Validation report form for post-registration changes for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the validation report form for post-registration changes for CDM project activities" at the end of this form.

VALIDATION REPORT ON POST-REGISTRATION CHANGES (PRCs)	
Title and reference number of the project activity	Metro Delhi, India
Process track	☒ Prior approval ☐ Issuance ☐ Renewal of crediting period
Version number of the validation report on PRCs	1.0
Completion date of the validation report on PRCs	05/12/2016
Type(s) of PRCs	☐ Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline ☐ Corrections ☐ Changes to the start date of the crediting period ☐ Inclusion of a monitoring plan to a registered project activity ☒ Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline ☐ Changes to the project design of a registered project activity ☐ Types of changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	4.0
Project participant(s)	Delhi Metro Rail Corporation Ltd. (private entity)? Grütter Consulting AG (private entity)
Host Party	India
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope 7: Transport ACM0016: Baseline Methodology for Mass Rapid Transit Projects; Version 04.0
Name of DOE	EPIC Sustainability Services Private Limited (hereinafter referred to as EPIC)
Name, position and signature of the	K. Sudheendra

approver of the validation report on PRCs	 Director and Head-Operations

SECTION A. Executive summary

EPIC Sustainability Services Private Limited (EPIC) has been contracted by Grütter Consulting AG to undertake the Validation of Post Registration Changes (PRC) of the registered CDM project activity[/2/] titled "Metro Delhi, India" (UNFCCC reference number: 4463).

This validation is an independent and objective review of the post registration changes in the registered PDD[/2/]. The purpose of this validation is to assess the permanent changes to the registered monitoring plan[/2/], and whether the changes that have material impact on the emission reductions and its calculations are in line with the applied revised version of the applicable methodology and, applicable standardized baseline if any. The validation consisted of checking the revised monitoring plan and the project's compliance with relevant UNFCCC and host country criteria in order to confirm that the monitoring plan as documented is sound and reasonable and meets the stated requirements and identified criteria.

This report summarizes the findings of the validation of the changes to the registered monitoring plan. EPIC has employed a risk-based approach in the validation based on the recommendations in the Validation and Verification Standard, Version 9.0 (hereinafter referred to as VVS)[/1/], focusing on the revised monitoring plan as documented in the revised PDD version 4.0[/4/] and the applied (latest) version of the monitoring methodology ACM0016, version 4.0[/3/]. The validation is not meant to provide any consulting towards the client. However, the stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring plan.

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader	IR	Anbazhagan	Prabu das	Central office, Bangalore	√	NA	√	√
2.	Team Member	ER	Sharma	Prem Chand	Central office, Bangalore	√	NA	√	√

B.2. Technical reviewer and approver of the validation report on PRCs

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical Reviewer	IR	Radhamadhavan	Vijayaraghavan	Central office of EPIC, Bangalore
2.	Technical Reviewer	IR	Singh	M	Central office of EPIC, Bangalore
3.	Approver	IR	Krishnachar	Sudheendra	Central office of EPIC, Bengaluru

SECTION C. Means of validation

C.1. Desk review

The validation team has reviewed the registered PDD[/2/] and its corresponding validation report[/2/], revised PDD, version 4.0[/4/] and additional background documents submitted by the project participant. Based on the review, the validation team issues corrective action requests/ clarification requests, however for this PRC validation no findings are raised, please refer to Appendix 4 of this report.

C.2. On-site inspection

On-site visit was not carried out, since the post registration changes only refer to the revision in registered monitoring plan as per the revised later version of the applied monitoring methodology. The validation of PRC is limited to assessment of the document review and interview against the requirement of the applied revised monitoring methodology, version 4.0[/3/].

