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Hinicio

Debt Financing for Zero Emission Buses in Latin America

ZEBRA
ZERO EMISSION BUS
RAPID-DEPLOYMENT ACCELERATOR

C40 CITIES

28th April, 2023

Glossary of terms and abbreviations

- **AFT:** Financial Administrator of Transantiago (Spanish acronym)
- **BEB:** Battery Electric Bus
- **CB:** Commercial Bank
- **CDMX:** City of Mexico
- **COP:** Colombian Peso
- **DTPM:** Directorate of Metropolitan Public Transport
- **EM:** Electromobility
- **EV**: Electric Vehicle
- **GHG:** Greenhouse Gas
- **ICE:** Internal Combustion Engine
- **LAC:** Latin America and the Caribbean Region
- **LATAM:** Latin America region
- **LCV**: Light Commercial Vehicle
- **MDB:** Multilateral Development Bank
- **MMX:** Millions of Mexican pesos
- **MUSD:** Millions of US dollars
- **M:** Million
- **NDB:** National Development Bank
- **NDC:** Nationally Determined Contribution
- **O&M:** Operations and maintenance
- **PROTRAM:** Federal support program for mass transit
- **PPP:** Public Private Partnerships
- **RRM:** Risk Recommendation Mechanism
- **TA:** Technical Assistance
- **TCO:** Total Cost of Ownership
- **ZE:** Zero Emission
- **ZEB:** Zero Emission Bus
- **ZEBRA:** Zero Emission Bus Rapid-deployment Accelerator

Debt Financing for Zero Emission Buses in Latin America

1

Main objective: to understand how cities can work with banks in LATAM to improve their ability to finance ZE buses

- The **Zero Emission Bus Rapid-deployment Accelerator** (ZEBRA), led by **C40 and the International Council on Clean Transportation (ICCT),** aims to accelerate the deployment of **zero emission buses in Latin America.** This may be achieved by overcoming financial, technical and political barriers, supporting decarbonization goals and enabling the e-mobility market transition.
- One of the main barriers for Zero Emission (ZE) buses in Latin America is their **high upfront cost compared to combustion technologies**. This is a critical challenge where **bus operation models rely on private owner-operation**, the **traditional ownership model** within the **public transport ecosystem** of the region, due to difficulty in accessing finance and raising capital.

This analysis includes mapping and interviews with banks, focusing on Mexico, Colombia, Brazil and Chile as core countries

This study aimed to:

1. Understand the **current status of products and credit lines for the financing of ZE bus projects** from banks in LATAM.
2. Understand the **needs of banks in relation to ZE bus infrastructure investment** and **provide guidelines** on what cities should focus when looking for investment for their public transport ecosystem.
3. **Recommend a set of risk mitigation mechanisms** aimed at improving the financing of ZE bus projects in Latin America.

The study identified 25 banks and other stakeholders that are relevant to the financing of ZE bus projects

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Fourteen of the banks provided inputs to the analysis

Mexico*

Surveyed

BANORTE

Interviewed

Banca Mifel

nacional financiera

- Interview participant
- Did not respond
- Survey participant

Colombia

Surveyed

BBVA

Interviewed

FDN

Findeter

BANCOLDEX

- Interview participant
- Did not respond
- Survey participant

Brazil

Surveyed

Itaú

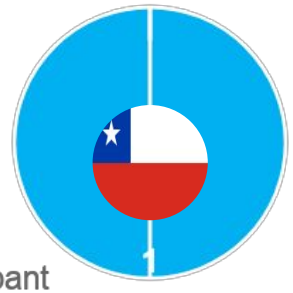
Mercedes-Benz Bank

Interviewed

BNDES

- Interview participant
- Did not respond
- Survey participant

Chile

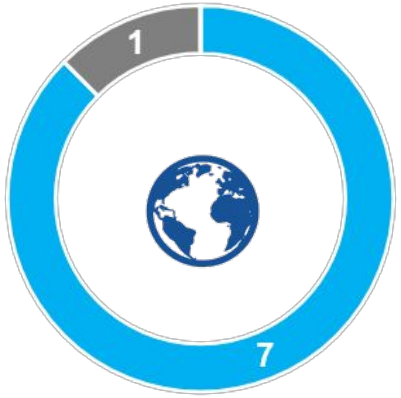


Interviewed

BancoEstado

- Interview participant
- Did not respond
- Survey participant

MDBs



Interview Participant

WB

IFC

IDB

IDB Invest

AFD

KFW

CAF

China Development Bank

国家开发银行 CHINA DEVELOPMENT BANK

Did not respond

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*GGGI (Global Green Growth Institute) and Emobilitas were also interviewed as relevant stakeholder in Mexico

Debt Financing for Zero Emission Buses in Latin America

2

Findings: **Strong cohesion** shown by **several initiatives** and **ongoing partnerships** among players

KEY MESSAGES

- The banks interviewed are **very familiar with ZE technologies** and have been monitoring the progress of pilots for several years.
- **Multilateral Development Banks** (MDBs) in the region have explicit mandates focused towards Zero Emission Mobility technologies.
- The **battery action plan** for its second-life reuse has a crucial importance for **MDBs when financing ZE projects.**
- **MDBs and NDBs** are actively working on establishing the conditions that facilitate the structuring of ZE Bus project finance.
- There is **low interest** from **local commercial banks** to participate in these projects, as project economic are too expensive and there is a general knowledge gap in relation to ZE technologies.
- New **bidding processes** must be clear in terms of **how to guarantee the source of repayments.**
- The **deployment of ZE Bus projects** in smaller cities is less attractive for MDBs.
- There is **strong cohesion among the actors interviewed** and many of them are already **working together to scale-up** ZE bus projects.

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KEY FIGURES

4 Banks have implemented instruments for the financing ZE Bus projects in LATAM

2 Targeted cities have secured financial support for ZE Bus projects

100% Of financial support adopts the unbundled model of public-private implementation in the public transport system

1 Commercial bank has been developing financial instruments for ZE Bus projects

*Scope includes those that participated in the interview or survey

Categorizing banks according to their experience with ZE bus projects

CATEGORIZATION OF MULTILATERAL DEVELOPMENT BANKS

1. **Level of Experience of financing Zero Emission Bus projects:** This considers the track record of the multilateral development banks in supporting the deployment of Zero Emission Bus projects, with banks assigned to one of three levels:

High: If the MDB has participated in the provision of financial support for any Zero Emission Bus projects in the region.

Medium: If the MDB has supported any Zero Emission Bus project in the region with technical assistance during the concession tender process.

Low: If the MDB has explored the different alternatives for supporting Zero Emission Bus projects with financing, but without any implemented cases to date.

CATEGORIZATION OF LOCAL BANKS

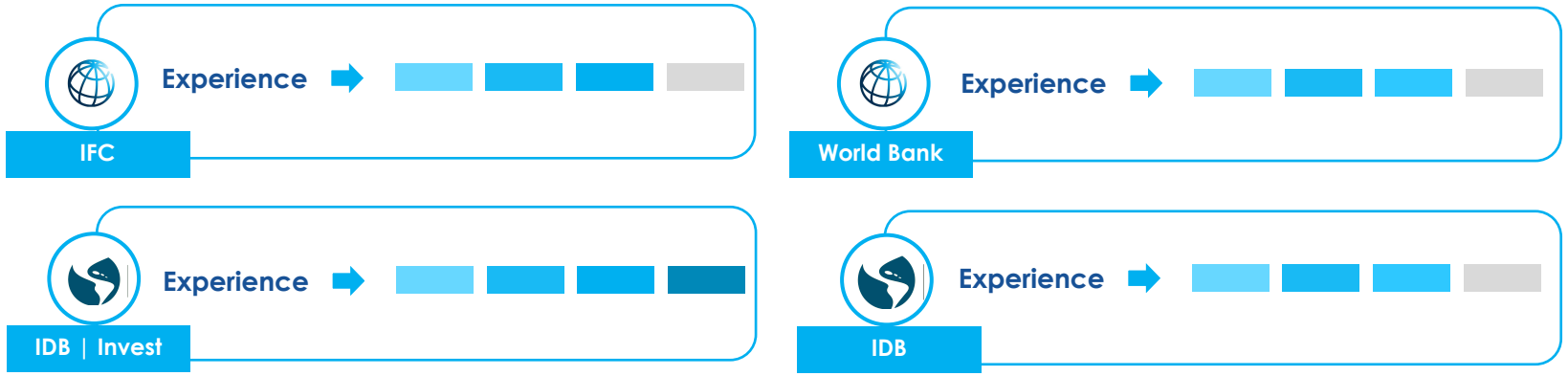
1. **Implementation timeframe of Financial Instruments for Zero Emission Bus projects:** This timeframe was assessed and projected by the consulting team, based on the interview with each bank. It provides an indication of the expected timeframe for the availability of financing instruments for Zero Emission Bus projects, considering the period (2022-2025).

Implemented: If the local bank has already supported the financing of a ZE Bus project in the region, as is the case of FDN and MIFEL in 2022.

Under Development: If the local bank is currently re-adapting and/or developing financial instruments (mostly loans or guarantees) to support the deployment of ZE Bus projects.

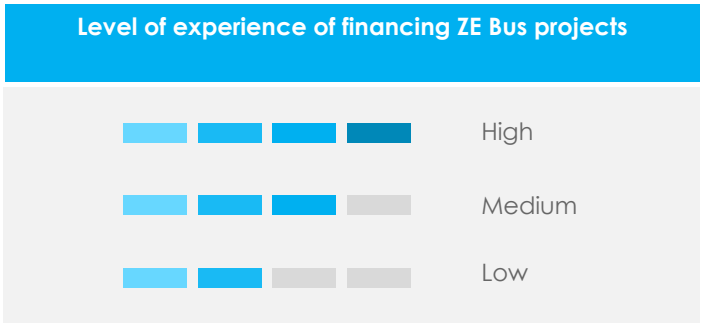
To be Implemented: If the local bank has a potential financial instrument to support ZE Bus projects that is expected to be implemented during the period indicated (for example, BNDES).

MDBs such as **IFC and IDB Invest** are leading the race **to implement financial instruments** for ZE Bus projects as of the end of 2022



Key Takeaways

- **IDB Invest and IFC** could become potential lenders in the "**E-Buses" project** that consists of the purchase of **992 electric buses** by the project Sponsor **(SPV) Buses K Cuatro. The 992 e-buses** will operate in **Santiago's** *Red Metropolitana* (metropolitan network) system under an unbundled business model. The total cost of the project is estimated at 460 MUSD. **IDB Invest** has been also involved in three ZE Bus projects in **Colombia**, where **Electribus** is the largest in terms of financial support committed.
- Both, the **World Bank and IDB** have an extensive track record providing technical assistance to LATAM cities. **IDB has supported the financing processes** of the public transport systems of both Bogota and Santiago, in addition to being able to leverage funds from the Green Climate Fund (GCF) in these cities. Both MDB's are able to offer credit guarantees to local participants.
- In addition, the **World Bank** is in ongoing conversation with **CAIXA, and Banco do Brazil** around the structuring of **credit lines** and is also supporting the **design of a Bus Rapid Transit (BRT) system** with 100 E –buses in Brazil.



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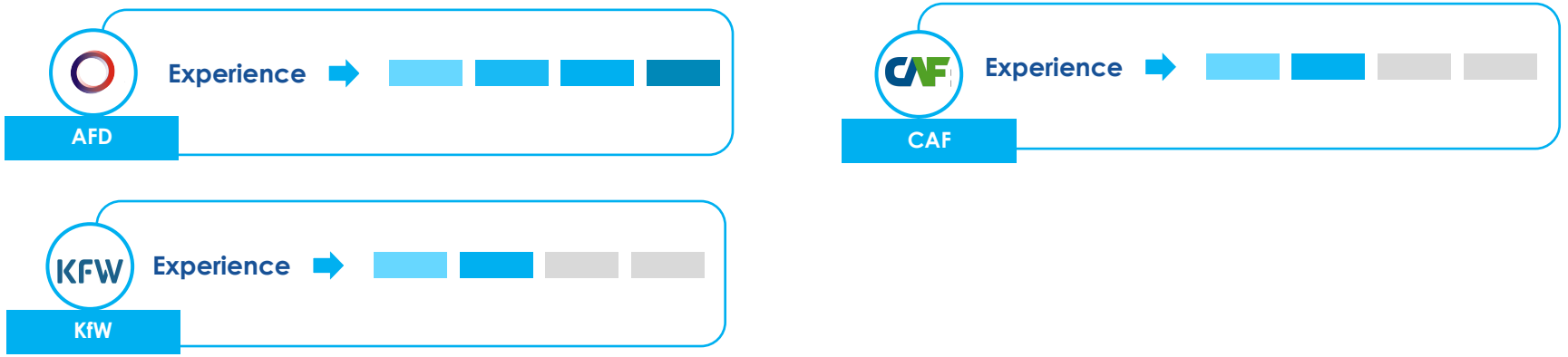
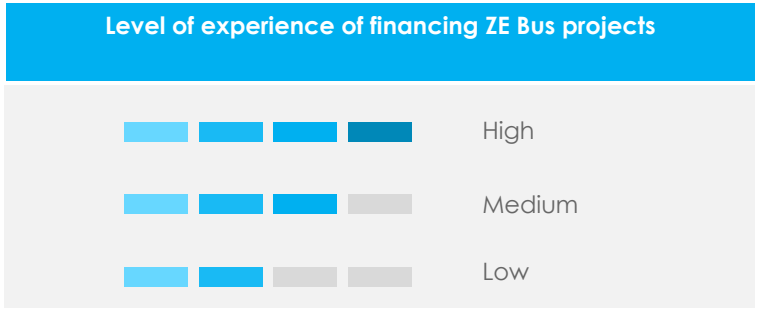
1 https://www.idbinvest.org/es/proyectos/e-buses-chile

AFD's development finance subsidiary **PROPARCO** has **leveraged over 100 MUSD** in **Bogota's Zero Emission Bus projects** as of 2022



Key Takeaways

- **AFD** through its private sector financing arm, **Proparco,** has already participated in **two projects in Bogota** (Electribus and Transmilenio). Its key partner is the Colombian's NDB FDN for leveraging French funds.
- **CAF** is expected to take a **crucial role in the region** within the coming years by exploring new **locations suitable for scaling up ZE Bus projects,** such as, for example, cities in Chile. Under the umbrella of **E-motion**, the Bank plans to finance ZE bus projects in Panama, Paraguay and Uruguay.
- **KFW Development Bank** has already agreed **partnerships** with local banks in **Colombia and Mexico**, while in **Brazil**, conversations are ongoing with **BNDES**. As Chile is not part of **Germany's ODA program,** the Bank will not participate in ZE bus projects in Chile.



