

**Assessment Report for
Insurgentes Avenue Bus Rapid Transit
Pilot Project
Mexico City, Mexico**

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Prepared for: The World Bank

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1. Introduction

This report is provided to The World Bank as a deliverable of the assessment of emission reductions for the Insurgentes Avenue Bus Rapid Transit (BRT) Pilot Project (the “BRT Project”) located in Mexico City, Mexico. The project activity consists of a corridor with exclusive bus lanes, fuel-efficient high capacity buses, and other improvements to increase efficiency and reduce fuel consumption of vehicles within the project boundary, resulting in a net reduction of GHG emissions.

The monitoring methodology, CDM Proposed New Methodology: Monitoring – Version 01 (NMM), in effect as of July 1, 2004, prescribes the overall quantification of emission reductions resulting from the project through the identification of discrete emissions changes and leakage “components” that, when summed together, provide an overall quantification of emission reductions. As outlined in the NMM, overall net project emission reductions are comprised of 23 discrete components: Component Numbers 1 through 5 are project emission reductions (reductions in GHG emissions to the atmosphere directly caused by project implementation); Component Numbers 6 through 11 are project emission increases (increases in emissions into the atmosphere directly caused by project implementation); and Project Leakages 1 – 12 are emission leakages (increases in project emissions that are indirectly caused by project implementation). Table 1 below contains details of each component.

The World Bank prepared three “Reportes de Reduccion de Emisiones” (Emission Reduction Reports, ERRs) corresponding to the following reporting periods: i) November 1, 2008 - October 31, 2009, ii) November 1, 2009 - October 31, 2010, and iii) November 1, 2010 - October 31, 2011. For the most part, the NMM monitoring methodology guided the development of the ERRs.¹ However, deviations from the NMM were identified. The World Bank asserted in some cases that due to the design of the BRT Project, some of the components outlined in the NMM are not relevant/did not apply to the BRT Project. The World Bank made similar statements during the assessment of the prior reporting periods performed by First Environment, Inc. (First Environment).

¹ The Emission Reduction Reports also relied on the non-validated PDD, the Spanish Carbon Fund Monitoring Guidelines, and Metrobus procedures as guidance documents used in the preparation of the reports. However, these were not included in the established Criteria; therefore, are excluded from this assessment as Criteria documents.

Table 1: NMM Methodology Emission Components and Leakages

	Component Number	Concept
Emissions Reductions	1	Operating condition improvements and/or the substitution of the number and technology of buses that operate on the main route or BRT corridor
	2	Improving the operating conditions for other vehicles operating on the main route
	3	Operating condition improvements and/or the substitution of the number and technology of buses that operate on feeder routes.
	4	Improving the operating conditions for other vehicles operating on the feeder routes
	5	Modal shift from cars on the route to buses
Emissions Increases	6	Extra buses required due to Modal shift from cars, Metro or other more-fuel-efficient-transport to buses on the BRT corridor plus rebound and new trip creation on the buses
	7	Elimination of left turns on the route or BRT corridor generates increased travel time and distance for those vehicles that now have to go-round-the-block
	8	Longer distance required for vehicles to cross the corridor due to the elimination of crossing points in the with-project case.
	9	Longer time required for vehicles to cross the route or BRT corridor due to traffic signal timing altered giving priority to buses
	10	Increase in fuel consumption during construction due to traffic delays on all vehicles that use the route
	11	Greenhouse gas emissions due to construction activities of the project and energy used to produce the construction materials
Leakages	Leakage 1	Greenhouse gas emissions generated whilst smelting the old vehicles removed from service
	Leakage 2	Transferring buses to the project activity that were previously in service on a different route
	Leakage 3	Buses displaced by the project activity are not scrapped Buses outside boundary are scrapped
	Leakage 4	Buses have to dead-head to reach their route
	Leakage 5	Competing buses on alternative routes
	Leakage 6	Project activity causes modal shift away from the buses
	Leakage 7	Shift from other forms of transport (outside the project boundary) to the buses
	Leakage 8	Additional delay to cross the main route for other traffic is so great that it affects several blocks either side of the main route.
	Leakage 9	Prohibition of left turns, the elimination of crossing-points or other factors force vehicles to change to alternative routes
	Leakage 10	Feeder route improvements adversely affect traffic flow on their cross-streets
	Leakage 11	Other vehicles that previously used routes outside the project boundary transfer to the main route
	Leakage 12	Project activity fuel-use or fuel-handling enhances pilfering or evaporative emissions

Since emissions reduction reporting had deviations from the NMM that excluded the ability to execute a verification following strict CDM guidelines, best practice analysis and evaluation approaches were applied including consideration of elements contained in ISO-14064-3: 2006. Therefore, this assessment of emissions reductions required additional flexibility that would not be possible under strict CDM guidelines. Hence, First Environment's approach to the

assessment of emission reductions claimed in the ERRs² is to assess, with limited assurance, that emission reductions claimed in the ERRs are not overstated. To be as transparent as possible regarding these deviations, First Environment will hereafter refer to this report as an assessment rather than verification. See Appendix A for the final Assessment Plan.

2. Objectives

The purpose of this assessment was, through review of appropriate evidence, to:

- provide limited assurance that the emission reduction assertions made in relevant monitoring reports are real and are not overstated by using the Monitoring Methodology NMM and Baseline Methodology NMB as a general framework.

