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DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

BRAZIL

CURITIBA SUSTAINABLE URBAN MOBILITY PROGRAM

(BR-L1532)

LOAN PROPOSAL

This document was prepared by the project team consisting of: Pablo Guerrero (INE/TSP), Project Team Leader; Karisa Ribeiro (TSP/CBR) and Jason Hobbs (CSD/HUD), Alternate Project Team Leaders; Elias Rubinstein (TSP/CUR); Luis Uechi, Lauramaría Pedraza, Agustina Cocha, Juliana Pimentel, and Aziz Baladi (INE/TSP); Cristina Marzo and Carolina Verissimo (LEG/SGO); José Luis de la Bastida (VPS/ESG); Karina Diaz and Mario Castañeda (FMP/CBR); Amanda Beaujon (INE/INE); Beatrice Zimmermann (SPD/SDV); and Fernando Aguiar (CSC/CBR).

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REQUIRED

1. Multiyear execution plan / annual work plan
2. Monitoring and evaluation plan
3. Environmental and social management report
4. Procurement plan

OPTIONAL

1. Project economic analysis
2. Environmental and social management plan
3. Environmental and social management framework
4. Involuntary resettlement plan
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6. Environmental and social analysis
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ABBREVIATIONS

AWP	Annual work plan
BIM	Building information modeling
BRT	Bus rapid transit
EIRR	Economic internal rate of return
ESMF	Environmental and social management framework
ESMR	Environmental and social management report
GHG	Greenhouse gas
IBGE	Instituto Brasileiro de Geografia e Estatística [Brazilian Institute of Geography and Statistics]
ICAP	Institutional Capacity Assessment Platform
ICB	International competitive bidding
Inter2	Linha Direta Interbairros 2 [Inter-Neighborhood Direct Route 2]
IPPUC	Instituto de Pesquisa e Planejamento Urbano de Curitiba [Curitiba Research and Urban Planning Institute]
MHDI	Municipal human development index
NCB	National competitive bidding
PEP	Multiyear execution plan
PlanMob	Plano de Mobilidade Urbana e Transporte Integrado [Urban Mobility and Integrated Transportation Plan]
QCBS	Quality-and cost-based selection
RIT	Rede Integrada de Transporte [Integrated Transport Network]
RMC	Região Metropolitana de Curitiba [Metropolitan Region of Curitiba]
SMF	Secretaria Municipal de Planejamento, Finanças e Orçamento [Municipal Planning, Finance, and Budget Department]
SMOP	Secretaria Municipal de Obras Públicas [Municipal Public Works Department]
TNC	Transportation network company
URBS	Urbanização de Curitiba [Curitiba Urban Transport Corporation]
UTAG	Unidade Técnico-Administrativa de Gerenciamento [Technical-Administrative Management Unit]

PROJECT SUMMARY

BRAZIL
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<table>
<tr><th colspan="6">Financial Terms and Conditions</th></tr>
<tr><td colspan="3">Borrower:</td><td colspan="3">Flexible Financing Facility[a]</td></tr>
<tr><td colspan="3">Município of Curitiba</td><td colspan="2" rowspan="2">Amortization period:</td><td>25 years</td></tr>
<tr><td colspan="3">Guarantor:</td></tr>
<tr><td colspan="3">Federative Republic of Brazil</td><td colspan="2" rowspan="2">Disbursement period:</td><td rowspan="2">5 years</td></tr>
<tr><td colspan="3">Executing agency:</td></tr>
<tr><td colspan="3" rowspan="2">Município of Curitiba, acting through the Technical-Administrative Management Unit (UTAG)</td><td colspan="2" rowspan="2">Grace period:</td><td rowspan="2">5.5 years[b]</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Source</td><td>Amount (US$)</td><td>%</td><td colspan="2">Interest rate:</td><td>LIBOR-based</td></tr>
<tr><td>IDB (Ordinary Capital):</td><td>106.7 million</td><td>80%</td><td colspan="2">Credit fee:</td><td>[c]</td></tr>
<tr><td rowspan="2">Local counterpart:</td><td rowspan="2">26.7 million</td><td rowspan="2">20%</td><td colspan="2">Inspection and supervision fee:</td><td>[c]</td></tr>
<tr><td colspan="2">Weighted average life:</td><td>15.5 years</td></tr>
<tr><td>Total:</td><td>133.4 million</td><td>100%</td><td colspan="2">Currency of approval:</td><td>U.S. dollar</td></tr>
<tr><th colspan="6">Project at a Glance</th></tr>
<tr><td colspan="6">Project objective/description: The general objective of the program is to improve urban mobility in Curitiba by increasing ridership demand on the city's collective public transportation system. The specific objectives are: (i) to improve the system's integration with complementary transportation modes; (ii) to enhance the operating efficiency of the Direta Inter2 bus route; and (iii) to make the bus stops and terminals of the Direta Inter2 route more accessible to pedestrians and mobility-impaired persons.</td></tr>
<tr><td colspan="6">Special contractual conditions precedent to the first disbursement of the loan proceeds: The borrower will provide evidence, to the Bank's satisfaction, that: (i) the municipal decree creating the Technical-Administrative Management Unit (UTAG) has been published and has entered into force, establishing its responsibilities for the execution and general coordination of the program; (ii) the program Operating Regulations have entered into force on the terms agreed upon with the Bank (optional link 8); and (iii) an execution agreement between the borrower and the Curitiba Research and Urban Planning Institute (IPPUC) has been signed and has entered into force, establishing the terms and conditions governing the transfer and partial use of the loan proceeds and the responsibilities of both parties during program execution (see paragraph 3.7).
Special contractual execution conditions: See ESMR Annex B, ESHS legal requirements (required link 3).</td></tr>
<tr><td colspan="6">Exceptions to Bank policies: None.</td></tr>
<tr><th colspan="6">Strategic Alignment</th></tr>
<tr><td>Challenges:[d]</td><td>SI</td><td>☐</td><td>PI</td><td>☑</td><td>EI ☐</td></tr>
<tr><td>Crosscutting themes:[e]</td><td>GD</td><td>☑</td><td>CC</td><td>☑</td><td>IC ☐</td></tr>
</table>

[a] Under the terms of the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, as well as currency, interest rate, and commodity conversions. The Bank will take operational and risk management considerations into account when reviewing such requests.

[b] Under the flexible repayment options of the Flexible Financing Facility, changes to the grace period are permitted provided that they do not entail any extension of the original weighted average life of the loan or the last payment date as documented in the loan contract.

[c] The credit fee and the inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with the applicable policies.

[d] SI (Social Inclusion and Equality); PI (Productivity and Innovation); and EI (Economic Integration).

[e] GD (Gender Equality and Diversity); CC (Climate Change and Environmental Sustainability); and IC (Institutional Capacity and Rule of Law).

I. PROJECT DESCRIPTION AND RESULTS MONITORING

A. Background, problems, and justification

1.1 **Curitiba and its metropolitan region.** The city of Curitiba, capital of the State of Paraná, is characterized by its high quality of life and an above-Brazilian-average per capita GDP of R$44,239.[1] This level of social wellbeing is founded mainly on territorial and economic planning that has enabled Curitiba to gain an important position in the industrial and tertiary sectors. The city has been able to capitalize on its strengths, to become the center of social and economic development in the Curitiba Metropolitan Region (RMC), which saw its population grow 25% in the last decade to 3.6 million inhabitants in 2019.[2] This has given RMC the second highest and the fastest rising human development index among Brazil's nine leading metropolitan regions.[3]

1.2 **Urban planning.** Curitiba is also known for its harmonious urban,[4] social and environmental development, which is the result of a well-organized planning process that was launched in the 1960s and implemented through a Master Plan in the decade that followed (optional link 10).[5] This plan modeled the city's development around urban "structural axes" that integrate infrastructure to enhance mobility with the decentralization of public services and different land uses, while fostering an industrial vocation for the city and its metropolitan area. The continuity given to planning by successive municipal administrations has enabled the management of a sustainability-oriented city, which has been recognized internationally for its urban and environmental quality, and in particular for its public transportation system.[6]

1.3 **Integrated Transportation Network (RIT).** Until the early 1960s, public transportation in Curitiba suffered from problems shared by many cities in Latin America and the Caribbean, including chaotic organization and poor service quality.[7] Starting in 1962, the Município of Curitiba ("the município") embarked on a modernization process, in which 230 existing operators were compulsorily

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1 Most recent measurement of national per capita GDP: R$30,548.40 (2016). Brazilian Institute of Geography and Statistics (IBGE).

2 Curitiba has a population of 1.92 million, and its metropolitan region has 3.9 million inhabitants distributed across 29 municípios.

3 Curitiba's municipal human development index (MHDI) was 0.823 in 2010 (the year of the most recent census survey), which placed the município in the very-high human development bracket (between 0.800 and 1), with income (0.850) and education (0.768) being the key MHDI dimensions. Source: Human Development Atlas of Brazil.

4 Curitiba has 58 square meters of greenspace per inhabitant, which is more than five times the public-use greenspace in most cities of Latin America and the Caribbean. Link.

5 Although preparation of Curitiba's Master Plan began in 1966, it was drafted and implemented in the 1970s. Since then, it has established guidelines prioritizing public over individual transportation and integrates public transportation with land use legislation.

6 A world pioneer, Curitiba devised the bus rapid transit (BRT) public transportation system, based on a trunk and feeder route bus operation, with priority transit on bus-only lanes, an integrated fare system, and a high quality standard. This became an efficient urban mobility solution that has been implemented by several cities around the world. Currently, 69 cities in Latin America and the Caribbean and 107 worldwide have invested in the construction, or are in the process of constructing, BRT systems.

7 Irazábal Zurita, Clara E. (2009). Planificación y diseño urbano y regional en Curitiba: el último medio siglo.

consolidated into 10 companies, with each one being assigned an exclusive geographic area of operation. In 1974, it began implementing exclusive public transportation lanes along the structural axes, together with a flat fare and neighborhood integration bus routes.