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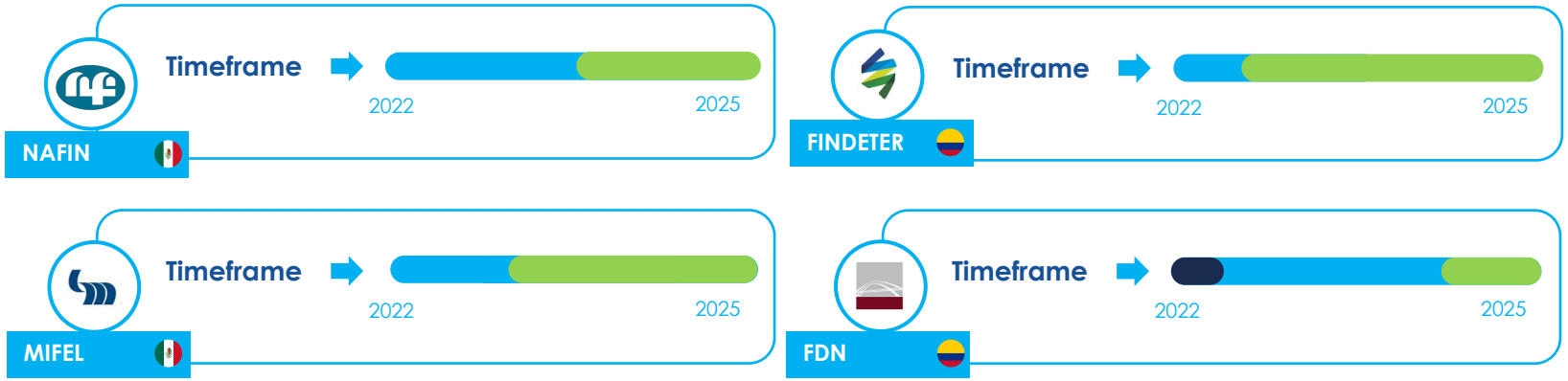
1 https://www.idbinvest.org/es/proyectos/e-buses-chile

Local banks are preparing to support ZE Bus projects, however, **national policies vary widely** between countries



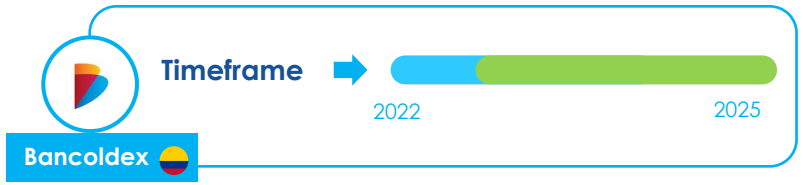
Status of Financial Instruments for ZEB Projects

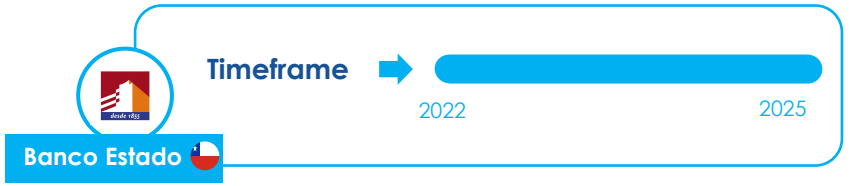
- Implemented
- Technical Assistance
- Under Development
- To be Implemented

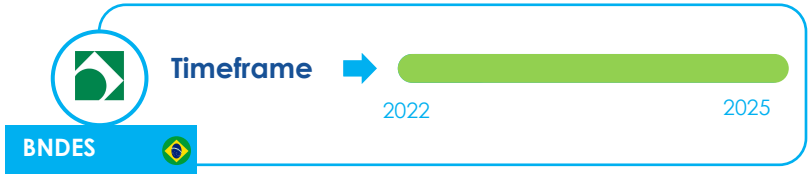
Key Takeaways

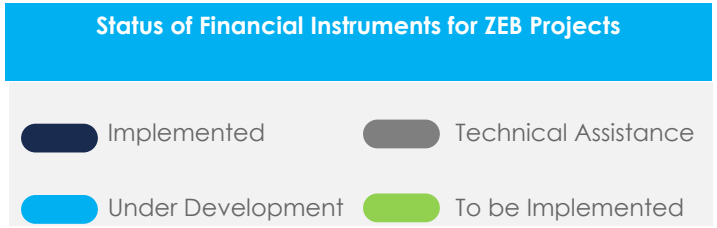
- In Mexico, **NAFIN** is currently developing **instruments for e-mobility**. In 2022, the Bank agreed a **partnership with KFW Development Bank for promoting electromobility**, with an initial focus on the **electrification of the taxi fleet** in Mexico City (CDMX).
- **MIFEL has declared its interest in financing the electric fleet of the Metrobus BRT** system in City of Mexico, by providing attractive **rates with a grace period** that could extend from **3 to 9 months**.
- **FINDETER** could also disrupt the market with its **"loan with compensated rates"** instrument. **This refers to loans with special and more competitive rates**, designed using federal as well as FINDETER resources enabling them to be competitive.
- **FDN** is the most active player **among** the **banks interviewed**. The Bank has granted loans to the **Electribus and Green Movil** projects, both currently in operation in Bogota.

BNDES has developed **credit lines towards ZE Bus projects**, however banks requisites remains as the **main barriers**









Key Takeaways

- **BANCOLDEX** expects to **leverage international funds** to offer **credit lines with lower rates** in the form of loans for 15-20 years. Although, the Bank has already received **funding from IDB for financing E-bus fleet** and **infrastructure**, these **funds remain frozen mainly due to their lack of concessional guarantees** between the Colombian Government and IDB.

- **BNDES**, the NDB interviewed in Brazil, has already issued FINEM , Finame Baixo Carbono and Fundo Clima credit lines for ZE Bus projects. And the Bank is in conversations with KFW Development Bank to explore opportunities to leverage German funding. However, one the main barriers to these activities identified during the interview is the requirement of BNDES for a **fiduciary agent to be involved in the financing model**. The **need for a commercial bank** to provide **indirect transactions to use BNDES credit lines** remains a **challenge** as there are currently few commercial banks that are interested in participating in the mobilization of these funds.

- **Banco Estado** states that, as of 2022, **they haven't financed ZE bus projects for public transport systems.** However, the Bank is currently supporting the purchase of **electric taxis, commercial/urban freight vehicles and buses for private passenger transport services** with "*green credit lines*"**.**

Debt Financing for Zero Emission Buses in Latin America

2

MEXICO

Status of ZE Bus Projects (end of 2022)

Improvement of transport systems relies on the extent to which **subnational authorities** can **capture public resources** that may **guarantee ZE bus operations**

1

The role taken by **National Development Banks**, such as **NAFIN** and **BANOBRAS**, will be key for **leveraging international funds** to provide **additional sources of financing for ZE Bus projects**, whereas, as per its Constitution, **municipalities** in Mexico are **unable to receive international funds** in the form of debt.

2

On behalf of the **PROTRAM program** of **BANOBRAS**, **federal resources** are being channeled into different cities in order to finance **infrastructures investments** in the **public transport system.** However, **this program does not consider the financing of bus fleets**.

3

Metrobus' model presents the **ideal conditions for the involvement of banks**. A key aspect identified in the interview is the "***Fideicomiso"* trust mechanism** that characterizes **Mexico City BRT system**. This concept plays a **fundamental role** as it provides a **guarantee for lenders in the financing of the ZE bus projects.**

NAFIN's credit guarantee stands out as a **potential instrument** for **ZE Bus** project financing in Mexico

Legend

Readiness[1]

- ★☆☆ Low probability of being deployed
- ★★☆ Medium probability of being deployed
- ★★★ High probability of being deployed

Key Takeaways

- NAFIN seeks to **leverage its credit guarantee scheme** toward ZE bus fleets. This national development bank, which is focused on **small and medium private companies**, has two potential path for **supporting these projects with financing:**
  1. By offering **attractive loans;**
  2. By offering **credit guarantees through sectorial programs.**

- **NAFIN's loans** can be delivered to the private sector at the ground floor, acting as a bank focused on small-scale projects, or at a higher level for bigger projects, acting as a **financial agent between international financial entities**. However, the Bank can only finance fleets and not infrastructure for e-mobility projects. Additionally, ZE Bus fleets are not eligible to receive financing.

NAFIN's existing financing options for ZE Bus projects

« Loans »

Readiness[1] ☆☆☆

- **Budget:** Not Defined
- **Off-taker:** Private
- **Instrument:** Loans
- **Scope:** Fleets

« Credit Guarantees »

Readiness[1] ★★☆

- **Budget:** Not Defined
- **Off-taker:** Private
- **Instrument:** Loans
- **Scope:** Sectoral programs (E-taxi / trucks)

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[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

MIFEL highlights interest in **financing electrification of Metrobús lines**

Legend

Readiness[1]

- ★ ☆ ☆ Low probability of being deployed
- ★ ★ ☆ Medium probability of being deployed
- ★ ★ ★ High probability of being deployed

Key Takeaways

- **MIFEL's loans are ready to be scaled-up towards ZE bus projects**. The Bank is considering offering attractive rates in the range of **TIIE** (Interbank Equilibrium Interest Rate of Mexico) **+2% to 5%.**
- For **MIFEL**, the ticket size of the financing should be roughly in the range of 500 MMXN (~ 27 MUSD) for Zero Emission projects.
- **The key driver for MIFEL** to begin financing ZE Bus projects in Mexico, is the trust instrument **(Fideicomiso) which provides a guarantee for repayments.**

MIFEL's existing financing options for ZE Bus projects

Readiness[1] ★ ★ ★

« Loans»

- **Budget:** No Information Available
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** To be defined

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[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

High dependency from **local governments** to finance their **mobility projects** relies on the **high % of revenues from federal resources**

01

Local resources
Resources that are collected by the authority through local taxes.

02

Metropolitan Fund (FM)
Funds to promote infrastructure projects related to regional development and urban planning. Only available for Mexico's metropolitan areas.

03

PROTRAM
Focuses on improving the mass transport system in cities with +500,000 people . Financial support to local governments for charging infrastructure, up to 50%, and technical assistance.

04

Climate Change Fund
Funds are administered by the Ministry of Finance and Public Credit (trustor) while NAFIN is the trust institution and SEMANRAT the supervising unit. Among others, one of its mandates is to support low emission public transportation.

05

FOTEASE
The Energy Transition and Sustainable Energy Use Fund was created in 2009 without an e-mobility component. The "Electromobility through charging infrastructure" component was approved in 2017 to develop a network of charging stations in the three major cities in Mexico and nine specific highway corridors.

Greener PROTRAM

- The interview with **GGGI and eMobilitas** provided **interesting findings** about the plans to make **PROTRAM** program greener.
- The **PROTRAM program is an initiative led by BANOBRAS** that uses resources from a trust fund (**FONADIN**) to support the public transport sector in Mexico.
- The "**greener" PROTRAM** concept should **provide a framework** that is aimed towards allocating **public funds for scaling up ZE Bus projects.**
- **GGGI (Global Green Growth Institute) is an active player** in the implementation of this new scheme, **providing technical assistance** on its development.
- There is an initiative to present the "Green PROTRAM" to the **GCF** and **implement a Fideicomiso** which could benefit 8 Mexican cities.