The goal for this project is to obtain a limited level of assurance as defined by International Standard ISO 14064 - *Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions*.³

3. Assessment Scope

Specific scope metrics for the assessment are outlined in the table below:

Geographic Boundaries	The “Insurgentes BRT Corridor” in Mexico City – 19.06 km of Insurgentes Avenue starting at Indios Verdes in the north and ending in Doctor Galvez, Rectoria in the south.
Greenhouse Gases Included	Emission reductions (expressed in units of Carbon Dioxide equivalents (CO ₂ -e)) resulting from the implementation of a Bus Rapid Transit project on the Insurgentes Corridor. Greenhouse gases included are CO ₂ , CH ₄ , and N ₂ O.
Reporting Periods	The assessment covers the following three reporting periods: November 1, 2008 – October 31, 2009, November 1, 2009 – October 31, 2010, and November 1, 2010 – October 31, 2011.
Source of Emission Reduction Assertions	<ul style="list-style-type: none"> • Reporte de Reducción de Emisiones - Reducción de Emisiones de Gases de Efecto Invernadero por el cuarto año de operación del Corredor Metrobús insurgentes (First Monitoring Report). • Reporte de Reducción de Emisiones - Reducción de Emisiones de Gases de Efecto Invernadero por el quinto año de operación del Corredor Metrobús insurgentes (Second Monitoring Report). • Reporte de Reducción de Emisiones - Reducción de Emisiones de Gases de Efecto Invernadero por el sexto año de operación del Corredor Metrobús insurgentes (Third Monitoring Report). • Ex-post calculation workbooks for each period.

² As agreed upon with The World Bank on May 2nd, 2012.

³ While the definition of “limited assurance” is defined in International Standard ISO 14064-3, the full standard was not used as Criteria for this assessment.

4. Standards Used to Assess Emission Reductions (Criteria)

The following table outlines the guidance and protocols used to conduct this assessment:

Standard of Assessment	The following documents provide a framework for this assessment: <ul style="list-style-type: none"> • CDM Proposed New Methodology: Monitoring (CDM-NMM) – Version 01 – in effect as of 1 July 2004 (NMM) • “GHG emissions reductions in urban transportation projects that affect specific routes or bus corridors or fleets of buses including where fuel usage is changed” (CDM-NMB) Version 02 – in effect as of 15 July 2005
Level of Assurance	Limited Assurance
Materiality	Overstatements greater than five percent of the project’s GHG assertion are considered material

5. Overview of the Assessment Process

To review the Project’s GHG information, the following assessment process was used:

- conflict of interest review;
- selection of Assessment Team;
- initial interaction with World Bank contacts;
- review of Metrobus’ three “Reportes de Reduccion de Emisiones” (ERRs);
- development of the final Assessment Plan in lieu of a Verification Plan;
- overall review and evaluation of raw data, calculations procedures, and GHG reported emission reductions for the three periods under review;
- follow-up interaction with World Bank contacts for clarifications, corrective actions, or supplemental data requests as needed; and
- final statement and report development.

The assessment process was utilized to gain an understanding of the Project’s emission sources and reductions (including the risk for leakage), to evaluate the collection and management of data, calculations that lead to the results, and the means for reporting the associated data and results. Based on the level of information provided by The World Bank during this assessment and information gathered by First Environment during the 2010 site visit, no additional visit was deemed necessary by First Environment.

5.1 Conflict of Interest Review

Prior to beginning any verification/assessment project, First Environment conducts an evaluation to identify any potential conflicts of interest associated with the Project. No potential conflicts were found for this Project.

5.2 Audit Team

First Environment's Audit Team consisted of the following individuals who were selected based on their verification experience, as well as familiarity with the verification process for greenhouse gas emission reduction projects.

- Lead Assessor – John Mosheim, P.E., CEM
- Assessors – Natali Ganfer, Ross MacWhinney
- Internal Reviewer - Michael Carim
- Technical Expert - Bob Previdi
- Senior Oversight - Jay Wintergreen

5.3 Project Kick-off

The project was initiated on April 4, 2012 with a kick-off conference call between members of the First Environment team and the primary World Bank and Metrobus contacts. Meeting attendees included:

The World Bank (TWB)

Mr. Jose Andreu – Project Manager, Ms. Jessica Wade-Murphy

Metrobus (MB)

Mr. Gonzalo Garcia

First Environment, Inc. (FE)

John Mosheim, P.E., CEM - Lead Assessor
Natali Ganfer – Assessor
Ross MacWhinney – Assessor
Bob Previdi – Technical Expert
James Wintergreen – Senior Oversight

The kickoff meeting discussions confirmed the scope, process, team members, and tentative schedule for the assessment. For discussion and review purposes, First Environment provided a preliminary version of the Verification Plan V. 0 prior to the kickoff meeting attendees.

5.4 Project Design Document Review

The Project Design Document Version 2 (PDD), in effect July 15, 2005, is not used as Criteria for this assessment. However, the PDD was used as an informal document where deemed useful.

5.5 Development of the Assessment Plan

An initial Verification Plan was sent to World Bank on April 20, 2012. Originally, one of the goals for the verification was to conduct the verification to a reasonable level of assurance, and to confirm that the project data and monitoring activity conformed to the NMM (monitoring) and the NMB (baseline) methodologies.

However, elements of the NMM were not strictly followed due to a variety of reasons, including difficulties associated with data monitoring and exclusions claimed resulting from BRT Project specific conditions. Once this issue surfaced, the goals of the verification were modified to an

assessment and a revised version of the Verification Plan was issued to World Bank on May 3, 2012 as an Assessment Plan. Documentation provided by The World Bank on this matter is included in Appendix B.

Version 1 of the Verification Plan was issued after the kickoff call on April 20, 2012. Version 2 of the plan, now redefined as an Assessment Plan, was issued on May 3, 2012.

The change in scope from verification to an assessment provides for more flexibility in the use of professional judgment to determine whether, taking into account all elements of the project and all combined deviations, emission reduction assertions provided in the relevant Emission Reduction Reports (ERRs) are *not overstated*.

Additionally, the original Verification Plan specified “reasonable” level of assurance as defined by International Standard ISO 14064 - *Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions*. The updated Assessment Plan specifies assessment to a “limited” level of assurance as defined by ISO 14064-3. This change in the level of assurance requires less focus on some of the requirements of the Criteria while maintaining overall integrity in the review of underlying data.