1.4 The RIT is regulated and managed by the Curitiba Urban Transport Corporation, Urbanização de Curitiba (URBS), a public-private municipal enterprise, while private firms bid competitively for 10-year operating concessions. These firms are responsible for providing the buses, collecting fares, and providing the transportation service.[8] The RIT consists of 252 routes, integrating trunk and feeder services around a radial network comprising 83 kilometers of bus-only lanes. The system is complemented by inter-neighborhood ring routes, called "interbairros," which, through transfers at terminals and a single fare, complete the system's global integration.[9] As the inter-neighborhood and feeder routes circulate alongside general traffic, they are significantly slower-moving. The RIT also has express and direct routes that enhance mobility on the main corridors and transfer points, although these circulate mostly in general traffic and only partially on exclusive infrastructure.

1.5 **The Direta Inter2 line.** The Direta Inter2 route is a 38-kilometer-long ring route (line) linking 28 of Curitiba's 75 neighborhoods and serving 580**,**000 inhabitants. Its service is vitally important for the mobility of city residents. Although the line's itinerary passes through 28 neighborhoods in seven parts of the city, all with a municipal human development index (MHDI) above 0.823,[10] as an integration service the Inter2 line also serves a wider region than in its immediate path (see paragraph 1.41). Trips on it originate both in the direct vicinity and in other RMC municípios with an average MHDI of 0.782. At its 19 bus stops (estações) and terminals, passengers transfer from more than 40 feeder lines serving the lower-income outlying neighborhoods of the RMC.

1.6 The Inter2 route connects transversely with all of the radial structural axes,[11] thus enabling quicker travel for trips that neither start nor end in the downtown area. The Inter2 route currently carries 91**,**000 passengers per day, distributed equally in each direction (clockwise and counterclockwise). It has the highest ridership of all of the system's direct routes; and, in conjunction with the Interbairros II route,[12] carries a total of 155**,**000 passengers per day, the second largest demand of the city's main transit corridor system.

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8 Under the terms of the operating contract, URBS may ask the operator to make changes in the composition of the bus fleet according to system needs.

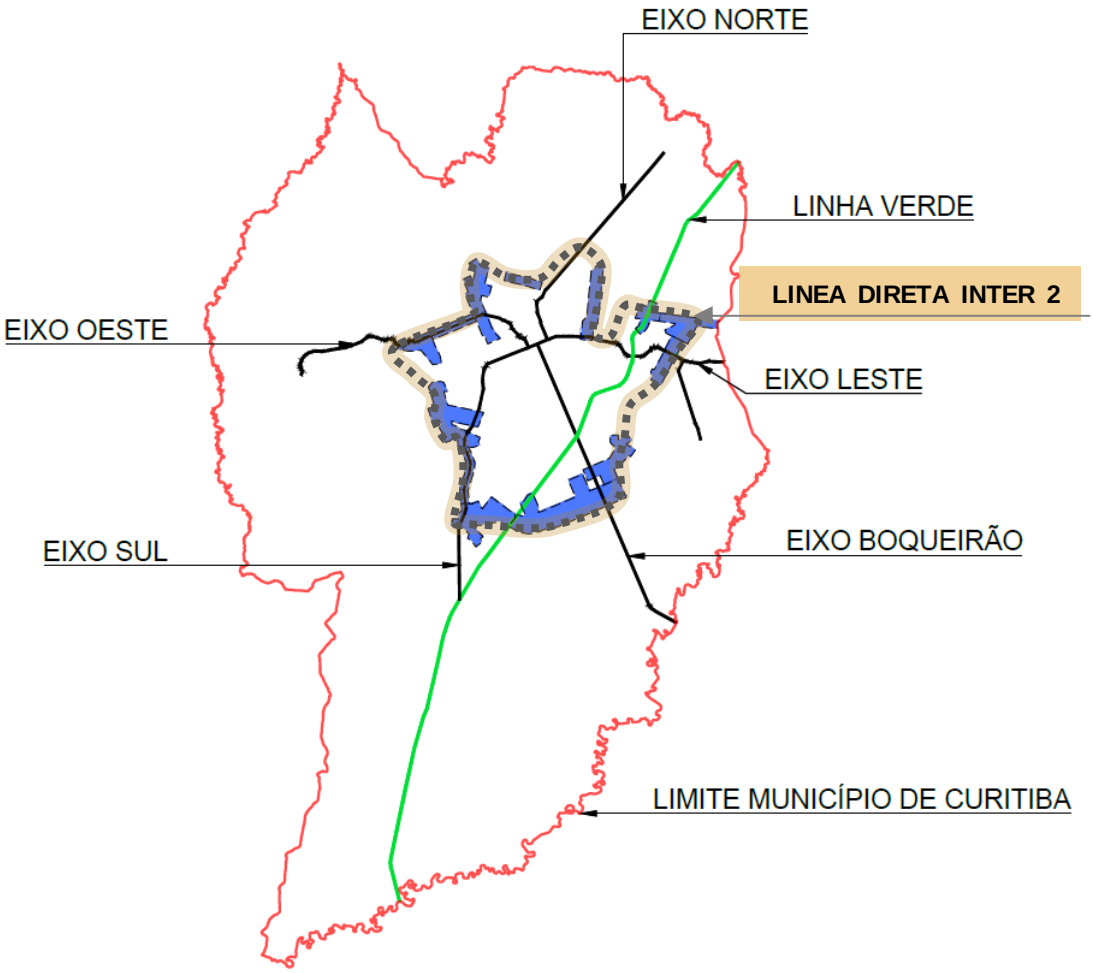
9 The fare charged to users is R$4.50 per trip, and the technical fare amount for compensation of operators is R$5.21, so the subsidized value is 13.71%, and the source of funding is the município and the State of Paraná.

10 Human Development Atlas of Brazil.

11 Structural axes (main transit corridors using bus-only lanes) through the terminals of Cabral on the North axis, Campina do Siqueira on the West axis, Capão Raso and Portão on the South axis, Hauer on the Boqueirão axis, and Capão da Imbuia on the East axis (optional link 17).

12 The Interbairros II line gave rise to the Direta Inter2 route. This is also a two-way ring route circulating in general traffic with step-up boarding and on-board ticket validation.

Map 1. Structural axes of the RIT and Inter2



1.7 Despite its strategic importance for the RIT, however, the Inter2 route operates to a lower standard than the other main transit corridors. Although it has external fare validation and platform-level boarding, as do other main transit corridor services, it does not receive preferential treatment, but circulates in general traffic. Given the growth in traffic on Curitiba's streets owing to rising rates of automobile use, the Inter2 line's operating speed has slowed 20% in the last decade from approximately 26 km/h to just over 21 km/h.[13]

1.8 **General problem.** Despite its leadership in urban mobility and sustainability, passenger demand for Curitiba's collective public transportation system has faltered in recent years,[14] particularly in the central part of the city, where one out of

[13] Information provided by the Município of Curitiba.

[14] Between 2009 and 2018 the number of passengers carried by the system fell 25% from 1,811,870 to 1,365,215. This generalized reduction is largely due to the loss of employment and slowing of economic growth since 2014, which has strongly impacted transportation demand in all cities of Brazil.

every three trips is now made[15] on public transportation. This reality is reflected in the increase in trips made either on complementary systems or in individual vehicles,[16] as a result of a larger number of transportation alternatives available for users to choose from. The roots of this problem include specific issues related to adequate integration with complementary transportation modes, the operational efficiency of the ring routes, and the ease with which the bus stops can be reached on foot or by bicycle.

1.9 **Integration with complementary transportation modes.** Technology, urban density, and private investment have combined to spur an increase in the number of transportation network companies (TNCs)[17] and bike and e-scooter sharing. All of these complementary modes of transportation must, over time, be linked through integrated platforms that provide travel planning, payments, and information, while also offering a better travel experience at a relatively low user cost. An origin-destination survey showed that just 21,000 trips per day, or 1.5% of the total, are made on complementary modes, which also need to be physically integrated with the public transportation system. The city's bus stops still have very few bike racks,[18] designated spaces for e-scooters, or parking lots for taxis and TNCs.

1.10 **Operating efficiency of the ring routes.** The main effect of the additional road congestion resulting from the expansion of motor vehicle use[19] has been slower speeds[20] on nonexclusive lanes, impacting the operational capacity of the system as a whole.[21] This has lengthened travel time for users and reduced comfort levels owing to increased vehicle occupancy.[22] This loss in service quality has contributed to a reduction in the daily number of passengers carried by the system, which fell from 1,619,647 in 2015 to 1,365,615 in 2018 (see paragraphs 1.13 and 1.14).

1.11 The significant increase in the city's motor vehicle fleet has created major challenges for urban mobility planning and management. It has also impaired air

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15 Trips longer than 1 km (Origin-Destination Survey, 2016). In comparison, public transportation accounted for 45% of all motorized trips in 2007 (Observatorio de Movilidad Urbana, CAF).

16 In 2016, 61.8% of the city's motorized trips were made in a private vehicle. Origin-Destination Matrix. IPPUC.

17 Since 2010, different services have coexisted in the city, provided by TNCs such as Uber and Cabify and commercial ride-share companies. In addition, the Brazilian shared bicycle and e-scooter startup, Yellow, operates 40 service points in the city within radius of 2.5 square kilometers, all linked through an app.

18 The city has 43 fixed bikeshare stations located in the city center and at universities. "Yellow" bicycles do not require a fixed station.

19 The motorization rate in the RMC grew from 28.2 to 52.8 vehicles per 100 inhabitants between 2001 and 2014.

20 The average operating speed of Curitiba's public transportation system slowed from 20.63 km/h in 2009 to 19.16 km/h in 2019, with operating speeds on direct routes (such as Inter2) decreasing the most, from 24.54 km/h to 20.89 km/h in the period.