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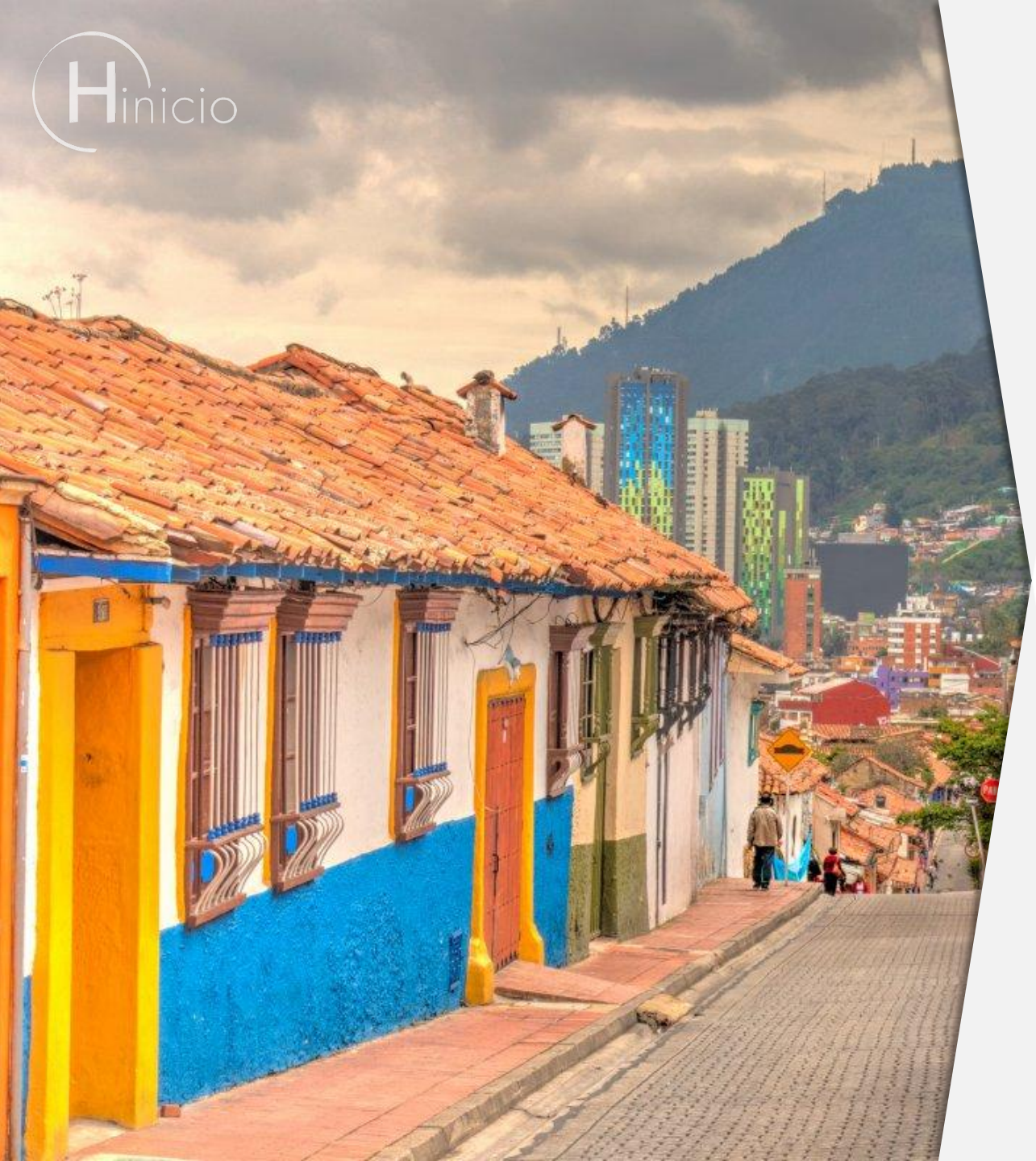
[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects



COLOMBIA

Status of ZE Bus Projects (end of 2022)

In **Colombia**, the promotion of **ZE bus projects** relies on **municipal support** and **Bogota's successful cases** have been, in part, thanks to **FET**[1]

1

Even though **FDN has been involved in two zero emission projects** in Bogota, both with great success, the **Colombian Government needs to address** more **concessional guarantees** with **Multilateral Development Banks** in order to leverage international funds for other cities, like Medellin.

2

On behalf of the **Bicentenary Group**, a **strategy is being carried out** for the **Colombian Government** to **reallocate public funds** through its **National Development Banks**. In this sense, the year **2023 will be key in terms of upscaling zero emission technologies.**

3

Successful cases have been driven by the **implementation of the unbundled model as part of concession tenders**. The **biggest challenge when it comes to replicating this model outside of Bogota**, is to **demonstrate a healthy balance sheet** to be able to access debt instruments.

4

The **Transmilenio system** in Bogota has implemented the **unbundled business model** with clear conditions that **guarantee repayment to the bus providers** and thus mitigate risk for lenders. However, **MDBs have declared lower interest in other Colombian cities** since restrictive concession conditions remain, placing increased risk on the transport operator.

[1]Tariff stabilization fund

FDN and **PROPARCO** have together leveraged **+200 MUSD to roll-out the deployment** of **Zero Emission Bus projects in Bogota**

Key Takeaways

- **Electribus:** The project consortium is owned by Ashmore and Somos K, including two project companies (Electribus Usme I and Electribus Fontibon II). These entities are responsible for the Integrated Public Transport System of Bogota. This project receives financial support from PROPARCO of (+/- 52 MUD) delivered as 2 loans and a liquidity credit line provided by FDN to cover cash shortfalls for operating expenses and debt service. UK SIP fund will issue a loan for the battery financing.

- **Green Movil:** In 2022, FDN and Proparco granted a loan in Colombian pesos of +/- 150 MUSD to the SPV formed by Transdev and Fanalca for the purchase of 250 new e-buses that will operate in the Transmilenio system. FDN will provide 66% of the project finance and the remaining amount, will be covered by PROPARCO

Projects	Financer	SPV	Duration	Project budget	Financing amount	Type of financing	Scope	Manufacturer
Electribus	FDN / Proparco/ IDB Invest	Ashmore and Somos K (Electribus Usme I, Electribus Fontibon II)	15 yrs	*NIA*	52 MUSD	Debt (Loan)	259 E-Buses and battery replacement	BYD
Guagua Usme	IDB Invest	Usme, Transmilenio	15 yrs	92 MUSD	28 MUSD	Debt (Loan)	229 E-Buses + Infrastructure	*NIA*
Guagua Fontibon	IDB Invest	Tercer Milenio	N/A	75 MUSD	25 MUSD	Debt (Loan)	172 E-Buses + Infrastructure	*NIA*
Green Movil	FDN / PROPARCO	Fanalca Group, Transdev	14 yrs	*NIA*	150 MUSD	Loans + Liquidity	406 E-Buses + Infrastructure	*NIA*

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[2]https://fileserver.fdn.com.co/Descarga?ruta=fdn/INFOINVERSIONISTAS/00001/FDNINFPRE000010062022062401.pdf
[3]https://cms.fdn.com.co/sites/default/files/2022-03/fdncomunicadomarzo2021financiacionbuseselectricos_0.pdf
[4]https://www.idbinvest.org/es/proyectos/guagua-fontibon-electric-bus-project

NIA: No Information Available

The **project sponsors** of Green Movil, as well as the **Fare Stabilization Fund (FET)** in Bogota, have played a key role the in financing of this project

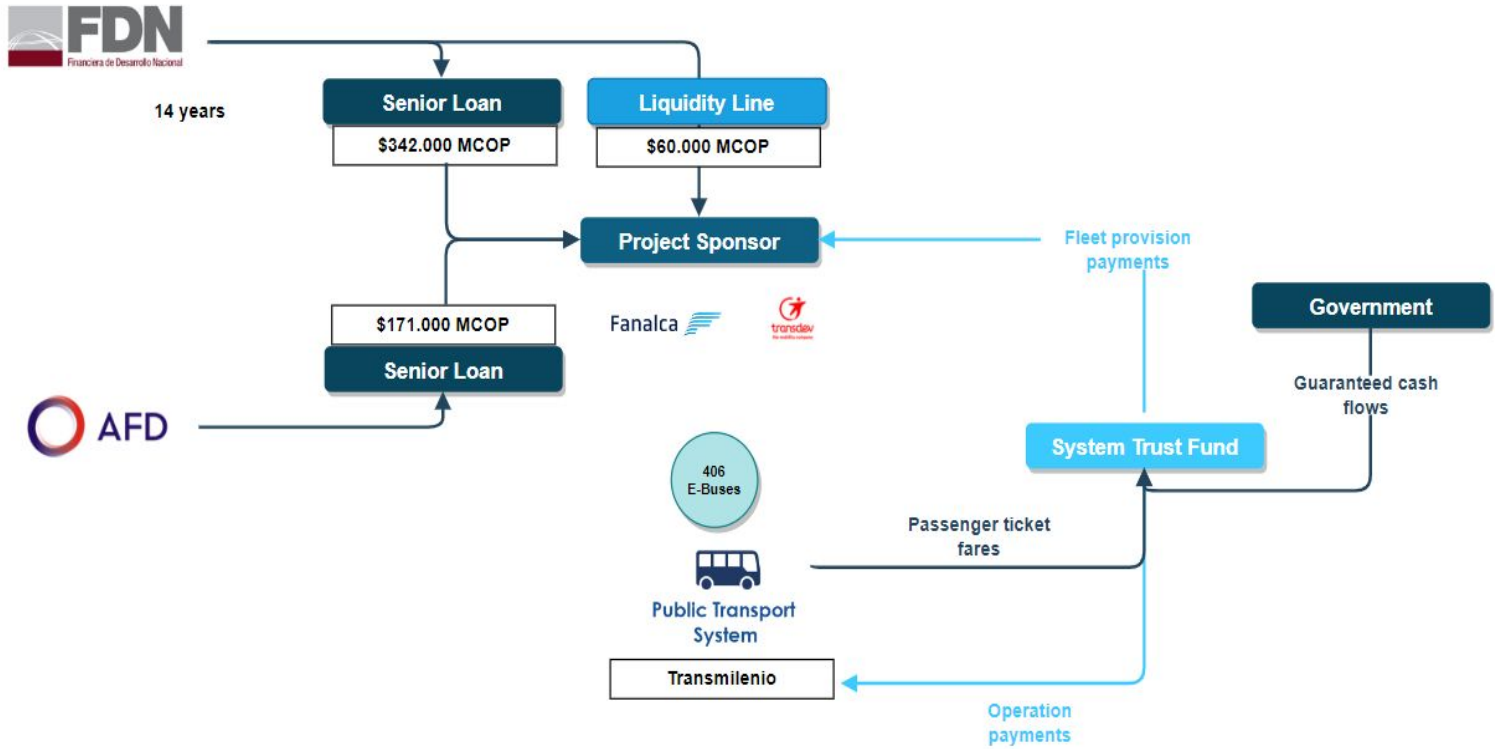
Green Movil Project

FDN

AFD

1 Green Movil

Financer: **FDN / Proparco**
Financing amount: **150 MUSD**
Off-taker: **Private**
Stakeholders: **Grupo Fanalca, Transdev**
Instrument: **Loans / Liquidity line**
Scope: **Fleet (406) / Infrastructure**
Location: **Bogota, Colombia**



- In June 2022, the board of FDN approved financing support of 342 MMCOP (~72 MCOP), 66% of the total project finance. The remaining 33% will be covered by AFD through its subsidiary PROPARCO. The support comes in the form of loans to the project sponsor.
- A System Trust Fund called FET is being implemented in Bogota to provide a guarantee for sources of repayment. In 2023, 11.2% of the total annual budget will go to the FET as annual losses of nearly $551 billion Colombian pesos are suffered as a result of passengers who don't pay to use Bogota's transportation system. This expense is assumed by the District and not by the operators.

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https://www.elespectador.com/bogota/criticas-desde-el-concejo-por-aumento-de-recursos-para-cubrir-deficit-del-transporte-publico-de-bogota/

BANCOLDEX is cautious about financing **ZE Bus projects** due to **its less than positive experience** with the **first hybrid buses fleets in Transmilenio**

Legend

Readiness[1]

- ★☆☆ Low probability of being deployed
- ★★☆ Medium probability of being deployed
- ★★★ High probability of being deployed

Key Takeaways

- BANCOLDEX is re-analyzing how to participate in ZE bus projects for public transport by **training their internal risk staff and is aiming to raise international funds.**
- As of 2022, BANCOLDEX is able to support this emerging industry by **offering credit lines through commercial banks** as well as through its restructured **leasing area,** however neither of these instruments are prepared for Zero Emission Bus projects and would need to be adapted to serve these projects.
- The Bank's position should be clearer following the results of the strategy that is being developed by the Bicentenary Group, which may see its readiness level to finance Zero Emission Bus projects increase in the short term.