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Grutter	Jurg	Grütter Consulting AG	**15/06/2016**	Changes to monitoring plan	Full team

C.4. Clarification requests, corrective action requests and forward action requests raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	0	0	0
Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline	0	0	0
Corrections	0	0	0
Changes to the start date of the crediting period	0	0	0
Inclusion of a monitoring plan to a registered project activity	0	0	0
Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline	0	02	0
Changes to the project design of a registered project activity	01	0	0
Types of changes specific to afforestation and reforestation project activities	0	0	0
Others (please specify)			
Total	01	02	0

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	As per the paragraph 295 to 297 of VVS, the validation team has checked if PP used a later valid version of the PDD form for the revised PDD (both in clean and track change versions). The validation team is to determine whether information transferred to the later valid version of the PDD form is materially the same as that in the registered PDD.
Findings	Not applicable
Conclusion	The project design document[/4/], version 4.0 submitted by the PP, uses the latest version of the PDD template[/5/] version 8.0 (CDM-PDD-FORM) which is currently applicable and hence acceptable. All relevant sections of the PDD are revised as per the instructions provided in the PDD template and the PP has submitted the revised PDD[/4/] (both in clean and track change versions). The validation team conforms that the information contained in the revised PDD[/4/] are materially the same as in the registered PDD[/2/].

D.2. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

Means of validation	Not applicable, as the post registration changes validated are pertaining only to the permanent change from registered monitoring plan.
Findings	Not applicable
Conclusion	The validation conforms that the there are no temporary deviations to the registered monitoring plan, kindly refer to Sec D.6 below for further resolution.

D.3. Corrections

Means of validation	Not applicable, as the post registration changes validated are pertaining only to the permanent change from registered monitoring plan
Findings	Not applicable
Conclusion	The validation team conforms that the there are no corrections involved and the PRC assessment is related only to the permanent changes to the registered monitoring plan.

D.4. Changes to the start date of the crediting period

Means of validation	Not applicable, as the post registration changes validated are pertaining only to the permanent change from registered monitoring plan
Findings	Not applicable
Conclusion	The validation team conforms that the there are no changes to the start date of the crediting period involved in this PRC validation.

D.5. Inclusion of a monitoring plan to a registered project activity

Means of validation	Not applicable, as the monitoring plan was part of the registered PDD/2/.
Findings	Not applicable
Conclusion	Not applicable

D.6. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

Means of validation	The permanent changes from the registered monitoring plan contained in the registered PDD were validated against the requirement mentioned in para 313 to 315 of VVS, version 9.0/1/ and the requirement referred in the para 283 to 286 of Project standard, version 9.0/1/.
Findings	Two CARs (CAR 01 and CAR 02) are raised in this section.
Conclusion	The monitoring plan in the registered PDD/2/ is as per the applied methodology ACM0016, version 1.0, the proposed changes to the registered monitoring plan in the revised PDD/4/ refer to the later version (version 4.0) of the applied methodology/3/ in the registered PDD/2/. Sec B.2 of the revised PDD, referring to applicability of the methodology is also updated to later version (4.0) of the methodology, and the project is verified to be continued to meet all the applicability conditions of the new version of meth. The changes to the monitoring plan are identified by PP and the monitoring plan has been revised as per the requirement of ACM0016, version 4.0/3/. The information regarding the parameters to be monitored/not monitored is presented in the revised PDD/4/ in track change. Following are the changes proposed in the revised monitoring plan/4/ as per the later version of the methodology and the referred tool (Baseline emissions for modal shift measures in urban passenger transport, version 1.0):- a) <u>Reduces monitoring requirements set in the Mass Rapid Transit System (MRTS) passenger survey from annual monitoring to monitoring in the years 1 and 4 of the crediting period;</u> As per registered monitoring plan - annual passenger survey is to be done, however in the revised monitoring plan, the survey frequency is changed to year '1 and 4' of the crediting period. The change is as per version 4.0 of the applied monitoring methodology and is acceptable. Accordingly the parameters $\mathbf{BTD_{p,l}}$, $\mathbf{IPTD_{p,l}}$, $\mathbf{P_{SPER}}$ and $\mathbf{FEX_p}$ are updated in the revised PDD/4/. b) <u>Reduces monitoring requirements (from monitoring in the years 1, 4 and 7 to years only 1 and 4 of the crediting period) for leakage monitoring of load factor of buses and taxis</u> As per registered monitoring plan – the Number of buses, taxis and motorized rickshaws circulating in the city and its occupancy rate is to be

monitored in the year 1, 4 and 7 of the crediting period, however in the revised monitoring plan, the monitoring frequency is changed to year only '1 and 4' of the crediting period. The change is as per version 4.0 of the applied monitoring methodology[3] and is acceptable. Accordingly the parameters $\mathbf{N_{B,T,TR}}$ and $\mathbf{OC_{B,T,TR}}$ are updated in the revised PDD[4].

c) Paragraph 74 of ACM0016, Version 04.0[3] says "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.