21 The system has had to reduce the coverage and frequency of its offerings by reducing the number of kilometers travelled. In 2008, 334,128 kilometers were travelled on working days, compared to 298,374 kilometers in 2018, or 10% less.

22 For example, on the counterclockwise Inter2 route (line 023), buses run overcrowded during hours of peak demand (optional link 1). On these routes, operating speeds on shared roads have fallen from 21 km/h at the start to 17 km/h at present.

quality by increasing the particulates per million (PM) count from mobile sources, which is aggravated by the preponderance of buses that use internal combustion engines (see paragraph 1.23).[23] Curitiba currently has weather stations that record PM2.5 and PM10 concentrations above the thresholds set by the World Health Organization (WHO, 2019).

1.12 **Bus stop accessibility.** Infrastructure for nonmotorized transportation is a fundamental part of the integrated operation of a public transit system, enabling passengers to access stops. The gender-sensitive walkability index[24] methodology was applied to four Inter2 pedestrian access routes and showed the importance of improving the built environment, to enhance the pedestrian experience and guarantee the safety of women and girls (see paragraph 1.27).[25] In the case of persons with disabilities, although 98% of the system's bus stops have ramps or lifts for the mobility-impaired,[26] the width and type of surface used in pavements, street furniture, and landscaping do not take these users' needs into account (see paragraphs 1.13, 1.14, and 1.31).

1.13 **The município's strategy.** Given this scenario, the município is endeavoring to regain the level of public transport ridership lost in recent years. To this end, the Urban Mobility and Integrated Transportation Plan (PlanMob)[27] (optional link 11) was devised in 2018, with a view to modernizing metropolitan connections and prioritizing low-carbon public transportation and nonmotorized mobility (walking and cycling) over the use of private vehicles. It also encourages a shift in the transportation energy matrix toward low-carbon buses. In addition, PlanMob introduces accessibility as a mandatory criterion and targets actions to ensure that all people, particularly the mobility-impaired, can move around the city safely, autonomously, and quickly without impediments to making their trips or to using public services.

1.14 The resulting actions include the restructuring of circular interconnection services between main transit corridors (inter-neighborhood lines) by shortening travel times and raising service quality standards, increasing their capacity, and building dedicated infrastructure. This is to be accomplished through exclusive infrastructure enabling buses to circulate without interference in general traffic; new terminal and bus stop infrastructure (including the installation or upgrading of air conditioning, and automatic ticket validation and charging systems); and larger capacity vehicles that are accessible and more energy-efficient.

1.15 On 10 September 2019, Municipal Council approved a municipal law authorizing the charging of differentiated fares, with cheaper rates during off-peak hours between 8:30 a.m. and 11:00 a.m., between 2:00 p.m. and 5:00 p.m., and after

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[23] Relatório Anual da Qualidade do Ar na Região Metropolitana de Curitiba. 2011.

[24] The gender-sensitive walkability index is a tool for measuring the characteristics of the urban environment from the pedestrian standpoint. It captures dimensions relating to road safety, connectivity, quality of sidewalks, public signage, use of walls and buildings, existing street furniture, and the level of pedestrian comfort and safety (optional link 15).

[25] Accessibility to the Campina do Siquiera terminal, the Jacarezinho/Rosa Saporski Norte two-way stop, the Jacarezinho/Rosa Saporski Sul two-way stop and the Capão Raso – Xaxim – Hauer terminal are rated 2.21 on average (maximum 4, minimum 0).

[26] Municipal Government of Curitiba, 2017.

[27] PlanMob is part of the Master Plan approved by municipal law in 2015 and ratified in 2018.

8:00 p.m. on weekdays. The law also allows for measures to alleviate traffic at system peak hours by distributing bus use more efficiently throughout the day, reducing bus fleet downtime, and making public transportation more attractive, to stem the loss of passengers from the system.

1.16 **Rationale.** The Direta Inter2 route will be the first bus route addressed under PlanMob, with the financing included in this program. By physically prioritizing this route and increasing capacity, travel times are expected to be shortened by 35%, and service quality improved. The increase in speed means that completing the route will take less time, so, in conjunction with higher capacity vehicles, fewer buses will be required.

1.17 **Rationale for interventions.** Evidence shows that investments to improve the quality of transportation infrastructure generate positive environmental, economic, and social impacts by reducing emissions, costs, and travel times and by facilitating access to places of work.[28] According to estimates made by the Bank,[29] investments to improve urban mobility can generate savings in transportation costs and increase the productivity of the beneficiary population.[30] Improvements in urban transportation also generate potential productivity and competitiveness gains[31] and reduce greenhouse gas (GHG) emissions.[32]

1.18 The importance of the built environment in improving the use of public and nonmotorized transportation is also widely recognized.[33] The bus stops of a structural axis system, for example, with adequate pedestrian infrastructure and complementary services, boost passenger demand (estimated at more than 45,000 embarkations per week). Moreover, stops that serve institutional uses and mix nonmotorized transportation infrastructure with a pedestrian-friendly design have utilization rates 144% higher than those without such attributes.[34] An accessible built environment also contributes to enhanced habitability, public health through physical movement, and economic development.[35] In addition, the

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28 A Bus Rapid Transit (Metrobus) in Mexico and Transport systems and their impact on gender equity.

29 Do bus rapid transit systems improve accessibility to jobs?: The case of Lima, Peru. Comparative case studies of three IDB-supported urban transportation projects.

30 Impact analysis of Transoeste Bus Rapid Transit System in Rio de Janeiro.

31 Because of increased productivity in mobility and the greater competitiveness of economic agents in cities (the result of more effective and efficient access by firms to productive inputs).

32 The city of Guangzhou in China reduced CO_2 emissions per person-trip by 31.5% after implementing a BRT system. In Bogotá, after two years of operation, the BRT reduced emissions by 82,128 tons of CO_2 equivalent per vehicle-kilometer) (UN Habitat and World Bank).

33 Land development impacts of BRT in a sample of stops in Quito and Bogotá and Joint impacts of bus rapid transit and urban form establish the importance for BRT passengers of built environment characteristics such as economic activity, land use, nonmotorized infrastructure, and public facilities.

34 Urban development around bus rapid transit stops in seven cities in Latin America looks at BRT systems in seven Latin American and Caribbean cities, including Curitiba, Goiânia, and São Paulo in Brazil. Studies conducted in countries outside the region also reached similar conclusions.

35 The effect of BRT implementation and streetscape redesign on physical activity: A case study of Mexico City, proves the relationship between the effectiveness of walking strategies and access to public transportation systems.

quality of pedestrian access to bus stops increases the use of the public transportation system.[36]

1.19 For this reason, exclusive and preferential lanes will be upgraded with new geometry and dimensions, where appropriate, along with asphalt resurfacing, signage, and pavement markings, as well as improved system feeder roads, including implementation of new landscaping, sidewalks, public lighting, and measures to ensure universal accessibility.

1.20 With Bank support, the município has also begun activities aimed at distributing transportation demand and actions to reduce dependence on fare collection. The program will thus support the performance of studies and behavioral experiments to identify measures that motivate citizens to use the system and the development and implementation of exchange standards to facilitate integrated single payment for complete trips, the connection of several mobility accounts into a common account, and the use of multimodal planning tools (see paragraph 1.38). The resulting ecosystem will be an environment in which better information and connectivity will help the city cope with changes in travel patterns and travel preferences, providing a functional service for system users.

1.21 **The Bank's knowledge of the urban transportation sector and lessons learned.** The Bank's knowledge stems from its long-standing involvement in financing infrastructure and urban transportation projects, including specific programs in Brazil,[37] in the cities of São Bernardo do Campo, Fortaleza, Curitiba, São Paulo, Santo André, and others, covering different types of intervention, support mechanisms, public policy, and the management of transportation systems. The program design draws on the following lessons learned: (i) the importance of works execution being monitored by the executing agency through technological innovations and the assignment of qualified technical teams and the contracting of independent external support for such purpose, all strategies that enhance the final quality of the works; and (ii) starting land purchase and involuntary resettlement processes early, before solicitation of competitive bidding for the works.

1.22 The preparation of this program specifically draws on lessons learned from the Município of Curitiba Integrated Social and Urban Development Program (loan 2246/OC-BR) (see paragraph 3.1), including the following: (i) incorporate international best practices in technical and technological solutions to mobility challenges; (ii) identify intervention needs through a participatory process at the community level; and (iii) maintain the structure of the Technical-Administrative Management Unit (UTAG) in the município, to continue implementing the city's development programs.

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[36] Evaluating the implementation and active living impacts of a state government planning policy designed to create walkable neighborhoods demonstrates the positive impact of appropriately designed public spaces and sidewalks on decisions to walk.

[37] Fortaleza Urban Transport Program II (loan 3289/OC-BR); Santo André Sustainable Urban Mobility Program (loan 3708/OC-BR); Maracanaú Urban Transport and Logistics Program (loan 4445/OC-BR); São Paulo Metro Line 5 – Lilas Expansion Program (loan 2305/OC-BR); Blumenau Sustainable Urban Mobility Program (loan 2746/OC-BR); and São Bernardo do Campo Urban Transport Program II (loan 2888/OC-BR).

1.23 **Electromobility and adoption of new technologies.** Electromobility offers a solution for mitigating emissions of GHGs and local pollutants (EIA, 2019, paragraph 1.11). In the case of buses, the progress made in the chemical structure of battery cells has helped extend their useful life and improve operational performance. Electromobility can lower operating costs compared to internal combustion engines. In the specific case of Brazil, transport electrification suggests a reduction in emissions of up to 90% and operational savings per kilometer traveled (optional link 14).

1.24 This program will strengthen analytical and decision-making processes for new technology adoption in the city of Curitiba. Other regional experiences will be shared, and electromobility route maps will be defined in the RIT. The implementation of electromobility programs requires enabling environments, standardization, and technological harmonization, including fiscal and nonfiscal incentives and regulation, but mainly financial mechanisms for implementation (IDB, 2019).

