CERTIFICATION AND FINANCING PROPOSAL

BORDER-WIDE PROGRAM FOR THE PURCHASE OF LOW-EMISSION VEHICLES IN MEXICO

Submitted: July 15, 2016

CERTIFICATION AND FINANCING PROPOSAL

BORDER-WIDE PROGRAM FOR THE PURCHASE OF LOW-EMISSION VEHICLES IN MEXICO

INDEX

EXECUTIVE SUMMARY

BORDER-WIDE PROGRAM FOR THE PURCHASE OF LOW-EMISSION VEHICLES IN MEXICO

Project:

The proposed project consists of the establishment of a program to support the acquisition of vehicles with low-emission technology for public transportation (PT) within the 300-kilometer border region in Mexico (the "Project" or "Bus Program").

Project certification and financing for a pilot program in the form of a revolving line of credit for up to $120.0 million pesos were approved by the Board on June 24, 2014, through Resolution BR 2014-11 (the "Pilot Program").[1] To date, a total of 58 vehicles have been purchased through the Pilot Program by public transportation providers in three communities (Ciudad Juarez, Hermosillo and Tijuana).[2]

Given the success of the Pilot Program, the sponsor has requested a new revolving loan for up to $500.0 million pesos to establish the Bus Program, which could initially support the sale of an estimated 250 low-emission vehicles. This quantity could potentially be scaled up by the revolving nature of the proposed loan, as well as possible future loan increases that would be submitted for Board approval through the loan extension process.

Project Objective:

The Project will improve PT fleets by facilitating the financing of low-emission vehicles, contributing to the displacement of greenhouse gases (GHG) and other pollutants in urban areas throughout the northern border region of Mexico.

Expected Project Outcomes:

The Project is expected to generate environmental and human health benefits related to air quality improvements, through the sale of low-emission vehicles, as the use of new diesel vehicles that comply with the 2004 emission standards set by the U.S. Environmental Protection Agency (EPA) can reduce nitrogen oxides (NOx) and hydrocarbons (HC) emissions by approximately 50% and reduce carbon dioxide (CO_2) emissions by nearly 24% compared to older models, while in the case of natural gas-fueled vehicles, the criteria pollutant emissions are nearly eliminated.

[1] Border-Wide Public Transportation Improvement Program in Mexico (BD 2014-14).
[2] Of the 58 vehicles acquired under the program, 33 are diesel-powered and the remaining 25 are powered by compressed natural gas (CNG).

Project outcomes will be measured based on the emissions generated by vehicles with the low-emission technology offered through the Bus Program compared to the emissions generated by diesel buses with EPA 1998 technology, which are commonly used for public transportation in the Mexican border region. The following table shows the expected emission factors per emission technology, which will be used to determine emission displacement based on actual bus purchases.[3]

EMISSION FACTORS FOR VEHICLE TECHNOLOGIES				
Technology	**Fuel**	**Criteria Pollutant Emission Factor* (g/mile)**		**Greenhouse Gases** (g/mile)**
		NOx	**HC**	**CO_2**
EPA 1998	Diesel	14.88	0.61	1,617.60
EPA 2004	Diesel	8.84	0.36	1,579.20
EPA 2013	Natural gas	0.80	0.19	1,320.00

* Source: California Environmental Protection Agency, Air Resources Board, *Methods to Find the Cost-Effectiveness of Funding Air Quality Projects.*
**Source: Intergovernmental Panel on Climate Change (IPCC).

Sponsor: Mercader Financial, S.A., SOFOM, E.R. (Mercader).

Borrower: Mercader.

NADB Loan Amount: $500.0 million pesos (US$28.0 million).

[3] Under this premise, the initial acquisition of 250 diesel buses with EPA 2004 emission technology would generate environmental and human benefits related to the displacement of an estimated 479.6 metric tons/year CO_2, 75.0 metric tons/year of NOx and 3.0 metric tons/year of HC.

CERTIFICATION AND FINANCING PROPOSAL

BORDER-WIDE PROGRAM FOR THE PURCHASE OF LOW-EMISSION VEHICLES IN MEXICO

1. ELIGIBILITY

Project Type

The Project falls in the eligible sector of public transportation (PT).

Project Location

The Project will be implemented within the 300-kilometer BECC/NADB jurisdiction in Mexico.

Project Sponsor and Legal Authority

The private-sector project sponsor is Mercader Financial, S.A., SOFOM, E.R. (Mercader or the "Sponsor"), a financial entity created in 1992 with the authorization of the Ministry of Finance and Public Credit (SHCP) to operate as a lender for heavy vehicle sales. Mercader is the financing division of DINA Camiones, S.A. de C.V., a Mexican bus manufacturer.

2. CERTIFICATION CRITERIA

2.1. TECHNICAL CRITERIA

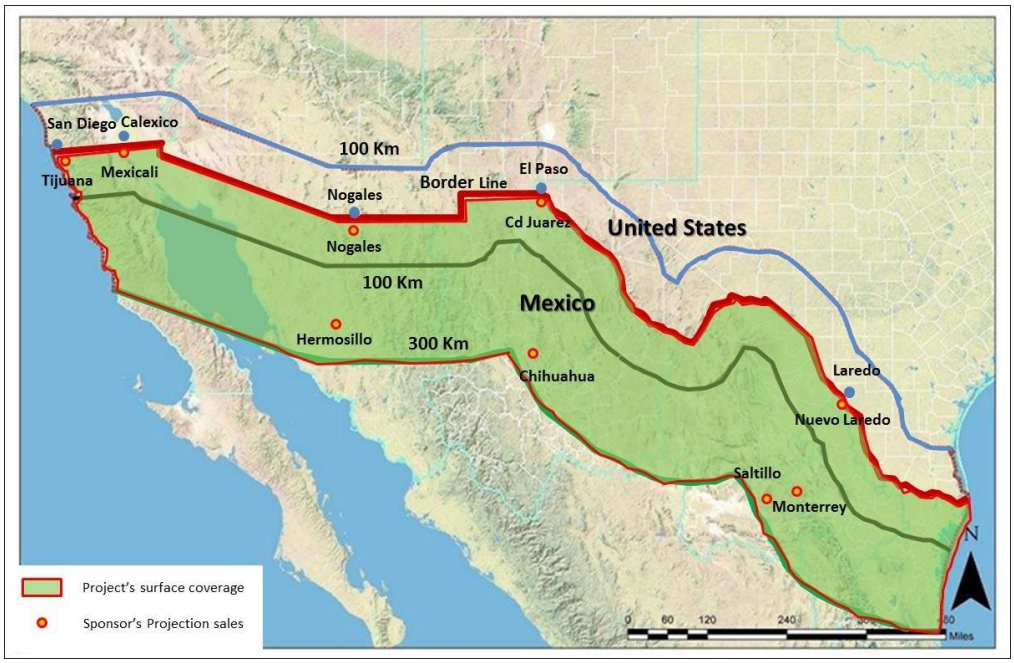
2.1.1. Project Description

Geographic Location

The Project is intended to improve public transportation systems through the financing of low-emission multi-passenger vehicles or buses in urban areas within the 300-km border region in Mexico. As demonstrated with the Pilot Program, the most likely market for the new buses exists in large cities, such as Mexicali, Tijuana, Hermosillo, Nogales, Chihuahua, Ciudad Juarez, Saltillo, Monterrey, and Nuevo Laredo, where there is a substantial demand for access to public transportation.