5.6 Emission Reduction Data and Calculation Assessment

This assessment used information and insights gained during the previous steps to evaluate the collected data and reported emission reduction quantities, and identify if either contained material or immaterial misstatements. Specifically, First Environment reviewed the emission reduction spreadsheet calculations and emission data rollup procedures, monitored data and supporting reports, data collection systems, emission factors, constants, and other variables cited in the calculations. First Environment also reviewed the findings from the assessment of the prior reporting periods and other relevant documentation to support the current assessment project. The results are presented in Section 6 of this report.

5.7 Corrective Actions and Supplemental Information

The team requested supplemental information to support emissions calculations and to confirm how the raw data was rolled up in the emission reduction calculations. Supplemental information requests were conducted both informally by email and phone and through official Clarification and Corrective Action Requests. .

Several clarification and corrective action requests were submitted to The World Bank between May 25 and July 27, 2012. A total of 43 individual requests were submitted to The World Bank. All responses to First Environment’s requests were provided by August 4, 2012.

Where First Environment found answers that did not completely satisfy the nature of the request, it applied professional judgment and determined if these would or would not have a material impact on the assessment opinion and proceeded accordingly.

While the Assessment Team found deviations from the Criteria, specifically the NMM, in the ERRs, qualitatively none of these deviations were significantly different from the deviations identified during the assessment of the prior reporting periods. Also, in response to First Environment’s inquiry regarding Project and monitoring changes, The World Bank provided documentation where it was asserted that Project conditions found in the November 5, 2005 -

October 31, 2008 monitoring periods had not changed during the current monitoring periods (see Appendix C).

5.8 Assessment Reporting

Assessment reporting, represented by this report, documents the assessment process and identifies its findings and results. Assessment reporting consists of this report for World Bank.

6. Site's Conformance with Assessment Criteria

6.1 Site Overview

The "Insurgentes BRT⁴ Corridor" was implemented along 19.06 km of the 34 km of Insurgentes Avenue, starting in Indios Verdes in the north and ending in Doctor Galvez, Rectoria in the south in Mexico City, Mexico. The project began operating on June 19, 2005.

The pilot BRT system was built using the center two lanes and medians and includes 34 stations distributed approximately 450 meters apart along a 19.06-kilometer stretch of Insurgentes Avenue. Initially, 80 new diesel fuel (which includes a 10 percent maintenance reserve) high-capacity articulated autobuses replaced a fleet of around 350 existing buses and minibuses within the boundary of the Insurgentes Avenue project. Distances traveled by the BRT Project buses experienced a steady increase between 2006 and 2011, which is indicative of an increase of number of trips and ridership.⁵

Messrs. John Mosheim and Bob Previdi visited Mexico City on October 20 to 21, 2009, during the assessment of the prior reporting periods, to confirm and document the basic physical elements of the BRT system as stated in the Project Design Document (PDD) and the NMM.

The World Bank provided First Environment with an agreement to sell emission reductions, which is titled the Spanish Carbon Fund Clean Development Mechanism Emission reductions Purchase Agreement (ERPA) dated October 31, 2005. During the course of this assessment, First Environment did not attempt to determine the legal validity of this document nor the ownership rights of Metrobus to the emission reductions claimed in the assertions.

6.2 Data Collection and Monitoring Processes

First Environment examined the data and information provided by The World Bank regarding several aspects of the Project's operation for the three reporting periods subject to this assessment. This information was in the form of Emission Reduction Reports (ERRs), operational data reports, management and technical reports, fuel consumption reports, and passenger survey reports, among several other documents. This data and information was used by The World Bank to support the GHG reduction assertions contained in the ERRs. First Environment inquired about several aspects of the data and information provided by The World Bank and is of the opinion that there is no indication that Metrobus does not have adequate data collection and monitoring procedures to sufficiently support the data and information used to generate the ERRs.

⁴ BRT = Bus Rapid Transit

⁵ Page 25 Chart 2 of the 2010-2011 ERR

As mentioned previously, during the data and information evaluation performed by First Environment, several deviations from the NMM were identified. Specifically, a number of Components and Leakages were not monitored in accordance with the NMM or were not monitored at all. These omissions/deviations from the NMM made the assessment incompatible with a reasonable level of assurance opinion but eligible for a limited level of assurance; therefore, this assessment was carried out in this manner.

6.2.1 Component and Leakage Monitoring

As in the previous reporting periods, several components and leakages were not monitored, as required by the NMM. Metrobus provided justifications and explanations as to why certain Project Components and Leakages were not monitored in accordance to NMM. The components and leakages not monitored during the current (2008-2011) reporting periods do not differ significantly from the ones not monitored during the (2005-2007) monitoring periods. These previous omissions were resolved by The World Bank and First Environment's prior report.

A list of component and leakage elements that were not monitored by The World Bank is provided as Appendix B. The Emission Reduction Reports (ERRs) provided by the World Bank refer to a few of these omissions and justify, in part, the exclusion of some Components and Leakages. Additional documentation provided by The World Bank further justified or explained these omissions. Details as to the monitoring assessment of each emission and leakage component are provided in Section 6.2.2.

During the report writing phase of this assessment, errors were discovered in the calculation of the Project Baseline. In particular, the 2008-2009 ERR has an *under reporting* error of emission reductions in the range of 14 percent (conservative). Since this error was detected in the final stages of report writing, no request was submitted to The World Bank to correct this quantitative deviation. However, this issue was communicated to The World Bank and agreement was reached not to modify the ERRs but to note the deviation in this report. Other emission reduction miscalculations or omissions are noted in Section 6.2.2.

Taken in totality, during the course of this assessment no evidence was discovered or reviewed that would indicate that the deviations from the NMM, NMB, or emission calculations discrepancies result in material overstatements (over 5 percent) of emission reductions in any of the three ERRs. .

6.2.2 Assessment of Monitoring Components and Leakages

A description of deviations from the NMM and quantitative discrepancies with respect to monitoring of each Component and Leakage follows. As discussed previously, The World Bank provided a statement asserting that no monitoring and/or Project changes had occurred in the Project relative to the earlier reporting periods (see Appendix C). Therefore, this assessment takes into account this assertion in an effort to avoid non-essential repetition of issues that were resolved satisfactorily during the assessment of the prior reporting periods performed by First Environment.

