

Technical Cooperation Document

I. Basic Information for TC

▪ Country/Region:	Regional
▪ TC Name:	Accelerating NDC implementation. Unlocking clean buses in LAC
▪ TC Number:	RG-T3078
▪ Team Leader/Members:	Claudio Alatorre (CSD/CCS), team Leader; Carlos Mojica (INE/TSP) alternate team leader; Ernesto Monter, Natalia Sanz, Juan Manuel Leaño, Julieta Abad, Karisa Ribeiro, Rafael Acevedo-Daunas, Elias Rubinstein da Silva, Mauricio Bayona Pulido (INE/TSP); Maria Alexandra Plana Marti (INE/ENE); Benoit Lefevre, Gloria Visconti, Giovanni Frisari, Sandra Lopez, Juan Gomez, Carlos Guiza (CSD/CCS); Ophelie Chevalier (CSD/HUD); Maria Netto, Alexander Vasa (IFD/CMF); Matilde Neret (SCL/SPH); Felipe Ezquerra, Elizabeth Robberechts (IIC/INO-IEN); Hilen Meirovich, Matthieu Pegon, Ricardo De Vecchi, Iván Corbacho (IIC/INO-NFP); Paula Castillo, Enrique Rebolledo (IIC/DSP-DCO); Margie-Lys Jaime Ramirez, Liza Lutz (LEG/SGO); Maria T. Soto and Ileana Pinto (VPC/FMP).
▪ Taxonomy:	Client support
▪ Date of TC Abstract authorization:	September 27 th , 2017
▪ Beneficiary:	Regional: ¹ Colombia (Bogota, Medellin); Paraguay (Asunción); Argentina (Buenos Aires); Brazil (Sao Paulo); Costa Rica (San Jose)
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	NDC Pipeline Accelerator Multi Donor Trust Fund (ACL); OC Strategic Development Program for Infrastructure (INF); OC Strategic Development Program for Sustainability (SUS)
▪ IDB Funding Requested:	US\$1,200,000
▪ Local counterpart funding, if any:	N/A
▪ Disbursement period (Execution):	36 months (execution period: 36 months)
▪ Types of consultants:	Firms and individuals
▪ Prepared by Unit:	CSD/CCS
▪ Unit of Disbursement Responsibility:	CSD
▪ TC Included in Country Strategy:	No
▪ TC included in CPD:	No
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	productivity and innovation; and climate change and environmental sustainability

II. Objective and Justification

- 2.1 The objectives of this Technical Cooperation (TC) are: (i) mitigate the climate change impacts of the transport sector in Latin American and Caribbean (LAC) cities through the replacement of internal combustion engine (ICE) buses with low-carbon hybrid or electric alternatives; and (ii) improve the quality of public transportation by strengthening the capacity of local agencies to implement efficient and financially sustainable transit systems. Its specific objectives are: (i) reduce barriers for private

¹ This is a pre-selection based on public information and BID knowledge. The TC will work upon request and this list can be modified during the execution of the operation.

bus operators to adopt and deploy cleaner technology buses; (ii) reduce greenhouse gas emissions, local pollution, transportation operating costs and noise levels; and (iii) develop capacities to operate and maintain clean technology vehicles.

- 2.2 As part of the Paris Climate Agreement, countries pledged to implement specific actions to meet the global objectives. These actions are framed as Nationally Determined Contributions (NDCs). Improving the fuel and vehicle efficiency of the transport system is stated as a key action in most of the NDCs² in LAC. This is a line of action that brings co-benefits in other areas besides the environment, such as mitigating urban congestion and improving public health.
- 2.3 Clean technology [buses are already deployed at scale](#) in the USA, Europe and China. The technologies are now mature and alternative business models have been successfully implemented. According to the Zero Emission Urban Bus System, there are about 173.000 hybrid or electric buses operating in the world. Despite these good experiences worldwide, the political support³ for decarbonizing bus systems and the large potential market volume, the uptake of clean bus options has been limited in LAC. Bogota, Medellin, Asuncion, Buenos Aires, Mexico City, Sao Paulo, San Jose, San Salvador, Nassau, Bridgetown or Santiago are examples of LAC cities which will be renewing their fleet in the next 3 to 5 years. The window of opportunity is open to explore innovative business models and financial incentives to increase the penetration of clean technologies in these cities. Failure to embed clean technologies could lock-in cities with high-emission buses for the lifespan of these vehicles (10-12 years).
- 2.4 Argentina, Brazil, Colombia, Costa Rica, and Paraguay have expressed their interest in participating in the program.
- 2.5 From an economic perspective, a bus fleet represents up to 75% of an operator's assets.⁴ The higher costs⁵ of hybrid and electric buses can be offset by their long-term benefits in terms of lower operating costs and their co-benefits. Financial viability, from the operator's perspective, depends on variables such as the farebox recovery ratio, availability of operational subsidies, financial costs, fuel and electricity prices, etc. From the city viewpoint, the viability to incorporate new technologies relies in its fiscal capacity, considering the need to recover higher upfront costs. Economic, financial and fiscal feasibility are vital to ensure success of clean technology bus adoption.
- 2.6 Although many challenges to switch to clean buses have been overcome in some cities, the current literature^{6,7} shows there are several market barriers that still affect such transition, namely: (i) direct capital expenditures: hybrid and electric buses represent a higher initial cost to bus operating companies compared to diesel buses; (ii) lack of access to long-term finance:⁸ concessionaries and technology providers do not have access to the required long-term capital to finance investments in this type of