BANCOLDEX's existing financing options for ZE Bus projects

« Through an intermediary »

Readiness[1] ★★☆

- **Budget:** Non Information Available
- **Off-taker:** Private
- **Instrument:** Loans
- **Scope:** Fleets

« Leasing area»

Readiness[1] ★☆☆

- **Budget:** No Information Available
- **Off-taker:** To be defined
- **Instrument:** Loans
- **Scope:** Fleets

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[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

FDN not only **supports ZE Bus projects with financing**, but the Bank also act as an **articulator in the current Colombian ecosystem**

Legend

Readiness[1]

- ★☆☆ Low probability of being deployed
- ★★☆ Medium probability of being deployed
- ★★★ High probability of being deployed

Key Takeaways

- Through working alongside the government, one of FDN's **objectives is to encourage the participation of additional actors.**
- As of 2022, **FDN has been involved in Colombia's largest e-mobility projects, leveraging resources alongside PROPARCO**. The Bank has used two instruments for the roll-out of ZE Bus projects in Bogota. (**Loans with attractive rates and a liquidity line**).
- **The liquidity line** of FDN is a financial instrument that **aims to cover cash shortfalls for operating expenses and debt services.**

FDN's existing financing options for ZE Bus projects

« Loans»

Readiness[1] ★ ★ ★

- **Budget:** Not Defined
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** Fleets

« Liquidity Line»

Readiness[1] ★ ★ ★

- **Budget:** Not Defined
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** Fleets

Prepared by

[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

Under the framework "*Reactiva Colombia*", **FINDETER** seeks to have **concrete financial instruments** for **E-mobility projects by 2023**

Legend

Readiness[1]

- ★☆☆ Low probability of being deployed
- ★★☆ Medium probability of being deployed
- ★★★ High probability of being deployed

Key Takeaways

- The **Reactiva Colombia Program** is an initiative that seeks to boost the economy and **promote investments in key sectors for Colombia's development** in term of **infrastructure, by using compensated rates.**
- FINDETER has extensive experience in supporting cities to improve their public transport systems by providing technical assistance (Manizales & Villa Vicencio).
- **The "compensated rate" uses federal/national resources as well as FINDETER resources to offer attractive financing in the form of debt.** The Bank will start piloting a credit line on behalf the Reactiva Colombia program, with an initial budget of 48 billion COP and compensated rates (10 MUSD) during 2023 for financing green projects, including, potentially, ZE bus projects.

FINDETERS's existing financing options for ZE Bus projects

Readiness[1]

« Compensated rates» ★★☆

- **Budget:** No Information Available
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** Fleet and Infrastructure

Prepared by

[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

BRAZIL

Status of ZE Bus Projects (end of 2022)

Partial Credit Guarantees (PCGs) could help to **guarantee sources of repayment** from cities for scaling up ZE Bus projects

1

Electric buses in Brazil are expensive. **Import tariffs** in Brazil are very high in comparison with other Latin American countries, making the cost of electric buses up to **5 times higher** than **diesel powered buses**.

2

BNDES can provide direct financing for ZE bus projects through FINEM Meio Ambiente and Fundo Clima credit lines. However, for this type of project it is considered too risky to have the **private operator as the direct borrower** and **public guarantees are needed as sources of repayment for the lenders.**

3

BNDES can also provide indirect financing for ZE bus projects. However, in Brazil scaling-up **these activities require an intermediate commercial bank**. A **lack of interested commercial banks** in the Brazilian ecosystem is a gap for manufacturers such as BYD and Eletra.

4

Due to the local context in Brazil and the way in which **public transport systems are managed**, **scaling up the finance for ZE Bus projects** will require changes that provide more **transparent and innovative** conditions and allow good service levels.

BNDES is committed to promoting the adoption of e-buses and **already has a credit line** that **can be used** to finance ZE Bus projects

Legend

Readiness[1]

- ★☆☆ Low probability of being deployed
- ★★☆ Medium probability of being deployed
- ★★★ High probability of being deployed

Key Takeaways

- The **direct credit lines of BNDES** must be linked to a **fiduciary agent acting in the transaction**. BNDES requires the presence of an entity that can provide services as a fiduciary agent to guarantee sources of repayment. However, **securing such a participant is a major challenge for local municipalities** as they must modify their operating models to ensure that the flow of money passes through this agent.
- **FINAME's loan** seems to be a feasible instrument for bringing financial support into zero emission bus projects as the conditions of the loan are **attractive in financial terms**. Nonetheless, this instrument needs the presence of a **local commercial bank that acts as an intermediate bank** for leveraging the funds to the final off-taker. And the missing link here is a **lack of commercial banks** interested **in participating** as **intermediary entities** in this type of transaction.

	Path / Years		Rate	MIN Fin.	MAX Fin.
FINAME	Indirect	10	TLP + 0.95% -3.5%	N/A	N/A
FINEM	Direct	15	TLP + 0.90% + risk rate	$8 MUSD	N/A
FUNDO CLIMA	Direct	12	1% + risk rate	$2 MUSD	$16 MUSD
FUNDO CLIMA	Indirect	12	1.5 % + risk rate	N/A	$2 MUSD

Prepared by

[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

TLP refers to the long-term rate of BNDES

BNDES has **minimum requirements for manufacturers**, with only **BYD and ELETRA accredited** by the system

Legend

Readiness[1]

- ★ ☆ ☆ Low probability of being deployed
- ★ ★ ☆ Medium probability of being deployed
- ★ ★ ★ High probability of being deployed

BNDE'S requirements for manufacturers

PRODUCTS	Phase 1		Phase 2		Phase 3		Phase 4	
	IC	IEP	IC	IEP	IC	IEP	IC	IEP
Chassis	20%	15%	30%	20%	40%	25%	50%	30%
Recharging Equipment	25%	15%	35%	25%	45%	30%	50%	30%
Batteries	10% local manufacturing in phase 1 (general rule from 2031 onwards)							

BNDE's existing financing options for ZE Bus projects

« Fundo Clima »

- **Budget:** 80 MMR / year (~15 MUSD)
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** Fleet and Infrastructure

★ ★ ★

Readiness[1]

« Finem Meio Ambiente »

- **Budget:** Min 40 MMR / (~7 MUSD)
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** Fleet and Infrastructure

★ ★ ★

Readiness[1]

« FINAME »

- **Budget:** No Information Available
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** Fleet and Infrastructure

★ ★ ★

Readiness[1]

Prepared by

[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

CHILE

Status of ZE Bus Projects (end of 2022)

National E-mobility Strategy states that all new **fleets deployed** must be **100% electric** in **public transport systems by 2035**

1

The **successful experience in Santiago with the purchase of 992 E-buses** by Buses K Cuatro, **shows that the unbundled model** has marked a **positive impact in terms of scaling up ZE bus fleets**. It is expected that RED Metropolitan's bidding process, which should be published at the **end of 2023,** will include heavy **involvement of some of MDBs interviewed**

2

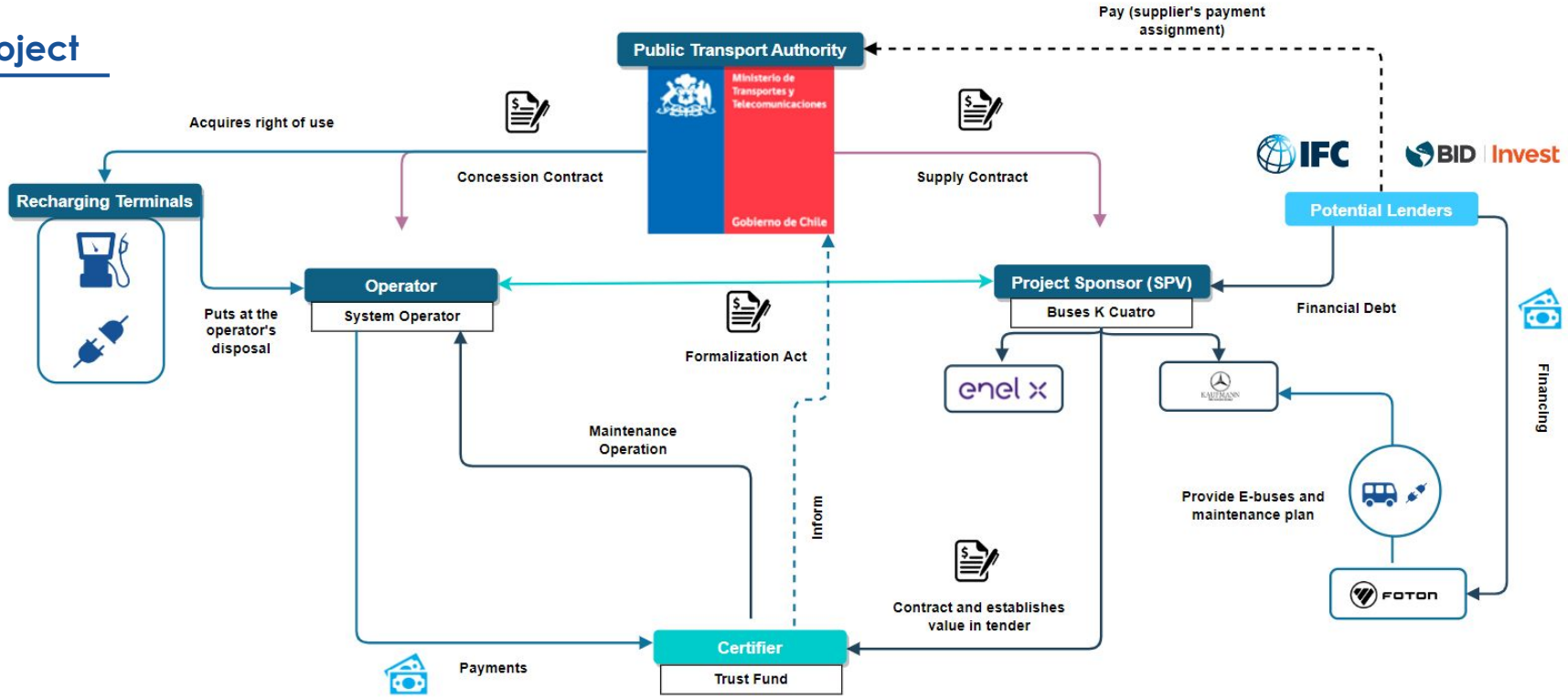
Public transport systems in Chilean regions are **less attractive for MDBs** like IFC and IDB Invest, as **ticket size may be too small to be competitive**. However, **with the Ministry of Transport and DTPR, CAF is exploring pathways** to finance the entire **regional transport system** rather than region-by-region.

3

Banco Estado has been implementing **credit lines for ZEV** but **alternatives for public transport systems** are still **under development**. **Coordination is needed between DTPR** and **Banco Estado** to establish operator/ asset owner conditions that align with the Bank's policies. This **is expected to progress during 2023.**

The latest purchase of **992 e-buses are expected to** include **financial support** of **IFC and IDB Invest of 304M USD**

E-Buses Chile Project



IFC and **IDB Invest** are expected to become the main lenders (**304 MUSD**) to the SPV" **Buses K Cuatro**". The project considers the purchase of **992 electric buses** to be operated in Red Santiago system.

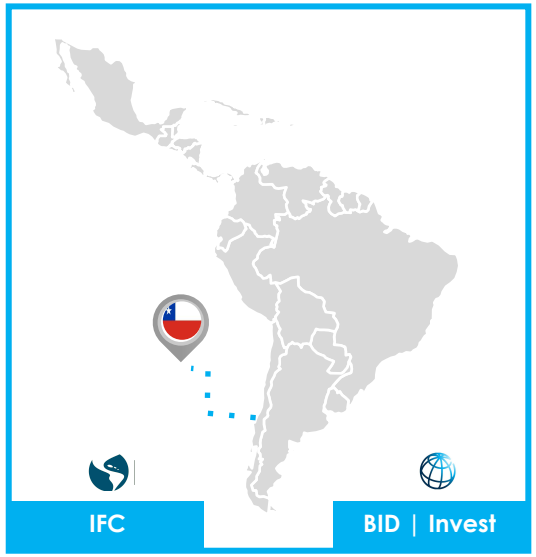
The **concession tender for** this project was based on an **unbundled business model**. **IFC** and **IDB Invest** have stated that the **strong sponsorship shown by the Joint Venture** was key to structuring this potential financing operation.

A **federal trust agency** that guarantees a source of repayment for lenders, **appointed as AFT**, receives funds from **passenger tickets fares** and then provides **payments based on passenger tickets fares and kilometers** to the **infrastructure and energy supplier** as well as to the operator of the RED metropolitana system.

Prepared by

[1]https://www.dipres.gob.cl/597/articles-244603_doc_pdf.pdf

Project finance for the **purchase of 992 e-buses serves** as an example for implementing the **unbundled model in tenders**



Legend

Readiness[1]

- ★☆☆ Low probability of being deployed
- ★★☆ Medium probability of being deployed
- ★★★ High probability of being deployed

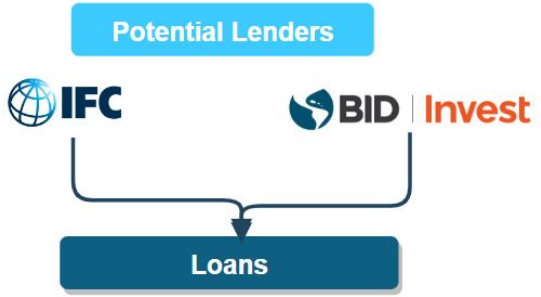
[1] Level of readiness to implement its existing instrument for the financing of ZE Bus projects

1 E-Buses Chile

Readiness Level[1] ★ ★ ★

Key Takeaways

- The purchase of **992 electric buses in Santiago expects to include the financial support of IFC and IDB Invest** in the form of debt to the bus provider represented by Kaufmann and Enel X, "Buses K Cuatro".
- **AMP Capital publicly announced the acquisition of the Zero Emission Bus projects of ENEL X in Chile and Bogota**.



