

July 2, 2013

**Response of IDB on Approval by Mail: Colombia: Technological  
Transformation Program for Bogota's Integrated Public Transport System  
(IDB) - CTF**

Dear Zhihong

Please find enclosed our responses on the Bogota project.

Regards

Claudio Alatorre

# Responses to Questions and Comments from the United Kingdom and the World Resources Institute on the “CTF-IDB Technological Transformation Program for Bogota’s Integrated Public Transport System” Proposal

Prepared by the Inter-American Development Bank (IDB)

2 July 2013

We would like to thank the government of the United Kingdom and the World Resources Institute for the written questions and comments. Please find below our responses.

## United Kingdom’s Questions

*Q: Carbon Savings and cost effectiveness. Is it possible to clarify what the carbon savings will be? The overall amount of carbon savings seems quite high and somehow contradicts between what is stated in the CTF indicators, the results matrix and the attached report. \$18.6/t seems to be calculated correctly based on the numbers provided. Although, it is unclear how \$146/t cost effectiveness figure is calculated.*

A: The carbon savings are presented in the different formats required for the IDB and the CTF. However, all the indicators are correct in their estimation. Please find below a detailed explanation of each:

### IDB Results Matrix

The *Impact* indicators in the IDB Results Matrix (Annex 2) show the baseline yearly GHG emissions (2013) at 528,773 Ton/year and the future GHG emissions (2017) at 470,662 Ton/year. These indicators measure the GHG-reduction impact of implementing the SITP in Bogotá with the pilot clean technology bus fleet.

The *Results* indicators in the IDB Results Matrix (Annex 2) show the baseline yearly GHG emissions (2013) at 15,157 Ton/year and future GHG emissions (2017) at 8,095 Ton/year. These indicators measure the impact of implementing only the pilot clean technology bus fleet in Bogotá, in the context of the SITP.

### CTF Indicators

In the case of the CTF co-financing indicators, the estimation is shown in the “Program Fit with Investment Criteria” document. Section 2 shows a GHG emissions reduction of 2.2 Million Tons in a 24 year period (concession period). Thus, the Core Indicator of 92,308 Tons/year.

The estimation of the cost effectiveness indicator considers the costs of the project scenario (US\$ 1,100 million) minus the costs of the baseline scenario (US\$ 782 Million). Both cost scenarios were estimated in a 24 year horizon. This difference (US\$ 318 Million) is divided

by the total GHG emissions reduction (US\$ 2.2 Million Tons). Thus the cost-efficiency indicator of 143.76 US\$/Ton.

Similarly, the 18.06 US\$/Ton was estimated by dividing US\$ 40 Million, which is the total amount of CTF investment, by the total GHG emissions reduction (US\$ 2.2 Million Tons).

***Q: Additionality. It is unclear in the proposal how the pilot fleet will demonstrate the market potential and lead to the replacement of the fleets of other operators – so that the envisaged transformational impact is achieved.***

A: The operation will contribute to overcome existing barriers to incorporate clean technology buses in the SITP. These barriers include financial barriers (costs are higher) but also include knowledge barriers (no experience with the technologies). Financial barriers are likely to be lower over time as the technology matures, the price of batteries is reduced and the manufacturers develop their production, marketing and distribution networks in Colombia. Knowledge barriers will be overcome when operators acquire initial experience with the new technologies and demonstrate its benefits to the public (and to other operators). This operation is a step in the right direction towards materializing the potential market of clean technologies in Bogotá and potentially other cities that may follow its lead, as it happened in the early 2000s with Transmilenio and the BRTs.

***Q: Electric vs Hybrid. (i) Have implementation issues for electric buses been taken into consideration - given the battery technology? As we understand it - deep cycling a battery from 100% to 0% charge will limit its lifetime to about 18 months and therefore operators of electric vehicles would be subject to a regular substantial cost of battery replacement on a fairly regular basis. In comparison to properly designed hybrid buses where the battery will only cycle between about 40% and 80%. This increases battery life to about 7 years and therefore reduces costs substantially (although offset by the need to still burn some diesel). (ii) There is also no mention of the impact of electric buses on the grid.***

A: All technology risks, as the ones mentioned in this question, will be borne by the bus operator or by the bus manufacturer. For the purposes of risk assessment, nor the IDB or Bancóldex will bear any of the technological risk as the operation will provide financing to the Local Financial Institutions (commercial banks) who provide the loans to bus operators. However, the IDB is fostering the dialogue about clean technologies (hybrid and electric) and ensuring that bus operators are fully aware of all the technological risks. Manufacturers have been part of this dialogue and have been eager to contribute to mitigate the technological risks through innovative commercial proposals, such as battery lease schemes. In the end, the program will operate by demand of the bus companies, which will take the final decisions regarding any technology alternatives (hybrid or electric).

Regarding the impact of the electric buses on the grid, the electricity companies have participated in the broader dialogue of electric buses in Bogotá and have not raised major concerns regarding the grid capacity.