² For instance, GHG emissions reduction and energy efficiency in the transport sector is stated in NDCs from these countries: Argentina, Brazil, Colombia, Mexico, Paraguay and Peru.

³ In 2015, 26 mayors signed the C40 Clean Bus Declaration sending clear signals to the market about their commitment to transition fleets to low emissions buses. This included 18 of the biggest LAC cities.

⁴ Díaz, R. 2015. *Oportunidades de financiamiento a operadores privados de transporte público en LAC*.

⁵ Grütter, J. 2014. *Real World Performance of Hybrid and Electric Buses*. LAWDP. 2016. EV Bus Charging Utility Opportunities. Papson, A. 2016. Ecoliner electric bus. Overview and lessons learned. Presented at the *Advanced Clean Transit Technology Symposium*. Sacramento, CA. f

⁶ Sims, R., R. Schaeffer, F. Creutzig, X. Cruz-Núñez, M. D'agosto, D. Dimitriu, ... O. Lah. 2014. Chapter 8: transport. Presented at the *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom: Cambridge University Press.

⁷ Carroll, S. 2015. *Green Fleet Technology Study for Public Transport*. Cenex.

⁸ Lajunen, A. 2014. Energy consumption and cost-benefit analysis of hybrid and electric city buses. *Transportation Research Part C: Emerging Technologies*, 38, 1–15.

projects; (iii) limited institutional coordination to fix financial disincentives:⁹ while most clean technology vehicles are produced elsewhere, there are tariffs and taxes to protect local vehicle manufacturing and assembly industries, fossil fuel subsidies and favorable financing for ICE buses; (iv) unfavorable regulatory and procurement frameworks and limited institutional capacity to adjust:¹⁰ governments have limited capacity to manage, structure and negotiate the necessary regulatory adjustments, including: (a) certification of new types of vehicles; (b) application of new revenue models for concessions; and (c) different age limits for buses with different technologies; (v) scale economies and transaction costs: in a context where competing operators are vying for portions of the transit market, transaction costs can become a major disincentive for first movers; and (vi) lack of knowledge and capacity leading to high perceived risks:¹¹ These factors generate uncertainty about performance and characteristics, which augments the risk perception.

- 2.7 These barriers signal that the incorporation of clean technologies is unlikely, unless a combination of business model analyses, regulatory adjustments, technical assistance and financial incentives are enacted to ensure they are viable for private investors and sustainable from a fiscal standpoint.
- 2.8 This TC is the first part of a wider program that brings together a suite of IDB Group services (technical assistance and financing) under a single-engagement aimed at creating viable markets for clean buses in each client country. This operation will support pre-investment activities, from project preparation to procurement process and tender award. The second part of the program, which will support the financing of clean buses, responds to the financing needs that will be covered by the set of financing solutions the IDB Group can offer, complemented by the mobilization of concessional climate finance (from the Green Climate Fund or other climate funds).
- 2.9 This “one-stop-shop” program aims at increasing the likelihood of adopting clean buses in client cities looking to improve the greenhouse gas footprint of their transport systems. The successful implementation of this program across countries will create a new regional market for clean buses and increase the likelihood of the financial sector participation. The additionality of this TC will encompass: (i) building knowledge and capacity in public and private stakeholders; (ii) addressing institutional coordination and capacity barriers; and (iii) helping reduce high transaction costs.
- 2.10 This TC builds upon previous work the IDB has done through the [testing program](#) with the Clinton Foundation and C40 and the results of the clean bus financing program in Bogota (a Clean Technology Fund financed [IDB credit line operation](#) with [Bancoldex](#)).
- 2.11 This operation is consistent with the Update to the Institutional Strategy 2010-2020 (AB-3008) and is aligned with the development challenge of productivity and innovation as it improves availability of and access to information, knowledge and efficient technologies. It is also aligned with the cross-cutting theme of climate change as it will foster sustainable, efficient and low-carbon public transportation. Likewise, the operation is aligned with the Transportation Sectoral Framework Document (SFD) (GN-2740-7) and its focus on “sustainable urban transportation” and the “institutional development in the transportation sector”, as well as with the Climate Change SFD as it will contribute to “make climate change considerations more central to sector actions”.