Since the project activity has not taken away the existing road space, the monitoring of the leakage emissions due to reduced congestion ($LE_{CON,y}$) is not required as per the revised monitoring methodology[3], accordingly the parameters MS_i, $NIZ_{C,T}$, $TDIZ_{C,T}$ and V_P are removed in the revised PDD[4] and found to be acceptable.

Delhi Metro has not removed any road space. No roads were removed. Para 75 refers to the formula in Para 76 where RS_{PJ} refers to bus lanes: Total available road space in the project (=RSB minus kilometer of lanes that where reduced due to dedicating bus lanes to the project activity) (lane-kilometers). The project has not constructed any bus lanes. Metro lanes have not been constructed on existing roads. RS_{PJ} is therefore identical to RS_{BL} which results that it is mathematically not possible that road space was reduced.

Equation (1)

$$ARS_y = \sum_y \frac{BSCR_y}{N_B} \times SRS - \frac{RS_{BL} - RS_{PJ}}{RS_{BL}}$$

d) ACM0016 Version 04.0 - Introduces the requirement to account for leakage due to upstream emissions in case project vehicles consume more gaseous fuels than baseline vehicles;

The project activity i.e metro runs on electricity, hence upstream emissions from gaseous fuels are not applicable therefore not considered.

e) The requirement to conduct a sensitivity analysis of data and parameters used to determine baseline, project and leakage emissions is removed in ACM0016 Version 04.0;

The revised monitoring plan[4] is changed to comply with this requirement. This is considered acceptable for version 4 of the applied methodology ACM0016[3].

f) ACM0016, Version 04.0[3] - Introduces a reference to the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion";

The project activity i.e metro runs on electricity, and done not involve any fossil fuels, hence emissions due to fossil fuels are not applicable, therefore not considered

As per the requirement of the referred tool "Baseline emissions for modal shift measures in urban passenger transport" version 01, the parameter $\mathbf{SFC_B}$ is determined ex-ante and not monitored annually. In the revised PDD, the parameter $\mathbf{SFC_B}$ which was indicated as 'parameters to be monitored' in sec B.7.1 is now removed. Further, the technology improvement factor which was not applied for the baseline buses, is now applied in the revised PDD.

The proposed revised monitoring plan is verified to be in accordance with the version 4.0 of the approved monitoring methodology ACM0016[/3/], ensuring correctness of the emission reductions calculations.

The proposed permanent changes ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as the monitoring plan is updated to comply with a more recent version[/3/] of the methodology than used at the time of registering the project[/2/].

The emission reduction calculation approach is the same under the revised PDD as under ACM0016, Version 04.0 including the relevant tools, specifically the tool "Baseline emissions for modal shift measures in urban passenger transport". Formulae are represented in a slightly different manner and abbreviations used are different. However, the calculation approach is identical.

The revised PDD as well as ACM0016, Version 04.0 have the steps:
1. Determine relevant vehicle categories
2. Determine emission factor per km
3. Determine emission factor per pkm
4. Determine baseline emissions

ACM0016 Vs 4 as well as the revised PDD use the same steps, the same parameters and the same mathematical formulae.

Ex-Ante Parameters

S.No	Meth Tool and ACM0016 Ver 4.0	Revised PDD, Ver 4.0	Comment
1	SFC and SEC with decreasing preference order 1-5	SFC	Taxis: option 1 (local data) Motorcycle: option 1 (local data) Motorized rickshaws: option 1 (local data) Cars: option 2 (national or international data) Rail: option 1 (local data) with annual monitoring Buses: option 1 (local data):
2	N	N	cars from city vehicle registration statistics in accordance with the Tool; Buses, motorized rickshaws and taxis share per fuel based on regulations in Delhi; Motorcycles based on national registration
3	NCV	NCV	National values in accordance with tool
4	EFCO2	EFCO2	IPCC in accordance with tool
5	IR	IR	0.99 for all categories has been applied in the PDD as recommended in the Tool with exception of rail where value is monitored annually in accordance with ACM0016 Vs 1 which is more realistic as it is based on actual values and not default calculations
6	OC option 1, 2,3 (no preference order)	OC	Taxi, motorized rickshaw, motorcycles, train, passenger cars, buses Option 3 (local study) Measurement procedures used in PDD as described in Tool
7	DD buses	DD buses	Data from bus companies; revised PDD and ACM0016 Vs 4 use the same source and measurement procedure
8	EF_{CH4}	EF_{CH4}	For gaseous units; has been updated in