Name	Potential Lenders	SPV	Duration	Project budget	Financing amount	Type of financing	Scope	Manufacturer
E-Buses Chile	IFC / IDB Invest	Buses K Cuatro*	14 yrs	460 MUSD	304 MUSD	Debt (Loan)	992 E-Buses	Foton

*Buses K Cuatro is a Joint Venture formed by ENEL X and Kaufmannr

https://www.idbinvest.org/es/proyectos/e-buses-chile

Prepared by

Banco Estado has been exploring how to provide the **conditions to finance public transport systems in regions** through their credit lines

Legend

Readiness[1]

- ★ ☆ ☆ Low probability of being deployed
- ★ ★ ☆ Medium probability of being deployed
- ★ ★ ★ High probability of being deployed

Key Takeaways

- As of today, **Banco Estado possesses a relevant track record in clean initiatives under its Green Finance area**. Some of these initiatives include: *Mi Taxi Electrico, Micromobility* and *E-mobility for trucks and buses*. However, the Bank's focus remains on small and medium-sized businesses and B2B services.

- The current financial instruments of Banco Estado (credit lines for small and medium-sized businesses) have a very low level of market readiness in terms of their potential for financing zero emission bus projects for public transport systems. Other than this:
  1. The leasing area of Banco Estado has already participated in the financing of last miles trucks as well as small scale fleets, mainly in e-buses for passenger transportation at mining sites (B2B).
  2. The current leasing product cannot be applied to public transport systems.

Banco Estado's existing financing options for ZE Bus projects

« Loans for MSMEs»

Readiness[1] ★ ☆ ☆

- **Budget:** No Information Available
- **Off-taker:** Private
- **Instrument:** Loans
- **Scope:** Fleets

« Leasing»

Readiness[1] ★ ☆ ☆

- **Budget:** No Information Available
- **Off-taker:** Private / Public
- **Instrument:** Loans
- **Scope:** Fleets

Prepared by

[1] Level of readiness to implement its existing instruments for the financing of ZE Bus projects

Debt Financing for Zero Emission Buses in Latin America

2

Key information is systematically presented in the **datasheet of each bank** according to the following sections

DATA SHEET SECTIONS

1. **Scope of finance:**
   - Pathway: whether the bank considers financing only private, only public or both off-takers.
   - Scope of ZE Bus projects financing: the type project for which the financing is aimed (Fleet / Infrastructure / Both).
   - Cities targeted: whether the bank has the intention of financing specific cities
   - Other countries: whether the bank has the possibility to provide financial support in other countries

2. **Type of bank:** the type of bank interviewed (CB, NDB, MDB)

1. **Track record of financing ZE Bus projects:** whether the bank has participated in any zero emission bus projects by providing:
   - Technical Assistance
   - Financial support for Pilot Projects
   - Financial support for Fleets Projects

1. **Internal mandate for ZE technologies:** The current positioning of the bank towards zero emission bus projects at the corporate level.

1. **Challenges:** The main challenges for the bank in terms of its ability to finance zero emission bus projects.

5. **Financial instruments applicable to ZE Bus projects:** This section seeks to assess the track record of the bank in financing zero emission bus projects, according to the following legend:

Planned: The bank has not started to develop a financial instrument for ZE Bus projects.

Under Development: If the bank has announced its commitment to deploying a financial instrument for ZE Bus projects in the short-term.

Available: If the bank has an existing financial instrument for ZE Bus projects but the instrument has not yet been applied.

Technical Assistance: If the bank has provided technical support to any ZE Bus projects.

Executed: If the bank has already implemented a financial instrument for financing ZE Bus projects.

5. **Preferred risk mitigation mechanism:** This section highlights key actions for the bank to take in order to reduce project risks.

Prepared by

Corporate mandates strongly **support ZE technologies** and **38% of banks interviewed** have already **financed ZE Bus projects**

	NAFIN	MIFEL	FDN	BANCOLDEX	FINDETER	BNDES	BANCO ESTADO	CAF	IDB INVEST	IDB	WORLD BANK	IFC	KFW	AFD
Internal mandate for ZE technologies	▲▲	▲▲▲	▲▲▲	▲▲	▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲
Financial instruments applicable to ZE bus projects	Under Development	Available	Executed	Under Development	Under Development	Available	Planned	Under Development	Executed	Technical Assistance	Technical Assistance	Under Development	Under Development	Executed
Type	NDB	CB	NDB	NDB	MDB	NDB	CB	MDB	MDB	MDB	MDB	MDB	MDB	MDB
Off-takers	BOTH	BOTH	BOTH			BOTH	BOTH	BOTH	BOTH					
Scope		BOTH	BOTH		BOTH	BOTH	BOTH	BOTH	BOTH	BOTH	BOTH	BOTH	BOTH	BOTH
Batteries action plan required	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆

Internal mandate focused on

- ▲▲▲ ZE technologies
- ▲▲ Energy Transition
- ▲ Sustainability

Scope

Fleet, Infra.

Off-takers

Public, Private

Batteries Action Plan

- ◆◆◆ Not requested
- ◆◆◆ Pending regulation
- ◆◆◆ Mandatory

Prepared by Hinicio, ZEBRA, C40 CITIES

NAFIN's ambition for ZE Bus projects will focus on credit guarantees through sectoral programs rather than loans

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No
Fleet	Infra	Both
Cities targeted	CDMX, Puebla, Jalisco	
Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical assistance	✓
Pilot projects	–
Fleet projects	–

Internal mandate for ZE Technologies

- NAFIN's focus is on **micro, small and medium scale companies (MSMEs)**, where its finance is through two paths: **1) loans, either acting as an entry-level bank or through an intermediary entity and 2) credit guarantees through sectoral programs for e-taxis and truck electrification.** One of the guarantee programs was developed in Mexico City (e-taxis), where NAFIN provided a guarantee of 50% to the financial entities involved. NAFIN is also acting as a financial agent for international financial entities, holding a key role on the Climate Change Fund as a trust institution.

Challenges / Bank's vision

- NAFIN faces certain **limits in terms of the financing** it is able to offer. Firstly, it can only finance fleets as part of e-mobility projects (BANOBRAS is the NDB that can finance public infrastructure). In addition, the Bank requires the presence of an **intermediary** (Volkswagen leasing, Volvo leasing) to be able to channel these funds into the private sector. However, **there are a limited number of entities that can provide this service**. Thus, the Bank's main potential impact in terms of financing ZE Bus projects will be **by offering credit guarantee schemes** that reduce financial risks rather than by offering loans, as it is difficult for them to finance large scale fleets. Currently, its guarantee program has three lines of action (sectoral schemes, selective guarantees and corporate financing), however NAFIN must expand the scope of its current guarantee program, since at present it only includes electric taxis and electrification of trucks.

Financial instruments applicable to ZE bus projects

Under Development

- The **replacement of taxis in Mexico City** as part of the partnership with KFW put into action the first potential instrument available to NAFIN to support ZE Bus projects, acting as an entry-level bank. NAFIN will provide grants for the replacement of taxis (total budget up to 10 MEUR to be used within 4 years). This support makes use of a credit line of 100 MEUR provided by a collaboration agreement to finance green projects between the German and Mexican governments. As part of this, KFW and NAFIN signed an MoU, in which KFW commits to invest 2 or 3 times the amount that is leveraged by the Secretary of Mobility to the trust fund of this project. The financing considers 3 instruments: Loans, Grants and Technical Assistance.

Preferred RMM for the Bank

- **New tariff schemes,** based on a hybrid model (ticket per passenger + number of kilometers) is mandatory for securing sources of payment for lenders.

Demand

Financial

- **Scrapping action plan** should be requested in tenders and taken over by operators / OEMs; essential for NAFIN to join the project.

Technological

Prepared by

Hinicio ZEBRA C40 CITIES

MIFEL aims to finance the zero emission Metrobus shuttle route to the Airport in City of Mexico

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No
Fleet	Infra	Both
Cities targeted	Puebla, Acapulco, Hidalgo, Queretaro, CDMX	
Other countries	Yes	No

Type of bank

CB | NDB | MDB

Track record financing ZEBs

Technical assistance	⊖
Pilot projects	⊖
Fleet projects	✓

Internal mandate for ZE Technologies

- MIFEL has the ambition of scaling up **e-mobility projects** to the fleet-scale. Previously, in Mexico there have only been pilot projects with relatively few units, however, the successful operation of these indicates that the technology is now reaching sufficient maturity to be scaled-up. This is important for them because they have previously supported diesel bus projects **and so have relevant sector knowledge**.
- They are exploring the possibility of financing the **airport shuttle bus route**, one of the lines of metrobus that will be **operated by ZE buses.**

Challenges / Bank's vision

- Mexico City has an advantage in terms of operating potential ZE Bus projects due the presence of the **"Fideicomiso" role** in its public transport system. This tool should be taken **as an example that may be replicated in other cities that are moving towards the e-mobility transitio**n. Nonetheless, smaller cities remain oriented towards diesel-technologies. Under a national state policy, Mexico is working on behalf of Metrobus to electrify buses (however, only in Mexico City). The **presence of an organization/entity that regulates payments** is very important for enabling the financing of type of project under the traditional model.
- Another challenge is that the economics of ZE Bus projects are more expensive than diesel alternatives, meaning that **public incentives are key in the short term** to make these projects viable.

Financial instruments applicable to ZE bus projects

Executed

- **MIFEL** is very flexible in terms of the ticket size of **ZE Bus projects**. The Bank considers that the amount should ideally be in the range of **500 MMXN (~ 250 MUSD), with a minimum of at least 20 MMXN (~ 10 MUSD**) to be financially viable.
- In this type of projects, the presence of the "Fideicomiso" role brings security to the financing of the project. And the Bank is considering an interest rate of TIIE +2% to 5% for this type of project where the grace period could go from 3 to 9 months.
- While there is no public information available, **MIFEL commented in the interview that they had participated in the purchase of 9 electric buses by VEMO that are operating in the Metrobus system**, by providing financial support. In this transaction, the contract that VEMO has with the trust fund (Fideicomiso) was key for achieving the financial support.

Preferred RMM[1] for the Bank

- **Sponsor Profile** needs to be reliable in order to provide sufficient project finance guarantees.
- **Implementation of different payment schemes** to secure sources of repayment so that the operator does not depend only on the collection of ticket fares (e.g., tariff per km).
- **Presence of a public entity, in this case fideicomiso, that is able to facilitate the funds** by guaranteeing a source of repayment.

Financial

Prepared by

Hinicio ZEBRA C40 CITIES

Due to Law 1964 and Bogota's solid balance sheet, **FDN** has already financed over 650 electric buses in the city

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No
Fleet	Infra	Both
Cities targeted	Bogota, Medellin	
Other countries	Yes	No

Type of bank

CB | NDB | MDB

Track record financing ZEBs

- Technical assistance ✓
- Pilot projects ✓
- Fleet projects ✓

Internal mandate for ZE Technologies

- Its track record in e-mobility dates back to 2018. The Bank is currently working on ZE technologies **under a specialized "Sustainable financing" department.** It has supported **both public and private initiatives**, proposing not **only financing but also supporting the "structuring" of the system** with the mission to **mobilize other players to participate in consortium projects**. This role was undertaken with great success in Electribus, where the British investment group Ashmore joined the project as a financer. They are working alongside the **government to transform the current public transport** system of Colombia towards a ZE system, with success cases already in operation in Bogota.

Challenges / Bank's vision

- The recent change of government is a good signal for the market, as they are very focused on sustainable investment under **the Colombian Law 1964 where 100% of buses in the mass transit system must be electrified by 2036**. Nevertheless, the interest of **Commercial banks** in financing mobility projects has diminished because of an issue related to the estimation of tariffs in a previous projects (the estimations proved lower than the final amounts, generating substantial uncertainty). For the deployment of this industry, **it will be necessary to reincorporate these sectors** (CBs) in these projects.
- The presence of a public entity in the consortium **of ZE Bus projects is key to the mobilization of funds** and it could be even more challenging to achieve this in other cities besides Bogota, which **has access to the FET** (Fare Stabilization Fund). The unbundled model represents a relevant potential driver for this.

Financial instruments applicable to ZE bus projects

Executed

1. **Electribus:** This project consisted of the purchase of **259 e-buses in Bogota for the replacement of diesel-powered units**. The financing was delivered in **two loans**: one at the beginning **(T=0)**; **and a second at the 8th year of operation when the** battery might need to be replaced. The budget finished at **432 BCOP (~72 MUSD)**. This project implemented the unbundled model in the concession tenders.
2. **Green Movil (Transmilenio):** The project consisted of the purchase of **406 electric buses in Bogota.** The contribution of AFD was made via a senior loan for a period of 14 years of 342.000 MCO, in addition to the addition of a liquidity line for 60,000 MCOP (an additional credit line to avoid liquidity problems).

Preferred RMM[1] for the Bank

- **Liquidity line guarantee:** to ensure access to lines of credit in the event of a fall in demand
- **Financial Incentives** towards other cities besides Bogota will be crucial to maintain the tariffs for ZE Buses at levels similar to the current system

Financial

- **Articulator role** among participants to solve technical gaps. FDN can connect stakeholders / investors and help them to understand the e-bus system with the ambition of offsetting technological gaps.