1.25 **Building information modeling (BIM)** will be used in the program, both to contract final designs for the works to be financed, and to build capacity within the município and modernize the processes of planning, conception, design, execution, and monitoring of works and actions in the city, deploying modern tools for the purpose (see paragraph 1.38). By adopting these technologies, the município seeks to: (i) speed up the process of implementing the works and actions envisaged in the program and in the Government Plan, Master Plan ,and sector plans from project design through execution; (ii) enhance the transparency of municipal public administration and allow for greater participation and monitoring by society, facilitating technical follow-up, inspection, and dissemination to citizens; and (iii) reduce costs and optimize the results of the public investments (optional link 12).

1.26 **Climate change adaptation.** Rainfall has increased in quantity, intensity, and frequency in recent years.[38] For urban infrastructure, this imposes greater demands on the capacity of the drainage system to evacuate rainwater, and on the quality and conservation of road surfaces. For this program, the works drainage system calculation has been adapted: for rainwater galleries from 5 to 10 years and for collector cells from 20 to 40 years.

1.27 **Public transportation and gender equity.** Although the RIT is more widely used by women—as is also the case in other cities[39]—the literature on gender and urban mobility reports gender differences in mobility patterns, in terms of the number of trips per day, the number of stops, and the time and reason for trips. One of the main problems faced by women in Brazil is harassment and violence. In 2017, 37.1% of Brazilian women said they had been harassed in the preceding 12 months: 32.1% reported receiving insulting comments when walking down the street, and 7.8% had been harassed on public transport.[40]

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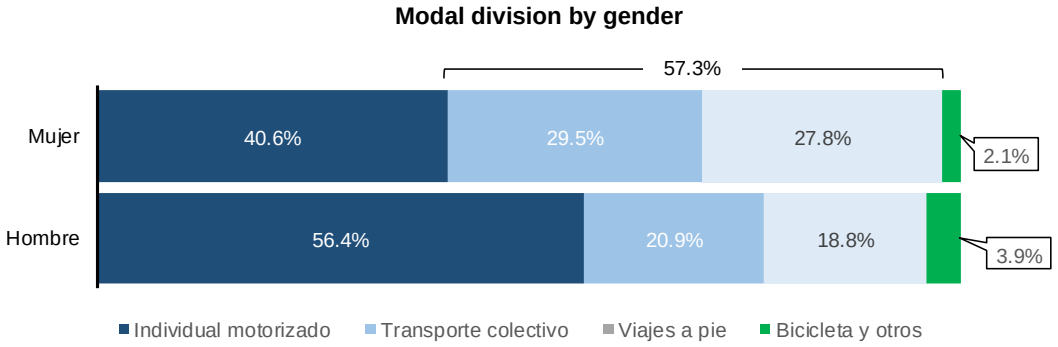
38 Por que estados, municípios e cidades tem que se adaptar ás mudanças do clima?

39 On Lima's bus rapid transit (BRT), the number of women choosing to travel on the system increased, as did their labor market participation. Connecting to economic opportunity: The role of public transportation in promoting women's employment in Lima.

40 Brazilian Public Safety Forum. Visível e invisível: a vitimização de mulheres no Brasil.

1.28 In Curitiba, women account for 61% of all RIT passengers, and 54% in downtown neighborhoods.[41] In 2016, the município launched the *Busão sem Abuso* ("Bus Without Abuse") campaign to reduce harassment on public transport, in order to raise passenger and system employee awareness so that they identify and report cases of sexual harassment.[42] As a result, complaints reported to the Municipal Guard have decreased, but indecent acts remain a problem.[43]



Source: Prepared by the authors on the basis of IPPUC 2019 data.

1.29 The program recognizes women's reliance on public transport and seeks to improve their experience by analyzing the built environment, improving infrastructure, and raising awareness (see paragraph 1.38). This will include: (i) the collection of gender-specific information on perceptions of the quality of the nonmotorized transportation infrastructure; (ii) infrastructure improvements, such as adequate lighting at bus stops, access roads, and system bus stops; installation of security cameras inside buses, bus stops, and terminals; and (iii) awareness-raising campaigns to reduce the harassment of women in buses and public spaces (streets, bus stops, and terminals) and provide information on mechanisms for reporting harassment and creating consequences.

1.30 Women account for 21% of the total RIT workforce (mostly employed as ticket collectors/inspectors), and 79% are men. Women represent 43% of the total number of ticket collectors, but only 2% of drivers.[44] Following the implementation of Municipal Law 15,463, a total of 5,334 ticket collectors/inspectors (2,274 women and 3,060 men) will lose their jobs owing to the adoption of an electronic fare collection system. The firms are offering training courses and retraining opportunities for ticket collectors to be reassigned to administrative and operational services (optional link 13). To this end, the program will seek to ensure that at least 40% of those enrolled in the courses offered are women. It also aims to increase the proportion of female drivers from 2% to 5% by providing incentives such as job advertisements and gender-sensitive training courses, and to inform women about the advantages of being drivers, among other benefits.

41 IBGE and Origin-Destination Matrix. IPPUC.

42 Yedav, N. (2016). Reframing the issues of women's safety in public transportation in Brazil and France.

43 Idem Note 41.

44 Município of Curitiba. (2019). A questão de gênero em Curitiba e no transporte colectivo de Curitiba.

1.31 **Universal accessibility.** Curitiba is home to 354,964 persons with disabilities, who represent 26.5% of the city's population. Of these, 268,196 are visually impaired, 79,184 are hard of hearing, 95,335 suffer from a physical or motor disability, 21,880 are mentally or intellectually impaired, and 443 have an unspecified disability (IBGE, 2010). The Universal Declaration of Human Rights proclaims freedom of movement as a right, and Sustainable Development Goal 11, "Make cities and human settlements inclusive, safe, resilient, and sustainable," makes reference to the inclusiveness and accessibility of public transport. This program will implement the customer trip mapping methodology, which relies on collecting qualitative data (based on user experience) and an interviewer's observation of seven user profiles during a typical trip on public transportation (optional link 13).

1.32 **Strategic alignment.** The program is aligned with the IDB Group country strategy with Brazil 2019-2022 (document GN-2973) via the strategic objective of narrowing infrastructure gaps by improving sustainable urban mobility. It also proposes solutions for the crosscutting themes of gender and diversity, climate change and environmental sustainability, and innovation and digital transformation. The program promotes and creates conditions for private sector participation through the operation of the urban transportation system, since private firms are responsible for vehicle purchase, maintenance, fare collection, and operation.

1.33 The program is aligned with the Update to the Institutional Strategy (document AB-3008) and the challenge of increasing productivity and innovation through investments in infrastructure services that improve the productivity of the population, since bus-only corridors will produce savings in travel time and reduce the operating costs of the transportation system.

1.34 The program is also aligned with the following crosscutting themes: (i) Climate Change and Environmental Sustainability, through the implementation of a more modern, efficient and sustainable public transportation infrastructure that reduces GHG emissions from transportation; and (ii) Gender Equity and Diversity, by incorporating gender-differentiated needs in transportation services, improving women's safety in the use of transportation, encouraging women to become bus drivers, and promoting accessible infrastructure for mobility-impaired persons. Of the program's funding, 82.66% will be used to finance climate change mitigation actions, according to the joint methodology of the multilateral development banks. These resources contribute to the IDB Group's goal of increasing lending for climate change-related projects to 30% of all operational approvals by the end of 2020. The program contributes to the Corporate Results Framework 2016-2019 (document GN-2727-6) as follows: (i) reduction of emissions with support of IDB Group financing (annual tons of CO_2 equivalent); and (ii) mass transit systems built (kilometers). It is also consistent with the Sustainable Infrastructure Framework, particularly in terms of environmental sustainability, through support for the development of the decarbonization plan by promoting electromobility in public transportation.

1.35 The program is aligned with the Sustainable Infrastructure Strategy for Competitiveness and Inclusive Growth (document GN-2710-5), through the strategic principle of planning, building, and maintaining road infrastructure to provide quality services by prioritizing bus-only corridors. It is also consistent with the following sector framework documents: (i) Transportation (document

GN-2740-7) by expanding and improving the coverage, capacity, quality, and connectivity of transportation infrastructure and related services; (ii) Urban Development and Housing (document GN-2732-6) by promoting sustainable and safe urban mobility systems, integrated with land use and urban planning; (iii) Climate Change (document GN-2835-8) by promoting mitigation and adaptation measures as an infrastructure sustainability strategy, including the use of low-carbon urban transportation modes; and (iv) Gender and Diversity (document GN-2800-8) by incorporating actions designed with a gender equality perspective, including the vision of women as transportation system users, promoting activities to prevent violence against women in public transportation, and promoting actions for women's integration into the workforce. The operation is included in the Update to Annex III of the 2019 Operational Program Report (document GN-2948-2).

B. Objectives, components, and cost

1.36 **Program objectives.** The general objective of the program is to improve urban mobility in Curitiba by increasing ridership demand on the city's collective public transportation system. The specific objectives are: (i) to improve the system's integration with complementary transportation modes; (ii) to enhance the operating efficiency of the Direta Inter2 bus route; and (iii) to make the bus stops and terminals of the Direta Inter2 route more accessible to pedestrians and mobility-impaired persons.

1.37 **Component I. Civil works and works supervision (US$122.3 million).** This component will finance: (i) implementation of exclusive or preferential road infrastructure along the Direta Inter2 route, totaling approximately 60 kilometers, and rehabilitation of urban infrastructure with universal accessibility; (ii) implementation of RIT public transport terminals and public transport integration stations along the Direta Inter2 route; (iii) implementation of socioenvironmental plans, expropriations, and compensation payments for temporary effects on businesses; and (iv) technical supervision.