⁹ Eudy, L. 2016. U.S. Zero Emission Bus Evaluation Results & Status. Presented at the *Advanced Clean Transit Technology Symposium*. Sacramento, CA.

¹⁰ Ercan, T., and O. Tatari. 2015. A hybrid life cycle assessment of public transportation buses with alternative fuel options. *The International Journal of Life Cycle Assessment*, 20(9), 1213–1231.

¹¹ IDB. 2013. *Hybrid – Electric Bus Test Program in Latin America*. Washington, D.C.

- 2.12 This TC is aligned with the IDB Country Strategy with Colombia (2015-2018) (GN-2832) which prioritizes “raising the quality of infrastructure and urban development and reducing transaction cost in the economy”. In addition, this TC will build upon the results of a previous clean bus financing program in Bogota (3003/TC-CO). The TC is aligned with the IDB Country Strategy with Paraguay (2014-2018) (GN-2769) as it gives priority to transportation and connectivity, energy and productive development, in support of the objective of reducing extreme poverty. In addition, the operation builds upon a TC being executed by the Transport Division (TSP) in the country (ATC/ME-15900-PR). The operation is aligned with IDB Country Strategy with Costa Rica (2015-2018) (GN-2829-1) which prioritizes improvements in “productive infrastructure, efficiency and sustainability”, and builds upon TCs being executed by TSP in Costa Rica (ATN/OC-15916-CR, ATN/OC-15160-CR, ATN/OC-14954-CR). The TC is aligned with the IDB Group Country Strategy with Argentina (2016-2019) (GN-2870-1), as it will support “business climate improvement” and contribute to “strengthening of private sector integration and insertion into value chains”. In addition, the operation builds upon operations 4265/OC-AR and 3183A/OC-AR-1 executed by TSP in Argentina. The TC is aligned with the IDB Country Strategy with Brazil (2016-2018) (GN-2850), which prioritizes improving public services and strengthening government institutions as well as economic development of metropolitan areas. In addition, the TC builds upon operations BR-L1444, BR-L1445 and GRT/FM-14717-BR executed by TSP in Brazil.
- 2.13 This TC is aligned with strategic areas and eligibility criteria established for: (i) the NDC Pipeline Accelerator Multi-Donor Trust Fund (ACL);¹² (ii) the Ordinary Capital Strategic Development Program for Infrastructure;¹³ and (iii) the Ordinary Capital Strategic Development Program for Sustainability.¹⁴
- 2.14 The operation is a demand-driven program that will allocate resources to specific projects upon request and comply with relevant eligibility criteria. Initially, potential opportunities will be assessed in at least six countries/cities. Then, pre-investment support will be provided to at least three countries (selected from the previous six; see paragraph 4.2 for selection criteria) to develop and implement business models that facilitate the integration of clean buses in the fleet renewal of a major municipality. These rely at the stages of bus service project preparation; bid preparation; and tendering process and awards. Moreover, the TC will also finance capacity building for project execution.

III. Description of Activities/Components and Budget

- 3.1 **Component 1. Engagement preparation (US\$75,000).** This TC will fund a “market assessment of technological alternatives” for clean technology buses. This market assessment will take the form of a report that will be used to engage local stakeholders. It will be based on the existing literature, interviews and analysis of case studies where

¹² The ACL fund intends to support IDB member countries with the preparation of investments to meet their sustainable development objectives, as well as mobilize resources to cover costs associated with preparing and managing sustainable projects.

¹³ In particular with the following objectives defined in the Ordinary Capital Strategic Development Program for Infrastructure: (i) the improvement of the quality of infrastructure projects in LAC; (ii) the promotion of investments in infrastructure and the enhancement of its performance, quality, and sustainability the services it provides; and (iii) the improvement in the design and monitoring of public policies and the transmission of lessons learned in the infrastructure sector.

