																									
	Source clearly referenced?	Yes																									
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology																									
	Has this value been verified?	Yes, from the survey report																									
	Choice of data correctly justified?	Yes																									
	Measurement method correctly described?	NA																									
	<table><tr><th>Data/Parameter title: SFC_{c,g}</th><th>Comments</th></tr><tr><td>Value</td><td>Yes, 0.076 for baseline emissions and 0.075 for project emissions</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/></td></tr><tr><td>Fixed throughout the crediting period?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, litre/km</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Value provided is considered reasonable?</td><td>Yes, based on survey report which is based on the procedure described in the applied methodology</td></tr></table>		Data/Parameter title: SFC_{c,g}	Comments	Value	Yes, 0.076 for baseline emissions and 0.075 for project emissions	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/>	Fixed throughout the crediting period?	Yes	Data unit correctly expressed?	Yes, litre/km	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology							
	Data/Parameter title: SFC_{c,g}	Comments																									
	Value	Yes, 0.076 for baseline emissions and 0.075 for project emissions																									
	Title in line with methodology?	Yes																									
	Fixed at PoA/CPA level?	PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/>																									
	Fixed throughout the crediting period?	Yes																									
	Data unit correctly expressed?	Yes, litre/km																									
	Appropriate description of parameter?	Yes																									
	Source clearly referenced?	Yes																									
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology																									

Validated situation		Conclusion
	Has this value been verified?	Yes, from the survey report
	Choice of data correctly justified?	Yes, Upper boundary of 95% confidence interval is used for baseline emissions and lower boundary for project emissions
	Measurement method correctly described?	NA
	Data/Parameter title: SFC_{C,D}	Comments
	Value	0.0543 for baseline emissions and 0.0536 for project emissions
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, litre/km
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology
	Has this value been verified?	Yes, from the survey report
	Choice of data correctly justified?	Yes, Upper boundary of 95% confidence interval is used for baseline emissions and lower boundary for project emissions
	Measurement method correctly described?	NA
	Data/Parameter title: SFC_{C,CNG}	Comments

Validated situation		Conclusion
	Value	0.0645 for baseline emissions and 0.0635 for project emissions
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, litre/km
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology
	Has this value been verified?	Yes, from the survey report
	Choice of data correctly justified?	Yes, Upper boundary of 95% confidence interval is used for baseline emissions and lower boundary for project emissions
	Measurement method correctly described?	NA
	Data/Parameter title: SFC_{T,CNG}	
	Value	Yes, 0.0629 for baseline emissions and 0.0627 for project emissions
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, litre/km
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes

	Validated situation		Conclusion
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology	
	Has this value been verified?	Yes, from the survey report	
	Choice of data correctly justified?	Yes, Upper boundary of 95% confidence interval is used for baseline emissions and lower boundary for project emissions	
	Measurement method correctly described?	NA	
	Data/Parameter title: SFC_{B,CNG}	Comments	
	Value	Yes, 0.382	
	Title in line with methodology?	Yes	
	Fixed at PoA/CPA level?	PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/>	
	Fixed throughout the crediting period?	Yes	
	Data unit correctly expressed?	Yes, litre/km	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes,	
	Value provided is considered reasonable?	Yes, Value has been sourced from the fuel consumption data of Delhi Transport Corporation.	
	Has this value been verified?	Yes,	
	Choice of data correctly justified?	Yes,	
	Measurement method correctly described?	NA	
	Data/Parameter title: SFC_{MR,CNG}	Comments	
	Value	0.0303 for baseline	

	Validated situation		Conclusion
		emissions and 0.0301 for project emissions	
	Title in line with methodology?	Yes	
	Fixed throughout the crediting period?	Yes	
	Data unit correctly expressed?	Yes, Kg/km	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes	
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the applied methodology	
	Has this value been verified?	Yes, from the survey report	
	Choice of data correctly justified?	Yes, Upper boundary of 95% confidence interval is used for baseline emissions and lower boundary for project emissions	
	Measurement method correctly described?	NA	
	Data/Parameter title: SFC_{M, gasoline}	Comments	
	Value	0.0177 for baseline emissions and 0.0175 for project emissions	
	Title in line with methodology?	Yes	
	Fixed throughout the crediting period?	Yes	
	Data unit correctly expressed?	Yes, Kg/km	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes	
	Value provided is considered reasonable?	Yes, based on survey report which is based on the procedure described in the	

	Validated situation		Conclusion
		applied methodology	
	Has this value been verified?	Yes, from the survey report	
	Choice of data correctly justified?	Yes, Upper boundary of 95% confidence interval is used for baseline emissions and lower boundary for project emissions	
	Measurement method correctly described?	NA	
	Data/Parameter title: TD_{EL,i}	Comments	
	Value	Yes, 16.05 (Metro), 18 (sub-urban rail)	
	Title in line with methodology?	Yes	
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>	
	Fixed throughout the crediting period?	Yes	
	Data unit correctly expressed?	Yes, km	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes,	
	Value provided is considered reasonable?	Yes, based on detailed project report for metro and Indian railways data for suburban rail.	
	Has this value been verified?	Yes, from the review of detailed project report, and annual report of Indian railways.	
	Choice of data correctly justified?	Yes,	
	Measurement method correctly described?	NA	
	Data/Parameter title: AD_B	Comments	

Validated situation		Conclusion
	Value	Yes, 47077.69
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, km/bus
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, based on Delhi statistical handbook (2010-11)
	Has this value been verified?	Yes, from the review of Delhi statistical handbook (2010-11)
	Choice of data correctly justified?	Yes,
	Measurement method correctly described?	NA
	Data/Parameter title: AD_T	Comments
	Value	Yes, 91250
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, km/Taxi
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, based on survey report
	Has this value been verified?	Yes, from the review of survey report
	Choice of data correctly justified?	Yes,
	Measurement method correctly described?	NA

	Validated situation		Conclusion																								
	<table><tr><th>Data/Parameter title: AD_{MR}</th><th>Comments</th></tr><tr><td>Value</td><td>Yes, 43800</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/></td></tr><tr><td>Fixed throughout the crediting period?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, km/motorized autorickshaw</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Value provided is considered reasonable?</td><td>Yes, based on survey report</td></tr><tr><td>Has this value been verified?</td><td>Yes, from the review of survey report</td></tr><tr><td>Choice of data correctly justified?</td><td>Yes,</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>		Data/Parameter title: AD_{MR}	Comments	Value	Yes, 43800	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>	Fixed throughout the crediting period?	Yes	Data unit correctly expressed?	Yes, km/motorized autorickshaw	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Value provided is considered reasonable?	Yes, based on survey report	Has this value been verified?	Yes, from the review of survey report	Choice of data correctly justified?	Yes,	Measurement method correctly described?	NA	
	Data/Parameter title: AD_{MR}	Comments																									
	Value	Yes, 43800																									
	Title in line with methodology?	Yes																									
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>																									
	Fixed throughout the crediting period?	Yes																									
	Data unit correctly expressed?	Yes, km/motorized autorickshaw																									
	Appropriate description of parameter?	Yes																									
	Source clearly referenced?	Yes																									
	Value provided is considered reasonable?	Yes, based on survey report																									
	Has this value been verified?	Yes, from the review of survey report																									
	Choice of data correctly justified?	Yes,																									
	Measurement method correctly described?	NA																									
	<table><tr><th>Data/Parameter title: N_i</th><th>Comments</th></tr><tr><td>Value</td><td>Yes, 6204 (N_B for buses) 1543326 (N_C for cars) 57958 (N_T for taxis) 4342403 (N_M for Motorcycles) 88181 (N_{MR} for motorised auto-rickshaws)</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/></td></tr><tr><td>Fixed throughout the crediting period?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, number of vehicles</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr></table>		Data/Parameter title: N_i	Comments	Value	Yes, 6204 (N _B for buses) 1543326 (N _C for cars) 57958 (N _T for taxis) 4342403 (N _M for Motorcycles) 88181 (N _{MR} for motorised auto-rickshaws)	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>	Fixed throughout the crediting period?	Yes	Data unit correctly expressed?	Yes, number of vehicles	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes									
	Data/Parameter title: N_i	Comments																									
	Value	Yes, 6204 (N _B for buses) 1543326 (N _C for cars) 57958 (N _T for taxis) 4342403 (N _M for Motorcycles) 88181 (N _{MR} for motorised auto-rickshaws)																									
	Title in line with methodology?	Yes																									
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>																									
	Fixed throughout the crediting period?	Yes																									
	Data unit correctly expressed?	Yes, number of vehicles																									
	Appropriate description of parameter?	Yes																									
	Source clearly referenced?	Yes																									

Validated situation		Conclusion
	Value provided is considered reasonable?	Yes, For buses, taxis, motorcycles and motorised auto-rickshaw, the information is based on Delhi Statistical handbook. For cars the information is sourced from Delhi transport department data.
	Has this value been verified?	Yes, from the review of Delhi statistical handbook (2010-11) and Delhi transport department data.
	Choice of data correctly justified?	Yes,
	Measurement method correctly described?	NA
	Data/Parameter title: $N_{x,i}$	Comments
	Value	Yes, 6204 ($N_{B,CNG}$ for buses) 203323 ($N_{C,CNG}$ for cars) 316897 ($N_{C,Diesel}$ for cars) 1023106 ($N_{C,gasoline}$ for cars) 57958 ($N_{T,CNG}$ for taxis) 4342403 ($N_{M,gasoline}$ for Motorcycles) 88181 ($N_{MR,CNG}$ for motorised auto-rickshaws)
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input type="checkbox"/> CPA <input checked="" type="checkbox"/>
	Fixed throughout the crediting period?	Yes
	Data unit correctly expressed?	Yes, number of vehicles
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes

Validated situation		Conclusion
	Value provided is considered reasonable?	Yes, based on mandatory regulation 'The Impact of Delhi's CNG Program on Air Quality' 2007 for buses, taxis and motorised auto-rickshaw. For motorcycles, the information has been sourced from emission factor development for Indian vehicles, ARAI, Pune. This report shows that there is no category of two wheelers other than those using gasoline. For cars, the information has been sourced from Delhi Transport Department
	Has this value been verified?	Yes, from the legal regulation
	Choice of data correctly justified?	Yes,
	Measurement method correctly described?	NA
	Data/Parameter title: EF_{Grid,CM}	Comments
	Value	Yes, 0.9219 for NEWNE grid 0.8430 for Southern grid
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	PoA <input checked="" type="checkbox"/> CPA <input type="checkbox"/>
	Fixed throughout the crediting period?	Yes

Validated situation		Conclusion
	Data unit correctly expressed?	Yes, tCO ₂ /MWh
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, based on baseline emission factor for Indian power sector, Version 7.0
	Has this value been verified?	Yes, from the official report
	Choice of data correctly justified?	Yes,
	Measurement method correctly described?	NA
	Data/Parameter title: TE_{EL,i,y}	Comments
	Value	Yes
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	NA
	Fixed throughout the crediting period?	No, determined ex-post
	Data unit correctly expressed?	Yes, tCO ₂
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, The data is calculated using the tool.
	Has this value been verified?	Yes,
	Choice of data correctly justified?	N.A.
	Measurement method correctly described?	Yes
	Data/Parameter title: EC_{PJ,y}	Comments
	Value	Yes
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	NA
	Fixed throughout the crediting period?	No, determined ex-post

Validated situation		Conclusion
	Data unit correctly expressed?	Yes, MWh
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, The data is calculated based on traction energy recorded at receiving substation.
	Has this value been verified?	Yes,
	Choice of data correctly justified?	N.A.
	Measurement method correctly described?	Yes
	Data/Parameter title: TE_{Total-RSS,y}	Comments
	Value	Yes
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	NA
	Fixed throughout the crediting period?	No, determined ex-post
	Data unit correctly expressed?	Yes, MWh
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, Total traction energy for the project as well as non-project measured at the receiving substation.
	Has this value been verified?	Yes,
	Choice of data correctly justified?	N.A.
	Measurement method correctly described?	Yes
	Data/Parameter title: car-km_{CPA-MRTS,y}	Comments
	Value	Yes

Validated situation		Conclusion
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	NA
	Fixed throughout the crediting period?	No, determined ex-post
	Data unit correctly expressed?	Yes, MWh
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, This value is measured for using the fixed timetable and distance between the operating stations that is included in the CPA.
	Has this value been verified?	Yes,
	Choice of data correctly justified?	N.A.
	Measurement method correctly described?	Yes
	Data/Parameter title: car-km_{RSS-Total,y}	Comments
	Value	Yes
	Title in line with methodology?	Yes
	Fixed at PoA/CPA level?	NA
	Fixed throughout the crediting period?	No, determined ex-post
	Data unit correctly expressed?	Yes, MWh
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes
	Value provided is considered reasonable?	Yes, This value is measured for using the fixed timetable and distance between the operating stations.
	Has this value been verified?	Yes,
	Choice of data correctly justified?	N.A.
	Measurement method correctly described?	Yes

	Validated situation	Conclusion																								
	<table><tr><th>Data/Parameter title: TDL_y</th><th>Comments</th></tr><tr><td>Value</td><td>Yes</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>NA</td></tr><tr><td>Fixed throughout the crediting period?</td><td>No, determined ex-post</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, %</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Value provided is considered reasonable?</td><td>Yes, Based on Delhi Transco data</td></tr><tr><td>Has this value been verified?</td><td>Yes,</td></tr><tr><td>Choice of data correctly justified?</td><td>N.A.</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr></table>	Data/Parameter title: TDL_y	Comments	Value	Yes	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	NA	Fixed throughout the crediting period?	No, determined ex-post	Data unit correctly expressed?	Yes, %	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Value provided is considered reasonable?	Yes, Based on Delhi Transco data	Has this value been verified?	Yes,	Choice of data correctly justified?	N.A.	Measurement method correctly described?	Yes	
	Data/Parameter title: TDL_y	Comments																								
	Value	Yes																								
	Title in line with methodology?	Yes																								
	Fixed at PoA/CPA level?	NA																								
	Fixed throughout the crediting period?	No, determined ex-post																								
	Data unit correctly expressed?	Yes, %																								
	Appropriate description of parameter?	Yes																								
	Source clearly referenced?	Yes																								
	Value provided is considered reasonable?	Yes, Based on Delhi Transco data																								
	Has this value been verified?	Yes,																								
	Choice of data correctly justified?	N.A.																								
	Measurement method correctly described?	Yes																								
	<table><tr><th>Data/Parameter title: NCV_{g,d,y}</th><th>Comments</th></tr><tr><td>Value</td><td>Yes</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>NA</td></tr><tr><td>Fixed throughout the crediting period?</td><td>No, determined ex-post</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, MJ/kg</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Value provided is considered reasonable?</td><td>Yes, Based on 2006 IPCC values for National GHG inventories</td></tr><tr><td>Has this value been verified?</td><td>Yes,</td></tr><tr><td>Choice of data correctly justified?</td><td>N.A.</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr></table>	Data/Parameter title: NCV_{g,d,y}	Comments	Value	Yes	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	NA	Fixed throughout the crediting period?	No, determined ex-post	Data unit correctly expressed?	Yes, MJ/kg	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Value provided is considered reasonable?	Yes, Based on 2006 IPCC values for National GHG inventories	Has this value been verified?	Yes,	Choice of data correctly justified?	N.A.	Measurement method correctly described?	Yes	
	Data/Parameter title: NCV_{g,d,y}	Comments																								
	Value	Yes																								
	Title in line with methodology?	Yes																								
	Fixed at PoA/CPA level?	NA																								
	Fixed throughout the crediting period?	No, determined ex-post																								
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	Appropriate description of parameter?	Yes																								
	Source clearly referenced?	Yes																								
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	Has this value been verified?	Yes,																								
	Choice of data correctly justified?	N.A.																								
	Measurement method correctly described?	Yes																								