## World Resources Institute's Questions

*Q: The CTF funds will be used to purchase approximately 282 medium-sized, 'clean technology' passenger buses. The emissions savings presented in the CTF proposal will result from: i) a reduction in the total size of the bus fleet from 16,000 to 9,000 vehicles, ii) optimization of transit routes, iii) reduction of the average age of the fleet, and iv) technological improvements to diesel engines and bus types. Of these i) and ii) are a result of the wider SITP system design, which cannot be attributed to CTF financing. Additionally, it is unclear what the distinction is between iii) and iv), given that the average age of the fleet will fall because new buses, with improved technologies will be bought. With these corrections, a more accurate and CTF-specific reading of the GHG impact can be ascertained.*

A: The SITP was designed as a comprehensive program and thus the GHG emission reduction indicators reflect the impact of the wider design. The SITP was designed so that all the necessary investments for the project operate as expected. This includes investments in transportation infrastructure, new vehicles and other systems (i.e. fare collection, fleet management and GPS/radio communications). The SITP will not work as designed if only a few of these investments are materialized.

This CTF program is co-financing the SITP by providing concessional finance to investment in new vehicles. If the effect of the technological change is isolated, it will effectively ignore the larger effort that the city of Bogotá is undertaking to transform the current transport system, and which is described throughout the document. The team considers that the SITP is a project with transformational potential, and thus the results framework considers the broader SITP impacts (not only the technological change).

This is, actually, a standard MDB practice in urban transport projects such as BRTs. The MDB-funded public sector usually finances only the infrastructure investments while the private sector finances the vehicles and systems investments. The standard MDB practice in these projects has been to account for all the project benefits in the results frameworks, instead of isolating and focusing exclusively on the infrastructure-related benefits.

Nevertheless, the team considers that it is important to show what the expected impacts expected are at the *city* level and also the impacts at the *bus fleet* level. Therefore, the indicators in Annex 2 (Results Matrix) are presented in two tiers:

1. Impact indicators, which consider the broader city-wide impact of fully implementing the SITP (including the pilot clean-technology bus fleet).
2. Results indicators, which consider the impact of the pilot clean-technology bus fleet in the context of the SITP.

Both in the cases of the Impact indicators and the Results indicators, benefits entail the reduction in the size of the bus fleet, optimization of the transit routes, reduction of the average age of the fleet and technological improvements. Please see the comments column in the Results Matrix for a detailed explanation of each indicator.

*Q: The new buses will bring an improvement in local air quality and will contribute to a more user-friendly system, as presented in the project proposal. However the extent to which they deliver affordability and gender benefits will depend, again, on the results of the wider SITP implementation. Therefore these development impacts will depend greatly on how well the SITP as a whole designs supporting infrastructure – such as well-lit bus stations and integration into urban design – and builds capacity of relevant bus stakeholders, such as bus drivers. It should be made clear in the CTF project proposal that these impacts will come from the systemic improvements as a whole.*

A: The team agrees that affordability and gender benefits will depend on the implementation of the program. In particular, the affordability benefits will materialize if the proposed fare policy is fully implemented and sustained over time in order to ensure lower fares in comparison with the current ones (full-cost transfers). Similarly, the described gender benefits will materialize when the boarding infrastructure and systems are fully implemented. The team acknowledges that this is a complex project which requires important implementation efforts. Based on the appraisal, the team identified that the SITP has a broad support at the political and technical levels and is confident that the ongoing implementation will be completed, thus producing affordability and gender benefits.

*Q: In order to address user concerns and wishes into the transportation system, the project should be able to demonstrate to TFC members how stakeholder consultations, especially with public transport users, have taken place. While we are aware of local consultations regarding the final definition of routes, the project design has not taken into account user wishes for faster, more comfortable services. We are aware that the overall project is facing some implementation hurdles so it will be advisable that the CTF project also contribute to risk mitigation and acceleration of reforms by building stakeholder consensus through improving the way gender and user needs are considered.*

A: The SITP has been presented to user groups, transport experts, bus companies, interest groups and other major stakeholders. The design of the system has been shown in open forums, focus groups and dedicated meetings. User opinions have been incorporated in the system design and in key elements such as the SITP route definitions and the way-finding. Aspects related to the perception of public transport performance are gathered in public transport opinion surveys and household mobility surveys, which are carried out by the Secretariat of Mobility or Transmilenio S.A, both entities directly involved in the SITP design.

Faster routes will be provided in the corridors of the highest demand. These are corridors that carry sufficient passenger demand to support investments in Bus Rapid Transit infrastructure. Currently, the city has 102 km of Bus Rapid Transit, 20 of which have been inaugurated in the last 2 years, in parallel with SITP implementation. These investments require a careful process of planning and prioritization. Additional corridors have been identified as well (Av 68 and Av. Boyacá) and are planned to be implemented in the near future.

The ability of this Program to contribute to the acceleration of wider transportation reforms is rather limited due to the nature of the Borrower, which is in this case a second-tier bank

(Bancóldex). This Program will provide concessional credit directed to the incorporation of clean technology buses, and it will be disbursed depending on the demand for these buses. Bancóldex does not have the mandate or the capacity to implement the larger reforms of the SITP, which are in this case responsibility of Transmilenio S.A. The Program will, however, foster the dialogue about the incorporation of clean technologies in the SITP among the major stakeholders and contribute to overcome the knowledge barriers about hybrid and electric buses in bus operating companies.

Any large project as the SITP will face implementation hurdles; however the team is confident about the capacity of Transmilenio S.A. to fully implement the SITP due to the broad support of the SITP at the political and technical levels.