Component Number 1 Baseline (Dynamic): Operating condition improvements and/or the substitution of the number and technology of buses that operate on the main route or BRT corridor.

Discussion: The baseline component provides the emissions of the buses, minibuses, and microbuses that would have been in operation if the Project had not been implemented.

Initial baseline data were provided by the SENES report and adjusted based on improved vehicle technology and other specifications. Baseline calculations are a key element of the Project's emission reduction profile.

While the baseline calculation procedures followed the spirit of the NMM, several conservative (and significant) miscalculations were found by First Environment when recalculating the vehicle replacement schedules during report writing. These miscalculations were detected during a risk-based QA/QC check. The baseline emission miscalculations result in emission reduction under reporting of about 14 percent for the 2008-2009 reporting period, about 0.3 percent for the 2009-2010 reporting period, and about 2 percent for the 2010-2011 reporting period. As an aggregate, the baseline miscalculations result in over 6,000 metric tonnes of CO_{2e} in emission reduction under reporting. This is a conservative error.

A zero (0) baseline vehicle growth along the Insurgentes corridor assumption was not reported transparently in the ERRs. This exclusion results in conservative emission reduction calculations. This is a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment indicates that calculation results of Component 1 - Baseline is an overstatement of emissions for this component.

Component Number 1: Operating condition improvements and/or the substitution of the number and technology of buses that operate on the main route or BRT corridor.

Discussion: To collect fuel consumption data, the fuel consumption per hour is measured by monitoring six fuel injectors and utilizing algorithms to translate this information into volume of diesel fuel used for each bus. Distance traveled by bus is also logged electronically for each bus. These two numbers (fuel use and odometer readings) are used to obtain the fuel economy per bus in km/l (FEN). Bus data is downloaded periodically during the course of the year. The World Bank provided information indicating that it periodically monitors the fuel economy reported by the Operating Companies to verify that FEN falls within a pre-established acceptance interval.

Finding: No evidence or inconsistencies discovered/reviewed in the course of the assessment indicates that the reported information results in an overstatement of emission reductions for this component.

Component Number 2: Improving the operating conditions for other vehicles operating on the main route.⁶

Discussion: In all three Emission Reduction Reports (ERRs), emission reductions for this component were omitted. All three ERRs state that this omission was caused by monitoring difficulties resulting from Metro's line 12 construction activities and its impact in private vehicle's traffic flow and travel times. This is a deviation from the NMM. The same omission was

⁶ Ex-ante PDD LCL emission reductions for Component Number 2 are 4,500 metric tonnes CO_{2e}.

identified during the assessment of the prior reporting periods and resolved satisfactorily as a conservative deviation. The emission reductions that could be attributed to Component Number 2 were calculated ex-ante in the PDD and amounted to about 4,500 metric tonnes of CO₂e.⁷

Finding: As this component accounts for emission reductions, implicitly reporting a value of zero (0) is a conservative deviation. No evidence discovered or reviewed in the course of the assessment indicates that zero is an overstatement of emission reductions for this component.

Component Number 3: Operating condition improvements and/or the substitution of the number and technology of buses that operate on feeder routes.⁸

Discussion: This component was not monitored or reported and therefore is indirectly reported as zero (0). The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project. However, this is a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Component Number 4: Improving the operating conditions for other vehicles operating on the feeder routes.⁹

Discussion: This component was not monitored or reported and therefore is indirectly reported as zero (0). The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since then and that this component does not affect the Project. However, this is a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Component Number 5: Modal shift from cars on the route to buses.

Discussion: In Component Number 5, the variable AKAV_n (or the annual kilometers per vehicle avoided by private vehicles whose users switched to mass transit in year n) was not monitored in accordance with the NMM. The NMM states that the data for this variable is determined each verification period from on-board rider-ship surveys. However, for all three years' calculations of emissions for this component, the value 19.06 km/day was used for the AKAV_n. This is a deviation from the NMM.

In response to inquiries regarding this deviation from the NMM, The World Bank pointed to specific information that indicates that the ex-ante value of 19.06 km is conservative (see Appendix D). First Environment assessed the information provided by The World Bank and found no evidence that would contradict the statements provided regarding that the AKAV_n

⁷ Based on ex-ante calculation procedure in page 66 of PDD.

⁸ Ex-ante PDD value for Component Number 3 is zero (0).

⁹ Ex-ante PDD value for Component Number 4 is zero (0).

used is a conservative distance. However, it cannot be stressed enough that this number is not based on field data. The same deviation was found during the assessment of the prior reporting periods.

This deviation was not reported transparently in any of the three ERRs. Since a significant amount of calculated emission reductions depend on this variable, this deviation is significant. Failure to monitor this variable in accordance with the NMM and instead relying on the ex-ante value is inconsistent with best practices. Additionally, a failure to transparently explain this deviation in the ERRs reports is also inconsistent with best practices.

Finding: Having reviewed the responses and justifications from The World Bank, no evidence discovered or reviewed in the course of the assessment indicates that the deviation resulted in an overstatement of emission reductions. Therefore, using professional judgment, the Audit Team can provide limited assurance that this deviation does not result in an overstatement of emission reductions based on information provided by The World Bank.

Component Number 6: Extra buses required due to Modal shift from cars, Metro, or other more-fuel-efficient-transport to buses on the BRT corridor plus rebound and new trip creation on the buses.

Discussion: Trip creation on BRT buses is accounted for in Component 1 and not in Component 6, as prescribed in the NMM. The same discrepancy was identified during the assessment of the prior reporting periods and resolved satisfactorily.

The World Bank used an actual bus count increase in Component 6 calculations as opposed to a calculated value. This is allowed by the NMM. The 2009-2010 calculations have an error in the bus count (uses 20 instead of 21) that results in about 180 metric tonnes CO₂e emission reduction over reporting (non-conservative). No errors were identified in the 2008-2009 or the 2010-2011 ERR. No report revisions were requested from The World Bank for this deviation.