	Validated situation	Conclusion																								
	<table><tr><th>Data/Parameter title: NCV_{cng,y}</th><th>Comments</th></tr><tr><td>Value</td><td>Yes</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>NA</td></tr><tr><td>Fixed throughout the crediting period?</td><td>No, determined ex-post</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, MJ/kg</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Value provided is considered reasonable?</td><td>Yes, Based on data of gas supplier data, i.e. Indraprastha gas limited. If the value</td></tr><tr><td>Has this value been verified?</td><td>Yes,</td></tr><tr><td>Choice of data correctly justified?</td><td>N.A.</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr></table>	Data/Parameter title: NCV_{cng,y}	Comments	Value	Yes	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	NA	Fixed throughout the crediting period?	No, determined ex-post	Data unit correctly expressed?	Yes, MJ/kg	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Value provided is considered reasonable?	Yes, Based on data of gas supplier data, i.e. Indraprastha gas limited. If the value	Has this value been verified?	Yes,	Choice of data correctly justified?	N.A.	Measurement method correctly described?	Yes	
	Data/Parameter title: NCV_{cng,y}	Comments																								
	Value	Yes																								
	Title in line with methodology?	Yes																								
	Fixed at PoA/CPA level?	NA																								
	Fixed throughout the crediting period?	No, determined ex-post																								
	Data unit correctly expressed?	Yes, MJ/kg																								
	Appropriate description of parameter?	Yes																								
	Source clearly referenced?	Yes																								
	Value provided is considered reasonable?	Yes, Based on data of gas supplier data, i.e. Indraprastha gas limited. If the value																								
	Has this value been verified?	Yes,																								
	Choice of data correctly justified?	N.A.																								
	Measurement method correctly described?	Yes																								
	<table><tr><th>Data/Parameter title: EF_{co2,g,d,cng,y}</th><th>Comments</th></tr><tr><td>Value</td><td>Yes</td></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Fixed at PoA/CPA level?</td><td>NA</td></tr><tr><td>Fixed throughout the crediting period?</td><td>No, determined ex-post</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes, gCO₂/MJ</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Value provided is considered reasonable?</td><td>Yes, Based on 2006 IPCC national GHG inventories.</td></tr><tr><td>Has this value been verified?</td><td>Yes, Upper level of 95% confidence interval has been considered for project</td></tr></table>	Data/Parameter title: EF_{co2,g,d,cng,y}	Comments	Value	Yes	Title in line with methodology?	Yes	Fixed at PoA/CPA level?	NA	Fixed throughout the crediting period?	No, determined ex-post	Data unit correctly expressed?	Yes, gCO ₂ /MJ	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Value provided is considered reasonable?	Yes, Based on 2006 IPCC national GHG inventories.	Has this value been verified?	Yes, Upper level of 95% confidence interval has been considered for project					
	Data/Parameter title: EF_{co2,g,d,cng,y}	Comments																								
	Value	Yes																								
	Title in line with methodology?	Yes																								
	Fixed at PoA/CPA level?	NA																								
	Fixed throughout the crediting period?	No, determined ex-post																								
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	Value provided is considered reasonable?	Yes, Based on 2006 IPCC national GHG inventories.																								
	Has this value been verified?	Yes, Upper level of 95% confidence interval has been considered for project																								

	Validated situation		Conclusion
		emissions and lower level was considered for baseline emissions.	
	Choice of data correctly justified?	N.A.	
	Measurement method correctly described?	Yes	
	Data/Parameter title: OC_{B,T,MR,y}	Comments	
	Value	Yes	
	Title in line with methodology?	Yes	
	Fixed at PoA/CPA level?	NA	
	Fixed throughout the crediting period?	No, determined ex-post	
	Data unit correctly expressed?	Yes, Passengers	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes	
	Value provided is considered reasonable?	Yes, Based on survey conducted at year 1 and 4 of the crediting period.	
	Has this value been verified?	Yes,	
	Choice of data correctly justified?	N.A.	
	Measurement method correctly described?	Yes	
	Data/Parameter title: P_y	Comments	
	Value	Yes	
	Title in line with methodology?	Yes	
	Fixed at PoA/CPA level?	NA	
	Fixed throughout the crediting period?	No, determined ex-post	
	Data unit correctly expressed?	Yes, Passengers	
	Appropriate description of parameter?	Yes	
	Source clearly referenced?	Yes, Based on automatic	

Validated situation		Conclusion
	fare collection system.	
	Value provided is considered reasonable?	
	Has this value been verified?	
	Choice of data correctly justified?	
	Measurement method correctly described?	
	Data/Parameter title: $N_{i,y}$	
	Value	
	Title in line with methodology?	
	Fixed at PoA/CPA level?	
	Fixed throughout the crediting period?	
	Data unit correctly expressed?	
	Appropriate description of parameter?	
	Source clearly referenced?	
	Value provided is considered reasonable?	
	Has this value been verified?	
	Choice of data correctly justified?	
	Measurement method correctly described?	
	Data/Parameter title: $P_{EL,i,y}$	
	Value	
	Title in line with methodology?	
	Fixed at PoA/CPA level?	
	Fixed throughout the crediting period?	
	Data unit correctly expressed?	

Validated situation		Conclusion
	Appropriate description of parameter?	Yes
	Source clearly referenced?	Yes, Based on Delhi Metro data for metro passengers and Indian railways data for suburban train
	Value provided is considered reasonable?	Yes, The value is based on Delhi Metro data for metro rail and Indian railways data for suburban rail
	Has this value been verified?	Yes,
	Choice of data correctly justified?	N.A.
	Measurement method correctly described?	Yes
<p>3. Confirm that all assumptions and data used by PPs are listed in the PoA-DD and in the specific CPA-DD, including their references and sources, and that the documentation used as the basis for these assumptions and source of data is correctly quoted and interpreted in the PoA-DD and in the specific CPA-DD.</p> <p>If the specific CPAs have both A/R and non A/R components, ensure that no emissions associated with the A/R activity are accounted for.</p>	<p>Based on the review of survey report, team confirms that it is in accordance with the methodology requirements. Detail of validation of methodology requirements is presented above.</p> <p>The PP has correctly sourced the baseline occupancy rate, specific fuel consumption, average distance driven by baseline taxis and auto-rickshaws from the review of traffic survey report. The specific fuel consumption of buses, average annual distance driven by baseline buses was sourced from Delhi Transport Corporation report. Total number of buses, taxis, auto-rickshaws, and two wheelers operating in the city was sourced from Statistical Handbook of Delhi. Total number of cars operating in the city was confirmed from the Delhi Transport Department data. Total diesel cars, gasoline cars and CNG cars were also sourced from the Delhi Transport Department data. Percentage of CNG buses, taxis and auto-rickshaws were sourced from the Mandatory regulation of Supreme court of India "The impact of Delhi's CNG Programme on Air Quality, 2007". Percentage of two wheelers using gasoline was sourced from the Air</p>	OK

	Validated situation	Conclusion
	<p>Quality monitoring project – Indian clean air programme (ICAP), Emission factor development for Indian Vehicles, ARAI; it has identified only gasoline based two wheelers during their survey.</p> <p>The PP has correctly sourced the grid emission factor data from the CO₂ baseline database for Indian power sector, Version 07.</p> <p>Validation team confirmed from the site visit and its sectoral expertise that the specific CPA does not have any A/R component.</p>	
4. Confirm that all estimates of the baseline emissions can be replicated using the data and parameter values provided in the PoA-DD and in the specific CPA-DD.	The baseline emissions can be replicated using the data and parameter and could be confirmed from the emission reduction spreadsheet submitted by the PP.	OK
5. If any of the parameters used to calculate ERs have been obtained using sampling methods, please use the “Standard for sampling and surveys for CDM project activities and PoA” paragraphs 20 to 26 to determine whether the sampling plan proposed by the PPs will provide parameter value estimates in an unbiased and reliable manner.	<p>Yes.</p> <p>Sampling plan will be used to calculate emission reductions. The ex-ante value was based on the initial traffic survey.</p> <p>The PP has followed the sampling plan as described in the applied methodology. Further, ex-ante parameters provided below are evaluated based on sampling survey with 95% confidence level.</p> <p>SFC_{C, G} (Specific fuel consumption of passenger cars using gasoline) SFC_{C, D} (Specific fuel consumption of passenger cars diesel) SFC_{C, CNG} (Specific fuel consumption of passenger cars CNG) SFC_{T, CNG} (Specific fuel consumption of taxis) SFC_{M, Gasoline} (Specific fuel consumed by motorized two wheelers)</p> <p>Occupation study has also been conducted based on the sampling. The parameters OC_B, OC_C, OC_T, OC_M, OC_{MR} were determined based on this study.</p> <p>Study for both occupation study and specific fuel consumption study is based on the procedures described in the applied methodology.</p>	OK

	Validated situation	Conclusion
	Further, for the monitoring of this project the Origin-Destination study and occupation rate study used for calculation of ERs will be conducted in the first and fourth year of each CPA. In the first year and while the system is stabilized, a single measurement will be taken and a second measurement will be carried out in a later period (test-retest method), with a sample size of less than half of the initial survey. This procedure is also in accordance with the applied methodology.	

	Validated situation	Conclusion
SECTION 7. Management system		
1. Describe the competencies of the CME to check the features of potential CPAs to ensure that each CPA meets all requirements and eligibility criteria before inclusion in the registered PoA.	<p>The coordinating/managing entity have established the following management system, discussed by LRQA during interviews with PPs:</p> <p>CDM manager from Delhi Metro Rail Corporation Limited is appointed to be responsible for checking of the features of potential CPAs against CDM requirements and eligibility criteria for inclusion into PoA. There is an option to outsource this check to a third party. The competencies of the CDM manager as discussed during interviews and as presented in the PoA DD involve understanding of CDM requirements; knowledge of applicable to the project methodology ACM0016; understanding The DMRC system.</p>	OK
<p>2. Confirm that the CME have developed and implemented a management system that includes the following:</p> <ul style="list-style-type: none"> i) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies; ii) Records of arrangements for training and capacity development for personnel; iii) Procedures for technical review of inclusion of CPAs; iv) A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA); v) Records and documentation control process for each CPA under the PoA; vi) Measures for continuous improvements of the PoA management system; vii) Any other relevant elements. 	<p>As presented above the overall responsibility for managing the process of inclusion of a CPA into PoA is given to the CDM manager of DMRC. During the interview CDM manager showed understanding of the applicable CDM requirements and in particular with the requirements of methodology ACM0016. He showed understanding of company management system and records generated in the company that have relation to the project activity. Support from external third party may be requested on this.</p> <p>A flow chart was presented and discussed showing the steps of the process related to inclusion of the CPA into the PoA.</p> <p>The process starts with announcing of the potential a MRTS project to be included into a PoA and signing of a memorandum of understanding with the interested MRTS (sample of such a memorandum was presented for validation purposes). Programme coordinator is appointed by the DMRC. The responsibilities of this person are related to managing of the programme at CPA level.</p> <p>All personnel involved in construction, repair and maintenance, inspections and reading of monitoring equipment under the CPAs is planned to undergo training held by DMRC.</p>	OK

	Validated situation	Conclusion
	<p>A set of documents prepared for the training of technicians Competence statement and checklist, Training and capacity development form, Attendance sheet.</p> <p>Technical review for the inclusion of CPA into PoA is done by the CDM manager or contracted for the purpose third party.</p> <p>For the developed specific CPA the following system for keeping records and document control are presented below which will be monitored by the monitoring team:</p> <ol style="list-style-type: none"> 1. Identification of external surveyor to carry out monitoring survey 2. Training to surveyor 3. Supervising monitoring survey 4. Collecting and collating monitoring information from each CPA entity 5. Record keeping of monitoring data <p>Operation and maintenance of the concerned MRTS CPA will be under the CPA MRTS owner.</p>	

	Validated situation	Conclusion																		
SECTION 8. Start date of a PoA/CPA																				
1. Does the PoA-DD clearly indicate the start date and length of the PoA in format: dd/mm/yyyy, and is it in line with the PS? Paragraphs under section 11.6 “Duration and Crediting Period”	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> The start date of the PoA is 06/11/2012 for a length of 28 years based on the date of webhosting of the PoA for global stakeholder webhosting.	OK																		
2. Confirm that the start date of the PoA is either of the two dates below: (a) The date of notification of the intention to seek the CDM status to the Secretariat and the DNA; or (b) The date of publication of the PoA-DD for global stakeholder consultation	<p>The PoA-DD was published for GSP on 06/11/2012.</p> <p>The PoA-DD describes one of the inclusion criteria of the CPA as it should have a start date after 06/11/2012.</p> <p>The start date of the CPA is 12/02/2013 which is the earliest date when the implementation or construction of the CPA begins.</p> <p>The start date was determined following the chronological order of events that were taken up for securing carbon credits for the project. The chronological events are as follows:</p> <table><tr><th>Date</th><th>Event</th></tr><tr><td>February 2011</td><td>DPR for Phase-III corridors of Delhi Metro project</td></tr><tr><td>26 September 2011</td><td>Sanction order (no. K-14011/4/2009-MRTS) by Ministry of Urban Development (MoUD) for implementation for the CPA corridors</td></tr><tr><td>8 February 2012</td><td>Appointment of CDM consultant through Letter of Acceptance</td></tr><tr><td>15 February 2012</td><td>Contract agreement signed with consultant</td></tr><tr><td>1 June 2012</td><td>Tender floated for appointment of DOE</td></tr><tr><td>8 June 2012</td><td>Selection and Appointment of DOE</td></tr><tr><td>July 2012</td><td>Baseline traffic survey carried out for the project</td></tr><tr><td>31 August</td><td>Letter of Acceptance (LoA) to DOE</td></tr></table>	Date	Event	February 2011	DPR for Phase-III corridors of Delhi Metro project	26 September 2011	Sanction order (no. K-14011/4/2009-MRTS) by Ministry of Urban Development (MoUD) for implementation for the CPA corridors	8 February 2012	Appointment of CDM consultant through Letter of Acceptance	15 February 2012	Contract agreement signed with consultant	1 June 2012	Tender floated for appointment of DOE	8 June 2012	Selection and Appointment of DOE	July 2012	Baseline traffic survey carried out for the project	31 August	Letter of Acceptance (LoA) to DOE	CAR-03 OK
Date	Event																			
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	Validated situation		Conclusion
	2012		
	7 September 2012	Project documents initially submitted to DOE	
	5 November 2012	Project documents submitted to DOE after completeness check before webhosting	
	6 November 2012	Webhosting of PoA (considered as start date of PoA)	
	12 February 2013	First work order signed for the CPA	
	The start date of the corridors covered in the CPA is the date of first contract agreement signed between Delhi Metro Rail Corporation Limited and Arvind Techno Engineers Pvt. Ltd. on 12th February 2013 for the construction of main viaduct, ramp, Mukundpur elevated station and depot, and chainage on Mukundpur-Yamuna Vihar corridor. CAR 03 was raised as CPA –DD submitted for validation does not describe how the start date was determined. Evidence of start date of the PoA and CPA was not submitted. Detail of the closure is provided in the finding log.		
3. Confirm that the start date for any CPA is on or after the start date of the PoA.	Yes. The start date of the CPA is 12/02/2013, after the start date of the PoA which is 06/11/2012.		OK
Proposed First CPA for Validation			

	Validated situation	Conclusion
<p>4. Does the CME provide a description of how the start date and expected operational lifetime of any proposed CPA has been determined? Assess this description in the CPA-DD</p> <p>(a) The start date of the CPA shall be the earliest date at which either the implementation or construction or real action begins.</p>	<p>The CME shall check the start date of the project activity by means of first purchase order placed by activity implementer / operator for the project (For example purchase order for rail lines / equipment / civil construction / Engineering and procurement contract etc.) and confirm that it's after 6th November 2012.</p> <p>The starting date of the crediting period is 01/01/2016, which is after the commercial operation of the project is expected to start.</p> <p>Duration of the crediting period is 10 years; or from 01/01/2016 to 31/12/2025. This period is within the end date of the PoA.</p>	
<p>5. Confirm that the CME has selected the type (fixed or renewable) and duration of crediting period in the CPA-DD considering that:</p> <p>(a) Each renewable crediting period shall be at most seven years and may be renewed at most three times, for a maximum total length of 21 years;</p> <p>(b) A fixed crediting period shall be at most 10 years.</p>	<p>The CME has selected 10 year fixed crediting period.</p>	OK
<p>6. Confirm that the CME has determined only one start date for the crediting period in the CPA-DD, even in cases of phased implementation of the CPA.</p>	<p>Yes, the start date of the crediting period stated in the CPA-DD is 01/01/2016.</p>	OK
<p>7. Confirm that the CME has stated the start date of the crediting period in the CPA-DD in the format dd/mm/yyyy, and has not used any qualifications to the start date, such as expected.</p>	<p>Yes.</p>	OK