Figure 1 shows the BECC/NADB jurisdiction within Mexico, identifying those major urban markets, as noted above.

Figure 1
PROJECT VICINITY MAP



General Community Profile

The six northern border states represent 17.8% of the population of Mexico and 22.6% of its gross domestic product (GDP). Because PT systems are typically established in densely populated urban areas, the Project Sponsor anticipates that the cities identified in Figure 1 will be the primary market for Project implementation; however, the implementation of the Project is not limited only to these locations. Below is a brief summary of the demographics of these major cities.

Table 1
URBAN AREA DEMOGRAPHICS

City	Population*	Annual Growth Rate**	Average Household Income (MX$)	Main Workforce Activities
Monterrey	4,106,054	1.99	130,500	Manufacturing, commerce and services
Juarez	1,321,004	0.65	81,500	Manufacturing
Tijuana	1,300,983	1.56	87,500	Manufacturing
Chihuahua	809,232	1.42	146,500	Manufacturing
Hermosillo	715,061	1.60	186,500	Manufacturing and commerce
Nogales	709,671	1.43	156,000	Manufacturing and services
Saltillo	709,671	1.43	156,000	Manufacturing and commerce
Mexicali	689,775	1.38	120,900	Manufacturing
Nuevo Laredo	373,725	1.14	57,800	Manufacturing, commerce and logistics

*Source: Mexican national statistics institute, *Instituto Nacional de Estadística y Geografía* (INEGI), 2010.
**Source: Mexican national population council, *Consejo Nacional de Población* (CONAPO), 2010-2015.

According to the Mexican national statistics institute, *Instituto Nacional de Estadística y Geografía* (INEGI), a notable percentage of households within these same urban areas do not own a personal vehicle.[4] Table 2 presents the number of total households and the number of those households without a personal vehicle.

Table 2
HOUSEHOLDS WITHOUT A VEHICLE IN 2010

City	Total Households	Total Households Without a Personal Vehicle	% Without a Personal Vehicle
Monterrey	994,274	418,519	42%
Juarez	342,814	123,743	36%
Tijuana	419,357	152,896	36%
Chihuahua	228,580	64,088	28%
Hermosillo	210,275	65,798	31%
Nogales	57,647	1,297	2%
Saltillo	184,417	70,472	38%
Mexicali	258,788	62,661	24%
Nuevo Laredo	94,979	31,944	34%

Source: INEGI, 2010.

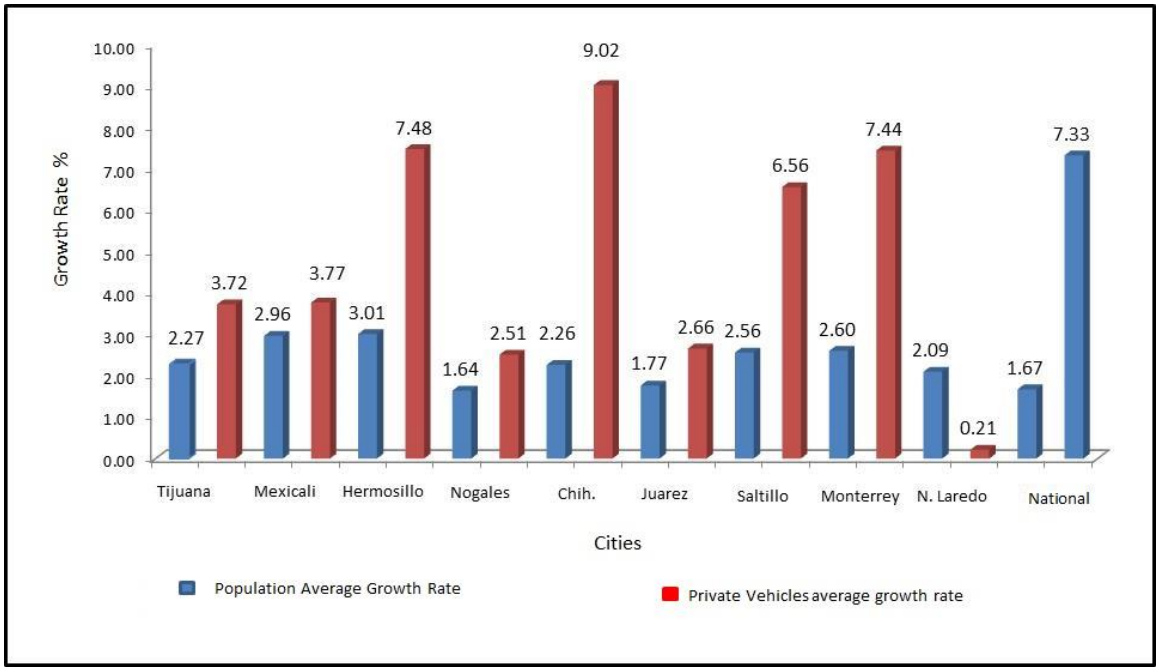
Since the average number of persons per household in the border region is estimated to be 3.7, it is likely that more than 3.5 million persons lack access to a personal vehicle and, therefore, depend on public transport to support their daily activities: employment, school, access to health care, and other needs.

Public Transportation Profile

INEGI reported that more than 15.6 million vehicles were registered in 2000 in Mexico. By 2010, vehicle inventories had more than doubled to 31.6 million. Nearly 20% of these vehicles were registered in the six northern border states. In fact, the average growth rate for personal vehicles in many of the major border cities over the last 10 years grew at a significantly faster rate than the population itself. Figure 2 shows a comparison of population and private vehicle registration growth rates for each of the cities mentioned above.

[4] INEGI is the agency responsible for collecting, analyzing, and distributing statistics for vehicle registrations in Mexico. The data does not provide specific information related to registered vehicles, such as use, condition or emissions.

Figure 2
POPULATION VS PERSONAL VEHICLE REGISTRATION GROWTH RATES
(2000-2012 Average)



Source: INEGI: Registered motor vehicles in circulation.
http://www.inegi.org.mx/sistemas/olap/Proyectos/bd/continuas/transporte/vehiculos.asp?s=est&c=13158&proy=vmrc_vehiculos

INEGI reported over 35 million vehicles registered nationwide in 2012, an increase of nearly four million in two years. Of this total, approximately 67% of the vehicles registered are for personal use, 28% are heavy trucks for commercial transportation, 1% is for public transportation, and the remaining 4% are motorcycles. Even with the steep growth trend in registered vehicles, based on the statistics described above, less than 63% of households in the major urban areas of the border region have access to privately-owned vehicles.