Finding: Deviations discovered in the calculation methodology for Component Number 6 result in an emissions reduction overstatement in the 2009-2010 ERRs of about 180 metric tonnes CO₂e (0.4%). This is a non-material emission reduction overstatement.

Component Number 7: Elimination of left turns on the route or BRT corridor generates increased travel time and distance for those vehicles that now have to go-round-the-block.

Discussion: Emission reductions for this component were not reported; this is a non-conservative deviation from the NMM. The World Bank has stated that this component was not monitored for any of the 2008 - 2011 reporting periods as it does not affect the Project. The World Bank has also stated that Project conditions have not changed. The same discrepancy was identified, analyzed, and resolved during the assessment of the prior reporting periods.

Finding: As this component accounts for emission increases created by the Project, this deviation is not conservative and is relevant to the Project. Ex-ante calculations of emission increases from Component Number 7 in the PDD were in the range of 800 metric tonnes

CO₂e.¹⁰ However, the emission reductions that could be attributed to Component Number 2 were calculated ex-ante in the PDD and amounted to about 4,500 metric tonnes CO₂e. Based on professional judgment and a review of relevant information, First Environment determined, with a limited level of assurance, that emission increases resulting from Component Number 7, in combination with the emission reductions from Component Number 2, on balance, do not result in an overstatement of emission reductions.

Component Number 8: Longer distance required for vehicles to cross the corridor due to the elimination of crossing points in the with-project case.¹¹

Discussion: This component was not monitored or reported and therefore is indirectly reported as zero (0). The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this component does not affect the Project. However, this is a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Component Number 9: Longer time required for vehicles to cross the route or BRT corridor due to traffic signal timing altered giving priority to buses.

This component was not monitored or reported and therefore is indirectly reported as zero (0). This is a deviation from the NMM. The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. During the 2010 site visit by First Environment, Metrobus stated that traffic signal timing had not been changed as a result of the Project. Therefore, there were no emissions resulting from this component. The World Bank has stated that Project conditions have not changed since and that this component does not affect the Project.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Component Number 10: Increase in fuel consumption during construction due to traffic delays on all vehicles that use the route.

Not applicable. This component applied to the construction stage of the Project.

Component Number 11: Greenhouse gas emissions due to construction activities of the project and energy used to produce the construction materials.

Discussion: Not applicable. This component applied to the construction stage of the Project.

Leakage 1: Greenhouse gas emissions generated whilst smelting the old vehicles removed from service.

¹⁰ Ex-ante PDD emissions for this component at the lower 95% confidence level is 812 MTCO₂e/year.

¹¹ Ex-ante PDD value for Component Number 8 is Zero (0).

Discussion: Not Applicable. This one time only leakage was accounted for and addressed satisfactorily during the assessment of the prior reporting periods.

Leakage 2: Transferring buses to the project activity that were previously in service on a different route.¹²

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). This is a deviation from the NMM. The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 3: Buses displaced by the project activity are not scrapped. Buses outside boundary are scrapped.¹³

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). This is a deviation from the NMM. The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the information provided by The World Bank.

Leakage 4: Buses have to dead-head to reach their route.

Discussion: This leakage concept is included in the Project, and the additional distance and emissions involved are included in Component Number 1¹⁴ as part of the BRT buses' km travelled. However, Leakage 4 is not explicitly quantified in the ERRs. The same deviation was identified during the assessment of the prior reporting periods and resolved satisfactorily; however, this is a deviation from the NMM.

The World Bank indicated that Leakage Number 4 is based on fixed distance allocations given to the bus operators and by accounting for the number of buses that stay in each garage and how many and where they begin their route; as opposed to odometer readings. There is no explanation for this change in any of the ERRs; however, this is not considered a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

¹² Ex-ante PDD value for Leakage 2 is Zero (0).

¹³ Ex-ante PDD value for Leakage 3 is Zero (0).

¹⁴ Consistent with page 59 of PDD.

Leakage 5: Competing buses on alternative routes.¹⁵

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). This is a deviation from the NMM. The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 6: Project activity causes modal shift away from the buses.¹⁶

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). This is a deviation from the NMM. The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project.

According to information contained in the ERRs and other documents provided by The World Bank, there is evidence of a modal shift *towards* the Project for all reporting periods.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 7: Shift from other forms of transport (outside the project boundary) to the buses.¹⁷

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). This is a deviation from the NMM. The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 8:¹⁸ Additional delay to cross the main route for other traffic is so great that it affects several blocks either side of the main route.

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). This is a deviation from the NMM. The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project.

¹⁵ Ex-ante PDD value for Leakage 5 is Zero (0).

¹⁶ Ex-ante PDD value for Leakage 6 is Zero (0).

¹⁷ According to page 59 of the PDD this leakage is automatically included in Components 5 and 6.

¹⁸ The PDD page 95 states that this leakage is automatically included in in the Project activity calculations.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 9:¹⁹ Prohibition of left turns, the elimination of crossing-points or other factors force vehicles to change to alternative routes.

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project. However, this is a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 10:²⁰ Feeder route improvements adversely affect traffic flow on their cross streets.

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project. However, this is a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 11:²¹ Other vehicles that previously used routes outside the project boundary transfer to the main route.

Discussion: This leakage was not monitored or reported and therefore is indirectly reported as zero (0). The same non-reporting discrepancy was identified, analyzed, and accepted during the assessment of the prior reporting periods. The World Bank has stated that Project conditions have not changed since and that this leakage does not affect the Project. However, this is a deviation from the NMM.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

Leakage 12: Project activity fuel-use or fuel-handling enhances pilfering or evaporative emissions.²²

¹⁹ The PDD page 96 states that this leakage is automatically included in in the Project activity calculations.

²⁰ The PDD page 81 states that Feeder Routes are not included in the Insurgentes BRT corridor project thus this leakage does not apply to the Project. Therefore, no emissions are associated with Leakage 10.

²¹ The PDD page 97 states that this leakage is automatically included in in the Project activity calculations.