	Validated situation	Conclusion
Prior Consideration of the CDM		
1. Confirm by referring to the list of prior consideration notifications from the UNFCCC website and communication between the PP the Secretariat and the DNA regarding the commencement of the PoA, that the PP has provided such notification within 180 days of the PoA start date.	Not applicable.	NA

	Validated situation	Conclusion
SECTION 9. Additionality of a project activity		
1. Does the PoA-DD clearly describe how the proposed PoA is additional? Additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CPAs would occur.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> The PoA-DD describes the additionality criteria as described in the applied methodology.	OK
2. List the documents and tools provided by the CDM Executive Board used to demonstrate the additionality	The PoA-DD and CPA-DD has used the additionality criteria described in the applied methodology.	OK
Additionality for PoA that include one or more small-scale CPA		
Determine whether the proposed CPAs are additional in accordance with CDM requirements applicable for small-scale project activities: Attachment A to Appendix B of 4/CMP 1 annex II and "non binding best practice examples to demonstrate additionality for SSC project activities"		
3. Describe and assess the relevant criteria for the automatic additionality of the CPAs in accordance with the Positive List of technologies and project activity types in the last version of the Guidelines on the demonstration of additionality of small-scale project activities. Confirm that the CPA size is up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW).	Not applicable	NA
4. Describe and assess the relevant criteria for the automatic additionality of the following cases, in accordance with the last version of the Guidelines for demonstrating additionality of microscale project activities: a) Type I CPAs up to 5 MW that employ renewable energy as their primary technology, b) Type II energy efficiency CPAs that aim to achieve energy savings at a scale of no more than 20 GWh per year, c) Type III CPAs that aim to achieve emissions reductions at a scale of no more than 20 ktCO ₂ e per year.	Not applicable	NA

Validated situation		Conclusion
Demonstration of additionality for large scale PoA and SSC PoA with no automatic additionality:		
SECTION 9a. Identification of alternatives		
<p>1. Does the PoA-DD identify credible alternatives to the CPAs, to determine the most realistic baseline scenario?</p> <p>Assess this list of alternatives and ensure that:</p> <p>(a) The list of alternatives includes as one of the options that the PoA is undertaken without being registered as a proposed CDM PoA.</p> <p>(b) The list contains all plausible alternatives considered to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM PoA.</p> <p>(c) The alternatives comply with all applicable and enforced legislation.</p> <p>If the Baseline scenario is prescribed in the approved methodology, no further analysis is required and this section is not applicable.</p>	LIST OF ALTERNATIVES	
	No	Description in the PoA-DD
		Describe why it is credible and complete
	1	Continuation of the use of existing transport system
	2	Project activity
		This alternative was described in the applied methodology.
The methodology prescribes the baseline scenario. No further evaluation was done.		OK

	Validated situation	Conclusion
SECTION 9b. Investment analysis		
1. Verify the accuracy of financial calculations carried out for the investment analysis: (a) Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters. (b) Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices. (c) Review feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participant.	The CPA-DD applies additionality using procedure B (Analysis of the impact of CDM registration) described in the applied methodology. Following this procedure, it was required to demonstrate that annual revenues from CERs are equal to or exceeds 10% of the total annual operation and maintenance cost. Suitability of O&M cost has been presented above.	OK
2. Assess the correctness of computations carried out and documented by the project participant	The annual O&M cost and annual CER revenue have been correctly calculated. Validation team confirms it from the review of spreadsheet.	OK
3. Assess the sensitivity analysis by the project participant to determine under what conditions variations in the result would occur, and the likelihood of these conditions.	Not applicable. The CPA demonstrates the additionality using the procedure B described in the applied methodology. The procedure B does not involve sensitivity analysis.	OK

Use the table below to list all the inputs to the investment analysis and to describe how each parameter has been validated:

Parameter/input	Symbol/Unit	Value	Source	Means of validation	Conclusion
					NA
					NA
					NA
					NA
					NA
					NA
					NA

	Validated situation	Conclusion
<p>4. Confirm the suitability of any benchmark applied in the investment analysis:</p> <p>(a) Determine whether the type of benchmark applied is suitable for the type of financial indicator presented.</p> <p>(b) Ensure that any risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity.</p> <p>(c) Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participant involved and determining whether the same benchmark has been applied or if there are verifiable circumstances that have led to a change in the benchmark.</p> <p>(d) Confirm the suitability of the benchmark (WACC) by checking that its components are calculated using reasonable vintage years that are consistent with the investment horizon and the period for risk free rate. Guidance 15 of the Guidelines on the Assessment of Investment Analysis should be taken into account for estimating the market return rate.</p>	NA	NA
<p>5. If the project participant rely on values from a Feasibility Study Report (FSR) approved by any national authority, the team is required to ensure that:</p> <p>(a) The FSR has been the basis of the decision to proceed with the investment in the PoA, that is, that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying PoA that the input values would have materially changed.</p> <p>(b) The values used in the PoA-DD and associated</p>	<p>The additionality for all the CPAs included in this PoA has been described in the PoA-DD. The PoA follows the stepwise approach for additionality as described in the applied methodology. Though the input values are taken from the DPR, it will be independently validated, during inclusion.</p> <p>For CPA001, the PP has relied on input values such as Operation & Maintenance cost from Detailed Project Report (DPR) prepared by the technical team of the DMRC. The input values were independently verified based on the sectoral expertise of the team.</p>	OK

	Validated situation	Conclusion
<p>annexes are fully consistent with the FSR and, where inconsistencies occur, the DOE should validate the appropriateness of the values.</p> <p>(c) On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.</p> <p>Use the table below to cross-check input values and describe here the results of the comparison.</p>	<p>DPR was prepared on February 2011 by DMRC for the corridors included in this CPA. Most values as assumed in the DPR holds relevance in the present day economic condition of the company and country as well.</p> <p>The validation team has checked the values from publicly available documents to check its relevance and appropriateness.</p> <p>The O&M cost consists of Manpower cost, Maintenance cost and electricity used to run the trains cost. Manpower cost has been checked from websites on December 2011 where DMRC had posted information regarding different vacancies and there salary range. The team checked the appropriateness of manpower cost considering the upper confidence level provided, there is no impact on the Additionality. The team further confirmed the manpower cost while interviewing the Human Resource department of DMRC during site visit.</p> <p>The number of manpower needed is confirmed from the note provided by DMRC on July 2009 which is based on study done by third party (Feedback Ventures Pvt Ltd).</p> <p>The electricity costs provided in the DPR is conservative considering the present electricity charges (checked from bills of 2011) is lower.</p> <p>Maintenance cost has been confirmed from the note provided by DMRC for the maintenance to capital cost ratio for last 10 years. The maintenance cost as provided in the DPR is conservative.</p> <p>The team further confirmed the suitability of all values used for calculating the O&M cost from the CA certificate provided.</p>	

Comparison to similar registered projects/PoAs in the region: Not applicable

CDM Ref	Investment cost	Tariff	O&M cost	Capacity	Output	Investment cost per output	Load factor	O&M relative to investment	O&M per output

	Validated situation	Conclusion			
SECTION 9c. Barrier analysis					
1. Does the PoA-DD demonstrate that the proposed PoA faces barriers that prevent its implementation and do not prevent at least the implementation of one of the alternatives? Provide here an overall determination of the credibility of the barrier analysis. Use the below table to list each barrier considered in the PoA-DD and to describe how the team undertake their validation.	NA	NA			
Barriers are issues in CPA implementation that could prevent a potential investor from pursuing the implementation of the proposed CPAs. The identified barriers are only sufficient grounds for demonstration of Additionality if they would prevent potential project proponents from carrying out the proposed CPAs undertaken without being registered as a CDM PoA.					
Type of Barrier	Description in the PoA-DD	Determination			Conclusion
		Barriers are real	Prevent implementation of CPA	Do not prevent implementation of BL	
Access to finance					NA
Risks related barriers					NA
Technological					NA
Due to prevailing practice					NA
Other					NA
First of its kind					NA

	Validated situation	Conclusion
SECTION 9d. Common practice analysis		
1. Describe how the geographical scope of the common practice analysis has been validated. Assess whether the geographical scope (for example, the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the PoA's technology or industry type.	<p>The methodology does not describe any requirement of Common Practice analysis.</p> <p>The part of common practice is covered under the step 1, 2 and 3 i.e. demonstration of Additionality in line with the approved methodology.</p> <p>In step 1 the country level, tests the penetration of MRTS project in the host country, which the concerned project does not satisfy as the country already has 3 rail based MRTS fully operational without any CDM benefits (Kolkata, Bangalore and Delhi metro Phase I).</p> <p>However the concerned project satisfies the step 2 which is the city level assessment which requires the project to show that the share of MRTS in the concerned city is less than 20%.</p>	OK
2. Determine to what extent similar and operational projects (for example, using similar technology or practice), other than CDM projects ⁸ ; have been undertaken in the defined region.	Same as above.	OK
3. If similar and operational projects, other than CDM projects are already widely observed and commonly carried out in the defined region, assess whether there are essential distinctions between the proposed CPAs of the CDM PoA and the other similar activities.	Same as above.	OK
4. For the following measures confirm that PPs have applied the four step process described in the last version of the Methodological tool for the demonstration and assessment of additionality, and assess its implementation. In this	Same as above,	OK

⁸ Registered CDM project activities and CDM project activities that have been published on the UNFCCC website for global stakeholder consultation as part of the validation processes

	Validated situation	Conclusion
<p>case the three sections above are not applicable:</p> <ul style="list-style-type: none"> a. Fuel and feedstock switch; b. Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies); c. Methane destruction; d. Methane formation avoidance. 		

	Validated situation	Conclusion
SECTION 10. Eligibility criteria for inclusion of a CPA in the PoA		
1. Has CME developed the eligibility criteria for inclusion of a CPA under the PoA and has included these criteria in the CDM-PoA-DD (Section I of the PoA-DD) and has demonstrated their usability to assess the inclusion of CPAs in the generic CPA-DD (Section II of the PoA-DD)?	Yes the CME has developed eligibility criteria in the section I of the PoA-DD and has demonstrated their usability to assess the inclusion of CPAs Generic CPA-DD. The validation has checked and confirmed the same	OK
2. Confirm that the eligibility criteria defined by the CME cover as a minimum the below table items and that additional criteria specified by the Validating DOE and/or the EB have also been included, in accordance with the Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for PoA. Assess the eligibility criteria in the table below and determine whether the eligibility criteria are sufficiently objective and comprehensive to permit the assessment of the inclusion of CPAs in the PoA.	Yes the CME has developed eligibility criteria in the section I of the PoA-DD and has demonstrated their usability to assess the inclusion of CPAs Generic CPA-DD. The validation has checked and confirmed the same	OK
3. Check and assess that for PoAs involving combinations of technologies/measures and/or methodologies, the eligibility criteria relative to each of them have been proposed to demonstrate additionality.	NA	NA

Eligibility criteria in the Standard	Eligibility criteria in the PoA-DD	Validated situation	Conclusion
The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA	The project should be located in India	PoA-DD specifies that the boundary of the PoA is the territory of India.	OK
Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);	Confirm that the project activity under the CPA is not registered or being registered as a stand-alone CDM project outside of the PoA. This would be achieved through	Validation team confirmed from the review of management system and interview of the CME that undertaking will be taken from the project	OK

Eligibility criteria in the Standard	Eligibility criteria in the PoA-DD	Validated situation	Conclusion
	undertaking by project implementer and display of Unique identification number of the project activity (as per the CPA) along with PoA name on main stations of the CPA	implementer that the project does not involve double counting of emission reductions. Further, the main stations of the MRTS included in this PoA will display the Unique identification number along with the name of the PoA.	
The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	The project activity should establish and operate rail based MRTS.	PoA-DD specifies that only rail based MRTS is covered in this PoA.	OK
Conditions to check the start date of the CPA through documentary evidence	Confirm that the start date of any CPA is not, prior to the commencement of validation of the programme of activities, i.e. the date on which the PoA-DD is first published for global stakeholder consultation.	PoA-DD specifies that only those CPA which are implemented after 06/11/2012, after the publication of the PoA-DD for stakeholders consultation, are covered.	OK
Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;	<p>The project activity should establish and operate rail based MRTS.</p> <p>The project constructs a new rail-based infrastructure, the project needs to involve the construction of a new infrastructure (new rail lines);</p> <p>The rail-based MRTS replaces existing bus routes (e.g. through scrapping units or through closing or re-scheduling existing bus routes) operating under mixed traffic conditions;</p> <p>The project activity should not constitute of only operational improvements (e.g. new or larger buses) of an already existing and operating bus lane or rail-based MRTS;</p>	Team confirms that all relevant applicability conditions are correctly covered in the PoA-DD. The Part II of the PoA-DD clearly describes how each of the applicability condition will be validated. Further, the real case CPA, CPA0001, describes that each condition will be validated through DPR, and baseline tariff survey.	OK

Eligibility criteria in the Standard	Eligibility criteria in the PoA-DD	Validated situation	Conclusion
	<p>The project activity under this PoA would be able to claim emission reduction for passenger transport only;</p> <p>The project activity which implements air- and water-based transport systems is not eligible for this PoA;</p> <p>The project activity should constitute of only urban or suburban trips. It is not applicable for inter-urban transport.</p>		
<p>The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as follows:</p> <ul style="list-style-type: none"> - PoAs that consist of one or more microscale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of the "Guidelines for demonstrating additionality of microscale project activities". - PoAs that consist of one or more small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of attachment A of Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities". - PoAs that consist of one or more large scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements contained in the additionality section of the large scale methodologies. 	<p>In the event a non CDM public transport system of the same category exists in the city then the share of trips realised by the same is equal or less than 20% of total public transport trips in the host city.</p> <p>In the event the project activity is implemented by a non-commercial entity like public sector / Government agency then annual revenues from CERs are equal to or exceed 10% of the total annual operating and maintenance costs of the MRTS proposed as CDM project activity otherwise It should be demonstrated that Equity IRR from project activity is lower than the benchmark . In applying the investment analysis reduced revenues of former MRTS investments compared to original projections, which make new investments less viable and riskier, can be considered in the investment analysis</p>	<p>PoA-DD clearly specifies the condition related to additionality. The additionality was demonstrated in the PoA through two levels of assessment, i.e. city level assessment and project level assessment, as required by the applied methodology.</p> <p>For, city level assessment the eligibility criteria is related to share of tips realised by the same category as the project activity should be equal to or less than 20% of the total public transport category.</p> <p>For project level assessment the eligibility criteria is related to demonstration of additionality through investment analysis where more than 50% of the investment is made through commercial funds. For cases where more than 50% of the investment is made through non-commercial entity, the impact due to</p>	OK

Eligibility criteria in the Standard	Eligibility criteria in the PoA-DD	Validated situation	Conclusion
		<p>CDM registration needs to be demonstrated, i.e. annual revenues from CER should be equal to or exceeds 10% of the total annual O&M cost.</p> <p>Based on the above criteria, the additionality of each CPAs can be demonstrated.</p>	
The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;	The project activity should undertake local stakeholder consultation	<p>PoA-DD clearly states that local stakeholders' consultation will be conducted for each CPA covered in this PoA.</p> <p>The PoA-DD states that EIA is not required for the MRTS projects in India. Team confirmed it from the review of EIA requirements in the host country and its host country expertise. Therefore, eligibility criteria related to EIA is not required for the CPAs covered in this PoA.</p>	OK
Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance	The project implementing agency needs to provide written confirmation that there is no diversion of ODA funding due to the project activity. In the event there is ODA funding is involved the implementing agency needs to provide conformation that and it is separate from and is not counted towards the financial obligations of those Parties providing funding.	Team confirmed from the review of the management system, and interview of the CME, that use of no ODA funding will be confirmed through the undertaking provided by the CPA implementer. In case ODA is used for the project activity, it will be further clarified that it will not be counted towards the financial obligations of the Parties providing funding.	OK
Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-	The project activity under this PoA would be able to claim emission reduction for	The PoA is targeting only the urban or suburban passenger transport. This	OK