			revised based on IPCC and new GWP (25 instead of 21) for CH4
9	P	P	In accordance with the tool based on official statistics of the operator (bus, rail)
10	TD	TD	In accordance with the tool based on official statistics of the operator (rail). For bus the bus operator monitors directly the occupation rate and therefore TD is not required
11	AD	AD	Based on records of operator for bus, records of taxi companies and national study for rickshaws in accordance with ACM0016 Ver 4.0
12	NIZ	NIZ	Local study, visual counting in accordance with ACM0016 Ver 4.0
13	V	V	Local study in accordance with ACM0016 Ver 4.0

Ex-ante parameters of the revised PDD correspond to the ones in ACM0016 Ver 4.0 and the corresponding tools. The PDD used in all parameters the preferred option based on ACM0016 Ver 4.0 and is therefore conservative in its calculation. The EF_{CH4} have been updated in the revised PDD version based on the GWP of 25 instead of the previous GWP 21 as indicated in ACM0016 Ver 4.0 and the corresponding tools. Therefore all baseline data used in the revised PDD are in accordance with the new methodology version and are conservative.

The validation team concludes that the applied version 4.0 of the methodology simplifies monitoring without impacting the conservativeness of the monitoring and verification process including the related emission reductions calculations. The reasons to support concerning conservativeness are explained below:-

1. Passenger survey
The survey basically identifies which mode passengers would have used in absence of the project and the respective trip distances. Following arguments against annual surveys are:-

- Mode shifts do not occur quickly i.e. only gradual changes occur over time.
- Mode shifts tend to be towards high polluting vehicles like cars as people increase income and access to cars and taxis over time. Not monitoring annually would thus be conservative.
- Trip distances tend to increase over time as cities sprawl. Not monitoring annually would thus be conservative.

The evidence of DMRC also shows that the trip distances and private means of transit increase over time which result in higher baseline emissions each year i.e. not making a survey each year is conservative. Table below related to DMRC project shows clearly an increase of baseline emissions over years which means that taking a survey from the past will result in lower baseline emissions than realizing each year a survey. The following data is based on the results of the annual surveys realized (2011-12, 2012-13, 2013-14 all based on verified reports published at the UNFCCC website for issued CERs) and 2014-15 is the newest survey.

Table 1: Baseline Emission per passenger DMRC[1]

	2011-12	2012-13	2013-14	2014-15

[1] http://cdm.unfccc.int/Projects/DB/SQS1297089762.41/view

EF baseline g/CO2 per passenger	986	1,651	2,129	2,227	

From above data it is clear that it is conservative to take the data from a previous year (year 4) and then use it for the following years as the probability is high that with annual monitoring baseline emissions would be higher.

Leakage impacts of DMRC have been as in all other monitored metro projects i.e 0 or marginal. Annual total leakage emissions for DMRC have been between 0 and 144 tons, while emission reductions were over the same period on average 280,000 i.e. leakage represents 0.035%. This share has dropped over time. The last monitored year[2] 7/2013 to 6/2014 had leakage emissions of 0 and ERs of 600,000 tCO_2. Clearly, as per the data available it is therefore conservative to discontinue these annual surveys.

Thus, the validation team is convinced that the application of later version of the methodology does not impact the conservativeness of the monitoring and verification process, in particular the related emission reductions calculations.

Further, since the changes proposed do not fall under Appendix 1 of the CDM project standard version 9.0/1/, the prior approval is required by the board for the changes to the monitoring of the registered CDM project activity.

D.7. Changes to the project design of a registered project activity

Means of validation	. The permanent changes from the registered monitoring plan contained in the registered PDD were validated to conform whether the changes are due to any change in the project design.
Findings	One CL (CL 01) is raised in this section.
Conclusion	The project design of the project activity has not changed as conformed from the submitted revised PDD and through interview of the PP. The changes requested and validated are only pertaining to the registered monitoring plan.