¹⁴ In particular with the following objectives defined in the Ordinary Capital Strategic Development Program for Sustainability: (i) expand the knowledge base on climate change mitigation, adaptation, and sustainable energy geared towards leveraging climate investment; and (ii) support municipal governments to prepare for challenges related to rapid urban growth in a sustainable manner.

clean technology buses have been successfully adopted. A special focus will be given to the business models mobilized to ensure financial and fiscal sustainability.

- 3.2 This TC will fund in at least 6 countries/cities assessments of the potential opportunities through an engagement with transport authorities at the national and local levels, bus operators, bus providers and local financiers. This assessment will lead to the presentation of a thorough analysis regarding barriers and opportunities, and will ultimately design a strategy for an urban transportation transformation with a focus on fleet renewal with clean technologies. Based on this assessment, resources from Component 2 could be utilized to support further steps leading to the procurement process and tender award. This stage is expected to take no more than 3 months.
- 3.3 Component 1 deliverables include –for each participating city: (i) a kick-off meeting or workshop in each participating city; (ii) a report with a diagnosis of the current situation including: policy landscape analysis, opportunities assessment, identification of stakeholders and their responsibilities and capabilities (authorities, operators, manufacturers, etc.), assessment of funding and financial situation, assessment of existing technology alternatives, barriers for clean buses adoption and draft strategy for subsequent steps; and (iii) the establishment of a focal group convening key stakeholders and endorsed by decision-makers.
- 3.4 **Component 2. Pre-investment support (US\$1,125,000).** Once a project is agreed upon and identified, this component will finance preparatory activities, studies and provide technical support prior to the implementation of the new bus fleet. This component is expected to take between 12 to 24 months for each city, depending on the stage where the IDB support begins. This component will offer a package of support from project preparation to procurement. Clients may need the full package (i.e. all the Sub-Components 2.1, 2.2 and 2.3) or only part of it. This TC will work upon request to address the specific needs of the countries/clients.
- 3.5 **Sub-Component 2.1. Bus service project preparation.** This component is intended to support the project preparation. Its goals entail building capacity in public and private stakeholders and identifying (alternative) viable operational models¹⁵ for clean buses adoption. Deliverables for this sub-component include –for each participating city: (i) a report and a workshop to present technical studies that include feasibility assessments, operational modelling, infrastructure requirements, vehicle technical specifications, IT requirements, cost-benefit analyses and potential GHG emissions reduction, among others; (ii) a report and a workshop to facilitate sectoral dialogue in order to select a viable business model and a sustainable financing structure, among a set of viable alternatives including Public-Private partnerships, transport operation concessions and public-sector operations; (iii) a report and a workshop to present legal, regulatory, financial and target sector needs analyses (project financial cashflow, impact on operators' cashflow, fiscal impact and operational subsidy requirements, vehicle regulations and import requirements, and tariff assessments among others); (iv) a proposal to mobilize concessional climate finance resources to support the financing of the investment; and (v) a report for the design of a pilot test –if required by the client.
- 3.6 **Sub-component 2.2. Bid preparation.** This component will support the bid preparation. The goal will be to reduce transaction costs associated to the complexities of preparing a bid for innovative clean technologies, and to build capacity and standards for further scaling up. Deliverables for this sub-component include –for each participating city: (i) legal and regulatory support for the preparation of the project

¹⁵ The operational model will probably include planning, design, governance scheme, funding, financing, delivery and management mechanism.

documentation; (ii) support for the preparation of the final tender documents (bid package); (iii) support for the financing, insurance and credit enhancement; and (iv) project “road shows”, consultations and dissemination activities.

- 3.7 **Sub-component 2.3. Procurement process and tender award.** This component will support the procurement process and tender award.¹⁶ The deliverables for each participating city are: (i) support to the process of requesting qualifications, the bidder consultations and the request for proposals; and (ii) support to the review of proposals and the signature/ratification of project documents.
- 3.8 The total estimated cost of the TC is US\$1,200,000 as shown below in the indicative budget table.