Eligibility criteria in the Standard	Eligibility criteria in the PoA-DD	Validated situation	Conclusion
connected/off-grid) and distribution mechanisms (e.g. direct installation);	passenger transport only; The project activity should constitute of only urban or suburban trips. It is not applicable for inter-urban transport.	target group for this PoA is already covered in the applicability criteria of the methodology. Team confirmed that these conditions will be met by all the CPAs in this PoA as it is a applicability condition.	
Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys	-	Not applicable as sampling will be conducted in accordance with the procedures described in the methodology. The generic CPA in the PoA confirms that these values to be determined based on the procedure described in the applied methodology	OK
Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA	-	Not applicable as the PoA comprises of only large scale CPA	OK
Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories	-	Not applicable as the PoA comprises of only large scale CPA	OK

			Validated situation	Conclusion
SECTION 11. Monitoring plan				
1. <i>Compliance of the monitoring plan with the approved methodology and the applicable tools.</i> Confirm that the MP in the Generic CPA (Section II of the PoA-DD) contains all the necessary parameters and that they are monitored in accordance to the approve Methodology and the applicable tools using the following table:				
Parameter	Monitoring Methodology / Tools description	Generic CPA description	Validated situation	Conclusion
$TE_{EL,i,y}$	Unit: tCO ₂ Description: Total emissions from the electricity-based rail system in year y Source of data: Rail operator for electricity consumption and as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Measurement methods and procedures: Calculated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Monitoring frequency: Annually QA/QC procedures: -	Unit: tCO ₂ Description: Total emissions from the electricity-based rail system in year y Source of data: DMRC (rail operator) Value(s) applied: 189,868 Measurement methods and procedures: Calculated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Monitoring frequency: Annually QA/QC procedures: Data will be archived for a period of 2 years after the end of crediting period or last issuance whichever is later. Purpose of data: To calculate project emissions	Data units and description are described correctly. The emission from rail based system is correctly calculated using the tool. As per the tool the electricity consumption is multiplied with the grid emission factor.	OK
EC_{PJ}		Data unit: MWh Description: Traction energy consumed by CPA MRTS line Source of data: DMRC; Ex-post the data will be calculated based on total traction energy	Data units and description are described correctly. Total electricity consumed by the traction energy is correctly presented. The total traction energy	OK

Validated situation			Conclusion
		<p>recorded at RSS (Receiving substation) level and car-km for CPA MRTS line</p> <p>Value (s) applied: <different values></p> <p>Measurement methods and procedures: The project traction energy consumption will be calculated on the basis of total traction energy recorded at RSS level. The total traction energy is recorded in traction meters. The traction energy for the CPA MRTS is therefore the total traction energy divided by total car-km (project and non-project) and then multiplied by CPA MRTS car-km.</p> <p>Monitoring frequency: Annually</p> <p>QA/QC procedures: The data can be cross-checked against the daily/monthly logbook records. Data will be archived for a period of 2 years after the end of crediting period or last issuance whichever is later.</p> <p>Purpose of data: To calculate $TE_{EL,i,y}$ (Total emissions from the electricity-based rail system in year y)</p> <p>Additional comment: Used for MRTS with rail-based systems using electricity The traction energy is generally</p>	<p>for this CPA will be calculated through apportioning. The traction energy for the CPA MRTS is therefore the total traction energy divided by total car-km (project and non-project) and then multiplied by CPA MRTS car-km.</p> <p>The monitoring procedure and QA/QC are in accordance with the applied methodology.</p>

		Validated situation	Conclusion
		recorded at RSS level. In case one RSS supplies energy to non-project lines then the traction energy will be divided accordingly among the project line and non-project line	
TDLy		Unit: % Description: Average technical transmission and distribution losses for Delhi Source of data: National Load Dispatch Centre or any other appropriate source Value(s) applied: 1.28% Measurement methods and procedures: Publicly available information from Delhi Transco or National Load Dispatch Centre will be used as per public availability Monitoring frequency: Annually QA/QC procedures: Data will be archived for a period of 2 years after the end of crediting period or last issuance whichever is later. Purpose of data: To calculate project emissions Additional comment:	<p>Data units and description are described correctly.</p> <p>Sourced of the data for transmission and distribution loss is justified. Measurement method is in accordance with the tool. The monitoring procedure and QA/QC are in accordance with the applied tool.</p> <p>OK</p>
TE _{Total-RSS, y}		Unit: MWh Description: Total traction energy recorded at RSS level Source of data: DMRC Operations and maintenance wing, Traction Value(s) applied: Measurement methods and	<p>Data units and description are described correctly.</p> <p>This parameter is used to calculate total traction electricity consumed by the project activity. This parameter is relevant where both project and non-</p> <p>OK</p>

Validated situation			Conclusion
		<p>procedures: The total traction energy is recorded in traction meters installed at RSS. This is read every month by DMRC officials under O&M wing, Traction.</p> <p>Monitoring frequency: Annually</p> <p>QA/QC procedures: The data will be measured continuously using meters of accuracy of at least 0.2(0.2%)</p> <p>The data can be cross-checked against the daily/monthly logbook records.</p> <p>Data will be archived for a period of 2 years after the end of crediting period or last issuance whichever is later. In case the meters are changed for calibration or due to maintenance need the change in meter will be properly documented in history card</p> <p>Calibration of meters will be done atleast once a year</p> <p>Purpose of data: To calculate traction energy consumed by CPA MRTS line, TE_{CPA},</p> <p>Additional comment: Used for MRTS with rail-based systems using electricity.</p>	<p>project line exists. Monitoring and measurement are in line with the applied system and methodology.</p>

		Validated situation	Conclusion
		The traction energy will be recorded at RSS level. In case one RSS supplies energy to non project lines then the traction energy will be divided accordingly among the project line and non project line	
Car-km_{CPA-MRTS,y}		<p>Unit: km</p> <p>Description: Car-km of CPA MRTS line in year y</p> <p>Source of data: Delhi metro Operations control centre morning position report</p> <p>Value(s) applied: NA</p> <p>Measurement methods and procedures: The distance between stations under project activity is fixed and the time-table is fixed for specific days in general with any minute changes recorded. Based on the time table, total car km run would be recorded annually.</p> <p>Monitoring frequency: Annually</p> <p>QA/QC procedures: The data can be cross-checked with OCC morning position report available at OCC and maintained by Chief Controller of OCC. Data will be archived for a period of 2 years after the end of crediting period or last issuance whichever is later.</p> <p>Purpose of data: To calculate traction energy consumed by CPA MRTS line, TE_{CPA}</p>	<p>Data units and description are described correctly.</p> <p>The distance between stations under project activity is known and time table is also fixed. The distance will be recorded daily.</p> <p>Monitoring and measurement are in line with the applied system and methodology.</p> <p>OK</p>

		Validated situation		Conclusion
Car-km_{RSS} Total,y		Unit: km Description: Total car-km supplied traction energy by the RSS Source of data: Delhi metro Operations control centre morning position report Value(s) applied: NA Measurement methods and procedures: The distance between stations under project activity is fixed and the time-table is fixed for specific days in general with any minute changes recorded. Based on the time table, total car km run would be recorded daily and aggregated annually. Monitoring frequency: Annually QA/QC procedures: The data can be cross-checked with OCC morning position report available at OCC and maintained by Chief Controller of OCC. Data will be archived for a period of 2 years after the end of crediting period or last issuance whichever is later. Purpose of data: To calculate traction energy consumed by CPA MRTS line, TE_{CPA}	Data units and description are described correctly. The distance between stations under project activity is known and time table is also fixed. The distance will be recorded daily. Monitoring and measurement are in line with the applied system and methodology.	OK
NCV_{G,D}	Data unit: GJ / mass or volume unit Description: Average net calorific value of fossil	Unit: MJ/kg Description: Net calorific value of	It was confirmed that the approach employed and the values used for	OK

	Validated situation		Conclusion									
<p>fuel type i used in the period t</p> <p>Source of data: The following data sources may be used if the relevant conditions apply:</p> <table><tr><th>Data source</th><th>Conditions for using the data source</th></tr><tr><td>a) Values provided by the fuel supplier in invoices</td><td>This is the preferred source</td></tr><tr><td>b) Measurements by the project participants</td><td>If a) is not available</td></tr><tr><td>c) Regional or national default values</td><td>If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td></tr><tr><td>d) IPCC default values at the upper or lower limit – whatever is more conservative⁶ – of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td><td>If a) is not available</td></tr></table>	Data source	Conditions for using the data source	a) Values provided by the fuel supplier in invoices	This is the preferred source	b) Measurements by the project participants	If a) is not available	c) Regional or national default values	If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).	d) IPCC default values at the upper or lower limit – whatever is more conservative ⁶ – of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If a) is not available	<p>gasoline and diesel</p> <p>Source of data: IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</p> <p>Value(s) applied: 43 (diesel) and 44.3 (Gasoline)</p> <p>Measurement methods and procedures: Default values should be used</p> <p>Monitoring frequency: Any future revision of the IPCC Guidelines should be taken into account</p> <p>QA/QC procedures: -</p> <p>.</p> <p>Purpose of data: To calculate baseline and project emissions,</p>	<p>determination of the parameter NCV_{a, D} are in line with the requirements of Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” .</p> <p>The sources of values applied are clearly stated and the actual values were confirmed to be correct.</p>
	Data source	Conditions for using the data source										
a) Values provided by the fuel supplier in invoices	This is the preferred source											
b) Measurements by the project participants	If a) is not available											
c) Regional or national default values	If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).											
d) IPCC default values at the upper or lower limit – whatever is more conservative ⁶ – of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If a) is not available											
<p>Measurement procedures (if any):</p> <p>For a) and b): Measurements should be undertaken in line with national or international fuel standards.</p> <p>QA/QC procedures: Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall out this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in a).</p>												

		Validated situation		Conclusion										
	b) or c) should have ISO17025 accreditation or justify that they can comply with similar quality standards. Any comment: Only applicable if option B1 is used													
NCV _{CNG}	Data unit: GJ / mass or volume unit Description: Average net calorific value of fossil fuel type i used in the period t Source of data: The following data sources may be used if the relevant conditions apply: <table><tr><th>Data source</th><th>Conditions for using the data source</th></tr><tr><td>a) Values provided by the fuel supplier in invoices</td><td>This is the preferred source</td></tr><tr><td>b) Measurements by the project participants</td><td>If a) is not available</td></tr><tr><td>c) Regional or national default values</td><td>If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).</td></tr><tr><td>d) IPCC default values at the upper or lower limit – whatever is more conservative⁶ – of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td><td>If a) is not available</td></tr></table> Measurement procedures (if any): For a) and b): Measurements should be undertaken in line with national or international fuel standards. QA/QC procedures: Verify if the values under a), b) and c) are within the uncertainty range of the IPCC	Data source	Conditions for using the data source	a) Values provided by the fuel supplier in invoices	This is the preferred source	b) Measurements by the project participants	If a) is not available	c) Regional or national default values	If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).	d) IPCC default values at the upper or lower limit – whatever is more conservative ⁶ – of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If a) is not available	Unit: MJ/kg Description: Net calorific value of CNG Source of data: Indraprastha Gas Limited, Oct 2010 Value(s) applied: 39.2 Measurement methods and procedures: The data will be considered from published sources of local/national sources. If available, the data from CNG suppliers/distributors of the city will be obtained for the purpose. Monitoring frequency: Annually QA/QC procedures: The values will be taken from official/published sources for the fuels during the monitoring period. However, if the values are considered based on measurement method, the values will be verified, if the values are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall outside this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements.	<p>It was confirmed that the approach employed and the values used for determination of the parameter NCV_{CNG} are in line with the requirements of Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” .</p> <p>The sources of values applied are clearly stated and the actual values were confirmed to be correct.</p>	OK
	Data source	Conditions for using the data source												
a) Values provided by the fuel supplier in invoices	This is the preferred source													
b) Measurements by the project participants	If a) is not available													
c) Regional or national default values	If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).													
d) IPCC default values at the upper or lower limit – whatever is more conservative ⁶ – of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If a) is not available													

		Validated situation		Conclusion
	<p>default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall out this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in a), b) or c) should have ISO17025 accreditation or justify that they can comply with similar quality standards.</p> <p>Any comment: Only applicable if option B1 is used</p>	<p>Purpose of data: To calculate baseline and project emissions,</p>		
EF _{CO2,G,D,CNG}	<p>Data unit: t CO₂ / GJ</p> <p>Description: CO₂ emission factor of fossil fuel type i used in the period t</p> <p>Source of data: The following data sources may be used if the relevant conditions apply:</p>	<p>Unit: gCO₂/MJ</p> <p>Description: CO₂ emission factor for gasoline, diesel and CNG</p> <p>Source of data: IPCC default values at the lower limit (for baseline) and upper limit (for project) of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</p> <p>Value(s) applied: For baseline estimations: Gasoline: 67.5 Diesel: 72.6 CNG: 54.3</p> <p>For project emissions estimations: Gasoline: 73 Diesel: 74.80 CNG: 58.30</p> <p>Measurement methods and</p>	<p>It was confirmed that the approach employed and the values used for determination of the parameter EF_{CO2,G,D,CNG} are in line with the requirements of Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion".</p> <p>The sources of values applied are clearly stated and the actual values were confirmed to be correct.</p>	OK

		Validated situation	Conclusion
	Data source	Conditions for using the data source	<p>procedures: Default values should be used data.</p> <p>Monitoring frequency: Any future revision of the IPCC Guidelines should be taken into account</p> <p>QA/QC procedures: No QA/QC required since default values would be used.</p> <p>Purpose of data: To calculate baseline and project emissions,</p>
	a) Values provided by the fuel supplier in invoices	This is the preferred source.	
	b) Measurements by the project participants	If a) is not available	
	c) Regional or national default values	If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).	
	d) IPCC default values at the upper or lower limit – whatever is more conservative ⁶ – of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If a) is not available	
<p>Monitoring frequency: For a) and b): The CO₂ emission factor should be obtained for each fuel delivery, from which weighted average values for the period t should be calculated For c): Review appropriateness of the values annually For d): Any future revision of the IPCC Guidelines should be taken into account</p> <p>Measurement procedures (if any): For a) and b): Measurements should be undertaken in line with national or international fuel standards.</p>			

		Validated situation		Conclusion
	<p>For a): If the fuel supplier does provide the NCV value and the CO2 emission factor on the invoice and these two values are based on measurements for this specific fuel, this CO2 factor should be used. If another source for the CO2 emission factor is used or no CO2 emission factor is provided, options b), c) or d) should be used.</p> <p>QA/QC procedures: Any comment: Only applicable if option B1 is used</p>			
<p>OC_{B,y}/OC_{T,y}/O_{CMR,y}</p>	<p>Unit: Passengers Description: Average occupation rate of vehicle category i in year y. In particular, B stands for buses, and T for taxis Source of data: Municipal transit authorities or specific studies done by the project proponent or a third party Measurement procedure: Based on visual occupation studies for all vehicle categories. For buses the occupation rate is based on boarding-alighting studies, electronic smart tickets or on visual occupation studies with expansion factors for routes served to determine the average occupation rate along the entire route. As an alternative for buses, the occupation rate can be based on average trip distance of bus passengers, total passengers and total distance driven of buses. For taxis, the driver should not be counted. The detailed procedures concerning visual</p>	<p>Unit: Passengers Description: Average occupation rate of vehicle category i in year y. In particular, B stands for buses, and T for taxis Source of data: Survey reports Value(s) applied: Buses: 37.1 Taxis: 2.31 Motorized auto-rickshaw: 1.65 Measurement methods and procedures: Based on visual occupation studies for all vehicle categories. For buses the occupation rate is based on visual occupation studies with expansion factors for routes served to determine the average occupation rate along the entire route. For taxis and</p>	<p>Data units and description are described correctly.</p> <p>The average occupation rate will be sourced from the survey following the methodology guidance.</p>	OK