The 2013-2018 National Development Plan (NDP) recognizes the need to address existing transportation inefficiencies and implement infrastructure that facilitates the transportation of people in a rapid, efficient and low-cost manner.[5] The document also encourages improved mobility within cities by promoting urban transportation systems consistent with sustainable urban development and the use of state-of-the-art technologies to optimize service. In addition, each state and many municipalities have programs and strategies to support sustainable urban development, including the expansion and renovation of PT systems.

According to a study published by the Mario Molina Center, Mexico has experienced significant population growth and expansion in urban areas, resulting in increased demand for public and

[5] This plan lists the major objectives of public policy and sets specific actions to achieve those objectives, as well as indicators to measure their progress.

private transportation. More vehicles on urban roadways give rise to side-effects such as traffic congestion, accidents, pollution and noise.[6] Additionally, the increased use of private vehicles in comparison with buses promotes an inefficient use of the urban surface, with private vehicles parked nearly 95% of the time, while public transportation works throughout the day and uses up to 50 times less road space per passenger carried. This study recommends that public transportation should take precedence over private vehicles

Table 3
SUMMARY OF PT SYSTEM REGULATIONS

State	Legal Authority	Requirements		Emission Requirements
		Fleet Age	Vehicles per License	
Baja California	State (state-wide / inter-municipal) Municipal	Tijuana – 8 yrs Mexicali – Not defined	Defined in license	Tijuana – Not defined Mexicali – Yes
Sonora	State	Not defined	1	Not defined
Chihuahua	State	10	1	Yes
Coahuila	State (state-wide / inter-municipal) Municipal	Not defined	1	Yes
Nuevo León	State	10	Defined in license	Not defined
Tamaulipas	State	8	Sole proprietor: 1 Associations: Defined in license	Not defined

Public transportation regulations are aimed at properly managing the number of buses in relationship to demand. One of the strategies used in several border cities is to limit the number of service licenses and related number of vehicles. The regulations also serve to prevent inefficiencies related to the useful life of PT vehicles, including increased emissions resulting from substandard engine conditions.

In order to comply with these regulations and based on the initial outcomes of the Pilot Program, there is a strong expectation that new low-emission buses will continue to replace less efficient vehicles rather than simply expand existing fleets. Since some states limit the allowable age of the vehicles in use, older vehicles will likely be retired and will require proper disposal or their components may be recycled and sold as spare parts. Based on the PT system conditions and regulations identified by BECC, as well as national, state and local public policy and transportation strategies, the Project will provide an important financing program to support the integration of efficient, low-emission buses into the PT system to meet existing and future demand.

As noted previously, BECC conducted an urban transportation study in several major border cities in 2012. The study evaluated the urban transportation system based on fleet conditions, demand and future growth within the cities. The study findings and recommendations are described in the following table.

Table 4

BECC URBAN TRANSPORTATION STUDY FINDINGS AND CONCLUSIONS	
Tijuana, B.C.	
Findings:	• The average age of the fleet is 13 years, one of the oldest in the cities analyzed. • The public transportation fleet has a total of 2,223 vehicles: 1,155 have a capacity of 40 seats and the remaining vehicles have a capacity of 24 seats. • Based on the number of vehicles and available seats, the current fleet size appears sufficient to meet demand. • A high number of licensed operators (concessions) with units of varying vehicle capacity create inefficiencies related to operation and maintenance, as well as more vehicles on the road than necessary.
Conclusions:	The vehicle fleet should be replaced with cleaner and more efficient units, and the vehicle size and technology should be standardized to make the system more efficient.
Mexicali	
Findings:	• The average age of the fleet is four years, one of the youngest in the cities analyzed. • The fleet has a total number of 427 vehicles: 420 with 40 seats and the remaining vehicles with 14 seats. • Based on the number of vehicles and available seats, the current fleet size appears insufficient to meet demand.
Conclusions:	The Mexicali transportation system may require additional units to meet current and future demand.
Hermosillo	
Findings:	• The average age of the fleet is four years, one of the youngest in the cities analyzed. • The fleet has total of 455 vehicles with 40 seats. • Based on the number of vehicles and available seats, the current fleet size appears to meet current demand, but is unlikely to meet growing needs. • The long distances traveled on a daily basis indicate that the existing vehicles, although new, may require extensive operation and maintenance, which may accelerate the need for vehicle replacement.
Conclusions:	Hermosillo should renew or supplement its fleet with more efficient vehicles, due to their heavy usage, even though the average fleet age is currently not a matter of concern.
Nogales	
Findings:	• The average age of the fleet is 15 years, the oldest in the cities analyzed. • The fleet has a total number of 179 vehicles: 129 with 40 seats, 20 with 24 seats, and the remaining vehicles have 14 seats. • Based on the number of vehicles and available seats, the current fleet size appears insufficient to meet demand.
Conclusions:	The vehicle fleet should be replaced with cleaner and more efficient buses.

BECC URBAN TRANSPORTATION STUDY FINDINGS AND CONCLUSIONS	
Chihuahua	
Findings:	• The average age of the fleet is six years, the youngest after Mexicali and Hermosillo. • The fleet has a total of 528 vehicles, all of them 40-passenger vehicles. • Based on the number of vehicles and available seats, the current fleet size appears to be well balanced to meet demand. • The distance travelled per unit is the longest among the analyzed cities; so there is potential for replacement of units in the midterm due to intensive use.
Conclusions:	Chihuahua has a good PT system. The possibility of implementing a program for the replacement of bus engines that use alternative fuels, such as natural gas, should be explored.
Juarez	
Findings:	• The average age of the fleet is 12 years, one of the oldest in the cities analyzed. • The public transportation fleet is the second largest, with a total of 1,016 vehicles, all of which have a 40-seat capacity. • Daily travel per unit is the second longest, just behind Chihuahua, which is likely influenced by the broad area covered by the city, requiring vehicles to travel long distances to serve a larger area. Inefficient route design may also be a negative influence.
Conclusions:	The vehicle fleet should be replaced with cleaner and more efficient buses.

All of the cities studied by BECC have made investments to support PT system improvements, such as fleet renovation and route efficiencies, as well as considered necessary rate adjustments. For example, cities such as Chihuahua, Ciudad Juarez, and Tijuana have worked to develop bus rapid transit (BRT) systems to further address the public transportation demands of their main urban corridors. Other cities in the border region, such as Monterrey, which was not included in BECC's study, have achieved significant progress in public transportation systems. The city has an agency dedicated to managing PT and in recent years has worked towards the implementation of a BRT system and renovation of its fleet.

Pilot Program Approved in 2014

The Pilot Program sponsored by Mercader consisted of the development of a financing program to support the acquisition of low-emission vehicles for public transportation within the 300-km border region in Mexico. The initial scope of the program was expected to support the acquisition of an estimated 100 buses, at a total estimated cost of $150.0 million pesos. Project certification and NADB financing in the form of a revolving line of credit for up to $120.0 million pesos were approved by the Board on June 24, 2014, through Resolution BR 2014-11.

The loan agreement between NADB and Mercader was executed on September 30, 2014. Disbursement of the initial $120.0 million pesos was expected to take about three years after

the program became available.[10] However, disbursement of those funds occurred more quickly than anticipated and was only sufficient to finance 58 vehicles, as demand for the program and the cost of the vehicles proved greater than originally projected.