Technological

Prepared by

Hinicio | ZEBRA | C40 CITIES

Concessional guarantees with the government are key for leveraging international funds through **BANCOLDEX**

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No
Fleet	Infra	Both
Cities targeted	Bogota, Medellin	
Other countries	Yes	No

Type of bank

CB | NDB | MDB

Track record financing ZEBs

- Technical assistance
- Pilot projects
- Fleet projects

Internal mandate for ZE Technologies

- Bancoldex launched a corporate strategy for the period 2022-2026, restructuring its internal mandate towards fostering the **ESG area**. Two relevant focus areas that may be triggered are: **1) financing of ZEVs** with the ambition to scale up their **line of products during 2023**, **2) capture of international funds.** Bancoldex could leverage its funds, either through **CBs by offering credit lines with attractive rates** or by the offer of **direct financing for companies through its leasing division** (this product remains under development).

Challenges / Bank's vision

- Their scope covers **companies only** (private), thus if municipalities purchase the assets, the Bank is unable to join the project. Here, **FINDETER is the NDB that could lead this financing**.
- The Bank doesn't look to compete with commercial banks, but to foster mutual collaboration adopting the role of an articulator. As a result, unless it sees an investment opportunity that involves **other players in the ecosystem**, they have limited interest in participating.
- Due the **new government** and under the **"Bicentenary Group" a new bicentenary strategy is under development** in which Colombia is aiming to reallocate investments and promote green finance. The government will reorient the mission and scope of the different national development banks, indicating where they should "play" in terms of targeting their investment activities.
- There is a financial challenge in order to **mitigate exchange risk** as the financing is in normally in USD, and the instruments are usually in COP.

Financial instruments applicable to ZE bus projects

Under Development

- **BID launched an agreement with Bancoldex through a credit line** for financing projects related to the **energy transition** that contribute to the reduction of CO2 emissions and economic reactivation. The credit line has a total budget **of +/- 45 MUSD**. Although, these funds are currently frozen due to a lack of **concessional guarantees for the funds**. As a consequence, the Bank was unable to leverage potential resources for the public transport system.

Preferred RMM[1] for the Bank

- **New tariff schemes,** in order to include a tariff per kilometer driven by the bus and end dependence on the passenger tariff.

Demand

Financial

- **Concessionaire expertise**: For both aspects, firstly, in operating new zero emission technology, and secondly, to understand how the city transit system works. This is key to securing the success of the operation.

Operational

- **Currency exchange mitigation mechanism** in the form of forwards / options to reduce financial risks, since the funding enters in USD and the financing is in COP.

Financial

Prepared by

Hinicio | ZEBRA | C40 CITIES

Alongside Colombia's public resources, **FINDETER** has the potential to provide attractive loans with compensated rates

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No
Fleet	Infra	Both
Cities targeted	Bogota, Manizales, Villa Vicencio, San Andres	
Other countries	Yes	No

Type of bank

CB | NDB | MDB

Track record financing ZEBs

- Technical assistance ✓
- Pilot projects –
- Fleet projects –

Internal mandate for ZE Technologies

- The Bank's workstream covers the territorial development of Colombia where they have already received international funds, from Germany (KfW Development Bank) and the UK (prosperity funds). The Bank possesses a strong corporate mandate towards its green financing. They are accustomed to working with municipalities, **where this NDB provides technical assistance for structuring public projects.** For example, using UK prosperity funds FINDETER is currently working in Manizales and Villa Vicencio on the design of public transport plans.

Challenges / Bank's vision

- The national development plan of Colombia will be oriented towards promoting e-mobility projects in the country and the new government is strongly committed to achieving this. However, the feasibility of **ZE Bus projects will vary depending on the financial health of each Colombian city**. Bogota has good balance sheet for accessing debt instruments, but this is not the case of other cities, such as San Andres, Villa Vicencio or Manizales, where FINDETER has already explored initiatives. For this reason, if the mayor of a city changes, it has the potential to present an important issue for them, because they provide advice and design the instrument tailored to the municipality itself. If there is no long-term plan, the possibility of rejecting the project are high.
- FINDETER needs the presence of a **commercial local bank for leveraging funds to the private sector**, and this fact may **delay projects since the involvement of this sector remains slow.**

Financial instruments applicable to ZE bus projects

Planned

- FINDETER does not have a specific line for **ZE technologies or green climate projects**, nevertheless these projects could be financed through its **compensated rates instrument**, which consists of loans with attractive rates (normally IBR +0%) where Colombian national funds are mixed with FINDETER funds. In 2023, and on behalf the credit line "**Reactiva Colombia**", the Bank will begin a **pilot loan project** of 48 BCOP (~10 MUSD), with compensated rates for financing green projects. The instrument will be composed of two loans of IBR +1% for 5 years and IBR +1.2% for transactions over 5 years.

Preferred RMM for the Bank

- **Access to local funds** for compensating tickets tariffs and supporting pricing gaps with public resources (e.g., FET in Bogota)

Demand

Financial

- **Workstream with the participation of different cities** to design public transport system. The main goal is to design projects suitable for receiving public funds.

Operational

Prepared by
Hinicio ZEBRA C40 CITIES

BNDES credit lines are expected to require a fiduciary agent (direct path) or to be used through a CB (indirect path)

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No
Fleet	Infra	Both
Cities targeted	Sao Paulo, Curitiba, Belho Horizonte	
Other countries	Yes	No

Type of bank

CB | NDB | MDB

Track record financing ZEBs

- Technical assistance
- Pilot projects
- Fleet projects

Internal mandate for ZE Technologies

- BNDES' mission is to **promote electric buses.** In fact, the Bank already has four credit lines that could be scaled to Zero Emission bus projects.
- BNDES is in **negotiations with cities and private companies** for the deployment of ZE Bus projects in Brazil, in cities outside of Sao Paulo. The Bank is able to provide either direct or indirect financing. In the case of the first route, the presence of a fiduciary agent is key for mitigating the project risks.

Challenges / Bank's vision

- The biggest challenge in Brazil is to **make these projects financially viable. Mainly because the economics of electric buses in Brazil are much less attractive than diesel-powered buses**.
- A key challenge for BNDES when it comes to the financing of ZE Bus projects relates to the requirement for the involvement of a third-party. On the one hand, BNDES requires the presence of a fiduciary agent if the Bank uses the direct financing route as it is risky to give the operator free access to the revenue of the bus system. However, this results in a major challenge for municipalities as they must re-adapt their current business model. On the other hand, if BNDES distributes funds through its indirect path, the presence of an intermediate commercial bank (CB) is required. Today, there is a lack of interest by CBs in participating in these transactions which results in a significant barrier to manufacturers BYD and ELETRA.

Financial instruments applicable to ZE bus projects

Available

- Depending on the type of financing there are **specific requirements for leveraging resources**. Regarding the **FINAME credit line, the Bank needs a commercial bank** to leverage its resources. The missing link here is the lack of intermediary banks. Mercedes Benz Bank can act as an intermediate banks, however, the Bank is restricted to financing only e-buses manufactured by its own group. Moreover, BNDES has minimum local content requirements for manufacturers, under which BYD and ELETRA are the only providers accredited by the system so far (end of 2022)

Preferred RMM[1] for the Bank

- **Fiduciary agent services:** The role of a Fiduciary agent is crucial for guaranteeing payments using BNDES direct path. This figure generate trust and confidence.
- **Public guarantee schemes** to provide financial incentives for the participation of stakeholders in ZE Bus projects, similar to the ESVs program in the US.

Demand

Financial

	Path / Yrs		Rate	Min/ Max	
FINAME	Indirect	10	TLP + 0.95% -3.5%	N/A	N/A
FINEM	Direct	15	TLP + 0.90% + risk rate	8 MUSD	N/A
FUNDO CLIMA	Direct	12	1% + risk rate	2 MUSD	16 MUSD
FUNDO CLIMA	Indirect	12	1.5 % + risk rate	N/A	2 MUSD

TLP refers to long term rate

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Hinicio ZEBRA C40 CITIES

Banco Estado will remain focused on B2B projects unless tender conditions begin to align with the Bank's requirements

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No
Fleet	Infra	Both
Cities targeted	Santiago and other regions*	
Other countries	Yes	No

** Locations refers to exclusion perimeters of MTT*

Type of bank

CB | NDB | MDB

Track record financing ZEBs

Technical assistance	➖
Pilot projects	✔
Fleet projects	➖

Internal mandate for ZE Technologies

- The Bank has already developed some initiatives towards ZE Bus technologies under its "**Green Finance**" workstream. Some of these initiatives are ***Mi Taxi Electrico***[1]**, *Micromobility and E-mobility* for *Trucks and buses*** (with special focus on B2B companies), where the Bank offers **attractive rates in terms of loans**. In 2022, Banco Estado launched a **"preferred" financing for Hyundai's**[2] new e-truck in Chile. The initiative promotes financing for small and medium-sized companies for the purchase of the Hyundai's e-trucks.

Challenges / Bank's vision

- The **bidding process** for the concession of the Public transport system is not aligned with the **requirements of local bank** for providing financing. This process is carried out by the DTT on behalf the Chilean Ministry of Transport, but the underlying criteria do not take into consideration the requirements and policies of the financial sector in terms of lending resources to the project sponsor. It is mandatory for Banco Estado that the entity (project sponsor) is able to demonstrate a **healthy balance sheet or the necessary experience** in the country for operating in the corresponding market.
- The Bank is participating in a mutual collaboration with the Ministry of Energy overseeing a bidding process that could align with the financial sector's requirements as well as rethinking the scope of its current leasing services as they only cover the private sector and B2B companies.

Financial instruments applicable to ZE bus projects

Planned

- In the medium-term, the Bank has two pathways to developing financial instruments for ZE Bus projects. The first goes through the **Credit's lines for MSMEs, while the second considers the financing of zero emission projects through its *Leasing* area**. As of today, Banco Estado does not have a specific instrument for zero emission bus projects, nor a proven track record with this type of project. The scope of the Bank remains oriented toward micro, small and medium-sized enterprises (MSME) and it is difficult to scale these instruments towards fleet-scale bus projects.

Preferred RMM[1] for the Bank

- **Sponsor profile:** Banco Estado requires the presence of an entity with expertise in the operation and strong knowledge of the market in the consortium. If the entity is international with less than 2 years of experience in the market, the sponsor will not be attractive for the Bank to finance.

Financial

- **Mutual collaboration among MTT** to develop concession tenders that align with the financial requirements and policies of local banks.

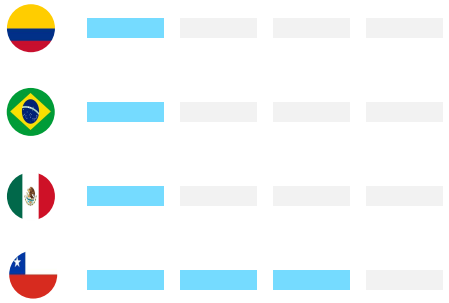
Financial

Prepared by

[1]https://www.bancoestado.cl/imagenes/_campanas/mundo-verde/electromovilidad.asp
[2]https://portalmovilidad.com/bancoestado-ofrece-financiamiento-preferencial-a-nuevo-camion-electrico-de-hyundai-en-chile/

CAF is aimed at exploring new destinations in LATAM whereas Chilean cities are expected to be targeted

Impact on Countries Targeted



Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical Assistance	✓
Pilot projects	✓
Fleet projects	–

Internal mandate for ZE Technologies

- CAF's experience in ZE Bus projects has been concentrated in **Pilot projects and Technical Assistance.** However, the entity has committed to scaling up Zero Emission bus projects in the short-term, exploring new locations as Chilean cities (besides Santiago), working with central authorities to support Chile's 2050 carbon neutrality goal. CAF's goal for the coming decade is to become the established **green bank for LATAM**. The Bank will strength its current workstream with national **development banks focusing on the private sector as principal clients**.

Challenges / Bank's vision

- It is **a challenge to provide financing** to systems that operate with the **current business model**, because it is difficult to mobilize funds, and CAF cannot absorb the whole risk associated with projects. As a result, the role of the **private sector is crucial**, as it has the potential to act as a **vehicle for the mobilization of funding** reducing demand and financial risks in the unbundled model.
- **Demonstrations and case studies of large fleets** help enormously to generate interest among banks and lower financing risks, as well as **promoting local manufacturing**, as in Brazil, as a mechanism for **adding value** to the new industry in addition to working with local communities.
- Chile is in the spotlight of CAF as subsidies are implicitly allocated in regional public transport system. It is expected that a national program will be mobilized to support energy transition technologies with CAF as a key player.

Financial instruments applicable to ZE bus projects

231 MUSD

Ticket size

1. **E-motion program[2]:** The project is oriented towards public/private ZEV fleet financing as well as technical assistance activities in Panama, Paraguay and Uruguay. The final financing provided by GFC totaled to 77 MUSD with a grant of 10M USD. The program aims to invest in large scale e-bus fleets and recharging stations.

Preferred RMM[1] for the Bank

- **Investment through local commercial banks** as the local bank has better understanding of the market and the country's boundaries as well as **a reliable sponsor** would help to guarantee sources of repayment.

Financial

- **Government grants for ZE technologies:** This mechanism could generate additional confidence and seriousness in terms of securing sources of repayment.