²² PDD shows an ex-ante null value for Leakage 12. During the 2010 site visit Metrobus stated that this Leakage is very small and is not applicable to the Project, the PDD states the same.

Discussion: This leakage was not monitored. This is a deviation from the NMM. The same discrepancy was identified during the assessment of the prior reporting periods and resolved satisfactorily.

Finding: No evidence discovered or reviewed in the course of the assessment contradicts the reported information.

6.2.3 Sampling Optimization

Sampling optimization was not performed as part of the Project. This is a deviation from the NMM. However, this deviation was also identified during the assessment of the prior reporting periods and was both resolved and accepted. During the 2010 site visit, Metrobus indicated that sampling optimization would not be performed beyond the first reporting period.

6.3 Emission Reduction Calculation Assessment

As part of the emission reduction calculation assessment, the assumptions and calculations used in the Project for all three reporting periods (2008-2009, 2009-2010, and 2010-2011) were reviewed.

During the emissions reduction calculation assessment, First Environment reviewed all activity data and factors applied in the calculations and confirmed that they were consistent with the evidence provided. A risk-based approach was used during the calculation assessment that focused on Components and Leakages that had the highest risk of producing significant errors in the reported emission reductions. Additionally, First Environment confirmed consistency between all formulas applied in the calculations and the NMM. All calculation errors discovered during the assessment period were corrected as requested, except for some of them which resulted in conservative results, as described in Section 6.2. Errors discovered during report writing were noted in Section 6.2.2. None of these errors resulted in material overstatements as noted previously.

First Environment also reviewed various reports and documents provided by The World Bank that provided background information to support the emission reduction calculations and found them to be in consistency with the overall reporting of the emission reduction assertions contained in the November 1, 2008 – October 31, 2009, November 1, 2009 – October 31, 2010, and November 1, 2010 – October 31, 2011 Emission Reduction Reports.

First Environment can confirm, with limited assurance, that the emission reductions totals for the 2008 - 2009, 2009 - 2010, and 2010 - 2011 Emission Reductions Reports provided by The World Bank for the Metrobus Insurgentes Project are free of material misstatements that would over-state the calculated emission reductions by more than five percent for any of the ERRs.

7. Assessment Conclusion

First Environment was retained to provide assessment services for the Project's GHG emission reduction assertions based on the following fundamentals:

- *Level of assurance:* Limited assurance.
- *Assessment criteria:* CDM Proposed New Methodology: Monitoring (CDM-NMM) – Version 01 – in effect as of 1 July 2004 (NMM) and “GHG emissions reductions in urban

transportation projects that affect specific routes or bus corridors or fleets of buses including where fuel usage is changed” (CDM-MNB) Version 02 – in effect as of 15 July 2005.

- *Objectives of assessment:* Using the NMM and NMB as a general framework, provide limited assurance that the emission reduction assertions made in relevant monitoring reports are real and are not overstated.
- *Definition of materiality:* Overstatements of more than five percent of the GHG reduction assertion are considered material.
- *Scope, including:*
 - *Boundaries of the assertion:* The “Insurgentes BRT Corridor” in Mexico City – 19.06 km of Insurgentes Avenue starting at Indios Verdes in the north and ending in Doctor Galvez, Rectoria in the South.
 - *Source of Emission reduction:* The building of a corridor with exclusive bus lanes, the introduction of more fuel efficient high capacity buses, modal shift from private vehicles to Metrobus buses, and other improvements to increase efficiency and reduce fuel consumption of vehicles. The greenhouse gases included in the emission reduction calculations are CO₂, CH₄, and N₂O.

The three time periods for the assertion: November 1, 2008 – October 31, 2009, November 1, 2009 – October 31, 2010, and November 1, 2010 – October 31, 2011.

Based on the assessments performed, the historical evidence collected, and the process and procedures conducted with respect to the GHG assertions contained in the relevant ERRs which appear below and provided by The World Bank:

- no evidence reviewed indicated that the assertions are not real;
- no evidence reviewed indicated that the assertions are overstated; and
- no evidence reviewed indicated that the assertions are not calculated in general consistency with the general framework established by the Project’s NMM and NMB.

Reporting Period 1: November 1, 2008 – October 31, 2009	
Mean Emission reductions (tCO ₂ -e)	43,952
Lower 95 th Confidence Interval Emission reductions (tCO ₂ -e)	36,302

Reporting Period 2: November 1, 2009 – October 31, 2010	
Mean Emission reductions (tCO ₂ -e)	49,222
Lower 95 th Confidence Interval Emission reductions (tCO ₂ -e)	42,328

Reporting Period 3: November 1, 2010 – October 31, 2011	
Mean Emission reductions (tCO ₂ -e)	46,332
Lower 95 th Confidence Interval Emission reductions (tCO ₂ -e)	39,538

8. Assessor Signatures



John Mosheim
Senior Engineer



Michael Carim
Senior Associate

APPENDIX A



Assessment Plan for World Bank

BRT Metrobus Insurgentes, Mexico VER Verification
WB Contract Number: 7162019

Approved by Lead Assessor ☒: JAM

Issue Date: 12-04-2012

Version: 3.1

Project Scope

BRT (Bus Rapid Transit) Metrobus Insurgentes in the Zona Metropolitana del Valle de México (ZMVM) is a BRT project installed on 19.06 km of the Insurgentes bus line in Mexico City (Project). The introduction of a new mass rapid transit mode of transportation creates modal shifts away from other more fossil-fuel intensive modes, resulting in a net reduction of GHG emissions.

As a result of First Environment, Inc.'s (First Environment) initial review of the "Reportes de la Reduccion de Emisiones de Gases de Efecto de Invernadero" for the 2008 - 2009, 2009 - 2010, and 2010 - 2011 time periods, First Environment identified high-level deviations from the established Criteria. This situation was discussed and addressed with the World Bank Team on April 24, 2012 via a teleconference. A key change that resulted from the teleconference meeting was the necessity to change the scope of the Project from a Verification to an Assessment. For details on the nature of the conversations and agreements reached during the April 24, 2012 teleconference, please see e-mail communication on May 2, 2012.