D.8. Types of changes specific to afforestation and reforestation project activities

Means of validation	Not applicable for this validation, as this is not an afforestation or reforestation project.
Findings	Not applicable
Conclusion	Not applicable

SECTION E. Internal quality control

After the completion of assessment by the validation team all the relevant documentation is submitted to a qualified, Independent Technical reviewer as part of EPIC' internal quality control system. A Technical reviewer team is appointed to review the draft final validation report (Draft FVR). The comments made by the Technical reviewer team are taken into consideration and incorporated in the final FVR. The technical reviewer team assesses whether all the reporting requirements have been fulfilled and whether all the issues raised were closed satisfactorily by the validation team with justification. The technical review process can also raise issues in this regard which is resolved further by the validation team to the satisfaction of the technical reviewer. The technical reviewer team either accepts or rejects the report made by the validation team. The final report (after resolutions of all findings) is then submitted to the Head-operations for review and approval.

SECTION F. Validation opinion

EPIC performed the validation of the Permanent changes to the registered monitoring plan included in the revised PDD, version 4.0/4/ submitted for validation of PRC of the CDM project "Metro Delhi, India" UNFCCC no: 4463. The validation was performed on the basis of the specific criteria as per VVS, PS and PCP/1/ and other relevant requirements.

[2] http://cdm.unfccc.int/Projects/DB/SQS1297089762.41/iProcess/EPIC_Sust1414584421.7/view

The validation team has concluded that revised PDD[/4/] version 4.0 uses the valid version of the PDD[/5/] template and all the necessary instructions are followed in preparing the PDD[/4/]. The project activity confirms with all the applicable conditions of the valid version of the applied methodology. The monitoring methodology[/3/] are applied in accordance with the applicable requirements of PS and the applied version of the methodology. The changes do not affect the accuracy of the monitoring system.

In summary, it is opinion of EPIC that the revised PDD, version 4.0[/4/] meets all relevant UNFCCC requirements for the CDM and the applied version of the methodology, and the proposed changes contained in the revised monitoring plan require prior approval by the CDM EB.

Project title:[/2/]	Metro Delhi, India
UNFCCC ref no[/2/]:	4463
Registered PDD[/2/]	Version 1.3, dated 20/01/2011
Revised PDD[/4/]	Version 4.0 dated 05/12/2016
Sector and applied methodology [/3/]	Sectoral scope: 07: Transport Applied Methodology: ACM0016 “Baseline Methodology for Mass Rapid Transit Projects, Version 04.0

Appendix 1. Abbreviations

Abbreviations	Full texts
ACM	Approved Consolidated Methodology
CAR	Corrective Action Request
CL	Clarification Request
DMRC	Delhi Metro Rail Corporation Ltd.
FAR	Forward Action Request
IR	Internal Resource
MRTS	Mass Rapid Transit System
PCP	Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PRC	Post Registration Changes
PS	Project Standard
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

The following validation team has been assigned to carry out the validation of the project.

Name	Mr. A. Prabu Das	Mr. Prem Chand Sharma	Mr. R. Vijayaraghvan	Mr. M. Singh,
Role	Team Lead Auditor	Technical Expert	Technical Reviewer	Technical Reviewer
Competence in relevant sectors	Sector 1 and 13	Sector 7	Sector 1 and 13	Sector 7
Responsibility	Doc review, DVR preparation, DVR resolution, PRC validation report preparation	Doc review, DVR preparation, DVR resolution,	Technical review	Technical review

Mr. A Prabu Das, holds a M.Tech Degree in Energy Conservation and Management and B. Tech Degree in Petro-chemical Technology. He is a certified Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has around 8 years of work experience in Design of biomass Power plants, preparing Techno Economic Feasibility Reports (TEFR), carrying out energy audits, of which last six years have been in CDM consultancy and validation services. He has undergone extensive training on CDM validation and verification and is a qualified lead auditor for Sectoral Scope 1 under Technical Area “TA 1.2 Renewables” in accordance with procedures of EPIC Sustainability Services Pvt. Ltd. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Mr. Prem Chand Sharma, has over 40 years of experience and worked as as Divisional Railway Manager, Chief Operations Manager and Additional General Manager in the largest transport organization in the world i.e Indian Railways. As a consultant for planning of major rail transportation projects in India, he has experience of five years. He has been associated as expert for rail infrastructure planning and operations for techno-economic studies of major rail infrastructure projects in India like North-South Dedicated Freight

Corridors – present (RITES ltd), Western Dedicated Freight corridors (Nippon Koei India Pvt Ltd)., ports, Multi Modal Logistics Park, coal based ultra mega power projects, cement plants. He has been qualified as technical expert for sectoral scope 7 under technical area “TA 7.1 transport’ in accordance with procedures of EPIC Sustainability Services Pvt. Ltd.