Demand

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No

Fleet	Infra	Both

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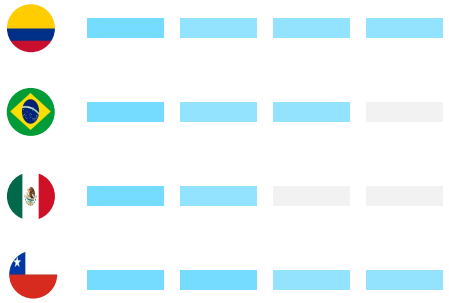
Hinicio ZEBRA C40 CITIES

IDB Invest's track record on ZE Bus projects is limited to Bogota and Santiago, however Brazil is a potential target

Impact on Countries Targeted



Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical Assistance	✓
Pilot projects	✓
Fleet projects	✓

Internal mandate for ZE Technologies

- **IDB Invest** is **committed to promoting ZE technologies**, an area in which it already possesses a **solid pipeline of potential projects** to be financed in the short-term. The Bank is **already financing ZE Bus projects** in the LATAM region, **specifically in Bogota and Santiago**. All of these initiatives are oriented towards mass public transport and have used the unbundled model in the concession tender processes. In general, to be attractive for the Bank the ticket size should be in the range of +20 MUSD with a tenure of 15-20 years, including a 9-month grace period.

Challenges / Bank's vision

- The Bank's ambition is to continue to strengthen its support for **the e-mobility sector in LATAM,** although they **perceive a lack of cohesion between stakeholders from both the public and private sectors.** These **partnerships need to be achieved in the short-term,** in order that risk can be adequately and appropriately distributed. The unbundled model is a success case in Santiago, and other cities might follow this example and **replicate the adoption of this model in the concession tender processes scaling up the adoption of E-buses in LATAM. Brazil shows up as a key target for this implementation.**
- In technological terms, there is clear uncertainty with regards the use of the **battery plan after its replacement**. The battery is an asset with high value since it retains more than **70% of its energy capacity even after its replacement**.

Financial instruments applicable to ZE bus projects

1. **E-Buses Chile:** Potential participation in the purchase of 992 e-buses for the RED-Santiago system. Project sponsor between Kaufmann/ENEL X. AMP capital also contributed with equity.
2. **Electribus:** Between Proparco and FND, 259 electric buses were purchased in Bogota for the replacement of diesel-powered units (2021) .
3. **Guagua Fontibon:** 172 E-buses and recharging infrastructure financed in Bogota.
4. **Guagua Usme:** 229 E-Buses and recharging infrastructure financed in Bogota

Preferred RMM[1] for the Bank

- **Solid Sponsor profile** is key for mobilizing financing and relies on a sponsor with expertise in the respective market.
- **Fostering cohesion between players** may materialize more readily under the unbundled model, distributing risk along stakeholders.

Financial

- **Tender requirements for the OEM related to battery replacement plans** to reduce technological risks.

Technological

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No

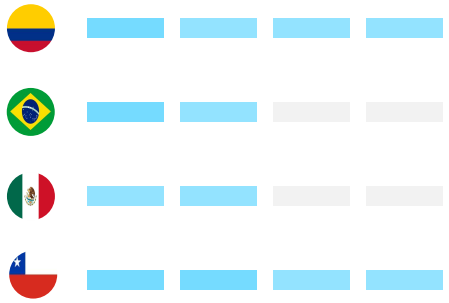
Fleet	Infra	Both

Prepared by

Hinicio ZEBRA C40 CITIES

IDB's impact relies on public entities, by structuring project finance as well as providing technical assistance

Impact on Countries Targeted



Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical Assistance	✓
Pilot projects	✓
Fleet projects	–

Internal mandate for ZE Technologies

- The IDB strongly promotes E-mobility across different continents. They have over **50 initiatives across the globe in ZE technologies**. Mostly, providing **technical assistance** to different municipalities. The Bank has participated in the successful cases in Bogota and Santiago by structuring the project financing of E-Buses and Electribus.
- The Bank is committed to scaling up ZE Bus projects through business models that can secure operational demand.

Challenges / Bank's vision

- When the **operator is public**, they may enter **as IDB**, but if the operator is private, the entity that leverages the funds would be IDB Invest. In this sense, **IDB can only finance a public SPV**.
- On behalf of the GCF, the Bank possesses a pipeline in which **medium cities** as well as **governments are interested in developing ZE Bus projects**. For this reason, the biggest impact is in these countries where access to financing is relatively more difficult, for example, Caribbean countries.
- When IDB commits to financing cites or municipalities, it is mandatory to leverage funds via a **validation by the national government as well as the signature of sovereign guarantors**. This assistance may include the **design of business models but also boundary conditions, which includes policy loans** to governments for speeding up ZE Bus projects.

Financial instruments applicable to ZE bus projects

Technical Assistance

- IDB has supported the large **processes in Santiago and Bogota**, by providing TA in structuring the concessionaires contract and the project finance for both projects. The Bank has not been able to directly finance the bus fleets and/or infrastructure as the project's sponsors are private companies.
- Under the umbrella of the **GCF**[1] the Bank is expected to contribute to Chile and Colombia with financial support. The program will be implemented for 6 years and has a series of components. Component N°3 is focused on investments in E-Buses.

Preferred RMM[1] for the Bank

- **Operational improvements in the adoption** of the unbundled model and the **adoption of new ticket fare collection mechanisms** are key drivers for Ze projects to upscale.

Financial

- **Tender requirements for the OEM related to battery replacement plans** to reduce technological risks. The entire battery value chain must be sustainable to reduce cradle-to-wheel impact.

Technological

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No

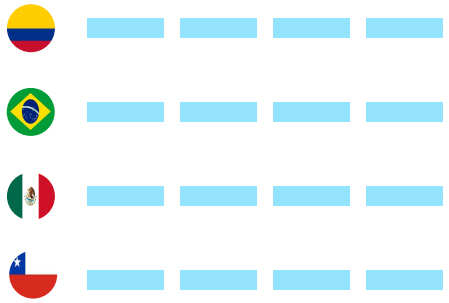
Fleet	Infra	Both

Prepared by

[1]https://www.greenclimate.fund/project/fp189#:~:text=The%20Program%20links%20e-mobility,performance%20risks%2C%20and%20low%20profitability

World Bank's credit guarantee presents a potential mechanism for the upscaling of projects in LATAM

Impact on Countries Targeted



Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical Assistance	✓
Pilot projects	✓
Fleet projects	–

Internal mandate for ZE Technologies

- Its track record dates back several years, when it started to support different cities across LATAM **with technical assistance,** including Brazil, Colombia and Chile. In Brazil they have already developed over 6 studies, including a key study on **how to change the current concession,** assessing the feasibility of introducing e-buses.
- It is currently in **conversation with CAIXA and Banco do Brasil** to raise funds and develop lines of credit for ZE Bus projects.

Challenges / Bank's vision

- As they do not offer direct financing to private companies, World Bank's scope for this type of project covers **only CAPEX (public infrastructure)**. Brazil is viewed favorably thanks to the input of **OEM inputs to their strategy for the development of E-buses in Brazil**. They expect an e-bus market to **consolidate within 3 years**. However, several political barriers exist, and **Brazilian cities are not prepared to make radical changes** to their public transit systems. Moreover, operators are powerful, and it is difficult to change concession contracts. The sample actors are always involved.
- One of the paths that the Bank may be able to offer **in support of these projects** are **credit guarantees** to the cities participating in ZE Bus projects, guaranteeing debt repayments.

Financial Instruments applicable to ZE bus projects

1. **In India:** With the help of a 250 MUSD ESMAP grant, the World Bank is supporting Kolkata's EV transition with technical assistance and financing.
2. **In Africa,** It is supporting 8 projects on BRT corridors with both technical and financial assistance.
3. **In Brazil:** The World Bank is supporting the design of a BRT system with 100 E –buses. In addition, the Bank has supported the municipalities of Salvador, Belho Orizonte & Fortaleza with technical assistance during the bidding process based on the Santiago model.

Preferred RMM[1] for the Bank

- **Technical assistance for local governments (municipalities)** in the design of concessions, based on the success cases with unbundled models, such as, for example, the case implemented in Santiago.

Financial

Operational

- **Credit guarantee services to offset the risk** of moral hazard for the operator and leverage financing in the project.

Technological

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No

Fleet	Infra	Both

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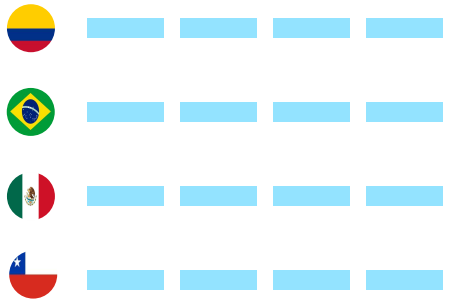
Hinicio ZEBRA C40 CITIES

IFC's experience was driven by Chile's commitment to ZE technologies and success of the unbundled model in the RED system

Impact on Countries Targeted



Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical Assistance	✓
Pilot projects	✓
Fleet projects	✓

Internal mandate for ZE Technologies

- The IFC has already implemented some financial operations and has projects under development. The potential case of Chile could become a flagship for the implementation of the unbundled model.
- They strongly promote the adoption of ZE technologies in different countries in the region, without budget limitations. In this sense, IFC can finance a wide range of project sizes.
- IFC is committed in playing a **catalytic role within the industry**.

Challenges / Bank's vision

- **For Brazil:** The concessions to operate the public transport system have very long timeframes, delaying the adoption of ZE Bus projects. In addition, the balance sheets of cities are not sufficiently "healthy" to be able to raise funds (loans).
- **For Colombia:** Only Bogota holds a solid balance sheet that guarantee debt repayments. Public funds are necessary to upscale financing to other cities, such as Cali.
- **For Mexico:** Operators always come from the same set of actors, who possess a lot of power in the decision-making process. This is the main reason why the unbundled model may be difficult to implement in Mexico City.

Financial instruments applicable to ZE bus projects

Under Development

304 MUSD

Ticket size

1. **E-buses Chile:** The SPV of this potential operation will be the company, Suministradora de Buses K Cuatro. It is a joint venture between Inversiones Kaufmann S.A., a Chilean vehicle distributor, and Enel X Chile, a subsidiary of the utility Enel Chile. Each currently owns 50 percent of the Company. The project consists of the purchase of 992 E-buses to be operated in Santiago's RED system.

Preferred RMM[1] for the Bank

- **Sponsor profile:** with strong knowledge of the operation. Implementation of different models, such as the "Unbundled", allows better risk allocation among players.

Financial

Operational

- **Battery replacement plan:** In Chile, Kaufmann was required to have a battery disposal plan and its implementation is mandatory.

Technological

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No

Fleet	Infra	Both

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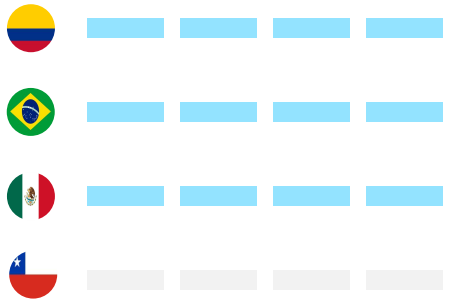
Hinicio ZEBRA C40 CITIES

KFW Development Bank requires the presence of a public body to distribute German funds

Impact on Countries Targeted



Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical Assistance	✓
Pilot projects	✓
Fleet projects	–

Internal mandate for ZE Technologies

- They have a **corporate mandate orientated towards ZE technologies**. Although they may only operate in **countries covered by the bilateral development cooperation agreement of Germany**. Its framework falls under the umbrella of the German Government, with the objective of promoting ZE technologies.
- In cases where there is no mandate to operate in that country, as the case of Uruguay, CAF is the key partner that facilitates these projects.

Challenges / Bank's vision

- **KFW Development Bank** has a clear mandate to interact with governments and public entities (like NDBs) in where they are limited to finance with loans/subsidies. In this sense, municipalities are not always partner for them to deploy bankable projects, as they don't possess the necessary debt repayment conditions. However, KFW Development Bank can finance the private sector via equity funds and facilities.
- Technical assistance, however, can be undertaken, and the Bank is currently working with several different cities. Its interlocutor is the **Ministry of Finance**. They **negotiate directly** with the federal government and the agenda of financing falls under the **ODA program** (Official Development Assistance*). Thus, they can only finance the public transport system in those countries that may benefit from the ODA. The big challenge is around how to generate capabilities in the financial market.

Financial instruments applicable to ZE bus projects

- The amount should be ~50MUSD-150 MUSD. Its strategy is oriented towards larger amounts, that allow them **to finance several smaller interventions**. In Mexico, they are already implementing a **financial instrument in Mexico City for the replacement of taxi fleet with E-taxis.** NAFIN will provide **guarantees for the repayments** and the grant will cover 15% of the vehicle's replacement cost. In Colombia, it does not have anything established, but its partner is **FINDETER** and in Brazil, the Bank is working in **Curitiba with BNDES**, exploring the substitution of bus lines with E-buses.

Preferred RMM[1] for the Bank

- **Consolidation of the unbundled model** to offset risk among stakeholders as well, as the implementation of **different tariff fare schemes**, are necessary to guarantee repayments.

Financial

- **Battery replacement plan / second use bus fleet plan** are required as part of the concession agreements for the Bank to be interested in financing the project.