1.38 **Component II. Innovation and technologies (US$2.5 million).** This component will finance: (i) hardware, software, and training for the preferential use of BIM in the development of the program works projects (see paragraph 1.25); (ii) hardware and software for the modernization of urban mobility management, including expansion of the operational control center; and (iii) studies and development of applications and technologies, including the following strategies: (a) low-carbon[45] and (b) strengthening of system fare and nonfare revenues to support higher passenger demand (see paragraph 1.20). This component will also fund the implementation of the gender-sensitive walkability index methodology and awareness campaigns to prevent violence against women (see paragraph 1.29).

1.39 **Program administration and management (US$8.6 million).** This component will finance the contracting of consulting services to support: (i) program management and environmental supervision; (ii) monitoring and evaluation; and (iii) external financial audit (see paragraph 3.9). It will also finance the purchase of hardware and software.

[45] The analysis of alternatives for incorporating low-carbon buses will initially be funded by technical cooperation operation ATN/AC-16601-RG.

C. Key results indicators

1.40 **Outcomes and indicators.** The main program outcomes will be verified through the following indicators: (i) shorter travel times for users (see paragraph 1.7); (ii) lower annual operating costs of transportation services on the Direta Inter2 line; (iii) reduced GHG emissions (CO_2) per day on the Direta Inter2 line; (iv) increased integrated multimodal travel; and (v) improved perception of the Direta Inter2 line's safety and walkability. The impact indicator proposed by the program is the number of passengers carried by the system.

1.41 **Program beneficiaries.** The program's direct beneficiaries are the RIT ridership using the Direta Inter2 route (in addition to passengers who use other routes and transfer to one of the terminals of the Inter2 line), totaling 155**,**000 passengers/day. The indirect beneficiaries are citizens living in the neighborhoods where the improved infrastructure will be built, i.e., 580**,**000 people living in the 28 neighborhoods in the vicinity of the Direta Inter2 route.

1.42 **Program technical and economic viability.** The sample projects were visited, and their respective technical viability and network perspective studies were reviewed and deemed adequate for the program and the actions to be financed. The economic viability analysis of the sample work (optional link 1) was performed using the cost-benefit methodology. This evaluates the social costs incurred by program implementation, maintenance, and operation, and the benefits attributable to it during its useful life (20-year analysis period). For the actions analyzed, economic benefits were quantified in terms of savings in bus operating costs and in travel time for users of the transportation services targeted by the program.

1.43 The results of the economic analysis for the sample work indicate an economic internal rate of return (EIRR) of 29.8%, which is higher than the reference discount rate (12%), and an economic net present value (ENPV) of US$21.4 million. Sensitivity analysis shows that the project is robust to a 25% increase in the financial cost of the works, simultaneous with a 10% decrease in demand. The base-case analysis was performed assuming that ridership under current conditions remains uniform over the 20-year period, i.e., under the most demanding conditions possible, as the project objective is, in fact, to increase demand.

II. Financing Structure and Main Risks

A. Financing Instruments

2.1 **Modality.** The program will be financed via an investment loan under the multiple-works program modality, since it will finance physically similar but independent works, the feasibility of which does not depend on execution of a particular number of projects or actions. The program will have a disbursement period of five years. To ensure that works not included in the representative sample start execution early enough to be completed within the disbursement period, the program's physical works will begin within four years, running from the date of entry into force of the loan contract. The program's total cost is US$133.4 million. Of that amount, the Bank will finance US$106.7million from its Ordinary Capital resources, and US$26.7 million will be local contributions in the form of property purchases.

Table 1. Estimated program cost table (US$ million)[46]

Components	IDB	Local contribution	Total	%
Component I. Civil works and works supervision	**95.60**	**26.70**	**122.30**	**91.68**
Road infrastructure	76.51	15.53	92.04	69.00
Integration terminals	0.78	0.01	0.79	0.59
Bus stops	4.89	-	4.89	3.67
Concrete or masonry structures	4.52	0.53	5.05	3.79
Environmental and social management, compensation, and land purchase	3.80	10.63	14.43	10.82
Works supervision	5.10	-	5.10	3.82
Component II. Innovation and technologies	**2.50**	**-**	**2.50**	**1.87**
BIM for administration and management	1.00	-	1.00	0.75
Operational Control Center	1.00	-	1.00	0.75
Studies, campaigns, and application and technology development	0.50	-	0.50	0.37
Program administration and management	**8.60**	**-**	**8.60**	**6.45**
Program administration and management support	4.72	-	4.72	3.54
Environmental supervision	3.28	-	3.28	2.46
Monitoring and evaluation	0.60	-	0.60	0.45
Total	**106.70**	**26.70**	**133.40**	**100.00**

Table 2. Projected disbursements (US$ million)

Source	Year 1	Year 2	Year 3	Year 4	Year 5	Total
IDB	8.65	25.05	32.59	27.56	12.85	**106.70**
Counterpart	7.49	7.41	5.37	4.69	1.74	**26.70**
Total	**16.14**	**32.46**	**37.96**	**32.25**	**14.59**	**133.40**

2.2 **Project eligibility criteria.** Consistent with a multiple-works program, each work to be financed by the program must satisfy the following eligibility criteria: (i) build improvement works along the Inter2 route as defined by PlanMob (see paragraph 1.13 and optional link 11); (ii) demonstrate a positive EIRR, showing that the work will yield a positive economic return; and (iii) address the socioenvironmental requirements identified in the environmental and social management framework (ESMF) (optional link 3), excluding category "A" projects.

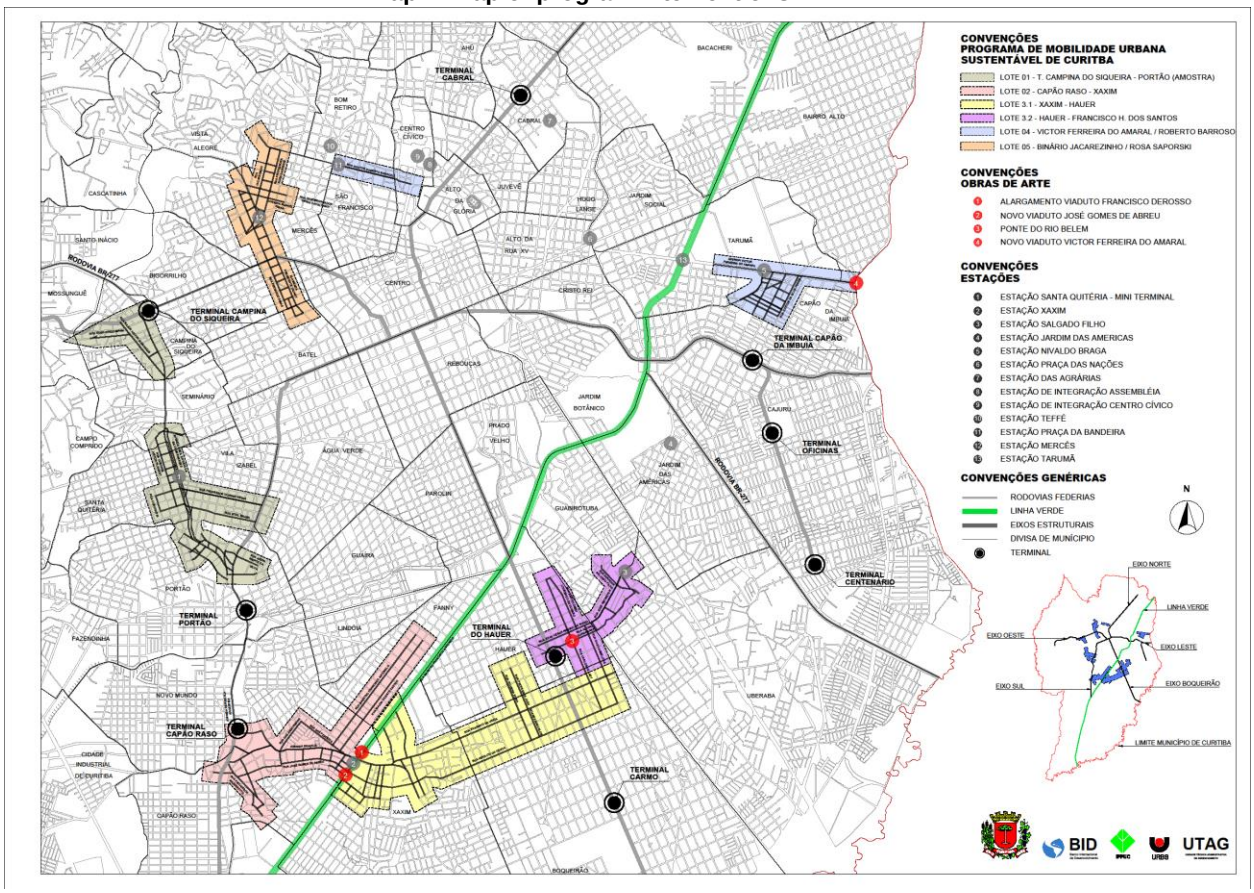
2.3 **Representative sample.** The program was evaluated by analyzing a representative sample of projects of the type of works to be financed under the program, along with their expected socioenvironmental impacts (optional link 7).[47] The sample includes works representing the types of actions that satisfy the eligibility criteria specified for the program (see paragraph 2.2). The sample has an estimated value of 30% of the Bank's contribution and includes direct investment costs, technical and environmental supervision of works, and program management. The sample includes technical engineering designs and socioenvironmental and economic viability assessments. The sample interventions are described below.

[46] The breakdown within the components is indicative.

[47] The project sample works include works to be built with different sources of financing. The loan program sample specifically consists of the work for the Campina do Siqueira – Portão segment.

2.4 **Campina do Siqueira – Portão.** The Campina do Siqueira – Portão segment is part of the route itinerary in both directions. The intervention involves the construction of the Campina do Siqueira terminal, which will also be financed by the program, and the Portão terminal. The specific items include road infrastructure, including bus-only lanes for public transportation, resettlements, and artwork to indicate where buses have priority when turning.