Mr. R. Vijayaraghavan, holds BE in Mechanical Engineering, M.Tech in Energy Conservation and Management and MBA in Technology Management. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 10 years of working experience in energy sector including validation / verification of fifty CDM and VCS/GS projects and has undergone extensive training on CDM validation and verification and has been qualified as Lead Auditor with Sectoral Scope 1 and 13. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Mr. M. Singh, holds Master’s Degree in Business Administration and Bachelor Degree in Electrical Engineering. He is a Certified Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 29 years of post qualification experience in a variety of sectors ranging from Thermal Power Plant, Railway Transport including Metro Rail, etc., in these sectors, he had long experience of working in Operations, Construction, Maintenance, Planning, Material Management, etc. His functional areas are illumination, power supply arrangement, rolling stock, traction, air-conditioning, fire detection and suppression, etc. His special areas of interests are energy, transport, renewables, clean development mechanism and associated subjects. He has conducted energy audit and presented his technical papers in many national and international seminars on topics related to his areas of interest in India and abroad. He also worked as technical reviewer and member of technical program committee (TPC) in many international seminar and conferences. He has been qualified as technical reviewer and expert for sectoral scope 7 under technical area “TA 7.1 transport” in accordance with procedures of EPIC Sustainability Services Pvt. Ltd.

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UNFCCC	Validation and Verification Standard version 9.0 https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20150225165215954/accr_stan02.pdf Project Standard version 9.0 https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20150225165159970/reg_stan01.pdf Project Cycle Procedure version 9.0 https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20150226145113383/pc_proc01.pdf	1	Publicly available
2	PP/DoE	Registered PDD, its corresponding validation report http://cdm.unfccc.int/Projects/DB/SQS1297089762.41/view	2	Publicly available
3	UNFCCC	ACM0016: Baseline Methodology for Mass Rapid Transit Projects; Version 04.0	3	Publicly available
4	PP	Revised PDD, version 4.0	4	PP
5	UNFCCC	PDD template http://cdm.unfccc.int/filestorage/e/x/t/extfile-20160415151851918-PDD_Form05.doc/PDD_Form05.doc?t=Vlp8bzg3NHZtfDB7gKdbN0CCLlNFhmVL3kck	5	Publicly available
6	PP/DoE	DMRC Monitoring reports for Monitoring period 1, 2 and 3 http://cdm.unfccc.int/Projects/DB/SQS1297089762.41/view	6	Publicly available

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

CL ID	01	**Section no.**	D.7	**Date:** 31/08/2016
Description of CL				
The PP is requested to clarify: (a) whether there are some changes to the project design which no longer satisfy the applicability conditions of original version of the methodology and (b) whether the registered monitoring plan is still implementable				
Project participant response				**Date:** 01/09/2016
The project design has not changed but the monitoring plan cannot be implemented anymore due to lack of funds for costing the annual surveys (annual monitoring costs of > 80,000 USD). The annual surveys have therefore not been realized anymore since 2015. Also some of the roads which are monitored from the original project design realized in 2010 have suffered changes in traffic flow due to overall road constructions not only on these roads but upstream or downstream which in practice do not allow anymore to separate project from external effects.				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** 05/09/2016
The project design of the project activity has not changed as conformed from the submitted revised PDD and through interview of the PP, thus the project activity continue to meet the applicability conditions of the original version of the methodology. The changes requested and validated are only pertaining to the monitoring plan. The technical and financial reasons justifying, why the registered monitoring plan cannot be implementable, as explained by PP, is found to be acceptable by the validation team. Moreover, the changes requested are in compliance with the more recent version of the methodology than used at the time of registering the project. **CL 01 is closed**				