		Validated situation		Conclusion
	<p>occupation and boarding alighting studies are presented in Annexes 1, 2 and 3.</p> <p>Monitoring frequency: Studies conducted in years 1 and 4 of the crediting period</p> <p>QA/QC procedures: -.</p>	<p>motorized auto-rickshaws, the driver should not be counted.</p> <p>Monitoring frequency: Studies conducted in years 1 and 4 of the crediting period</p> <p>QA/QC procedures: -.</p> <p>Purpose of data: To calculate leakage emissions,</p>		
P _y	<p>Unit: Passengers</p> <p>Description: Total passengers transported by the project activity transport system</p> <p>Source of data: MRTS operator(s) or system control manager</p> <p>Measurement procedure: Based on electronic (e.g. electronic smart cards) or mechanical control means (e.g. turnpikes at stations or in trains)</p> <p>Monitoring frequency: Continuously, aggregated at least annually.</p> <p>QA/QC procedures: Control with ticket sales.</p>	<p>Unit: Passengers</p> <p>Description: Total passengers transported by the project activity transport system.</p> <p>Source of data: Delhi Metro Rail Corporation</p> <p>Value(s) applied: Different values</p> <p>Measurement methods and procedures: OD matrix report generated by Automatic Fare Collection System.</p> <p>The automatic fare collection system tracks the entry and the exit of each passenger through smart media unique ID and generates an ODD Matrix at the end of the day</p> <p>This report contains all entry of all DMRC station and all corresponding exit at all station of DMRC metro network. Report is generated at the end of</p>	<p>Data units and description are described correctly.</p> <p>Total passengers transported by the project transport system will be calculated from the operator's internal system.</p>	OK

		Validated situation	Conclusion
		<p>day at Operation control Centre (OCC) and not at the station.</p> <p>Monitoring frequency: Frequency: Continuously monitored and aggregated annually.</p> <p>QA/QC procedures: The real data for the entire year can be verified by PDF files generated daily at OCC level. Live data for a vintage of 15 days would be available at OCC level..</p> <p>Purpose of data: To calculate baseline emissions and indirect project emissions,</p>	
$N_{i,y}$	<p>Data Unit: Number of vehicles</p> <p>Description : Number of vehicles of vehicle category i circulating in the larger urban zone of the city. In particular B stands for buses, and T for taxis</p> <p>Source of Data : Municipal transit authorities based on vehicle registration statistics from the respective city or data from vehicle control stations (technical and emission control stations)</p> <p>Measurement Procedure : For buses as well as for taxis informal or illegal units may operate. While estimates on the number of informal units may be available these are due to their nature not trustworthy. For both categories it is thus recommended to only include formally registered units</p> <p>Monitoring frequency: Studies conducted in</p>	<p>Data unit: Number of vehicles (Buses, Taxis, Motorized Rickshaws)</p> <p>Description: Number of vehicles of vehicle category i circulating in the larger urban zone of the city. In particular B stands for buses, and T for taxis, MR for motorised auto-rickshaw, etc.</p> <p>Source of data: Delhi Statistical Handbook</p> <p>Measurement methods and procedures: The data will be considered from the official/public sources of information.</p> <p>Monitoring frequency: Once during the year 1 and 4 of the</p>	<p>Data units and description are described correctly.</p> <p>Number of vehicle category will be estimated from the official sources, such as Delhi Statistical Handbook.</p> <p>OK</p>

		Validated situation		Conclusion
	years 1 and 4 of the crediting period QA/QC procedures : Comments : See also the table for Ni	crediting period QA/QC procedures: NA Purpose of data : To calculate baseline emissions Additional comment:		
P _{EL,R,y}	Data Unit: Passengers Description: Total passengers transported by baseline rail-system in year y Source of Data: Rail operator Measurement Procedure: Based in general on turnpike or electronic ticketing system; Cross check with ticket sales possible in some cases Monitoring frequency: Annually QA/QC procedures: Comments: Only required in case baseline rail systems operates	Data unit: Passengers Description: Total passengers transported by baseline electricity based rail-system per year in the year y Source of data: Rail operator Value(s) applied 516,982,658 (Metro) 3,030,000 (Suburban rail) Measurement methods and procedures: Based in general on turnpike or electronic ticketing system; Cross check with ticket sales possible in some cases Monitoring frequency: Frequency: annually QA/QC procedures: The parameter is proposed to be taken from official sources; hence, QA/QC is not under the control of project proponent. Purpose of data: To calculate baseline emissions Additional comment: Only required in case baseline rail systems operates in the urban zone covered by CPA MRTS	Data units and description are described correctly. Number of vehicle category will be estimated from the survey which will be conducted following the guidance provided by the methodology.	OK

	Validated situation	Conclusion
<p>2. <i>Implementation of the plan:</i> confirm that the monitoring arrangements described in the monitoring plan are feasible within the CPAs.</p> <p>Described the steps undertaken to assess this.</p>	<p>Generic CPA-DD both for the system metering and the model based method describe the approach employed for monitoring of the parameters identified as needed for determining emission reductions resulting from implementation of the project activity. The parameters were compared with the requirements of the methodology ACM0016 version 03.0.0.</p>	OK
<p>3. <i>Implementation of the Plan:</i> confirm that the means of implementation of the MP, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by / resulting from the proposed CPAs can be reported ex post and verified.</p>	<p>The management plan, quality control/ quality assurance procedures planned were confirmed to allow determination of emission reductions resulting from the implementation of the CPAs and can be verified.</p> <p>It was confirmed that data and parameters to be monitored and the description of the monitoring plan in the proposed specific CPA correspond to the requirements in the Generic CPA. Tables with parameters and proposed sampling were checked.</p>	OK
<p>4. Confirm that the data and parameters to be monitored and the description of the monitoring plan in the specific CPA meet the requirements in the Generic CPA.</p> <p>Check the parameters tables and the sampling proposed.</p>	<p>Yes, the data and parameters to be monitored and the description of the monitoring plan in the specific CPA meet the requirements in the Generic CPA. The validation team confirms it.</p> <p>Few parameters were monitored through the survey which is based on the sampling approach as described in the applied methodology.</p> <p>The PP has followed the sampling plan as described in the applied methodology. Further, ex-ante parameters provided below are evaluated based on sampling survey with 95% confidence level.</p> <p>Occupancy studies for buses, taxis and Motorized auto-rickshaws were conducted as per the procedures described in the applied methodology</p> <p>In the first year and while the system is stabilized, a single measurement will be taken and a second measurement will be carried out in a later period (test-retest method), with a sample size of less than half of the initial survey.</p>	OK

	Validated situation	Conclusion
	<p>Further the team took into account Appendix A of the Guidelines for sampling and surveys for CDM project activities and PoA version 02.0 to validate the sampling design for each parameter. The forms used for obtaining the necessary data were reviewed to check that the questions to collect data for the sampling were clear and unambiguous and not subject to sensitivity from the commuters.</p> <p>The sample design includes all stations as a part of strata. Stations of the existing metro line were divided based on its passenger flow into: high, medium and low. Further, sub-strata was build based on time of day to peak and off-peak. Intervals 8AM to 11AM and 3PM to 7PM are peak hours; and 5AM to 8AM, 11AM to 3PM and 7PM to 11 PM are off-peak hours.</p> <p>A two-stage probabilistic design was correctly applied in the survey. In first stage, simple random sampling was conducted based on the stations identified. In second stage, systematic sampling based on passenger flow per station was done.</p> <p>The sample size for the survey was estimated based on coefficient of variation of 5%-10%. The estimated sample size was 4000 based on Sarndal methodology used in the survey.</p> <p>It has been validated that the proposed sample plans described in the generic CPA and the sampling sizes calculated in the CPA-DD, allow for achieving of the required confidence level by the methodology ACM0016.</p>	

	Validated situation	Conclusion															
SECTION 12. Local stakeholder consultation																	
1. Indicate if the local stakeholder consultation process was carried out for the whole PoA or at the CPA level.	<p>The PoA-DD describes that local stakeholder consultation will be carried out at CPA level. The PP has conducted Local stakeholder consultation on 19th and 20th July 2011 in below provided addresses:</p> <table border="1"> <thead> <tr> <th>S. No.</th><th>Venue of the Public Consultation</th><th>Time and Venue</th></tr> </thead> <tbody> <tr> <td>1</td><td>Janpath, DMRC office</td><td>11:00 AM, 19th July 2011</td></tr> <tr> <td>2</td><td>Amar Jyoti Restaurant, Sarojini Nagar Market</td><td>04:00 PM, 19th July 2011</td></tr> <tr> <td>3</td><td>Star Rock Hotel, opposite IIT Delhi</td><td>11:00 AM, 20th July 2011</td></tr> <tr> <td>4</td><td>Shiv Mandir Dharamshala, Shanti Niketan, near Dhaula Kuan</td><td>04:00 PM, 20th July 2011</td></tr> </tbody> </table> <p>CAR 08 was raised as CPA inclusion criteria presented in section B.2 of the PoA-DD, does not include the criteria related to local stakeholders' consultation. PP has included LSC in eligibility criteria of the generic CPA-DD. Details are provided in the finding log.</p>	S. No.	Venue of the Public Consultation	Time and Venue	1	Janpath, DMRC office	11:00 AM, 19 th July 2011	2	Amar Jyoti Restaurant, Sarojini Nagar Market	04:00 PM, 19 th July 2011	3	Star Rock Hotel, opposite IIT Delhi	11:00 AM, 20 th July 2011	4	Shiv Mandir Dharamshala, Shanti Niketan, near Dhaula Kuan	04:00 PM, 20 th July 2011	CAR-08 OK
S. No.	Venue of the Public Consultation	Time and Venue															
1	Janpath, DMRC office	11:00 AM, 19 th July 2011															
2	Amar Jyoti Restaurant, Sarojini Nagar Market	04:00 PM, 19 th July 2011															
3	Star Rock Hotel, opposite IIT Delhi	11:00 AM, 20 th July 2011															
4	Shiv Mandir Dharamshala, Shanti Niketan, near Dhaula Kuan	04:00 PM, 20 th July 2011															
2. If the local stakeholder consultation process was carried out for the whole PoA describe the process of inviting comments and determine if this process assure that local stakeholders that can reasonably be considered relevant for the proposed CDM project activity, have been invited	NA. The local stakeholder consultation was carried out at CPA level.	OK															
3. If local stakeholder consultation process is conducted at CPA level, confirm that the process is in accordance with the level of consultation specified by the coordinating/managing entity in the PoA. Determine whether comments by local stakeholders that can reasonably be considered relevant for the proposed CPA,	<p>The validation team confirms that the local stakeholder process was conducted at CPA level and the process was in accordance with level of consultation specified by the CME in the PoA based on review of minutes of meeting, and attendance sheet provided.</p> <p>The PP had an open and transparent meeting with all stakeholders and also</p>	OK															

	Validated situation	Conclusion
have been invited	addressed there concern. No negative comments were received.	
4. Confirm that the summary of the comments received as provided in the PoA-DD and/or Specific CPA-DD is complete.	From the review of minutes of meeting, attendance sheet, video taken during the process and interview of selected stakeholders it was confirmed that summary of comments in the specific CPA-DD is complete.	OK
5. Confirm that the project participant have taken due account of any comments received and have described this process in the PoA-DD and/or Specific CPA-DD.	The PP had an open and transparent meeting with all stakeholders and also addressed there concern. No negative comments were received. Team confirmed from the review of local stakeholders' consultation that no negative comments were received.	OK

	Validated situation	Conclusion
SECTION 13. Environmental Impacts		
1. Indicate whether the analysis of environmental impacts is performed at the PoA and/or the CPA level. Is justification provided for the choice of level at which the analysis is undertaken?	<p>As per the host country regulations, EIA is not required for a MRTS project. This was confirmed from the review of EIA notification 2006 and its recent amendments. Environmental analysis may be carried out at CPA.</p> <p>In general, the introduction MRTS system in an Indian city will yield benefits from non-tangible parameters such as saving due to equivalent reduction in road construction and maintenance, vehicle operating costs, less atmospheric air pollution and socio-economic benefits of travel time, better accessibility, better comfort and quality of life. However, all benefits cannot be evaluated in financial terms due to non-availability of universally accepted norms. The parameters such as economic growth, improvement in quality of life, reduction in public health problems due to reduction in pollution, etc. have not been quantified.</p> <p>Various positive impacts have been listed under the following headings:</p> <ul style="list-style-type: none"> • Employment Opportunities, • Enhancement of Economy, • Mobility, • Safety, • Traffic Congestion Reduction, • Reduced Fuel Consumption, • Reduced Air Pollution, • Carbon Dioxide and Green House Gases (GHG) Reduction, • Reduction in Number of Buses, and • Saving in Road Infrastructure. 	OK
2. If the analysis of environmental impacts is selected to be done at CPA level, describe the analysis	The environmental impacts analysis is selected to be done at PoA level only.	OK

	Validated situation	Conclusion
undertaken as per the PoA.		
3. Is an EIA required by the environmental legislation of the host country? Describe the legislation applicable.	Host country regulations, i.e EIA notification 2006 ⁹ as amended in 2009 ¹⁰ , does not require EIA clearance for MRTS projects. Thus Environmental Impact Assessment of a MRTS project is not a regulatory requirement in the host country. Hence the MRTS projects under this PoA need not document the Environmental impact at the CPA level.	OK
4. Confirm whether the project participant have undertaken an analysis of environmental impacts and, if required by the host Party, an environmental impact assessment.	NA	NA
5. Confirm that environmental impacts considered significant by the PPs or the Host country are described in the PoA-DD or specific CPA-DD, including mitigation measures.	NA	NA

⁹ <http://envfor.nic.in/legis/eia/so1533.pdf>

¹⁰ <http://www.moef.nic.in/legis/eia/so195.pdf>

	Validated situation	Conclusion
SECTION 14. Eligibility of the Specific CPA		
<p>1. Assess how each generic CPA meets the eligibility criteria of the PoA including confirmation of additionality of the CPA for its inclusion into the PoA. Check the demonstration of eligibility for a Generic CPA in the PoA-DD section II and how it is applied to the specific CPA.</p> <p>Use the table below for each Eligibility criteria in the PoA-DD listed in section 9 above. Add further table as necessary.</p>	The eligibility criteria listed in the PoA-DD have been applied specifically for the proposed CPAs in the generic CPA and an example on how they will be assessed for each CPA is provided in the specific CPA. Below is the result of the validation of the application of each one for the specific CPA for its inclusion in the proposed PoA. .	OK

Ref. number	1
Eligibility Criteria in the PoA-DD	The project should be located in India
Information on how it is met in the Generic CPA	This would be confirmed from the geographical coordinates of projects as given in CPA-DD and its location from project specific documents like DPR/ feasibility report
Information on how it is met in the Specific CPA	The project is located in Delhi state, of India as evident from DPR.
Validated situation	The geographical coordinates provided in the CPA-DD falls under the political boundary of the host country India.
Conclusion	OK

Ref. number	2
Eligibility Criteria in the PoA-DD	The project activity should establish and operate an MRTS.
Information on how it is met in the Generic CPA	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.
Information on how it is met in the Specific CPA	The project involves establishment of rail based MRTS as evident from the DPR.
Validated situation	The validation team confirms the CPA is a rail based MRTS project as confirmed from DPR and publicly available documents.
Conclusion	OK

Ref. number	3
Eligibility Criteria in the PoA-DD	The project constructs a new rail-based infrastructure or segregated bus lanes: • For rail systems, the project needs to involve the construction of a new infrastructure (new rail lines);
Information on how it is met in the Generic CPA	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.
Information on how it is met in the Specific CPA	The project involves implementation of new rail based MRTS system and involves construction of new rail lines as evident from the DPR
Validated situation	The validation team confirms that the CPA has already begun construction as confirmed during site visit and further confirmed from the DPR and MoU of construction signed between Arvind Techno Engineers private limited and DMRC.
Conclusion	OK

Ref. number	4
Eligibility Criteria in the PoA-DD	The rail-based MRTS replaces existing bus routes (e.g. through scrapping units or through closing or re-scheduling existing bus routes) operating under mixed traffic conditions;
Information on how it is met in the Generic CPA	This would be confirmed from publicly available information / DPR or evidences provided by PP in CPA-DD
Information on how it is met in the Specific CPA	The project results in a reduction in the number of buses through scrapping of units ¹¹
Validated situation	The validation team confirms that the proposed Rail based MRTS does not replace existing rail lines based on review of the DPR, MoU for construction signed between Arvind Techno Engineers private limited and DMRC and site visit.
Conclusion	OK

Ref. number	5
Eligibility Criteria in the PoA-DD	The project activity should not constitute of only operational improvements (e.g. new or larger buses) of an already existing and operating bus lane or rail-based MRTS;
Information on how it is met in the Generic CPA	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.