Map 2: Map of program interventions



B. Environmental and social safeguard risks

2.5 In accordance with the Bank's Environment and Safeguards Compliance Policy (Operational Policy OP-703), the field visit, and information received, this operation is classified as category "B," given its potential for environmental and social impacts and the risks of the works in the representative sample. All of the risks have viable mitigation measures known to the executing agency. The environmental and social assessment reviewed these impacts and risks and identified the appropriate environmental and social management tools to be used during program execution, including the construction and operation stages.

2.6 Potential risks and negative impacts in the construction stage include: the generation of moderate volumes of debris, noise, vibrations, particulate matter, fuel spillage, temporary increase in traffic, and temporary interruption of basic services.

Social impacts and risks include: (i) total and partial expropriation of properties for road widening and geometry improvements, with 273 properties affected throughout the program (224 partial and 49 total), 27 of which are in the representative sample (24 partial and three total, including the displacement of two residences and two businesses); (ii) temporary impacts on the revenue of businesses located at the construction sites; and (iii) temporary impacts on the health and safety of construction workers and on the population in the area of direct influence. During the operating stage, potential risks and negative impacts related to traffic accidents owing to changes in vehicle patterns and flows, community complaints about the implementation of two-way public transportation systems in residential areas, and disputes with businesses owing to changes in the direction of traffic flow.

2.7 The impacts described can be avoided and mitigated through measures included in the environmental and social management plan (ESMP), the ESMF, and the Involuntary Resettlement Plan and Framework. The operation has a Low Type 1 disaster risk rating, given its minimal exposure to natural disaster events.

2.8 The public consultation process[48] involved six events, including three specific meetings held between 24 and 31 October 2019 with persons affected by partial and total expropriations. The results show that the consultation was meaningful, and that doubts and concerns about the implementation of the program works were clarified. The reports and recommendations were included in the final versions of the environmental and social instruments. During the consultation events, the community demonstrated acceptance of the program's works and interventions.

C. Fiduciary risks

2.9 The main aspects of the município's capacity for programming, organization, execution, and oversight of the program were analyzed using the Bank's Institutional Capacity Assessment Platform (ICAP). It was noted that the executing agency has experience on similar projects financed by the Bank (loan 2246/OC-BR) and other projects financed by Brazil's federal government (PAC COPA and PAC Mobilidade) and by the French Development Agency. The executing agency has sufficient personnel trained in project management, procurement, finance, and socioenvironmental safeguards.

2.10 Accordingly, the risk of unsatisfactory implementation owing to lack of capacity in the executing agency is low. Nonetheless, the following measures were identified to ensure cost-efficient execution: (i) strengthen the executing agency's capacity in the use of project management tools, for which the Bank will provide specific training to the executing agency; (ii) develop procedural manuals for technical quality management, project management, and systematic record-keeping; (iii) redesign the processing of contractual addenda, to ensure better contract execution; and (iv) put additional financial records and controls in place to make financial management more efficient. These measures will be financed by the program.

[48] https://www.iadb.org/en/project/BR-L1532.

D. Other key risks and issues

2.11 **Public management and governance risks.** If the loan contract is not signed before 31 August 2020, there could be a change of municipal government with potential to delay the start of program implementation. This risk is rated medium-high. As a mitigation measure, political actors will coordinate to prioritize financing and advance solicitations for competitive bidding processes.

2.12 **Development risks.** The following risks were identified in this category, all rated medium-high: (i) a selection of firms without the financial capacity to perform the work. As a mitigation measure, prices will be specified in the terms of reference/budgets for the works; and (ii) the number of municipal staff retirements scheduled for the coming years could affect the review and approval of designs. As a mitigation measure, it was decided to: (a) provide external support to the technical staff of the entities involved; and (b) speed up the public competitive bidding process for detailed engineering that has already begun.

III. IMPLEMENTATION AND MANAGEMENT PLAN

A. Summary of implementation arrangements

3.1 **Borrower and executing agency.** The borrower will be the Município of Curitiba, with the Federative Republic of Brazil as guarantor of the borrower's financial obligations. The executing agency will be the Município of Curitiba,[49] acting through the Technical-Administrative Management Unit (UTAG), which will be responsible for general coordination of program execution. The UTAG will be supported by the following municipal agencies directly involved in the program: the Curitiba Research and Urban Planning Institute (IPPUC), the Municipal Planning, Finance, and Budget Department (SMF), the Municipal Public Works Department (SMOP), or superseding entities with equivalent legal authority and jurisdiction. A Special Bidding Committee will be established.

3.2 **Implementation arrangements.** The UTAG will consist of a general coordinator and two coordinators, one for the administrative/financial area and the other for the technical and engineering area. The duties and responsibilities of the UTAG and Special Bidding Committee personnel will be described in the program Operating Regulations.

3.3 Under the program, the IPPUC will be responsible for the preparation and commissioning of studies and final designs, as well as the approval of geometry and landscape projects. The SMOP will be responsible for works contracting, inspection, and measurement, as well as approval of final designs for paving, structures, drainage, and street lighting under the program.

3.4 A Deliberative Council will also be established, consisting of the secretaries or representatives of the entities directly involved in the program, as listed in paragraph 3.1. Deliberative Council members will be appointed by municipal decree and will be responsible for supporting the UTAG in its role for the program.

3.5 **Administrative-Technical Analysis Commission.** In view of the number of businesses that could be temporarily affected during the construction phase of the

[49] The implementation arrangements will repeat those of loan 2246/OC-BR (see paragraph 1.22).

program, the município will establish an analysis commission and approve its operating regulations. The commission will assess the compensation payable for loss of profit owing to temporary disruption caused by the construction of the works financed by the program.

3.6 **Program Operating Regulations**. Program execution will comply with program Operating Regulations that specify environmental, fiduciary, financial, and other aspects of operations. The draft version of is attached as optional link 8. The program Operating Regulations harmonize the procedures to be followed and will define the following and other requirements: (i) coordination and reporting mechanisms; (ii) requirements for the submission and eligibility of each one of the works to be financed; (iii) procedures for the procurement of works, goods, and consulting services; (iv) guidelines for the use of resources and financial management of the program; and (v) disbursement procedures.

3.7 **As special contractual conditions precedent to the first disbursement of the loan proceeds, the borrower will provide evidence, to the Bank's satisfaction, that: (i) the municipal decree creating the Technical-Administrative Management Unit (UTAG) has been published and has entered into force, establishing its responsibilities for the execution and general coordination of the program; (ii) the program Operating Regulations have entered into force on the terms agreed upon with the Bank (optional link 8); and (iii) an execution agreement between the borrower and the Curitiba Research and Urban Planning Institute (IPPUC) has been signed and has entered into force, establishing the terms and conditions governing the transfer and partial use of the loan proceeds and the responsibilities of both parties during program execution.** Creation of the UTAG is considered essential to ensure that the executing agency will be ready with an effective team to start program execution; the Operating Regulations will specify the operational aspects of execution and harmonize the procedures to be followed by the executing agency; and, the execution agreement formalizes the commitment of the IPPUC, which is a separate legal entity from the executing agency, and will ensure: (i) the transfer of loan proceeds; (ii) the authority and responsibilities of the IPPUC as part of program execution; and (iii) the sound management and execution of resources in accordance with the Bank's applicable policies and procedures.

3.8 **Disbursements.** The loan will be disbursed in the form of advances of funds, the frequency of which will be determined by the project's financial programming, to be periodically updated by the UTAG pursuant to the Financial Management Guidelines for IDB-financed Projects (documents GN-2811-1, OP-273-12) and applicable Brazilian law, as described in Annex III. The Bank may make a further advance of funds, once supporting documentation has been provided for at least 80% of the total funds previously advanced. Disbursement requests will be subject to ex post financial review, as part of the external audit.

3.9 **External audit.** Within 180 days after the close of the respective fiscal year, the executing agency will deliver the program's annual financial statements to the Bank, duly audited by the State of Paraná Audit Office (TCE/PR) (an oversight authority certified by the Bank) or, as necessary, by a firm of independent auditors acceptable to the Bank. The cost will be financed with the loan proceeds (see paragraph 1.39).

3.10 **Maintenance**. The município will deliver an annual maintenance plan and status report on the works and equipment to the Bank in the first quarter of each year during the original or extended disbursement period and for a minimum of three years following the close of the original or extended disbursement period. The URBS and SMOP annual budget allocations for system maintenance by the entities responsible for the sample works are adequate, and the funds allocated for such purpose are considered sufficient.

3.11 **Procurement of works and services.** Procurement and contracting will be conducted in accordance with the Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-9), together with the provisions of the loan contract and the Procurement Plan (required link 4). Procurements may be subject to ex ante or ex post supervision, as specified in the procurement plan. Ex post review visits will be conducted every 12 months, and their reports will include at least one physical inspection visit selected from among the processes reviewed.

3.12 **Borrowing capacity.** The município had a debt-to-revenue ratio of 19.9% in 2017-2018, and 12.7% in 2019. Its modeling, including the international financing now in preparation, showed that by 2021 the debt-to-revenue ratio would be 14.14%. Additionally, its current savings indicator is B (90.92%), and its liquidity indicator is A (13.36%). The impact on the Federal Treasury Department's capacity to pay indicator (CAPAG) is positive, and the município should be able to maintain a "B" rating.

3.13 **Retroactive financing and recognition of expenditures.** The Bank may retroactively finance up to US$21,340,000 against the loan proceeds (20% of the loan amount), and recognize up to US$5,340,000 against the local contribution (20% of the local contribution amount) in eligible expenditures incurred prior to the loan approval date, provided that requirements substantially similar to those established in the loan contract have been met. Such expenditures must have been incurred on or after the project profile approval date (27 August 2019) but not under any circumstances more than 18 months prior to the loan approval date.