Between October 2015 and April 2016, public transportation operators in three communities acquired a total of 58 vehicles through the Pilot Program. Of those vehicles, 33 are diesel-powered and 25 are powered by compressed natural gas. A breakdown of the units financed to date is detailed in Table 5.

Table 5
VEHICLES FINANCED THROUGH THE PILOT PROGRAM
AS OF APRIL 2016

City	EPA 2004 Technology*	EPA 2013 Technology**
Hermosillo	30	–
Tijuana	3	–
Ciudad Juarez	–	25
Total	**33**	**25**

* Ultra-low sulfur (ULS) diesel-powered vehicles.
** Compressed natural gas (CNG) fueled vehicles.

The increased project costs can be partially explained by the devaluation of the peso following project certification in 2014, as DINA prices its vehicles in U.S. dollars but invoices them in Mexican pesos at the exchange rate in effect at the time of sale. Additionally, at the time of certification, more diesel units were expected to be sold based on fuel availability in the border region. However, with natural gas being more cost-effective and becoming more readily available in the region, close to half of the buses purchased and financed were CNG units, which are more expensive than diesel vehicles.

The estimated environmental impacts deriving from these buses are described in Section 2.2.2. of this document.

Based on the success of the Pilot Program and ongoing demand in the region, Mercader proposes to establish the Bus Program and continue supporting the acquisition of low-emission vehicles in the border region of Mexico.

Project Scope and Design

The proposed Project consists of the establishment of a program for the acquisition of low-emission vehicles for public transportation throughout the 300-kilometer border region in Mexico. Mercader has requested a new revolving loan for up to $500.0 million pesos to establish the Bus Program, which could initially support the sale of an estimated 250 low-emission vehicles. This quantity could potentially be scaled up by the revolving nature of the

[10] Due to the revolving nature of the financing, the borrower may draw down on the line of credit for up to $120.0 million pesos, make monthly payments, and have those sums available to draw down again during the disbursement period.

proposed loan, as well as possible future loan increases that would be submitted for Board approval through the loan extension process.

The Project Sponsor has a well-established financing program that is designed to extend purchasing credit to reputable PT service providers, associations or individuals. All the terms and conditions established under the Pilot Program will apply to new Bus Program. Therefore, clients of Mercader seeking financing must continue to meet the following criteria:

- Potential borrowers, including private transportation services to manufacturing companies, must have an existing license for the operation of a PT vehicle within the 300-km border region.
- The bus should be used for transportation within cities and urban areas.
- The cleanest technologies available in Mexico will be made available for purchase, including ULSD and/or CNG vehicle options. Selection of the specific vehicle is expected to be influenced by available fuel sources in the area of the service provider or based on local transportation system policies.
- Purchasers will need to complete available training from the manufacturer, access other technical assistance support provided by the manufacturer and comply with warranty requirements, such as preventive maintenance activities, as determined by the manufacturer.

On a case-by-case basis, the Project Sponsor will evaluate potential buyers for compatibility with the Bus Program. As with the Pilot Project, the sponsor will collect and submit information to NADB related to each vehicle sale including data such as: the type of vehicle sold, location of the vehicle's use, and whether the vehicle will substitute or augment existing fleet. Periodic updates related to this information will be presented to the BECC/NADB Board of Directors and posted on the website during the 20-year term of the Project.

As the Pilot Program is already in place, there are no pending milestones to be completed to initiate the operation of this Project. Disbursement of the initial $500.0 million pesos is expected to occur within two years.

The loan will be structured as a revolving line of credit, which will allow the Project Sponsor to continue to finance additional units over time. Should the demands for this affordable financing program continue to grow, subsequent requests for loan increases may be submitted to provide additional opportunities for communities to benefit from the availability of new low-emission PT vehicles and the related environmental improvements. Based on historical demand, sales projections and local government strategies, the Sponsor expects to continue allocating units within the border region.

2.1.2. Technical Feasibility

Selected Technology

The vehicles available for purchase through the Bus Program are manufactured by DINA Camiones, one of the largest bus and truck manufacturers in Mexico. DINA employs a High Technology Quality system to manufacture vehicles that meet the strict requirements set by the international market and official Mexican standards, considering such parameters as:

- Vehicles designed as a complete unit with modular structure.
- Designs and technology to increase quality and efficiency.
- Better performance with lower weight (from 1,000 to 2,600 lbs. less than other brands).
- Lower initial investment.
- Lower operating cost.
- Solid infrastructure that allows the development of integrated projects.
- Development of sustainable vehicles with lower fuel consumption and greenhouse gas (GHG) emissions.

According to the Project Sponsor, the typical life cycle of a new vehicle, with proper operation and maintenance, is between 10 and 15 years. New vehicles are expected to be more cost-efficient, as they consume less fuel and other operational costs are lower compared to an older vehicle that requires more extensive maintenance and frequent replacement of tires and other spare parts.

Table 6 shows the bus models, along with the corresponding emission standard and engine technology, which will be made available by DINA through the proposed Bus Program.

Table 6
DINA VEHICLES AVAILABLE FOR PUBLIC TRANSPORTATION

Commercial name	Type of Fuel	Emission Technology*	Engine Model Family
Picker	Diesel	EPA 2004	Cummins ISB
Linner	Diesel	EPA 2004	Cummins ISB
Linner-8	Diesel	EPA 2004	Cummins ISF
Linner-G	Natural Gas	EPA 2013	Cummins ISL G
Runner 8, 9 & 10	Diesel	EPA 2004	Cummins ISB
BRT Brighter	Diesel	EPA 2004	Cummins ISM
BRT Ridder	Natural Gas	EURO V	Cummins ISL
Ridder-G	Natural Gas	EPA 2013	Cummins ISL

* See Table 8 for emission factors.

The Cummins engines used by DINA in their vehicles comply with Mexican regulations and require a certification from the Mexican federal environmental protection agency, *Procuraduría Federal de Protección al Ambiente* (PROFEPA), which ensures compliance with current

standards. A list of certifications issued to DINA the engines is provided in section 2.2.1, below. of this document.

With low-emission technology in each model option, PT service providers can consider other vehicle characteristics to determine the most appropriate model to meet demand in their specific market. Table 7 presents the features of each vehicle.

Table 7
DINA VEHICLE CHARACTERISTICS

Commercial name	Number of seats	Total Length	Gross Vehicle Weight
Picker	40	416.10 in / 10,569 mm	30,000 lb. / 13,608 kg
Linner	41	409.00 in / 10,390 mm	35,000 lb. / 15,876 kg
Linner-8	31	310.8 in / 7,895 mm	23,148 lb. / 10,500 kg
Linner-G	41	409.00 in / 10,390 mm	35,000 lb. / 15,876 kg
Runner 8	27	321.78 in /8,174 mm	30,000 lb. / 13,608 kg
Runner 9	33	368.30 in / 9,355 mm	30,000 lb. / 13,608 kg
Runner 10	37	398.30 in / 10,117 mm	32,000 lb. / 14,515 kg
BRT Brighter	165 passengers	714.37 in / 18,145 mm	65,000 lb. / 29,483 kg
BRT Ridder	100 passengers	475.90 in / 12,088 mm	40,600 lb. / 18,415.85 kg
Ridder-G	100 passengers	475.90 in / 12,088 mm	40,600 lb. / 18,415.85 kg

Source: DINA's webpage: http://www.dina.com.mx/products.html

Figure 3, below, shows the available bus models offered by DINA for urban PT systems.