Indicative Budget (US\$)¹⁷

Component/Description	ACL	INF	SUS	Total
1. Engagement preparation	0	0	75,000	75,000
2.1 Project preparation	275,000	220,000	105,000	600,000
2.2 Bid Preparation	300,000	0	0	300,000
2.3 Procurement process & tender award	225,000	0	0	225,000
Total	800,000	220,000	180,000	1,200,000

IV. Executing agency and execution structure

- 4.1 Given the regional scope of the operations’ activities, the Climate Change (CCS) and Transport (TSP) Divisions of the IDB will be the units of basic responsibility for the execution of this TC. CCS and TSP have substantial experience in providing technical assistance and knowledge to cities, particularly in the areas of urban public transport, low-carbon technology and sustainability. The IDB will hire the consultancies relevant for the execution of the operation in accordance with its procedures. Execution will not start in pre-identified or future participating countries without: (i) the non-objection of the Bank’s liaison office in the country concerned; and (ii) a request for the IDB to be the executing agency in such country.
- 4.2 The execution structure is that of a demand-driven program. Specific resources of the TC will be allocated upon request and compliance with the following eligibility criteria: (i) demonstration project: capital city and/or city with more than 1,5 Million inhabitants; (ii) eligible projects: public or private initiatives to renew fleets of public transportation vehicles; these include transit operational concessions, bus rapid transit projects, sector reforms, among others; (iii) size: evidence that the country/city is willing to take at least 10% of the new fleet as clean buses (hybrid and/or electric). The higher this percentage, the better; (iv) geographical diversity: a maximum of two cities per country for Component 1, and a maximum of one city per country for Component 2; (v) commitment: letter of request from the interested country, and, if applicable, a letter of interest from the municipality, the transport authority, mobility regulator and/or bus operator associations that are leading the fleet renewal project; (vi) alignment with country/city strategies: substantial evidence of the alignment and commitment of the project with ongoing public policies in the national/local government program; (vii) alignment of the project with the corresponding IDB country strategy; and

¹⁶ If counterparties are interested and feasible, sub-component 2.3 will explore the possibility to carry out the bidding process jointly for various countries. This would allow for greater volume, bargaining power, and translate into lower costs for governments. It would also represent an innovative process in the region.

¹⁷ Approximately three percent of the budget (of the three-year contribution) will be expected to be used for trips to LAC client institutions to support the implementation of the components of this TC. Travel of IDB staff with funds from this TC will be allowed if it is deemed essential for the correct development of the project. This will not substitute administrative budget for regular supervision travel. (GN-2470-2)

(viii) technological diversity: if not compulsory, the preference will be to work with countries/cities interested in adopting electric and/or hybrid buses. New beneficiaries, in addition to those initially identified, may join the program if their proposed projects meet the above-mentioned eligibility criteria during the execution of this TC, and subject to the corresponding approval of the Bank's Administration.

V. Project risks and issues

- 5.1 Inter-sectoral coordination: Introduction of clean buses in renewal schemes of bus fleet requires coordination between public administrations and dialogue between private actors and public agencies. Through Components 1 and 2, the TC will pay particular attention to the development of the necessary institutional capacity, as well as the support to the sectoral dialogue.
- 5.2 Sustained financial support: The higher capital costs of clean technology buses will require a dedicated financing source to ensure sustainable results. If either via subsidies, fare collection or any other source –including long-term concessional climate finance, this issue should be raised during the early stages of project preparation.
- 5.3 Exposure of the financial sector to the transport sector. The debt capacity of concessionaries and the exposure of the finance sector to the transport sector further diminishes the ability to invest in these projects, absent adequate financing conditions, such as ancillary guarantees. Component 2 will facilitate sectoral dialogues to select: (i) a viable business model; and (ii) a sustainable financing structure, among a set of viable alternatives.
- 5.4 Technological and operational risks: Even though the technologies have been proven in other countries, some vehicles might require adaptations to local conditions. Also, most operators are not trained and lack the operational knowledge. Component 2 will actively address this through capacity building activities with bus manufacturers, transit agencies and bus operators, as well as the multi-stakeholder dialogue.
- 5.5 The proposed TC requires the participation of different stakeholders from both public and private sectors. Ensuring a smooth execution will require an active effort by the project team to guarantee an adequate coordination among stakeholders. To avoid risks regarding the quality of the work developed by participating consultants, the project team will supervise the products by continuously reviewing, monitoring and evaluating during the preparation and final delivery stages of the requested products.

VI. Exceptions to Bank Policy

- 6.1 There are no exceptions to the Bank policies regarding this operation.

VII. Environmental and Social Strategy

- 7.1 Given the nature of this TC, negative environmental and social impacts are not foreseen. This TC has been classified as Category "C" per the Environment and Safeguards Compliance Policy of the IDB (OP-703) (see the [Safeguard Policy Filter](#) and the [Safeguards Screening Form](#)).

VIII. Required Annexes

- Annex I** [Letter of Request](#)
- Annex II** [Results Matrix](#)
- Annex III** [Terms of Reference](#)
- Annex IV** [Procurement Plan](#)