¹¹ Chapter 3: Positive Impacts; EIA Report of Phase III prepared by RITES

Information on how it is met in the Specific CPA	The project involves implementation of new rail based MRTS system and involves construction of new rail lines as evident from the DPR.
Validated situation	The validation team confirms that the proposed Rail based MRTS does not result in operational improvement of the existing rail based MRTS based on review of the DPR, MoU for construction signed between Arvind Techno Engineers private limited and DMRC and site visit.
Conclusion	OK

Ref. number	6
Eligibility Criteria in the PoA-DD	The project activity under this PoA would be able to claim emission reduction for passenger transport only;
Information on how it is met in the Generic CPA	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.
Information on how it is met in the Specific CPA	The project activity involves passenger transport only
Validated situation	The validation team confirms that emission reduction will be claimed for passenger transport only as the metro is being constructed for public only based on the review of DPR and traffic survey.
Conclusion	OK

Ref. number	7
Eligibility Criteria in the PoA-DD	The project activity which implements air- and water-based transport systems is not eligible for this PoA;
Information on how it is met in the Generic CPA	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.
Information on how it is met in the Specific CPA	The project activity does not involve air or water based transport system
Validated situation	The validation team confirms that the proposed project is a rail based MRTS as confirmed from DPR and MoU for construction activity.
Conclusion	OK

Ref. number	8
Eligibility Criteria in the PoA-DD	The project activity should constitute of only urban or suburban trips. It is not applicable for inter-urban transport.
Information on how it is met in the Generic CPA	This would be confirmed from project specific documents like DPR/ feasibility report or any other similar document.

Information on how it is met in the Specific CPA	The project activity constitutes only urban and sub-urban trips in the region of state Delhi.
Validated situation	The validation team confirms that the CPA is being constructed within Delhi state only as confirmed from the DPR.
Conclusion	OK

Ref. number	9
Eligibility Criteria in the PoA-DD	Confirm that the project activity under the CPA is not registered or being registered as a stand-alone CDM project outside of the PoA. This would be achieved through undertaking by project implementer and display of Unique identification number of the project activity (as per the CPA) along with PoA name on main stations of the CPA
Information on how it is met in the Generic CPA	This would be achieved through undertaking by project implementer.
Information on how it is met in the Specific CPA	The CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA. The project is owned by DMRC Limited (CME for the PoA). A confirmation from DMRC Limited has been provided which evidence the same.
Validated situation	The team confirms that the CPA is not registered or being registered as a standalone CDM project, confirmed from the declaration provided by the DMRC limited.
Conclusion	OK

Ref. number	10
Eligibility Criteria in the PoA-DD	Confirm that the start date of any CPA is not, prior to the commencement of validation of the programme of activities, i.e. the date on which the CDM-PoA-DD is first published for global stakeholder consultation. The CME shall check the start date of the project activity by means of first purchase order placed by activity implementer / operator for the project (For example purchase order for rail lines / equipment / civil construction / Engineering and procurement contract etc) and confirm that it's after 6th November 2012.
Information on how it is met in the Generic CPA	The CME shall check the start date of the project activity by means of first purchase order placed by activity implementer / operator for the project (For example purchase order for rail lines / equipment / civil construction / Engineering and procurement contract etc) and confirm that it's after 6th November 2012
Information on how it is met in the Specific CPA	The Start date of the CPA is 12/02/2013 which is the date when agreement between DMRC and Arvind Techno Engineers Pvt Ltd was held for construction metro activity to begin.
Validated situation	Start date of the CPA is not prior to the date on which CDM-PoA-DD is first published for global stakeholder consultation which is 06/11/2012. Start date of the CPA is 12/02/2013 which is the

	date when agreement between DMRC and Arvind Techno Engineers Pvt Ltd was held for construction metro activity to begin.
Conclusion	OK

Ref. number	11
Eligibility Criteria in the PoA-DD	The project implementing agency needs to provide written confirmation that there is no diversion of ODA funding due to the project activity. In the event there is ODA funding is involved the implementing agency needs to provide on formation that and it is separate from and is not counted towards the financial obligations of those Parties providing funding.
Information on how it is met in the Generic CPA	This would be confirmed from the written confirmation from project operator.
Information on how it is met in the Specific CPA	The confirmation from DMRC stating that there is no diversion of ODA funding due to the project activity has been provided.
Validated situation	The validation team confirms that there is no diversion of ODA involved in the project based on the written confirmation provided by DMRC.
Conclusion	OK

Ref. number	12										
Eligibility Criteria in the PoA-DD	In the event a non CDM public transport system of the same category exists in the city then the share of trips realised by the same is equal or less than 20% of total public transport trips in the host city										
Information on how it is met in the Generic CPA	This would be confirmed from publicly available information and any such document provided by project operator in CPA-DD.										
Information on how it is met in the Specific CPA	<p>The breakdown mode-wise trips in the host city is provided below:</p> <table border="1"> <thead> <tr> <th>Mode</th><th>Percentage share</th></tr> </thead> <tbody> <tr> <td>Car</td><td>19.2%</td></tr> <tr> <td>Two-wheeler</td><td>21.5%</td></tr> <tr> <td>Auto</td><td>6.8%</td></tr> <tr> <td>Bus</td><td>48.2%</td></tr> </tbody> </table>	Mode	Percentage share	Car	19.2%	Two-wheeler	21.5%	Auto	6.8%	Bus	48.2%
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	<table><tr><td>Metro</td><td>3.7%</td></tr><tr><td>Train</td><td>0.6%</td></tr><tr><td>Total</td><td>100%</td></tr></table>		Metro	3.7%	Train	0.6%	Total	100%
	Metro	3.7%						
	Train	0.6%						
	Total	100%						
The proposed project activity falls under the category of metro. As can be inferred from the above table, that the share of public transport trip is 52.5% of the total trip and share of metro is 7.05% of the total public transport trips in the city.								
The share of metro in Delhi is less than 20% of total public transport trips in Delhi (host city).								
Validated situation	The DPR provides the share percentage of the different mode of transport. The team confirmed the same based on its sectoral expertise. The criterion is fulfilled as the percentage share of metro (MRTS) project is less than 20%.							
Conclusion	OK							

Ref. number	13	
Eligibility Criteria in the PoA-DD	<p>In the event the project activity is implemented by a public sector / government agency then annual revenues from CERs are equal to or exceed 10% of the total annual operating and maintenance costs of the MRTS proposed as CDM project activity otherwise it should be demonstrated that the return from project activity is lower than the benchmark. In applying the investment analysis, cost overruns of former investments in MRTS or reduced revenues of former MRTS investments compared to original projections, which make new investments less viable and riskier, can be considered in the investment analysis</p>	
Information on how it is met in the Generic CPA	This would be confirmed from justification given in CPA-DD.	
Information on how it is met in the Specific CPA	<p>The project is being implemented by a public sector company (DMRC). The revenue from CERs exceeds the 10% of total annual operating and maintenance expenses for the project activity. This has been further explained in the CPA-DD.</p>	
Validated situation	<p>The validation team confirms that information quoted from publicly available information and document such DPR for CPA to be included being justified based on its sectoral expertise. It is further detailed in the Additionality part of the Validation Report.</p>	
Conclusion	OK	

Ref. number	14	
Eligibility Criteria in the PoA-DD	The project activity should undertake local stakeholder consultation	

Information on how it is met in the Generic CPA	This would be confirmed from minutes of meeting, photographs and attendance sheet for local stakeholder consultation at CPA level.
Information on how it is met in the Specific CPA	DMRC had carried out local stakeholder consultation for the four corridors of the metro. The details on local stakeholder consultation has been provided in section C of this CPA DD.
Validated situation	The validation team confirms that the local stakeholders' consultation has been carried out before the webhosting of the PoA-DD. The team checked all evidences related to local stakeholder consultation and confirms its appropriateness.
Conclusion	OK

Findings¹²

1. Grade / Ref:	CAR 01	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 12.1 of CDM-PS, Version 07.0				
5. Nature of the Issue Raised:	<p>Though the proposed PoA involves Mono Rail, Light rail transit (LRT) and Metro Rail as well as Bus Rapid Transit System (BRT), CPA-DD for Mono Rail, Light rail transit (LRT) and Bus Rapid Transit System (BRT) was not submitted for validation.</p> <p>Further the separate generic CPA-DDs for Bus Rapid Transit System (BRT) & Mono Rail, Light rail transit (LRT) are not provided as part of the PoA-DD.</p>				
6. Nature of responses provided by the project participant:	<p>The objective of the PoA is to promote MRTS system in India for the purpose of modal shift from traditional means of transport, which are less efficient in terms of GHG emissions such as private vehicles and public vehicles to more efficient Mass Rapid Transit System. The technology proposed are rail based MRTS such metro, monorail and light rail transit.</p> <p>Further, separate generic CPA is not required for the cases where it does not differ in terms of emission reduction calculations, in accordance with footnote in section 12.1 of the CDM-PS. Metro rail, monorail, or light rail transit, are effectively forms of rail based MRTS having same project the emission reduction calculations does not vary, therefore, separate generic CPA is not required.</p>				
7. Assessment of such responses:	<p>PoA-DD has been correctly revised and project technology related to BRT has been removed.</p> <p>PP has correctly justified that the, Monorail, light transit rail and metro rail, can be classified as rail based MRTS. The emission reduction calculations for Monorail, light transit rail and metro rail, are same. Team confirmed from its sectoral expertise that emission sources for rail based MRTS are same. Therefore, following footnote in section 12.1 of the CDM-PS, team confirms that no separate CPA is required for these three MRTS technologies. Therefore, the finding is closed.</p>				
8. References to resulting changes in the PDD or supporting annexes:	Section A.2, A.6, B.1, and B.2 of PoA-DD				

¹² Explanation of the Findings Log structure:

1. Grading and Sequential Number of the finding
6. Details of PP's response

2. Date of Original Finding
7. Evaluation from the Validation team

3. New, Open, Closed

4. Requirement (VVS, PDD-CDM, etc)

5. Reference to Protocol

8. List of changes made as a result of the finding

1. Grade / Ref:	CAR 02	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 7.11 of CDM-PS, Version 07.0				
5. Nature of the Issue Raised:					
Description of the programme does not include: <ul style="list-style-type: none">• Project scale• Project type• Scenario existing prior to the project activity• Description of environmentally safe and sound technology• Description of technology transfer					
6. Nature of responses provided by the project participant:					
<p>PoA-DD has been revised to include the scale, type, scenario existing prior to the project activity, description of environmentally safe and sound technology, and description of technology transfer. It is described that the project is a large scale project of Sectoral scope 7: "Transport". Scenario existing prior to project activity: In absence of the PoA, continuation of baseline mode of transport would have been prevalent.</p> <p>Environmentally safe and sound technology: The most important environment benefit of an MRTS system is prevention of air pollution. MRTS system contribute to the air quality in a positive way by reducing the CO, NOx, SOx, HC and particulate matter (PM) compared with gasoline powered vehicles. Modal shift from private vehicles to MRTS leads to reduction in number of vehicles on road. This results in decrease in vehicular emission as well as decrease in fossil fuel consumption in per capita basis and thus helps in sustaining fossil fuel. Moreover, prevalence of MRTS reduces traffic load on road and in turn reduces congestion. Thus leads to efficient combustion of fossil fuel by vehicles through enhanced driving conditions and better speed delay statistics. Thus leads to lower vehicular pollution and efficient fuel consumption.</p> <p>Transfer of technology: The transfer of technology is diffusion within the country. DMRC who is the CME for the PoA is a successful pioneer in the sector of MRTS in India. Although MRTS was developed in Kolkata prior to Delhi metro, yet successful implementation of metro has been carried out only by the CME as of date. As such transfer of technology for metro MRTS will be diffusion within the country by the CME. In case of other MRTS such as LRT and monorail, the transfer of technology will be described in the CPA DD. The transfer of technology for the first CPA will be within the country and by the CME.</p>					
7. Assessment of such responses:					
The PoA-DD correctly describes the scale, type of the activity in section A.2. The PoA-DD correctly describes how environmentally safe and sound technology is, and transfer of technology. CPA-DD now describes the scenario existing prior to the project activity. Team confirmed the description in the PoA-DD and CPA-DD from the interview of the PP, and sectoral expertise of the team. Therefore, finding was closed.					

8. References to resulting changes in the PDD or supporting annexes:

Section A.2 & A.6 of PoA-DD

1. Grade / Ref:	CAR 03	2. Date:	28/02/2013	3. Status:	Closed												
4. Requirement:	Section 12.6 of CDM-PS 07.0 & Section 8.5.6 of CDM-VVS, Version 07.0																
5. Nature of the Issue Raised:																	
CPA –DD submitted for validation does not describe how the start date was determined. Evidence of start date of the PoA and CPA was not submitted.																	
6. Nature of responses provided by the project participant:																	
According to CDM Project Standard Version 07.0, Section 12.6: “The start date of a PoA shall be either of the two dates below: (a) The date of notification of the intention to seek the CDM status by the coordinating/managing entity to the secretariat and the DNA; or (b) The date of publication of the PoA-DD for global stakeholder consultation”																	
Thus, the start date of the PoA is taken to be 6th November 2012, when the PoA was made available for global stakeholder consultation.																	
The start date of the CPA is taken as the date of first contract signed for the present CPA, i.e. “CPA001: Delhi Metro under MRTS PoA”. It was determined from the first contract agreement signed between Delhi Metro Rail Corporation Limited and Arvind Techno Engineers Pvt. Ltd. on 12th February 2013 for the construction of main viaduct, ramp, Mukundpur elevated station and depot, and chainage on Mukundpur-Yamuna Vihar corridor.																	
Start Date for PoA : 6th November 2012 Start date of the CPA: 12th February 2013																	
The start date for the PoA and the CPA has been modified in the relevant sections of the PoA DD and CPA DD.																	
The start date was determined following the chronological order of events that were taken up for securing carbon credits for the project. The chronological events are as follows:																	
<table><tr><th>Date</th><th>Event</th></tr><tr><td>February 2011</td><td>Final DPR for the project activity</td></tr><tr><td>26 September 2011</td><td>Sanction order (no. K-14011/4/2009-MRTS) by Ministry of Urban Development (MoUD) for implementation for the CPA corridors</td></tr><tr><td>8 February 2012</td><td>Appointment of CDM consultant through Letter of Acceptance</td></tr><tr><td>15 February 2012</td><td>Contract agreement signed with consultant</td></tr><tr><td>1 June 2012</td><td>Tender floated for appointment of DOE</td></tr></table>						Date	Event	February 2011	Final DPR for the project activity	26 September 2011	Sanction order (no. K-14011/4/2009-MRTS) by Ministry of Urban Development (MoUD) for implementation for the CPA corridors	8 February 2012	Appointment of CDM consultant through Letter of Acceptance	15 February 2012	Contract agreement signed with consultant	1 June 2012	Tender floated for appointment of DOE
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8 June 2012	Selection and Appointment of DOE
July 2012	Baseline traffic survey carried out for the project
31 August 2012	Letter of Acceptance (LoA) to DOE
7 September 2012	Project documents initially submitted to DOE
5 November 2012	Project documents submitted to DOE after completeness check before webhosting
6 November 2012	Webhosting of PoA (considered as start date of PoA)
12 February 2013	First work order signed for the CPA

Now, according to section 12.6 of CDM Project Standard, version 7.0, "The start date of a CPA is the earliest date at which either the implementation or construction or real action of the CPA begins." Since the first contract for the project was signed on the 12th of February 2013, hence it is considered as the start date of the CPA.