Figure 3
DINA VEHICLES FOR PUBLIC TRANSPORTATION

Source: DINA webpage.

Vehicle types purchased under the Pilot Program to date include diesel-powered Linner, Runner and Picker vehicles, as well as Linner G natural-gas-powered buses.

2.1.3. Land Acquisition and Right-of-way Requirements

There are no land acquisition and rights-of-way requirements for the proposed Project. PT service providers requesting financing through the Bus Program will be required to demonstrate the appropriate license to own and operate the PT vehicle.

2.1.4. Management and Operations

Mercader provides various financial services in Mexico, including leasing services; loans for the acquisition of fixed assets; and loans for the purchase of passenger or cargo trucks. It serves micro, small, and medium enterprises in transportation, logistics and storage, food, automotive, real estate, and other sectors. The company was founded in 1992 and is based in Mexico City, Mexico. Mercader has extensive experience with the proposed financial structure with other banks, including other development banks, such as NAFIN. Mercader currently manages more than 800 loan accounts nationwide.

As the manufacturer of the buses, DINA has more than 60 years of experience offering solutions for public transportation through custom-made products using the latest technology for heavy vehicles. DINA has a manufacturing capability of 5,000 buses per year and offers guaranties against any defect for manufacturing and operation.

DINA has a technical assistance program accessible with the purchase and delivery of a vehicle, including a 24-hour toll-free number attended by qualified staff. The program offers four key services:

- *Training*: Vehicle operation and functions are reviewed to support optimal conditions for driver and passengers. Additionally, the mechanical features and basic maintenance activities are reviewed to ensure high performance. Once the training is complete, an evaluation is conducted to document if the training objectives were met.
- *Mobile Service Units*: Qualified personnel are deployed to diagnose any vehicle failure at the clients' facilities.
- *Technical Manuals*: Maintenance and vehicle parts manuals, maintenance schedules and logbooks are available on-line.
- *Spare Part Supplies*: Parts and materials are available nationwide in 13 warehouses and 57 service centers.

The partnership between the financing entity and bus manufacturer establishes a strong foundation for the operation and management of the proposed Project.

2.2. ENVIRONMENTAL CRITERIA

2.2.1. Compliance with Applicable Environmental Laws and Regulations

Applicable environmental laws and regulations for this Project are specifically related to the emission standards of the new vehicles. The federal government of Mexico has enacted standards for emissions and opacity from vehicles based on fuel source, as follows:

- *NOM-044-SEMARNAT-2006,* which establishes the maximum allowable pollutant emission levels of HC, NOx, carbon monoxide (CO), particulate matter and exhaust opacity from diesel vehicles.
- *NOM-045-SEMARNAT-2006*, which establishes the maximum allowable level of exhaust opacity for diesel vehicles.
- *NOM-076-SEMARNAT-2012*, which establishes maximum emission limits for unburned hydrocarbons (UHC), NOx and CO and evaporative emission limits for HC from new heavy-duty engines that use gasoline, liquid petroleum gas (LPG), natural gas or other alternative fuels.

The vehicles that will be financed through the proposed Bus Program use ULSD or CNG, aligned with the EPA 2004, EPA 2013 or EURO V emission technologies. [11]

Environmental Studies and Compliance Activities

The engine models for each vehicle are reviewed by PROFEPA for compliance with the applicable standard. Once approved, PROFEPA issues a certification. For the models proposed for the Project, all certifications have been issued.

It is the responsibility of the municipality and the state to establish the necessary regulations to ensure an efficient service and to inspect all vehicles destined for public transportation service. As described previously, only some regulatory frameworks enforce emission testing for vehicles. For municipalities with vehicle emission standards, bus owners must comply with emission testing requirements. Based on the results of this test, the municipality has the authority to remove a bus from service if it is highly contaminating or does not meet mechanical or technological requirements.

Pending Environmental Tasks and Authorizations

There are no pending environmental tasks or authorizations.

[11] EURO V was adopted by the EU Parliament in 2008. The directive set more stringent voluntary emission limits for extra low-emission vehicles, known as “enhanced environmentally friendly vehicles” or EEVs. (http://transportpolicy.net/index.php?title=EU:_Heavy-duty:_Emissions).

Compliance Documentation

Certifications issued by PROFEPA to Cummins engines include:[12]

- Certification Number PFPA-S11 DGIFC-VN-439/2011 for Model No. ISM 500 HP, Family 353X utilized in DINA BRT Brighter.
- Certification Number PFPA-S11 DGIFC-VN-445/2011 for Model No. ISB 280 HP, Family ISB-EX/PX6, utilized in DINA Runner, Linner, Picker, Outsider.
- Certification Number PFPA-S11 DGIFC-VN-451/2011 for Model No. ISL8.9E5400, Family ISL8.9E5, utilized in DINA Ridder.

2.2.2. Environmental Effects/Impacts

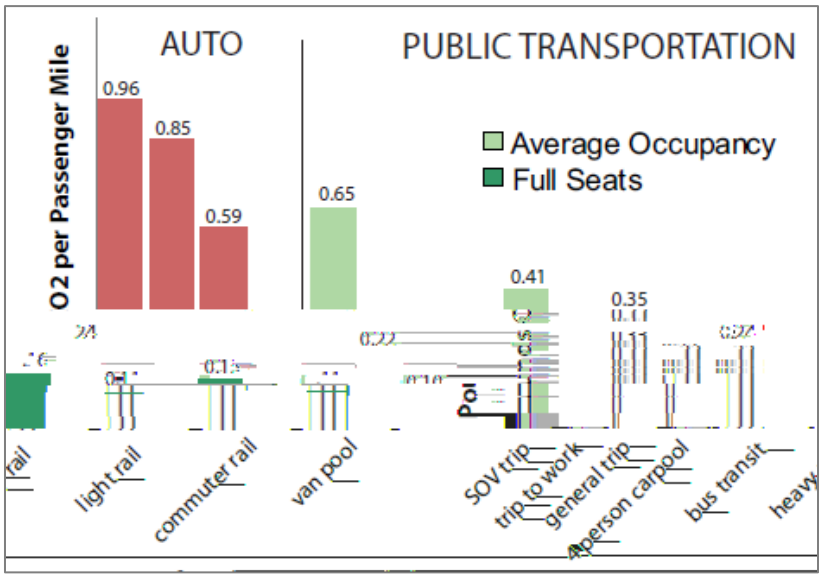
There are many reasons why residents may be interested in using public transportation, including cost savings related to fuel consumption, parking and/or maintenance; reduced stress; and increased time available for activities while riding a bus (reading, conferencing, etc.). Additional benefits to the system user and to the broader community include but are not limited to:

- A reduction in the number of cars on the road, which helps to alleviate traffic congestion, and thus helps to improve air quality and reduce noise pollution
- An increase in labor productivity by reducing travel time and out-of-pocket costs of commuters in congested areas, and
- An opportunity to reduce energy consumption, GHG and other pollutants.