B. Summary of arrangements for monitoring results

3.14 **Monitoring.** The monitoring and evaluation plan (required link 2) will track implementation according to the indicators and objectives specified in the Results Matrix. The following instruments will be used: (i) six-monthly reports (submitted by the borrower up to 60 days after the end of each six-month period) tracking the progress of the Results Matrix indicators and physical and financial execution based on work, execution, procurement, and disbursement plans; (ii) audits of financial statements; and (iii) the project completion report. The Bank will supervise the program through ex ante and ex post reviews of procurements, inspection visits, and administration missions. The executing agency will maintain effective systems for collecting periodic data on physical and financial progress and will keep the program information up to date.

3.15 **Evaluation** The analysis of the program's expected outcomes (required link 2) envisages the use of before-and-after methodologies, as well as an ex post cost-

benefit evaluation. If the Bank deems it necessary, the borrower will deliver a midterm evaluation of the program 90 days after the date on which 50% of the loan proceeds have been disbursed, or three years after signature of the loan contract.

Development Effectiveness Matrix		
Summary	BR-L1532	
I. Corporate and Country Priorities		
1. IDB Development Objectives		
Development Challenges & Cross-cutting Themes	-Productivity and Innovation -Gender Equality and Diversity -Climate Change and Environmental Sustainability	
Country Development Results Indicators	-Reduction of emissions with support of IDBG financing (annual million tons CO2 e)* -Urban rail and bus mass transit systems built or upgraded (km)*	
2. Country Development Objectives		
Country Strategy Results Matrix	GN-2973	Reduce infrastructure gaps.
Country Program Results Matrix	GN-2948-2	The intervention is included in the 2019 Operational Program.
Relevance of this project to country development challenges (If not aligned to country strategy or country program)		
II. Development Outcomes - Evaluability		Evaluable
3. Evidence-based Assessment & Solution		9.6
3.1 Program Diagnosis		3.0
3.2 Proposed Interventions or Solutions		3.6
3.3 Results Matrix Quality		3.0
4. Ex ante Economic Analysis		10.0
4.1 Program has an ERR/NPV, or key outcomes identified for CEA		3.0
4.2 Identified and Quantified Benefits and Costs		3.0
4.3 Reasonable Assumptions		1.0
4.4 Sensitivity Analysis		2.0
4.5 Consistency with results matrix		1.0
5. Monitoring and Evaluation		8.5
5.1 Monitoring Mechanisms		2.5
5.2 Evaluation Plan		6.0
III. Risks & Mitigation Monitoring Matrix		
Overall risks rate = magnitude of risks*likelihood		Medium
Identified risks have been rated for magnitude and likelihood		Yes
Mitigation measures have been identified for major risks		Yes
Mitigation measures have indicators for tracking their implementation		Yes
Environmental & social risk classification		B
IV. IDB´s Role - Additionality		
The project relies on the use of country systems		
Fiduciary (VPC/FMP Criteria)	Yes	Financial Management: Budget, Treasury, Accounting and Reporting, External Control, Internal Audit. Procurement: Information System, Price Comparison, Contracting Individual Consultant.
Non-Fiduciary		
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:		
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project	Yes	RG-T3078 will finance the first analysis of alternatives for the incorporation of low-carbon buses; RG-T3176 finances the application of the methodology to determine the Walkability Index.

Note: (*) Indicates contribution to the corresponding CRF's Country Development Results Indicator.

CURITIBA'S SUSTAINABLE URBAN MOBILITY PROGRAM (BR-L1532)
Evaluability Note

The main goal of the operation is to improve, through the public transport system, the urban mobility of Curitiba. To achieve this, the proposal defines three specific areas of intervention. The first area proposes to improve the integration of the public transportation system with other transport modes. The second area focuses on enhancing the operational efficiency of a critical circular bus line called Inter2. The last one aims to improve the accessibility of pedestrians and people with reduced mobility to the stations and terminals of the Inter2 line.

The project proposal diagnosis describes that Curitiba has been facing mobility issues related to the decreasing of public transport ridership during the last years. The diagnostic states that this demand shift, besides associated to many aspects of urban dynamics, relates to three specific issues correlated to the decision of using public transport: (i) limited integration with other transportation modes; (ii) operational inefficiencies of one of the main circular lines (Inter2) responsible for connecting all city trunked axes; and (iii) deficiencies in the accessibility to this bus line (Inter2). The diagnostic identifies as causes of these problems the lack of an exclusive roadway for the Inter2 line; the structural conditions of the accesses to the Inter2 line; the absence of an integrated system where users could manage different transport modes trips; and the lack of sufficient structure to integrate these other modes at the bus stations. In this sense, solutions are aligned to problems, although evidence of the effectiveness of some proposed solutions is not presented.

The economic analysis quantifies benefits associated with the travel time reduction for the users affected by the interventions and with the savings due to reduced buses operating costs. The model assumptions are based on the city public transport system information. The analysis concludes the Project has an internal rate of return of 25.2%.

Monitoring relies mainly on executing agency reports and studies; the executing agency will provide the result indicators after performing the ex-post analysis based primarily on its systems information and on surveys. The evaluation plan does not include an impact evaluation.

RESULTS MATRIX

Project objective:	The general objective of the program is to improve urban mobility in Curitiba by increasing ridership demand on the city's collective public transportation system. The specific objectives are: (i) to improve the system's integration with complementary transportation modes; (ii) to enhance the operating efficiency of the Direta Inter2 bus route; and (iii) to make the bus stops and terminals of the Direta Inter2 route more accessible to pedestrians and mobility-impaired persons.

EXPECTED IMPACT

Indicators	Unit of measure	Baseline	Baseline year	Final target (2025)	Means of verification	Comments
Impact: Improve urban mobility in Curitiba by increasing ridership volumes on the city's collective public transportation system						
System ridership	Passengers per weekday	1,365,215	2019	1,511,743	Administrative data, Curitiba Urban Transport Corporation (URBS)	Details of the indicator and its measurement in the monitoring and evaluation plan Responsibility: URBS

EXPECTED OUTCOMES

Indicators	Unit of measure	Baseline	Baseline year	Final target (2025)	Means of verification	Comments
Specific objective 1: Improve the system's integration with complementary transportation modes						
Integrated trips using more than one transportation mode	Number of integrated trips per day	21,160	2019	46,000	Technical inspection reports.	Trips included in the mobile platform are included. Responsibility: URBS
Specific objective 2: Enhance the operating efficiency of the Direta Inter2 bus route						
Travel time of Direta Inter2 route users	Minutes	106	2019	68	Report for the Inter2 route, prepared by URBS	Responsibility: Curitiba Research and Urban Planning Institute (IPPUC) and URBS
Annual operating cost of transportation services on the Direta Inter2 route	U.S dollars	2,452,000	2019	1,804,000	Ex post cost-benefit analysis	Responsibility: IPPUC and URBS

Greenhouse gas (CO_2) emissions per day on the Direta Inter2 route	Tons/ day	43.7	2019	30.4	Report calculating pollutant gas emissions	Planned change of bus fleet to Euro VI and V and use of B100 biodiesel Responsibility: IPPUC and URBS
Specific objective 3: Make the bus stops and terminals of the Direta Inter2 route more accessible to pedestrians and mobility-impaired persons						
Women's perception of safety in the pedestrian access to the Direta Inter2 route	Percentage	38%	2019	43%	Walkability Index Methodology	Responsibility: IPPUC Urban Furniture Coordination Unit
Walkability to Direta Inter2 route bus stops	Index	2.21	2019	2.7	Walkability Index Methodology	Values from 1 to 4 Gender monitoring Responsibility: IPPUC Urban Furniture Coordination Unit
Satisfaction with the Direta Inter2 line public transportation service among persons with disabilities	Index	3.2	2019	3.36	Customer trip mapping methodology	Values from 1 to 5 Gender monitoring Responsibility: Special Department for the Rights of Persons with Disabilities and IPUCC

OUTPUTS

Output	Unit of measure	Baseline	Baseline year	Year 1	Year 2	Year 3	Year 4	Year 5	Final target (2025)	Means of verification	Comments
Component I. Civil works and works supervision											
Number of bus stops built that include complementary transportation facilities	Number of bus stops	0	2019	0	6	4	2	0	12	Technical inspection reports. Minutes.	
Campina do Siqueira – Portão corridor completed	Kilometers	0	2019	0	0	6	6	0	12	Technical inspection reports. Minutes.	
Other kilometers of bus-only lanes completed	Kilometers	0	2019	0	0	0	8	10	18	Technical inspection reports. Minutes.	
Kilometers of mixed lanes upgraded	Kilometers	0	2019	0	0	10	10	10	30	Technical inspection reports. Minutes.	
Works of art finished and in operation	Number of works of art	0	2019	0	0	1	2	3	6	Technical inspection reports. Minutes.	
Santa Quitéria terminal built and in operation	Number of terminals	0	2019	0	0	1	0	0	1	Technical inspection reports. Minutes.	
Linear meters of sidewalks with lighting and furnishings	Meters	0	2019	0	28,000	49,000	49,000	14,000	140,000	Technical inspection reports. Minutes.	