The PP now submits the following as a supportive to this response:

1. Contract agreement with Arvind Techno Engineers Pvt. Ltd. dated 12 February 2013
2. Letter of acceptance for appointment of Consultant dated 8 February 2012
3. Contract agreement with consultant dated 15 February 2012
4. Sanction order from MoUD dated 26 September 2011

7. Assessment of such responses:

PoA-DD correctly describes the start date as date when PoA-DD was made publicly available for global stakeholders' consultation.

Start date of CPA has now been described as 12/02/2013 based on the contract agreement with Arvind Techno Engineers Pvt. Ltd. However, the necessary evidence was not submitted.

Team has now provided the process for determining start date by the CME. The validation has checked the evidence provided and confirms the start date to be appropriate. The finding is closed.

8. References to resulting changes in the PDD or supporting annexes:

Section D.1 of PoA-DD and Section A.8 of CPA-DD

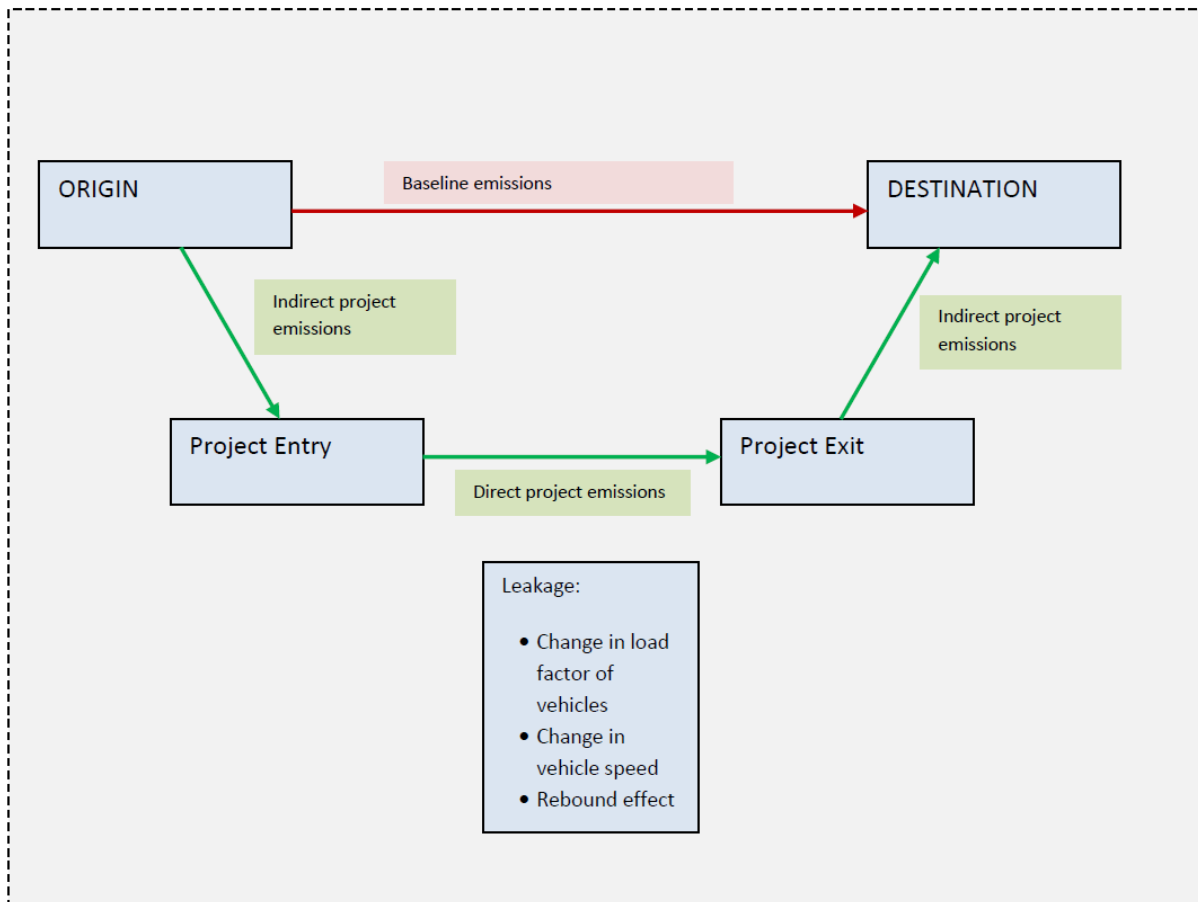
1. Grade / Ref:	CAR 04	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section A.7 of "GUIDELINES FOR COMPLETING THE COMPONENT PROJECT ACTIVITY DESIGN DOCUMENT FORM" Version 01.0				
5. Nature of the Issue Raised:	PP has not presented the specific geo-coordinates of the first CPA in the CPA-DD submitted for validation.				

6. Nature of responses provided by the project participant:	
<p>The MRTS in the CPA includes four corridors. The geographical coordinates of each corridor is as follows:</p> <p>Corridor 1 Mukundpur to Yamuna Vihar:</p> <p>Mukundpur (28°43'0.73"N, 77°10'54.27"E) Yamuna Vihar (28°42'9.29"N, 77°16'25.17"E)</p> <p>Corridor 2 Janakpuri to Kalindi kunj:</p> <p>Janakpuri (28°37'46.04"N, 77° 4'39.97"E) Kalindi Kunj (28°32'34.07"N, 77°18'36.68"E)</p> <p>Corridor 3 Mandi House to Kashmiri Gate:</p> <p>Mandi House (28°37'33"N 77°14'05"E) Kashmiri Gate (28°40'3.01"N, 77°13'41.43"E)</p> <p>Section A.7 of the CPA DD has been updated with the information</p>	
7. Assessment of such responses:	
CPA now correctly presents the geographical coordinates of each of the metro corridor. The team checked the coordinates with the DPR and google earth and found it to be correct and appropriate. The finding is closed.	
8. References to resulting changes in the PDD or supporting annexes:	
Section A.7 of the CPA-DD	

1. Grade / Ref:	CAR 05	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:		Section D.3 of “guidelines for completing the component project activity design document form” Version 01.0 & Section B.3 of “Guideline for Completing the programme design document form for CDM programmes of activities Version 03.1”			
5. Nature of the Issue Raised:					
PoA-DD and CPA-DD submitted for validation does not include flow diagrams, which physically delineating the project boundary					
6. Nature of responses provided by the project participant:					

According to ACM0016, version 3, “The spatial extent of the project boundary encompasses the larger urban zone of the city in which the project takes place. It is based on the origins and destinations of passengers using the project system. As the project cannot control the trip origins or destinations of passengers the spatial area of the project is the entire larger urban zone of the city in which the project operates.” Thus the project boundary is the entire Delhi-NCR region accounting for baseline emissions, project emissions and leakage.

Section D.3 of the CPA DD and Section B.3 of Part II of PoA DD has been modified by incorporating the project boundary diagram as follows:



7. Assessment of such responses:	
The PP has correctly included the project boundary diagram in the PoA-DD and CPA-DD. The finding is closed.	
8. References to resulting changes in the PDD or supporting annexes:	
Section D.3 of the CPA DD and Section B.3 of Part II of PoA DD	

1. Grade / Ref:	CAR 06	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 7.12.7 of CDM VVS, Version 07.0				
5. Nature of the Issue Raised:					
The Section D.6 of CPA-DD does not specify what means are used to determine the occupancy rate.					
6. Nature of responses provided by the project participant:					
Section D.6.1 now clearly states the process used to calculate the occupancy rate. The occupancy rates have been determined in accordance to Annex 1, and Annex 3 of the methodology ACM0016. In case of buses, visual occupation studies have been carried out using the following procedures: (1) Occupation categories are defined (usually five or six), for instance <50% occupied, 50-100% seats occupied, 100% seats occupied, <50% space for standing passengers occupied, 50-100% of standing space occupied, overload (>100% of legally permitted space occupied); (2) Formats for field study were prepared; (3) Field data collectors were trained; (4) Locations, days and times for field study were defined as described in traffic survey report dated May 2012. (5) Field data was collected Load factor studies for taxis/motorcycles or passenger cars have also been carried out through visual occupation as per Annex 3 of ACM0016. The actual number of passengers excluding the driver of taxis is counted in a given point within a given time period. The procedures to establish visual occupation : (1) Locations, days and times for field study were defined, avoiding days immediately after or before a holiday. (2) Field data was collected (3) Occupation is the number of passengers using the vehicle. The driver is not counted for taxis. Taxis without passengers were counted as no (zero) occupation; (4) The total number of vehicles and the total number of passengers was reported. The average occupation rate of vehicles is the total number of passengers divided by the total number of vehicles in which counts were performed; (5) The study is realized in different locations of the larger urban zone of the city The PP has strictly adhered to the methodology while carrying out surveys to determine occupation rate. The detailed traffic survey report dated July 2012 has been submitted.					

Annex 1 of the methodology ACM0016 states the “Guideline for the establishment of load factor studies for buses based on visual occupation.” According to point 6 of Annex 1, “Field data is collected. Coverage of the occupation counts should be higher than 95% of the number of buses that cross the checkpoint. 100% coverage is desired. To control this outcome, a separate vehicle count is advised. Data can be adjusted with the actual count.”

The field data for buses was collected at nine locations whereby simultaneously vehicular count was being carried out by separate data collectors. The vehicular count and occupancy count is available from the traffic survey forms. It was found that in all the locations (survey points), coverage of occupation points has been higher than 95% of the vehicular count at those survey points.

Location	Vehicular count	Occupancy counts	Coverage percentage
Dhauka Kuan	1966	1926	98%
Southex	4347	4177	96%
Akshardham	2552	2552	100%
Kalindi kunj	1526	1481	97%
Kalka	3109	3068	99%
GTK	2935	2856	97%
ITO	2231	2166	97%
Daryaganj	2110	2059	98%
Dabri Mor	2173	2170	100%

Annex 3 of ACM0016 Version 3 states the “Guideline for the establishment of load factor studies for taxis/motorcycles or passenger cars”. Point 2 of Annex 3 also states that “Field data is collected. Coverage of the occupation counts should be higher than 95% of the number of taxis that cross the checkpoint. One hundred per cent coverage is desired. To control this outcome a separate vehicle count is advised. Data can be adjusted with the actual count;”

The field data for taxi/motorcycles or passenger cars were also collected at nine locations whereby simultaneously vehicular count was being carried out by separate data collectors. It was found that in all the locations (survey points), coverage of occupation points has been higher than 95% of the vehicular count at those survey points.

Thus, the coverage of occupancy is in line with point 2 of Annex 3 of the methodology.

7. Assessment of such responses:					
CPA-DD now correctly includes the method determined to confirm occupancy rate. The description is now clear on how coverage of occupancy count and was also cross checked from following point 6 of Annex 1 and point 2 of Annex 3 of the applied methodology. The finding is closed.					
8. References to resulting changes in the PDD or supporting annexes:					
Section D.6.1 of the CPA-DD					

1. Grade / Ref:	CAR 07	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 7.12.2 of CDM VVS, Version 07.0				
5. Nature of the Issue Raised:	Applicability conditions of the applied tools are not presented in the B.2 section of PoA-DD and D.2 section of CPA-DD.				
6. Nature of responses provided by the project participant:	<p>The methodology refers to the following tools:</p> <p><i>"Tool for the demonstration and assessment of additionality", Version 07.0.0</i></p> <p><i>"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Version 01</i></p> <p>Applicability conditions for each tool are now presented in Section B.2 of Part II of PoA DD and Section D.2 of CPA DD.</p>				
7. Assessment of such responses:	Applicability condition of the applied tools is now included in the PoA-DD and CPA-DD. The finding is closed				
8. References to resulting changes in the PDD or supporting annexes:	<p>Section D.2 of CPA-DD</p> <p>Section B.2 of Part II of PoA DD</p>				

1. Grade / Ref:	CAR 08	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 7.12.7 of CDM-VVS, Version 07.0				
5. Nature of the Issue Raised:					
<p>PoA-DD does not describe how combined margin emission factor has been calculated. PP to further clarify how simple average of three year operating margin emission factors (for ex-ante approach) is in accordance with the tool requirements of generation weighted average.</p> <p>In CPA001, it is not clear how average distance travelled by the passengers using baseline metro system was estimated. Further, the baseline traffic survey for the project activity also identified that suburban rail is also a medium to travel, PP to clarify why, average distance travelled by it will not mentioned in the CPA-DD.</p> <p>For the parameters Nx,i the methodology requires the number of vehicles in each category and fuel needs to be mentioned, PP to justify how providing only percentage would be in accordance with the applied methodology.</p> <p>Emission factor used for methane is incorrect in this commitment period.</p> <p>PP to clarify why the parameters, average distance travelled by the buses, taxis and the motorized auto-rickshaws will not be described in the CPA-DD. PP to further justify why occupancy rate of auto-rickshaws will not be described.</p>					
6. Nature of responses provided by the project participant:					
<p>PoA-DD has now been revised to correctly describe the calculation procedure for combined margin emission factor; corrected the operating margin emission factor, average distance travelled by baseline metro system, parameters Nx,i, emission factor for methane. Further, it also describes the parameters related to average distance travelled by passenger using suburban rail, average distance travelled by buses, taxis and motorized auto-rickshaw, and average occupancy rate of auto-rickshaws. The average distance travelled by the metro system is now correctly sourced from the records of DMRC. Average distance travelled by suburban rail has been sourced from the data of Indian railways. The number of vehicle in each category is determined from the statistics of transport department of Delhi. Average distance travelled by bus was sourced from the data provided by Delhi Transport Department, taxis through the survey and motorized auto-rickshaw from auto-committee report.</p>					
7. Assessment of such responses:					
<p>The PoA-DD is now corrected to state the combined margin emission factor. The operating margin emission factor is now corrected to 3 year generation weighted average in accordance with the applied tool.</p> <p>The average distance travelled per passenger by the baseline metro system was confirmed from the review of DMRC website. The average distance travelled per passenger by the baseline suburban rail was now included and correctly sourced from Indian railways data. The average distance travelled by the buses, taxis and auto-rickshaw was correctly presented. The information was correctly sourced from the Delhi Transport Corporation, survey and auto-committee report.</p> <p>The number of vehicles in each category and fuel was now included and data taken from the Delhi Transport Department data. Correct emission factor for methane which is applicable for the second commitment period. Therefore, finding was closed.</p>					
8. References to resulting changes in the PDD or supporting annexes:					
Section B.6 of the PoA-DD Part-II and CPA-DD					

1. Grade / Ref:	CAR 09	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 7.12.9 of CDM-VVS, Version 07.0				
5. Nature of the Issue Raised:	<p>PP to clarify why the parameter of average transmission and distribution losses will not be described in the monitoring plan.</p> <p>It was noted that for cases (and in CPA001) where both project and non-project metro line exists, the traction energy will be calculated through apportioning. PP to clarify why apportioning procedure will not be described in the CPA-DD.</p>				
6. Nature of responses provided by the project participant:	<p>The parameter related to average transmission and distribution losses is now included in the monitoring plan described in PoA-DD. The PoA-DD describes the data will be sourced from National load dispatch centre or relevant electricity regulatory commission. For the CPA, the information has been correctly sourced from the Delhi Electricity Regulatory Commission.</p> <p>The apportioning procedure is now included in the PoA-DD and the CPA-DD. The apportioning is done based on the actual distance by the each car on that track. The CPA describes the procedure for calculation of car-km.</p>				
7. Assessment of such responses:	<p>The transmission and distribution loss is correctly described in accordance with the applied tool. The information on transmission and distribution will be correctly sourced from the national load dispatch centre or relevant electricity regulatory commission. For the CPA, the information of transmission and distribution losses has been sourced from the tariff order of July 2013 of Delhi Electricity Regulatory Commission. The transmission and distribution loss is average for three companies operating in New Delhi. Team confirmed the transmission and distribution loss from the review of tariff order and sectoral expertise of the team.</p> <p>The apportioning procedure has now been correctly described in the PoA and applied in the CPA. Further, the additional monitoring parameters such as $\text{Car-km}_{\text{CPA-MRTS},y}$, $\text{Car-km}_{\text{RSS-Total},y}$ and $\text{TE}_{\text{Total-RSS},y}$ is now included in section B.7.1 of the CPA-DD and procedure is described in the section B.7.2. Team confirms that the apportioning procedure is appropriate.</p> <p>The monitoring plan is considered complying with the monitoring methodology and feasible. Therefore, finding was closed.</p>				
8. References to resulting changes in the PDD or supporting annexes:	Section B.7 of PoA-DD Part-II and CPA-DD				