According to the U.S. Department of Transportation, new buses (especially newer diesel vehicles) produce less pollution than cars per passenger mile, 0.16 pounds of CO_2 and 0.96 pounds of CO_2, respectively, by utilizing advanced technologies and higher standards.[13] Figure 4 shows estimated CO_2 emissions per passenger mile.

[12] Source: http://www.dina.com.mx/.
[13] Source: U.S. Department of Transportation, Public Transportation's Role in Responding to Climate Change, http://www.fta.dot.gov/documents/PublicTransportationsRoleInRespondingToClimateChange.pdf.

Figure 4
ESTIMATED CO_2 EMISSIONS PER PASSENGER MILE
FOR AVERAGE AND FULL OCCUPANCY



Source: U.S. Department of Transportation.

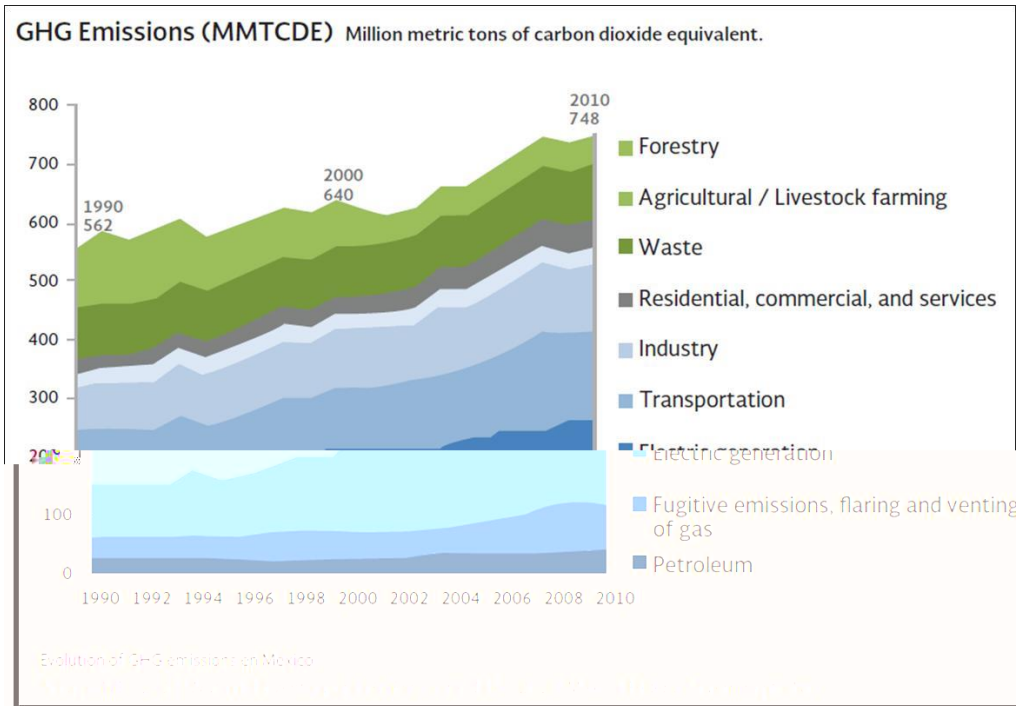
The Project is expected to improve public transportation systems by promoting access to low-emission buses, offering a comfortable, safe, fast, and accessible transportation option for the existing market, as well as achieving lower emissions related to vehicle operation and reduced urban congestion, which serves a broader environmental and human health benefit.

Existing Conditions and Project Impact – Environment

According to the National Climate Change Strategy of Mexico, GHG emissions increased 13.87% between 1990 and 2000 and 16.9% between 2000 and 2010. Mexico emitted GHG equivalent to 748 million metric tons of CO_2 (MMTCDE), representing a total increase of 33% in 20 years. In the period 2001-2010, GHG emissions registered an average annual growth rate (AAGR) of 2.6%, while the GDP grew at an average annual rate of 1.9%. Figure 5 shows the evolution of GHG emissions in Mexico and their sources. One of the emission sources that has registered the largest increase is transportation, with an AAGR of 4.1% between 1990 and 2010. This increase is mainly due to urbanization in Mexico during this period and the rapid growth of the vehicle fleet (with an AAGR of 6.3% between 2004 and 2009). The transportation sector has been associated with nearly 30% of total CO_2 equivalent emissions in Mexico.[14]

[14] Source: National Climate Change Strategy, 10-20-40 Vision.

Figure 5
EVOLUTION OF GHG EMISSIONS IN MEXICO



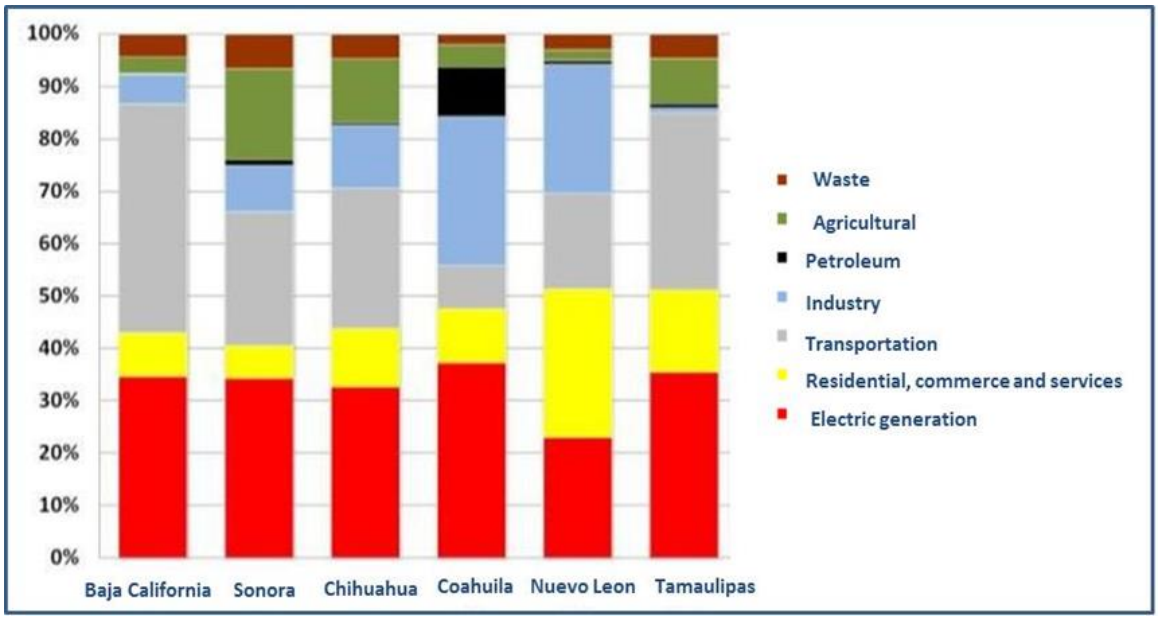
Source: National Climate Change Strategy, 10-20-40 Vision.