Therefore, First Environment will be assessing emission reductions generated by the Project against the criteria contained in the Baseline Methodology "*GHG emissions reductions in urban transportation projects that affect specific routes or bus corridors or fleets of buses including where fuel usage is changed*" - Version 02 in effect as of 15 July 2005 and the associated Monitoring Methodology CDM NMM 158, for the time period from November 1, 2008 - October 31, 2011 consisting of three (3) separate Emission Reduction Reports: 2008 - 2009, 2009 - 2010, and 2010 - 2011.

The assessment scope consists of an evaluation of the Project's implementation against the baseline and monitoring methodology and will assess monitoring and quantification of emission reductions generated by the Project during the stated three reporting periods. The Project boundaries are Zona Metropolitana del Valle de México, Insurgentes Avenue BRT 19.06 km corridor, bus fleets, and vehicles used in baseline scenario.

The emission reductions asserted by World Bank for this project are as follows:



Monitoring Period	Total Emission Reductions	95% lower confidence limit
November 1, 2008 - October 31, 2009	43,952 tonnes CO ₂ e	36,302 tonnes CO ₂ e
November 1, 2009 - October 31, 2010	49,222 tonnes CO ₂ e	42,328 tonnes CO ₂ e
November 1, 2010 - October 31, 2011	46,332 tonnes CO ₂ e	39,538 tonnes CO ₂ e

World Bank Project Team

- Mr. Jose Andreu - Project Manager, World Bank
- Ms. Jessica Wade-Murphy - World Bank
- Mr. Alfredo Pascual - Metrobus, Mexico

First Environment Project Team

- Lead Assessor: John Mosheim, P.E., CEM
- Assessor: Natali Ganfer
- Assessor: Ross MacWhinney
- Technical Expert: Bob Previdi
- Senior Oversight: Jay Wintergreen
- Internal Reviewer: Michael Carim

Level of Assurance

Limited Level of Assurance, as outlined in ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions 2006, a Limited Level of Assurance is being applied to an assessment and not a verification.

Assessment Details

The assessment covers the time period of November 1, 2008 - October 31, 2011. The standards used to assess emissions associated with the identified scope appear in Table 1 below.

TABLE 1: Assessment Standards

<p>Standard of Assessment</p>	<p>Baseline Methodology – <i>“GHG emissions reductions in urban transportation projects that affect specific routes or bus corridors or fleets of buses including where fuel usage is changed”</i> - Version 02 in effect as of July 15, 2005</p> <p>Monitoring Methodology CDM NMM 158 – Version 1 in effect as of July 1, 2004</p>
<p>Assessment Process</p>	<p>Use and consideration of best practices and guidance documents as deemed necessary.</p>

Neither of the Standards of Assessment listed in Table 1 are CDM approved methodologies. Assessment activities will also be conducted in accordance to First Environment’s proposal dated February 23, 2012. This proposal was written based on the premise that all findings (corrective actions, clarification requests) can be resolved in one round of follow up with First Environment, as stated in Attachment C of First Environment’s February 23, 2012 proposal outlined during the kickoff call.

The assessment process for the project will be as follows:

1. kick-off meeting with World Bank to discuss objectives, scope, criteria, and timeframes;
2. development of assessment and sampling plan;
3. review of GHG information systems and data;
4. follow-up discussions with site staff to fill in data gaps, if any;
5. completion of data assessment; and
6. reporting and statement.

Deliverables for this assessment will include a report and signed assessment statement consistent with the requirements of the Assessment Criteria. The statement will attest to the quality and eligibility of the data within the scope described above.

Sampling Plan

First Environment will develop a sampling plan, including a risk-based approach to capture the emissions sources that could have the most impact in the emissions reduction calculations.



To the degree that it is feasible, all communications, documentation, and calculations will be provided in English; however, it is understood that some documentation will be provided in Spanish.

Materiality

Materiality will be assessed both quantitatively and qualitatively. Misstatements of more than five percent (5%) of the project’s GHG assertion will be considered material. Qualitative non-conformities with the assessment Criteria will also be considered material and identified for corrective action. Objectives of assessment activities include assurance that the criteria and requirements shown in Table 1 are met.

Site Visit

First Environment assumes that a site visit will not be necessary to complete assessment activities since a site visit was performed previously. Should material differences in project implementation or significant changes in monitoring or data collection systems since the previous site visit be identified, a site visit might be called for. This contingency will be addressed if and when this situation arises.

Tentative Schedule

First Environment proposes the following schedule. This schedule may change depending on several factors including changes in scope, time required for data review, and the issuance and response to corrective action requests.

Task	Completion Target Week of:
Kickoff Meeting	April 4, 2012 (completed)
First Environment provides list of requested documents for assessment	April 19, 2012 (completed)
World Bank provides all requested documents and data to First Environment	May 3, 2012
First Environment completes initial data assessment; Corrective action and Clarification requests issued, if necessary	May 17, 2012
World Bank completes responses to corrective action and clarification requests, if applicable	June 7, 2012
Draft report delivered to World Bank	June 18, 2012
Final report delivered to World Bank (corrected)	June 25, 2012