Output	Unit of measure	Baseline	Baseline year	Year 1	Year 2	Year 3	Year 4	Year 5	Final target (2025)	Means of verification	Comments
Component II. Innovation and technologies											
Business information modeling system implemented and in operation	System	0	2019	0	1	0	0	0	1	Six-monthly progress reports	
Operational Control Center implemented and in operation	System	0	2019	0	1	0	0	0	1	Six-monthly progress reports	
User preference study completed	Consulting services	0	2019	1	0	0	0	0	1	Six-monthly progress reports	
Consulting on nontax income concluded	Consulting services	0	2019	1	0	0	0	0	1	Six-monthly progress reports	
Mobility mobile app developed as a service and implemented	Mobile app	0	2019	0	1	0	0	0	1	Six-monthly progress reports	
Low-carbon bus structuring completed	Consulting services	0	2019	0	1	0	0	0	1	Six-monthly progress reports	
Gender-sensitive walkability index methodology applied	Consulting services	0	2019	0	0	0	0	1	1	Six-monthly progress reports	
Awareness campaign on violence against women conducted	Consulting services	0	2019	0	0	0	0	1	1	Six-monthly progress reports	

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country:	Brazil
Project number:	BR-L1532
Project name:	Curitiba Sustainable Urban Mobility Program
Executing agency:	Município of Curitiba, acting through its Technical-Administrative Management Unit (UTAG)
Fiduciary team:	Karina Díaz and Mario Castaneda (VPC/FMP)

I. INTRODUCTION

1.1 The institutional assessment for the program's fiduciary management took account of the following: (i) the fiduciary context of the country; (ii) the institutional evaluation (using the Institutional Capacity Assessment Platform (ICAP)); (iii) the evaluation of the main fiduciary risks; (iv) previous experience in operations executed by the Município of Curitiba; and (v) working meetings held with the municipal authorities.

1.2 Brazil has robust country fiduciary systems that enable sound management of administrative, financial, oversight, and procurement processes, fulfilling principles of transparency, economy, and efficiency. The executing agency's systems have an acceptable level of development in terms of their capacity for planning and organization, execution, and oversight.

1.3 The Technical-Administrative Management Unit (UTAG) will be responsible for the overall coordination of this new program, taking advantage of the organizational structure already implemented and consolidated, and drawing on lessons learned from the Munícípio of Curitiba Integrated Social and Urban Development Program (loan 2246/OC-BR). Its organization will be described in the program Operating Regulations, which will be approved pursuant to its founding decree and in agreement with the Bank.

II. FIDUCIARY CONTEXT OF THE EXECUTING AGENCY

2.1 The Technical-Administrative Management Unit (UTAG) will be created by municipal decree establishing the necessary authority for the effective management of program resources, based on loan 2246/OC-BR, as relevant for the management and technical supervision of the various program activities. The UTAG has managed five internationally funded projects, and its management staff are career officials. However, due to their oversight role, they also have a support team to monitor program management.

2.2 The organizational structure of the UTAG includes a general coordinator, a technical division, and a financial/administrative division. The UTAG will rely on the following municipal agencies: the Curitiba Research and Urban Planning Institute (IPPUC), the Municipal Planning, Finance, and Budget Department (SMF), and the Municipal Public Works Department (SMOP). Support units will include the Special Bidding Committee, which has already been created for the necessary activities of this

program via Official Notice 85/2019; the Legal Department; and the office of the Comptroller General of the Município of Curitiba.

2.3 The UTAG uses the município's document processing systems to interact with entities involved in approving processes. The planning and monitoring functions are carried out in-project. Nonetheless, they are closely supported by the município's Public Management System, which performs budgetary and accounting control but allows for the monitoring of contracts awarded and financed with Bank funds.

2.4 Procurement and contracting will be conducted in accordance national competitive bidding legislation: Law 8,666/93. Procurements of off-the-shelf goods and services will comply with Law 10,520/2002, Electronic Reverse Auction ("Pregão Eletrônico").

III. Institutional Capacity Assessment, Fiduciary Risk, and Mitigation Actions

3.1 The ICAP institutional capacity assessment of the município found that the executing agency has a high level of institutional fiduciary capacity with experience in executing operations with the Bank, as well as a low level of fiduciary risk for the operation. Fiduciary reviews will therefore be on an ex post basis. The Bank's fiduciary team will support the operation by monitoring the risk level and adjusting the supervision plan, as appropriate.

IV. Considerations for the Special Provisions of the Loan Contract

4.1 The operation has no special contractual conditions precedent to the first disbursement of loan proceeds that are fiduciary in nature.

V. Agreements and Requirements for Procurement Execution

A. Procurement execution

5.1 **Procurement of works, goods and nonconsulting services.** Contracts for project works, goods, and nonconsulting services that are subject to international competitive bidding (ICB) will use the standard bidding documents (SBDs) issued by the Bank. Procurements subject to national competitive bidding (NCB) will use national bidding documents agreed upon with the Bank. The selection and contracting of works, goods and various consulting services will comply with the Policy for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document GN-2349-9).[1]

5.2 **Selection and contracting of consultants.** Contracts for consulting services will use the standard request for proposals (SRP) issued by the Bank. Selection and contracting will abide by the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-9).[2]

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[1] The amended policies will enter into force in January 2020, by which time the applicable policy will be document GN-2349-15.

[2] The amended policies will enter into force in January 2020, by which time the applicable policy will be document GN-2350-15.

5.3 **Use of the country procurement system.** The country procurement subsystem approved by the Bank, an online reverse auction system known as "Pregão Eletrônico," will be used for the procurement of off-the-shelf goods or services for up to US$5 million. Any system or subsystem approved subsequently will be applicable for the operation. The procurement plan and its updates will indicate which procurements are to be executed through the approved country systems.

5.4 **Advance procurement/retrospective financing.** The Bank may retroactively finance up to US$21,340,000 against the loan proceeds (20% of the loan amount), and recognize up to US$5,340,000 against the local contribution (20% of the local contribution amount) in eligible expenditures incurred prior to the loan approval date, provided that requirements substantially similar to those established in the loan contract have been met. Such expenditures must have been incurred on or after the project profile approval date (27 August 2019) but not under any circumstances more than 18 months prior to the loan approval date.

5.5 **Single-source selection.** Not envisaged.

Table 1. Thresholds for international competitive bidding and international short lists

Method	ICB works	ICB goods and nonconsulting services	International short list Consulting services
Threshold	US$25 million	US$5 million	US$1 million

Table 2. Main procurements

Item	Selection method	Estimated date	Estimated amount (US$ million)
Works			
Construction of urban terminals	ICB/NCB	QI and QII-2021/ QI and QII-2022/ QI-2023	97.6
Construction of bus stops and bridges	NCB	QI and II-2021/QI and QII-2022/ QI-2023	22.4
Consulting services			
Contracting of technological solution for project development using building information modelling (BIM).	Quality- and cost-based selection (QCBS)	QI-2020	1.0
Contracting of a firm to support works supervision	QCBS	QI-2020	5.1
Contracting of a firm to support program management	QCBS	QI-2020	4.6
Contracting of a firm to support environmental management and supervision.	QCBS	QI-2020	4.4

Link to procurement plan

B. Procurement supervision

5.6 Procurements will be subject to ex post review, unless ex ante review is warranted. Procurements processed through the country system will also be supervised through the country system.

5.7 The review method will be determined for each selection process. Ex post reviews will be performed every 12 months, according to the project supervision plan. Ex post review reports will include at least one physical inspection visit, chosen from the processes subject to ex post review.

Table 3. Thresholds for ex post review

Works	Goods	Consulting services
NCB and Shopping	NCB and Shopping	Less than US$1 million

C. Records and files

5.8 The UTAG will be responsible for documenting the process and will retain all documentation necessary for monitoring and auditing purposes.

VI. FINANCIAL MANAGEMENT

A. Programming and budget

6.1 The UTAG will ensure that the program activities are undertaken as envisaged in the multiyear execution plan (PEP), annual work plan (AWP) and financial plan. For this purpose, it will ensure that budgetary funding for the program (both from the Bank and the local contribution) is allocated annually and is available for execution in accordance with project planning.

B. Accounting and information systems

6.2 The program's accounts will be processed through the municipal accounting system. The UTAG will prepare a specific chart of accounts for the program, acceptable to the Bank, and will establish the records and ancillary controls necessary to comply with the Bank's record-keeping and control requirements.

C. Disbursements and cash flow

6.3 Disbursements will be made in U.S. dollars, primarily in the form of advances to cover the liquidity needs foreseen in the program's financial plan. Advances will be made on the basis of a projection of expenditure for periods of up to 180 days and disbursed into a special account designated for the project.

6.4 For subsequent advances, at least 80% of funds previously advanced will need to be accounted for. The Bank will verify expenditure records on an ex post basis.

6.5 The exchange rate agreed upon for the purpose of accounting for loan advances will be the internalization rate. In the case of reimbursements, where applicable, the agreed exchange rate will be the rate prevailing on the day before the reimbursement request is submitted to the Bank.

6.6 Any expenses deemed ineligible by the Bank will be reimbursed from other funds at the Bank's discretion, depending on the reasons for ineligibility.

D. Internal control and internal audit

6.7 The município has an internal audit unit that coordinates its activities with the State of Paraná Audit Office (TCE/PR).

E. External control and reports

6.8 Within 180 days after the close of the respective fiscal year, the executing agency will deliver the program's annual financial statements to the Bank, duly audited by the State of Paraná Audit Office (TCE/PR) (an oversight authority certified by the Bank) or by a firm of independent auditors acceptable to the Bank. The cost will be financed with the loan proceeds.

F. Financial supervision plan

6.9 The financial supervision plan may be adjusted during execution, according to changes in risk levels or for additional control needs.

Table 4. Indicative supervision plan

Supervision activity	Nature/scope	Frequency	Responsible party	
			Bank	Executing agency
Fiduciary	Ex post review of disbursements and procurements	Annual	Fiduciary team	UTAG – External auditor
	Annual audit	Annual	Fiduciary team	UTAG – External auditor
	Review of disbursement requests	Periodic	Fiduciary team	
	Supervision visit	To be decided - annual	Fiduciary specialist	

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-__/19

Brazil. Loan ____/OC-BR to the Municipality of Curitiba
Sustainable Urban Mobility Program in Curitiba

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Municipality of Curitiba, as borrower, and with the Federative Republic of Brazil, as guarantor, for the purpose of granting the former a financing aimed at cooperating in the execution of the Sustainable Urban Mobility Program in Curitiba. Such financing will be for the amount of up to US$106,700,000 from the resources of the Bank's Ordinary Capital, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

(Adopted on ___ _____ 2019)

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