According to the 2008 National Emissions Inventory of Mexico (INEM), urban buses nationwide emitted 0.3% of mobile sources of total CO, 3.2% of NOx, and 0.42% of HC. The emissions of urban buses in the six Mexican border states contributed 0.2% of CO from mobile sources, 3.6% of NOx, and 0.31% of HC.[15]

Regarding GHG emissions, in 2005, the six northern border states of Mexico emitted a total of 141.3 MMTCDE or 21.7% of national emissions as reported in the border state climate change action plans performed by BECC. Figure 6 shows the main sources of GHG emissions in the six northern border states of Mexico. [16]

[15] Mexican National Emissions Inventory Subsystem, 2008.
[16] Mexican National Emissions Inventory Subsystem, 2005, http://sinea.semarnat.gob.mx/sinea.php?.

Figure 6
EVOLUTION OF GHG EMISSIONS IN MEXICO



Source: BECC, *Border States Climate Change Action Plans.*

As indicated in the emissions inventory chart, the transportation sector has been a major contributor to GHG in the border region. As part of their climate action planning based on these inventories, the states of Baja California, Sonora and Coahuila have identified new public policy options and several potential projects to support emission reductions in the transportation and urban development sectors.

As shown in Table 8, the use of new diesel vehicles that comply with EPA 2004 standards, will lower NOx and HC emissions by approximately 50% and will achieve nearly 24% lower CO_2 emissions. In the case of natural gas-fueled vehicles, the criteria pollutant emissions are nearly eliminated, which helps improve the air quality of the community and reduce risks to human health.

Table 8
EMISSION FACTORS FOR VEHICLE TECHNOLOGIES

Technology	Fuel	Criteria Pollutant Emission Factor* (g/mile)		GHG** (g/mile)
		NOx	HC	CO_2
EPA 1998	Diesel	14.88	0.61	1,617.60
EPA 2004	Diesel	8.84	0.36	1,579.20
EPA 2013	Natural gas	0.80	0.19	1,320.00

* Source: California Environmental Protection Agency, Air Resources Board, *Methods to Find the Cost-Effectiveness of Funding Air Quality Projects.*
** Source: Intergovernmental Panel on Climate Change (IPCC).

Project outcomes for the proposed Project will be measured using the same baseline and methodology as the Pilot Program. Since existing public transportation fleets in most urban areas in the Mexican border region generally consist of vehicles that meet EPA 1998 technology standards, emission reductions are calculated based on the displacement of those vehicles with the low-emission vehicles offered through the Bus Program, using the factors provided in Table 8.

Based on this methodology, the estimated environmental benefits deriving from the acquisition of the first 58 vehicles—33 diesel buses and 25 CNG buses—under the Pilot Program, include the reduction of approximately 622.1 metric tons/year of CO_2, 38.9 metric tons/year of NOx and 1.3 metric tons/year of HC.[17] Given that 25 of the first 58 vehicles were CNG units, demand for this type of bus is expected to continue in this program, in which case the emission displacement results will be significantly higher for criteria pollutants per each unit sold. Furthermore, the Sponsor has indicated that in the near future, a complimentary project related to the construction of natural gas supply facilities for CNG vehicles may be submitted, which would further boost demand for these low-emission vehicles.

There is no way of knowing how many diesel or CNG vehicles will be financed under the Bus Program, although it is likely that more diesel units will be purchased due to the vast availability of the ULSD fuel source in the border region compared to compressed natural gas, however it is expected that as CNG fuel becomes available more natural gas vehicles may be acquired. Emission reductions will depend on the quantity and mix of ULSD and CNG units financed and will be calculated and reported at close out, based on the methodology described above.[18]

The results measurement process will document the actual vehicles financed through the Bus Program and calculate the displaced emissions on that basis. As with the Pilot Project, the Sponsor will collect and submit information to NADB related to each vehicle financed, including the type of vehicle sold, the location where it will be used and whether the vehicle will replace or augment the existing fleet.

Mitigation of Risks

The following potential risks related to Project implementation have been identified:

- Additional emissions will be generated by the introduction of a new vehicle.
- The addition of new buses may oversaturate the fleet and affect the efficiencies of the PT system.
- An existing PT vehicle replaced by a new bus will require proper disposal.

Based on information presented in the public transportation profile, the growth rate of personal vehicles exceeds the population growth rate in several urban areas in the border region. The

[17] The emission reduction was calculated considering the displacement of existing EPA 1998 technology vehicles with 33 diesel buses (EPA 2004) and 25 CNG buses (EPA 2013).

[18] Since new vehicles under the Bus Program must comply, at a minimum, with EPA 2004 emission standards, an initial target of 250 diesel buses with EPA 2004 technology would be expected to generate environmental benefits associated with the displacement of an estimated 479.6 metric tons/year CO2, 75.0 metric tons/year of NOx and 3.0 metric tons/year of HC.

Project will help to address existing demand for mobility, with new buses that produce less pollution than cars per passenger mile by utilizing advanced technologies and higher standards. Additionally, there is a growing demand for the expansion, improvement or renovation of existing PT systems. Without facilitating access to new vehicles, the demand will be met by the existing fleet or personal vehicles, which emit greater quantities of harmful emissions. The use of new low-emission technology buses will mitigate overuse of aging and less efficient PT vehicles and provide a safe and comfortable option to existing PT users.

Since existing regulations limit the number of licenses and/or the allowable age of vehicles used for PT services, it is likely that new low-emission buses will be purchased to replace less efficient vehicles rather than to expand existing fleets. Older less efficient vehicles that are discontinued in the PT fleet will require proper disposal or components of the vehicles may be recycled and sold as spare parts. The used vehicle, its parts and associated liquid waste is classified as special waste, which is regulated for proper disposal under the General Law for Waste Prevention and Management, and implemented and enforced by the states.

Natural Resource Conservation

The Project will be implemented within existing urban areas that have been previously impacted; therefore, it is not expected that the Project will have a negative impact on natural resources.

The higher-efficiency vehicles supported by the Project will use less fuel and oil, decreasing the demand on fossil-fuel resources. Additionally, the improved option for public transportation is expected to increase the general efficiency of urban mobility, resulting in improved air quality and lower GHG emissions.

No Action Alternative

The proposed EPA 2004 technology for the Project is the cleanest technology available in Mexico for diesel engines and is cleaner than the technologies being used for current public transportation systems in the border area. The technology commonly used in the border area is EPA 1998 with outdated emission control systems. The Project provides an opportunity to successfully facilitate the use of cleaner technologies for the public transportation sector. A lack of viable financing options for purchasing these vehicles may delay or inhibit the renovation of the current PT fleet and increase demand for less efficient means of transportation.

Existing Conditions and Project Impact – Health

Diesel and gasoline motor vehicles are a major contributor to air pollution in large cities. It is estimated that 40% of the urban population is exposed to air pollution.[19] Children, the elderly and the infirm are the most affected by this contamination.[20] Pollution is estimated to cause as many deaths per year as traffic accidents.