Table 2. CAR from this validation

CAR ID	01	**Section no.**	D.6	**Date:** 27/09/2016
Description of CAR				
PP to explain the specific provisions/steps of ACM0016 version 4.0 and relevant tools (e.g. tool "Baseline emissions for modal shift measures in urban passenger transport") that are applied to calculate the emission reductions in a step-wise approach. Further, specify the alternative opted (if applicable) in determining the ex-ante parameters				
Project participant response				**Date:** 29/09/2016
The emission reduction calculation approach is the same under the revised PDD as under ACM0016 Version 6 incl. relevant tools specifically the tool "Baseline emissions for modal shift measures in urban passenger transport". Formulae are written in a slightly different manner and abbreviations used are different. However, the calculation approach is identical. Ex-ante parameters of the revised PDD correspond to the ones in ACM0016 Vs 4 and the corresponding tools. And the EF_{CH4} have been updated in the revised PDD version based on the GWP of 25 instead of the previous GWP 21 as indicated in ACM0016 Vs4 and the corresponding tools.				
Documentation provided by project participant				
Revised PDD				
DOE assessment				**Date:** 07/10/2016
The validation team has reviewed the submitted PDD and concludes the following:- The emission reduction calculation approach is the same under the revised PDD as under ACM0016 including the relevant tools, specifically the tool "Baseline emissions for modal shift measures in urban passenger transport". Formulae are represented in a slightly different manner and abbreviations used are different. However, the calculation approach is identical. The revised PDD as well as ACM0016 Ver 4 have				

the following steps:
1. Determine relevant vehicle categories
2. Determine emission factor per km
3. Determine emission factor per pkm
4. Determine baseline emissions

ACM0016 Ver 4.0 as well as the revised PDD use the same steps, the same parameters and the same mathematical formulae.

Ex-ante parameters of the revised PDD correspond to the ones in ACM0016 Ver 4.0 and the corresponding tools. The PDD, used in all parameters the preferred option based on ACM0016 Ver 4.0 and is therefore conservative in its calculation. The EF_{CH4} have been updated in the revised PDD version based on the GWP of 25 instead of the previous GWP 21 as indicated in ACM0016 Ver 4.0 and the corresponding tools. Therefore all baseline data used in the revised PDD are in accordance with the new methodology version and are conservative.

CAR 01 is closed

CAR ID	02	**Section no.**	D.6	**Date:** 27/11/2016
Description of CAR				
The emission reduction calculation in the revised PDD is not in line with ACM0016 version 4 and the relevant tool in totality. For example, (and not limited to): a. Paragraph 12 and page 10 of the tool "Baseline emissions for modal shift measures in urban passenger transport" version 01 (i.e. referred in ACM0016 version 4, paragraph 40) requires ex-ante determination of vehicle specific fuel consumption, however the specific fuel consumption of baseline buses (i.e. paragraph SFCB) is to be annually monitored (page 32 and 59 of the revised PDD); b. Paragraph 18 of the same tool above requires application of technology improvement factor in calculating baseline emissions annually, however the technology improvement factor is not applied for the baseline buses.				
Project participant response				**Date:** 15/12/2016
The specific fuel consumption of buses is determined ex-ante and not monitored annually based on the tool "Baseline emissions for modal shift measures in urban passenger transport". The same tool requires the application of a technology improvement factor for all vehicles including buses. This has been applied				
Documentation provided by project participant				
Revised PDD				
DOE assessment				**Date:** 20/12/2016
As per the requirement of the tool "Baseline emissions for modal shift measures in urban passenger transport" version 01, the parameter $\mathbf{SFC_B}$ is determined ex-ante and not monitored annually. In the revised PDD, the parameter $\mathbf{SFC_B}$ which was indicated as 'parameters to be monitored' in sec B.7.1 is now removed. Further, the technology improvement factor which was not applied for the baseline buses, is now applied in the revised PDD. The validation team conforms that the corrections made in the revised PDD is as per the applied methodology and the referred tool. **CAR 02 is closed**				

Table 3. FAR from this validation

FAR ID	NA	**Section no.**	NA	**Date:** DD/MM/YYYY
Description of FAR				
No FAR is identified for this validation				
Project participant response				**Date:** DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** DD/MM/YYYY
NA				

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