APPENDIX B

Componente	¿Afecta Insurgentes?	Actividad	Vehículos afectados
1	Si	Vehículos en cada ruta principal dentro del límite del proyecto (las rutas principales se pueden modificar substancialmente al comportamiento del tráfico en las calles que cruzan)	Autobuses (consumo de combustible medida directamente)
2	Si		Todos los vehículos excepto los autobuses (cambio en el consumo de combustible determinado de la diferencia en los tiempos del recorrido)
3	No	Vehículos en las rutas alimentadoras dentro del límite del proyecto (las rutas alimentadoras no modifican substancialmente al comportamiento del tráfico en otras calles)	Autobuses (consumo de combustible evaluado medida directamente)
4	No		Todos los vehículos exceptuando a los autobuses (cambio en el consumo de combustible determinado de la diferencia en los tiempos del recorrido)
5	Si	Cambio modal a los autobuses de los coches privados y de otras formas de transporte	Disminución en el uso de coches privados
6	Si		Incremento en el servicio de autobuses para cubrir la demanda adicional
7	No	La eliminación de vueltas a la izquierda sobre las rutas principales	Todos los vehículos tienen que viajar una distancia adicional a dar "la vuelta a la cuadra" hacia la derecha para realizar una vuelta a la izquierda
8	No	La eliminación de cruces en las rutas principales	Todos los vehículos tienen que viajar una distancia adicional para utilizar un cruce distinto
9	No	Incremento en el tiempo requerido para cruzar la ruta principal	Todos los vehículos requieren más tiempo de recorrido para cruzar la ruta
10	No	Tráfico más lento debido a la actividad de la construcción	Todos los vehículos requieren más tiempo de recorrido debido a la congestión adicional
11	No	Emisiones debido a la actividad de la construcción más emisiones intrínsecas en material de construcción	Actividad de Construcción y material utilizada

Fuga	¿Afecta Insurgentes?	Actividad	Vehículos afectados
1	No aplica más	Fundición de vehículos removidos	Autobuses
2	No	Transferencia de autobuses a un servicio o ruta distinta	Autobuses
3	No	Los autobuses desplazados que no se destruyen (chatarrian)	Autobuses
4	Si	Los autobuses tienen que viajar desde su módulo para llegar a la cabeza de la ruta	Autobuses
5	No	Autobuses en rutas alternativas que compiten por pasaje	Autobuses
6	No	Cambio modal de los autobuses a otros modos	Autobuses , automóviles, taxis
7	No	Cambio de modos de transporte afuera del límite del proyecto a los autobuses	Autobuses , automóviles, taxis
8	No	Atraso adicional para cruzar la ruta que afecta varias cuadras	Todos los vehículos cruzando la ruta
9	No	Los vehículos cambian a rutas alternas fuera del límite del proyecto	Todos los vehículos en la ruta exceptuado a los autobuses
10	No	Las mejoras en la ruta alimentadora perjudican a tráfico que la cruce	Todos los vehículos cruzando la ruta alimentadora
11	No	Vehículos que utilizaron rutas fuera del límite del proyecto transfieren a la ruta principal	Todos los vehículos en la ruta exceptuado a los autobuses
12	No	El uso o manejo del combustible utilizado en la actividad aumenta emisiones evaporativas o sisa del mismo	Autobuses

APPENDIX C

John A. Mosheim

To: John A. Mosheim
Subject: FW: Follow-Up Clarification Request Metrobus Insurgentes, Mexico

From: jwademurphydejim@worldbank.org [<mailto:jwademurphydejim@worldbank.org>]
Sent: Saturday, August 04, 2012 1:45 PM
To: John A. Mosheim
Cc: jandreu@worldbank.org; Natali Y. Ganfer; Ross MacWhinney; bobprevidi@verizon.net; Jay Wintergreen
Subject: Re: Follow-Up Clarification Request Metrobus Insurgentes, Mexico

Dear John,

Here we provide the responses to the last two open clarifications, along with the related files (all attached).

Second, with respect to the methodology components and leakages that have and have not been included in the project monitoring and reporting, please see the attached list where we indicate which components and leakages are relevant for the project for the reporting periods currently under assessment (ComponentesyFugas.docx). As you can see, the applicable components and leakages are the same as those of the earlier reporting periods, since nothing has occurred that would affect this list.

We look forward to receiving the draft assessment report at your earliest convenience.

Best regards,
Jessica

erson/World Bank]

APPENDIX D

John A. Mosheim

From: John A. Mosheim
Sent: Friday, September 14, 2012 3:55 PM
To: John A. Mosheim
Subject: COMPONENT 5 - THE WORLD BANK JUSTIFICATION FOR DISTANCE AVOIDED BY VEHICLES ALONG INSURGENTES.

COMPONPONENT 5 EMAIL REGARDING JUSTIFICATION FOR DISTANCE AVOIDED BY VEHICLES ALONG INSURGENTES

From: jwademurphydejim@worldbank.org [<mailto:jwademurphydejim@worldbank.org>]
Sent: Monday, July 23, 2012 11:38 AM
To: John A. Mosheim
Cc: jandreu@worldbank.org; Natali Y. Ganfer; Ross MacWhinney; bobprevidi@verizon.net; Jay Wintergreen
Subject: RE: Telecom this morning

Dear John,

Look forward to speaking with you this afternoon. Below, I provide a summary of the issues to discuss.

05-25-2012 CL_CA – 09: The conservativeness of using the entire length of the Insurgentes project to estimate the kilometers per day travelled by the cars when calculating AKAV parameter in Component 5 is not justified by comparing the AKAV value to the average distance travelled by any car in Mexico City. Please provide further justification. See email sent by First Environment related to this question for additional information on this clarification request.

First, the passenger survey asks if Metrobus riders have a car, and if they have left it parked at home. Only those that respond "yes" to both these conditions are considered in calculating Comp 5 (modal shift). From this, we conclude that these riders have replaced their whole trip (i.e. home to destination) with a trip using Metrobus.

Second, the SENES study focused specifically on the Insurgentes corridor (not the whole city). According to its results, the distance baseline cars traveled on the corridor is similar to distance of an average trip on Metrobus. However the total distance that these baseline cars traveled is 39.6 km. Based on this we conclude that, given that former drivers leave their car parked at home and realize their whole door to door trip without the car and utilizing Metrobus; and that the average baseline travel distance per day for cars utilizing the Insurgentes corridor was 39.6 km (Senes study), then it is reasonable to use half of this distance (19.8 km) as a one-direction trip distance for a car using the Insurgentes corridor in the baseline. And, since we actually apply the value 19.058 km, which is less than 19.8 km, then 19.058 can be considered a conservative value.

Speak to you this afternoon.

Best regards,
Jessica