1. Grade / Ref:	CAR 10	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Paragraph 16 (g) of "Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities", Version 03.0 Section 8.5.13 of CDM VVS Version 07.0				
5. Nature of the Issue Raised:	CPA inclusion criteria presented in section B.2 of the PoA-DD, does not include the criteria related to local stakeholders' consultation				
6. Nature of responses provided by the project participant:	<p>The section B.2 of Part I and section B.5 of Part II of the PoA DD, which states eligibility criteria for including CPA have now been updated by incorporating the criterion of local stakeholder consultation. Further, the CPA-DD clearly states that local stakeholders' consultation has been done. The details of stakeholders meeting are included in the CPA-DD.</p> <p>The minutes of meeting, photographs and video-graph have been submitted to the DOE.</p>				
7. Assessment of such responses:	PoA-DD and CPA-DD correctly includes inclusion criteria for local stakeholders' consultation. Team confirmed from the site visit that the local stakeholders' consultation was conducted for the proposed CPA. The finding is closed.				
8. References to resulting changes in the PDD or supporting annexes:	Section B.2 of Part I and section B.5 of Part II of the PoA DD Section D.5 of the CPA DD				

1. Grade / Ref:	CAR 11	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 7.10 of CDM VVS Version 07.0				
5. Nature of the Issue Raised:	Latest CPA-DD and PoA-DD form are not used.				
6. Nature of responses provided by the project participant:	The CPA DD and PoA DD in version 2.0 template was webhosted in November 2012. The version 3.0 for PoA DD was revised and made available on UNFCCC website on 3 December 2012. The PP has now modified the PoA DD as per version 3.0 form. The CPA DD form has undergone no change and is still in version 2.0 and hence the PP has kept the specific CPA DD for the project in version 2.0 only.				
7. Assessment of such responses:	Correct form has been used for PoA-DD. The finding is closed				
8. References to resulting changes in the PDD or supporting annexes:	PoA-DD and CPA-DD				

1. Grade / Ref:	CL 01	2. Date:	28/02/2013	3. Status:	Closed															
4. Requirement:		Section 7.11 of CDM VVS, Version 07.0																		
5. Nature of the Issue Raised:																				
The DMRC website presents that tunnel boring machine was lowered at Mandi house on 25/10/2012 for Central secretariat-Mandi house-Kashmiri gate corridor. PP to clarify why this will not be considered as start date for the CPA? Further, inconsistency was noted in the total length of the metro between the documents submitted by the DMRC. PP to clarify the total length of metro line. PP to also clarify why location map of the proposed metro lines of the component programme activity will not be presented in section A.7 of the CPA-DD.																				
6. Nature of responses provided by the project participant:																				
Central secretariat to Mandi house line was planned for decongestion of Rajiv Chowk metro station. Based on the board note dated: 21/06/2010, the central secretariat to Mandi house is not a new metro line but extension of existing line (central secretariat to Badarpur). Therefore, the central secretariat to Mandi house line was removed from the CPA as this line is extension of the existing line.																				
Metro project is ongoing and there have been minor changes in the route line. The changes have to be made due to problem in land acquisition, civil work, traffic planning etc. The correct distance as per latest records is																				
<table><tr><td>S. No.</td><td>Corridors</td><td>Corridor Length (in km)</td></tr><tr><td>1</td><td>Mukundpur –Gokulpuri (Yamuna Vihar)</td><td>56.006</td></tr><tr><td>2</td><td>Janakpuri West - Kalindi Kunj</td><td>36.593</td></tr><tr><td>3</td><td>Mandi House - Kashmiri Gate</td><td>6.37</td></tr><tr><td></td><td>Total</td><td>98.969</td></tr></table>						S. No.	Corridors	Corridor Length (in km)	1	Mukundpur –Gokulpuri (Yamuna Vihar)	56.006	2	Janakpuri West - Kalindi Kunj	36.593	3	Mandi House - Kashmiri Gate	6.37		Total	98.969
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3	Mandi House - Kashmiri Gate	6.37																		
	Total	98.969																		
The evidence for route-length km for the CPA is submitted. The actual route length km is 98.969 km. The CPA DD is corrected accordingly. The PP also affirms that the Yamuna Vihar station is now renamed to Gokulpuri and hence corridor 1 is renamed as Mukundpur-Gokulpuri.																				
The corridor name has also been renamed in the route-map. Section A.7 of the CPA DD is modified accordingly. Location map showing the three corridors (metro lines) is now presented in section A.7 of the CPA DD.																				
7. Assessment of such responses:																				
Based on the review of the Board note dated: 21/06/2010, the central secretariat to Mandi house is an extension of existing line; construction of this line is a																				

separate decision and not a part of the project activity. The PP has correctly removed the Central secretariat to Mandi house from the CPA-DD. Further, to confirm the suitability of the Board note, the validation team reviewed the actual minutes, and interview the officials of DMRC.

CPA-DD has been corrected and now it states only 98.969 km as total length of the metro line. PP has submitted the relevant evidence a written confirmation from DMRC the implementing agency regarding the final length of each corridor which was also confirmed during site visit interview and therefore the finding is closed.

8. References to resulting changes in the PDD or supporting annexes:

Section A.7 of CPA-DD

1. Grade / Ref:	CL 02	2. Date:	28/02/2013	3. Status:	Closed
4. Requirement:	Section 7.12.8 of CDM VVS, Version 07.0, ACM0016 Version 3.0.0				
5. Nature of the Issue Raised:					
PP to justify the suitability of Operation and maintenance cost.					
6. Nature of responses provided by the project participant:					
The operations and maintenance cost for the project activity has been taken from the DPR dated February 2011. The DPR calculates O&M cost at 2010 price level. Since for the purpose of additionality analysis, the CER rate of 2011-12 has been taken, hence to conclude that the revenue from CER is 10% or more than O&M cost, the O&M at 2010 price level is considered appropriate. It is to be noted that the CER price in 2010 was higher than the price in 2011-12, thus making the analysis conservative.					
The parameters used in the O&M analysis include: Total manpower cost, Maintenance cost and electricity cost.					
Manpower cost constitutes 41%, maintenance cost constitutes 21% and electricity price constitutes 38% of the total O&M cost for the CPA.					
<u>Manpower cost:</u> The total manpower cost consists of two parameters: number of manpower involved and salary for each grade of manpower.					
i. <u>Number of Manpower:</u> The number of manpower assumed in the DPR is 3543. The number of manpower in the DPR can be cross-verified based on DMRC Note “Benchmark of Manpower Deployment (Non-executive) in O&M division in (Phase I and Phase II); reference no. DMCR/O&M/R&T/MPP dated 22/06/2009.					
The foundation of this note is a third party study and presentation namely “Operations & Maintenance Cost Optimization” by Feedback Ventures Limited. In this study, Feedback Ventures has done detailed analysis of DMRC operations and maintenance strategies and provided suggestions on to how DMRC can employ efficient O&M strategies for optimization of O&M cost. According to the study, the following applies:					
Number of Manpower Benchmark as per third party study		Total Manpower required according to		Total Manpower required	

		DPR	according to the CPA
Operations			
TO per 100 hours	26	650	650
DI/ALS per 15 TO	1	44	44
Station Manager		25	25
Chief Controller as 1 in each shift	1	2	2
Ridership More than 50000	1		
25000-50000	0.5		
<25000	0.33		
ASC/JSC per lakh ridership	1.35	26	26
ASC/JSC for every 15 parking lot	1		
ATC		5	5
Lines upto 25 stations	1		
Line more than 25 stations	2		
Time table controller	2	2	2
CRA per station	3.5	235	228
Crew Controller per station	4.05	272	264
JE Maintenance per route km		623	459
P-way	0.25		
Works	0.45		
E&M	1.10		

Traction	0.70		
Signal/ telecom	1.70		
RS (depot maintenance)	0.38		
Maintainer Maintenance per route km		1574	1158
P-way	0.75		
Works	0.30		
E&M	3.25		
Traction	2.20		
Signal/ telecom	4.20		
RS (depot maintenance)	0.87		
Stores per route km	0.41	56	42
Manager finance per 100 employee	0.50	11	15
Manager HR per 100 employees	0.30	18	9
Total		3543	2929

On the basis of above information, the total manpower for the present CPA (98.969 km route length and 62 stations) is 2929. This is less than the number of manpower as estimated in the DPR (i.e. 3543) and hence DPR value is considered to be conservative.

iii. Salary of manpower: The salary for different grade in the O&M wing as proposed in DPR can be cross-checked from publicly available DMRC employment advertisements. Although the salary of all manpower cannot be justified from publicly available information, yet salary of 96% of the total manpower can be justified from the publicly available information stated below. The remaining 4% of manpower's salary is not available on public domain, but will not affect the overall manpower cost and hence can be neglected. The publicly available information on remuneration is as follows:

			SALARY (INR)	
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Manpower	Total number of manpower for the CPA	% of total manpower	Source DPR 2011	Source: Derived from Publicly available advertisement on recruitment for DMRC	Reference of advertisement	DPR salary comes within range of publicly available salary
TO	650	22%	2,16,000 per annum (18,000 monthly)	It states the monthly salary range of Train-operator (TO) to be 13,500-25520. The salary assumed in the DPR is within this range and thus can be justified.	<i>Railways Recruitment 2012 in Delhi Metro Rail Corporation</i> Published by Admin on 3 rd January 2012 available at: http://hindicareer.com/railways-recruitment-2012-in-delhi-metro-rail-corporation.html	YES
CRA	228	8%	1,74,000 per annum (14,500 monthly)	It states the monthly salary range of Customer Relations Assistant (CRA) to be 10,170-18,500. The salary assumed in the DPR is within this range and thus can be justified.	<i>Railways Recruitment 2012 in Delhi Metro Rail Corporation</i> Published by Admin on 3 rd January 2012 available at: http://hindicareer.com/railways-recruitment-2012-in-delhi-metro-rail-corporation.html	YES
Crew Controller/station controller	264	9%	1,68,000 per	It states the monthly salary range of Station Controller (SC) to be	<i>Railways Recruitment 2012 in Delhi Metro Rail Corporation</i>	YES

			annum (14,000 monthly)	13,500-25,520. The salary assumed in the DPR is within this range and thus can be justified.	Published by Admin on 3 rd January 2012 available at: http://hindicareer.com/railways-recruitment-2012-in-delhi-metro-rail-corporation.html		
DI/ALS	44	2%	1,68,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	
Station Manager	25	1%	1,92,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	
ASC/JSC	26	1%	1,20,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	
ATC	5	0%	1,68,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	
Time Table controller	2	0%	1,68,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	
Chief controller	2	0%	1,92,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	
JE	459	16%	2,40,000 per annum (20,000	It states the monthly salary range of Junior Engineer (JE) to be 13,500-25520.	<i>Railways Recruitment 2012 in Delhi Metro Rail Corporation</i> Published by Admin on 3 rd January 2012 available at:	YES	

			monthly)	The salary assumed in the DPR is within this range and thus can be justified.	http://hindicareer.com/railways-recruitment-2012-in-delhi-metro-rail-corporation.html		
Maintainer	1158	40%	1,32,000 per annum (11,000 monthly)	It states the monthly salary range of Maintainer to be 8000-14,140. The salary assumed in the DPR is within this range and thus can be justified.	<i>Railways Recruitment 2012 in Delhi Metro Rail Corporation</i> Published by Admin on 3 rd January 2012 available at: http://hindicareer.com/railways-recruitment-2012-in-delhi-metro-rail-corporation.html	YES	
Stores	42	1%	1,68,000 per annum (14,000 monthly)	It states the monthly salary range of Store Assistant to be 10,170-18,500. The salary assumed in the DPR is within this range and thus can be justified.	<i>Railways Recruitment 2012 in Delhi Metro Rail Corporation</i> Published by Admin on 3 rd January 2012 available at: http://hindicareer.com/railways-recruitment-2012-in-delhi-metro-rail-corporation.html	YES	
Manager HR	15	1%	4,80,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	
Manager Finance	9	0%	4,80,000 per annum	Not available in public domain	<i>The Percentage of manpower is negligible and thus the salary of DPR if used will not affect overall manpower cost</i>	Not Applicable	

Thus based on the available information (number of manpower by Feedback Ventures and remuneration for different grade of manpower), from available public information on DMRC recruitment, it can be justified that the manpower cost applied to the project activity as per the DPR is conservative in nature.

Maintenance Cost: The maintenance cost of 32 crore is 0.1% of the total project cost of 31957 crore as mentioned in the DPR. The maintenance cost can be justified from available data on DMRC fixed assets and maintenance cost of nine years from 2003 to 2011.

Year		2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Fixed asset	(Rs. /crore)	1148	2616	4157	9286	10345	10735	11917	14966	29201
Maintenance cost for (Plant & Machinery)	(Rs. /crore)	0.96	3.6	5.63	4.93	5.46	13.03	16.01	17.61	18.08
Percentage of maintenance cost to fixed assets		0.08%	0.13%	0.13%	0.05%	0.05%	0.12%	0.13%	0.11%	0.06%

The nine years available data shows average maintenance cost of 0.09%. The DPR value of 0.1% of maintenance cost over total cost is thus on the higher end of actual nine years average, and hence is considered conservative

Electricity price: The unit electricity rate assumed in the DPR is INR 3.8/kWh. A cross-check was performed on existing electricity bills of DMRC wherein the PP is paying unit rate of INR 3.00/kWh in the months of August and September 2011 to two different DISCOMS. The reference is given below:

Bill no.	Bill date	DISCOM
10010345837	5 August 2011	North Delhi Power Limited
10000199148	4 August 2011	BSES
10010495753	26 September 2011	North Delhi Power Limited
1000060281755	1 September 2011	BSES

Considering the date of DPR to be February 2011 and the PP still paying unit rate of INR 3.00 in the months of August and September 2011; the assumed electricity rate of INR 3.8/kWh at the time of decision making is considered conservative.

The PP now submits the following evidences supporting the above responses:

1. Electricity bills of DMRC (Bill no.s 10010345837, 10000199148, 10010495753 and 1000060281755) as mentioned above
2. Maintenance cost letter for last nine years of DMRC dated 28 May 2013

3. DMRC Note "Benchmark of Manpower Deployment (Non-executive) in O&M division in (Phase I and Phase II); reference no. DMCR/O&M/R&T/MPP dated 22/06/2009.
4. Advertisement notice stating salary of manpower dated 3rd January 2012
5. Apart from the above mentioned documents, the PP also submits a Chartered Accountant certificate verifying the O&M cost for CPA a part of DMRC Phase
7. Assessment of such responses:
PP has provided relative evidence and justified the O&M cost of the CPA. The validation team has crosschecked the salary of manpower from publicly available documents (employment notice), Maintenance cost based on last 10 years of DMRC phase I & II and relevance of electricity cost from previous year electricity bill of DMRC phase I&II projects. The team found all cost included to be relevant and conservative. The PP has also included an escalation factor for future CPA inclusion which is based on the CPI of the host country India. The justification is appropriate as salary cost usually increases in subsequent years. The finding is closed
8. References to resulting changes in the PDD or supporting annexes:
NA