[19] Source: *Instituto Nacional de la Salud Pública* (National Health Institute), 2004.
[20] Source: World Health Organization, 2002.

The International Agency for Research on Cancer (IARC), which is part of the World Health Organization (WHO), has classified diesel engine exhaust from older technologies as carcinogenic to humans, based on sufficient evidence that exposure to criteria pollutants is associated with an increased risk for lung cancer. According to the American Cancer Society, diesel exhaust is also believed to play a role in other health problems, such as eye irritation, headaches, asthma and other respiratory diseases, heart disease, and possibly immune system problems. [21]

Like all fuel-burning equipment, diesel engines produce NOx and HC, which form ground-level ozone, a major component of smog in cities, and have been linked to respiratory illness and other health problems, including:

- Decreases in lung function, resulting in difficulty breathing and shortness of breath.
- Respiratory symptoms, including bronchitis, aggravated coughing, and chest pain.
- Increased incidence/severity of respiratory problems (asthma).
- Chronic inflammation and irreversible structural changes in the lungs.

Additionally, sulfur content in diesel engine emissions is associated with health risks, such as: increased risk for lung and bladder cancer; eye irritation; headaches, asthma and other lung diseases; as well as heart disease, and possibly immune system problems.[22]

Because of increasing environmental impacts and environmental health concerns over the past two decades, tighter emission standards for both diesel and gasoline engines have been implemented in North America, Europe and elsewhere. These standards have also required other changes, such as marked decreases in sulfur content in fuels, changes in engine design to burn diesel fuel more efficiently and reductions in emissions through exhaust control technology.

Due to the proximity of Mexico to the United States, its northern border cities have access to ULSD fuel and natural gas.[23] The availability of these fuels, along with the use of new low-emission buses, can help reduce the harmful emissions linked to the health risks described above.

Transboundary Effects

No significant transboundary impacts or negative effects have been identified and none are anticipated as a result of the development of the Project. Emissions from diesel engines are a significant source of air pollutants in the border region. In order to address the threat posed by diesel emissions, the Good Neighbor Environmental Board (GNEB), a U.S. federal advisory panel on U.S.-Mexico border issues, recommended in its 2006 annual report that the U.S. and Mexico work collaboratively to reduce emissions from diesel trucks, buses, municipal and private fleets,

[21] Source: American Cancer Society http://www.cancer.org/cancer/cancercauses/othercarcinogens/pollution/diesel-exhaust.
[22] Source: Agency for Toxic Substances & Disease Registry, Toxic Substances portal – Sulfur Dioxide, http://www.atsdr.cdc.gov/phs/phs.asp?id=251&tid=46.
[23] Source: Mexican Ministry of Energy, *Prospectiva de Petroliferos 2012-2026* (2012-2026 Petroleum Prospects).

and passenger vehicles.[24] The Project supports the achievement of this recommendation and a beneficial environmental effect is anticipated. The Project will also aid in addressing other environmental concerns related to GHG and climate change targeted by regional and international agendas.

Other Local Benefits

The Project is expected to generate permanent and temporary jobs in the border region from manufacturing the motors and operating the buses. Cummins, which designs, manufactures, distributes and services engines and related technologies worldwide, also has several plants on the Mexican northern border.

In addition to the economic benefits of employment, the local communities where the vehicles are purchased would benefit from the renewed public transportation fleet. The renewed fleet SDB,b a -hi

to $500 million pesos to Mercader for the funding the Bus Program described herein and under the same terms and conditions provided for the Pilot Program.

3. PUBLIC ACCESS TO INFORMATION

3.1. PUBLIC CONSULTATION

BECC released the draft project certification and financing proposal for a 30-day public comment period beginning July 6, 2016. The following Project documentation is available upon request:

- Certification and Financing Proposal for the Border-wide Public Transportation Improvement Program in Mexico, approved on June 24, 2014.
- *Hacia un Modelo de Transporte Sustentable para las Ciudades Mexicanas* (Moving toward a Sustainable Transport Model for Mexican Cities), Centro Mario Molina.
- List of applicable transportation regulations in the Mexican northern border states.
- *Diagnóstico Preliminar sobre Transporte Urbano de Pasajeros y Emisión de Contaminantes al Medio Ambiente en Siete Ciudades de la Región Fronteriza de México* (Peliminary Needs Assessment of Urban Public Transportation and Pollution Emissions in Seven Mexican Border Cities), BECC, May 2012.
- PROFEPA Certification Number PFPA-S11 DGIFC-VN-439/2011 for Model No. ISM 500 HP, Family 353X, utilized in DINA BRT Brighter.
- PROFEPA Certification Number PFPA-S11 DGIFC-VN-445/2011 for Model No. ISB 280 HP, Family ISB-EX/PX6, utilized in DINA Runner, Linner, Picker, Outsider.
- PROFEPA Certification Number PFPA-S11 DGIFC-VN-451/2011 for Model No. ISL8.9E5400, Family ISL8.9E5, utilized in DINA Ridder.

The public comment period ended on August 5, 2016, with no comments received.

.

3.2. OUTREACH ACTIVITIES

BECC conducted a media search to identify public opinion regarding public transportation conditions or needs.[25] The media articles described topics such as the approved Pilot Program and current conditions and future plans of the public transportation systems in the cities within the Project scope. For example, some articles mentioned DINA natural gas and diesel bus trials (Tijuana); the acquisition of new buses for the current transportation systems in Juarez and Hermosillo; and DINA sales activities in Tijuana, Hermosillo and Cd. Juarez. Examples of these articles can be found at the following links:

[25] A list of referenced documents is available upon request.

- *El Mexicano* (Juarez, June 17, 2016) – *"Financia la Cocef 25 unidades Ecovivebús - A TRAVÉS DEL BANCO DE DESARROLLO"* (BECC finances 25 *Ecovivebus* bus units through the development bank*),* http://www.oem.com.mx/elmexicano/notas/n4201231.htm

- *Diario* (Juarez, June 11, 2016) – *"Sacan viejos camiones del ViveBús"* (Vivebus disposes of old buses*),* http://diario.mx/Local/2016-06-10_1584b2ec/sacan-viejos-camiones-del-vivebus/

- *Magazine* (Tijuana, February 12, 2016) – *"Muestra DINA unidades Linner and Ridder en Tijuana"* (DINA shows Linner and Ridder units in Tijuana) http://revistamagazzine.com/articulo/muestra-dina-unidades-linner-y-ridder-en-tijuana

- *El Imparcial* (Hermosillo, February 2, 2016) – *"Probarán hoy camión que funciona con gas natural comprimido"* (Compressed natural gas bus to be tested today) http://www.elimparcial.com/EdicionEnLinea/Notas/Noticias/08022016/1052230-Probaran-hoy-camion-que-funciona-con-gas-natural-comprimido.html

In addition, information about DINA is available on its webpage: http://www.dina.com.mx/index_eng.html.

The Project Sponsor has demonstrated its willingness to continue supporting efforts to improve public transport systems and is working to meet technological emission control requirements, which support the objectives of the Project.