Technological

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No

Fleet	Infra	Both

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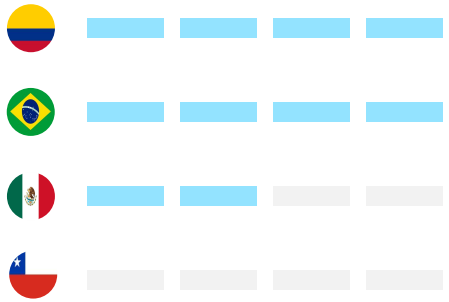
Hinicio ZEBRA C40 CITIES

** Chile is no longer part of the ODA and will no longer be able to receive federal support from the German Government through the KFW in ZE Bus technologies*

** KfW bank Group consists of several institutions which are active in international business, where KfW DEG and KfW IPEX which focus is private sector.*

Through **AFD's** subsidiary in LATAM, Proparco, the Bank is leveraging French funds through NDBs in Colombia

Impact on Countries Targeted



**Chile is not included in the scope of finance by AFD.*

Other countries	Yes	No

Type of bank

CB	NDB	MDB

Track record financing ZEBs

Technical Assistance	✓
Pilot projects	✓
Fleet projects	✓

Internal mandate for ZE Technologies

- AFD has a track record of over 15 years supporting energy transition projects in LATAM. Its experience in **E-mobility dates back to 2019**, when they developed a **E-mobility roadmap**, carrying out a **prescreening of projects and financial instruments where they could participate**. The Bank needs to improve the structuring of its current fund by offering attractive solutions for the region besides Colombia.
- Through its filial PROPARCO and with FDN, this entity has distributed over 250 MUSD towards the roll out of zero emission projects in Colombia.

Challenges / Bank's vision

- **In Mexico**, as per the Constitution, cities cannot borrow foreign funds, necessitating a different approach. AFD can only lend to NDBs. Metrobus is interested in AFD's funding, nevertheless the financial model is through a "Fideicomiso" and AFD cannot finance a public trust fund.
- **In Colombia**, each city has its own transport line, and the e-Buses belongs to each municipality. Thus, the challenge is not in Bogota, but in other cities that need to begin subsidizing their public transport mass system.
- **In Brazil**, high import tariffs and a lack of local production and competitiveness to supply the market are the main reasons why the costs of e-buses are 3-4 times higher than other countries in the region. Despite this, Sao Paulo leads the market in term of E-Bus fleets and Curitiba is well advanced for the development of ZE Bus projects in the medium-term.

Financial instruments applicable to ZE bus projects

1. **Electribus**: Through Proparco, AFD and FDN, it participated in the purchase of a 259 E-bus fleet and the battery replacement of the assets in Bogota. The financing was in Colombian pesos.
2. **Green Movil:** FDN and Proparco carried out the purchase of a 406 E-bus fleet and the recharging infrastructure in Bogota, Colombia. The total financing raised up to 342 billion COP.

Preferred RMM[1] for the Bank

- **The balance sheet and solidity of the city's operating system** are more relevant for AFD than the financial health of the operator. AFD demands a robust and smooth transport system in order to provide finance.

Financial

- **Extensive advisory prior to the financing**, normally led by Proparco to mitigate operational and technological risks in LATAM.

Technological

Scope of financing for ZEB projects

Private	Yes	No
Public	Yes	No

Fleet	Infra	Both

Prepared by

Debt Financing for Zero Emission Buses in Latin America

3

Bank's concerns in relation to the risk of ZE Bus projects are primarily **influenced by the extent to which public sector** and **transit authorities can restructure their public transport systems**

1

In all of the interviews undertaken, the participating Banks identified the need for more control from public sector/city authorities in the restructuring of the public transport system. From a bank's perspective, these comprehensive changes will provide the necessary conditions for the sustainable implementation of ZE bus fleets and, thus, increase their ability to provide finance either to bus operators or bus providers.

NEEDS	RISK PERCEPTION
Public sector Leadership Authorities needs to improve their capacity to control and establish clear rules for the operation of their public transport systems and organize the participation of stakeholders.	• An absence of clear rules that define and maintain a good level of service, making it difficult to establish the performance indicators that are required for the implementation of alternative payments methods to operators (frequency, maintenance level, and bus availability). • Low capacity for system planning and establishing concession conditions. • ZE bus policies and incentives rely on the local government in place.
System planning Public transport services and routes have often been deployed in cities with little control and a lack of planning, resulting in asymmetry in terms of how well services respond to public mobility policy.	• Services compete for routes in high demand areas. • While low demand areas have a lack of services. • This generates income uncertainty for bus operators depending on which areas are served.
Sustainability Public authorities need to be clear and transparent in setting out how public transport systems will sustain and finance their own operations.	• Cities have limited resources to support their current public transport systems and depend primarily on the collection fares and the capacity of the operator to capture demand. • Cities have low capacity to guarantee sources of repayment to the system. • Fare collection is not always centralized, and may be controlled by a third party, making revenue systems less transparent for investors

Improving the ability of banks to finance ZE bus projects will require formalization of the sector, **enabling the participation of stakeholders** that bring technical and financial capacities to the public transport system

2

The banks interviewed state that they would feel more comfortable financing ZE bus projects if borrowers (bus operators or suppliers) were formally established companies with financial capacities. Banks understand that the financing of ZE Bus projects requires comprehensive collaboration among stakeholders to share and allocate risk, in particular when new players enter the sector.

NEEDS

Promote Formalization

Restructuring the current system requires the establishment of clear conditions for the concession of routes, and promotion of a sector and fleet that is concessioned to operator companies rather than enabling "permits" for single bus-owners.

Explore Business Models

Cities need to create enabling conditions that support sector formalization, explore new business models, and, in parallel, guarantee diverse sources of funding. Allowing the entry of new players to strengthen local transport ecosystems will bring technical and financial capabilities that accelerate the adoption of ZE bus fleet.

RISK PERCEPTION

- Many transport systems include atomized operators (single bus-owners) that provide services with little control or standardization in terms of the level of service quality.
- A lack of regulation has resulted in an informal sector, with no clear track record of performance, not only in financial terms but also of service provision.
- Limited technical and financial experience has a relevant impact where single bus-owners explore ZE bus financing at higher investment costs

- ZE bus technologies have relatively higher CAPEX that may be unaffordable when financing is need at the fleet-level rather than a pilot with only a few units.
- From a bank's perspective, public transport systems already present an affordability challenge with current diesel technologies and the traditional business model of bus-operator ownership. As a result, the financing of more expensive buses while maintaining the same transport system structure is too risky and with a high risk of payment default.

Technology risk is not the main concern for banks when providing financing. Almost all of the participating banks **perceive good performance based on experience of pilots / fleets** with **zero emission technologies**.

3

Banks understand that OPEX is key for sustaining the financing of ZE bus projects over a longer concession period: 15/16 years with one battery replacement in the middle. The remaining technology risk is the battery life span within its first lifecycle (7/8 years) in terms of maintaining the range required to provide the concessioned service.

NEEDS

Technology support

Experience from pilots has demonstrated OPEX benefits, including lower energy costs, lower maintenance costs, improved energy efficiency. However, the supply and availability of ZE buses is crucial, and OEMs need to provide sufficient after-sale services (maintenance; spare parts; a trained, technical work force). Moreover, proper operation of ZE buses impacts energy efficiency (driving practices) as well as the state of health (SoH) of the battery.

Public sector incentives

In many cases, the TCO shows that ZE bus projects are cost competitive. However, technology costs are higher, and the public sector can provide incentives that reduce CAPEX or OPEX and speed up ZE bus adoption; necessary support while the cost of ZE bus technologies decreases.

RISK PERCEPTION

- The main support provided to ZE bus operators and suppliers by OEMs is through training and by establishing facilities where they keep spare parts and repair equipment. However, an effective inventory of spare parts should always be available on-site that covers the most common out-of-service issues. These relate more to auxiliary systems than electric drive systems (body-work, chassis, electronic door control systems, etc).
- Battery range needs to be guaranteed by OEMs for each 7/8 year life cycle, as there remains limited real-world evidence on battery performance in Latin American cities.

- Electricity prices should be guaranteed or safeguarded by public authorities to reduce uncertainties in the evaluation of energy-related OPEX.
- The implementation of ZE bus fleets requires depot upgrades, with associated costs. The public sector does not always consider this factor when designing concession contracts, and those extra costs are typically borne by and affordable to the transport operator. However, an "electric depot" also represents a system asset when the concession period ends.

Proposal for **possible risk mitigation mechanism** are presented **according** to **four (4) risk categories**

Financial Risk

- Financial outcomes that may arise during the development of Zero Emission Bus projects that have a negative impact on capital raising.

Demand Risk

- The potential for a lower-than expected demand for the services provided by ZE Bus projects, resulting in lower revenues that negatively affect the operating model.

Operational Risk

- Unforeseen events that may affect the operation and performance of Zero Emission Bus fleets, leading to further uncertainty when financing these projects.

Technology Risk

- The potential for loss or damage caused by the failure of Zero Emission technology-related related components (bus fleets and recharging infrastructure).

The following slides provide a deep dive analysis on these four (4) categories.

1. FINANCIAL RISK (1/3)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
1. Cash flow depends primarily on tariff collection	◆◆◆ HIGH	◆◆◆ HIGH	Restructure public transportation to consider cash flow mechanism related to service level KPIs, for transport operators and bus providers	Transit Authorities, Operator, Bus suppliers	Performance-based contracts and/or revenue sharing between operators and the SPV (or bus provider). This mechanism has been used by the Transmilenio system in Bogota (Swamy & Patel) where the entire revenue is distributed by the vendors according to their proportional costs.	Performance-based government grants to bus providers / operators based on the quality of service. The Norway (Hordaland) and New Zealand models (Hensher & Stanley, 2002) provide key examples in how performance-based contracts can be structured.
2. Lack of incentives to promote ZE bus projects	◆◆◆ HIGH	◆◆◆ MEDIUM	Implementation of trust funds for ZE Bus projects (national/city level)	Transit Authorities, Operator, Bus suppliers, Banks, Development banks	A city government can establish a trust fund with resources from its annual budget and requesting contributions from private actors and tariff collection. In Bogota, the public trust fund, "FET", is responsible for covering the differential between the costs incorporated in the system's technical tariff by Transmilenio and the revenues collected by the system (Alcaldía Mayor de Bogotá, 2019).	A trust fund, such as the Fideicomiso in CDMX or the FET in Bogota, is a system that provides greater security around repayments. This system can use national public funds that are allocated in the annual budget to mobilize money for the trust fund. As of 2022, the German national government's E-bus program had a budget of 300M EUR. This provides for a grant covering 40% to 80% of the incremental cost of electric and PHEV Buses (Jattin, October, 2019).
3. Lack of guarantees to promote ZE bus projects	◆◆◆ HIGH	◆◆◆ MEDIUM	A government Bond Guarantee Program make bonds more attractive to public investors	Transit Authorities, Operator, Bus suppliers, Banks, Development banks,	Municipalities can issue green bonds to public investors for Zero Emission Bus projects to raise capital and promote the development of these projects. (Anil Naair, 2017)	Governments can provide bond guarantees to cities making the bond more attractive to investors as it reduces default risk and increases repayment likelihood. As an example, the CDFI Bod Guarantee issued by the Secretary of the Treasury in the United States provides a 100% guarantee on the loans issued by cities (U.S Department of the Treasury, 2022).
			Partial Risk Guarantee (PRG) scheme to increase confidence and the credit rating of borrowers	Transit Authorities, Operator, Bus suppliers, Banks, Development banks,	Using financial instruments from MDBs, municipalities can use PRG to protect investors under government funding schemes or grants. This mechanism is commonly used in renewable projects in under development countries where the credit worthiness of governments remains low, such as, for example, on the Phu My 2-2 Power project in Vietnam (2002) (World Bank Guarantee Products, 2008).	Governments can issue funding schemes for Zero Emission Bus projects using resources from their annual budgets to cover a percentage of the cost difference between ZE Buses and conventional alternatives. For example, in the UK, the annual funding scheme for 2021 had a total budget of 269 MGBP (United Kingdom Government: Zero Emission Buses, Local Authority Toolkit, 2022)

1. FINANCIAL RISK (2/3)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
4. Concession periods are inconsistent with the lifespan of ZE Buses	◆◆◆ HIGH	◆◆◇ MEDIUM	Restructure public transport concessions to consider 15-to-16-year periods for ZE Bus projects, with one battery replacement in the middle of period	Transit Authorities, Operator, Bus suppliers	Concession requirements must include around a 14–15-year concession period for bus providers. In its latest concession process (2021), the Santiago transport system considerer a 14 year concession period for E-buses versus 10 years in the case of diesel buses (DTPM, 2020).	Long-term policy roadmaps defined by governments should consider explicit mandates that address the concession periods of E-buses, as the Federal Transit Administrations (FTA) in the United stated that requires a useful life of at least 12 years for buses. (Federal Transit Administration, 2023)
5. Uncertainty about the residual value of assets	◆◆◆ HIGH	◆◆◇ MEDIUM	Provide government (national/federal/local) grants for a residual value guarantee to secure a % of the residual asset value after termination of the contract period)	Transit Authorities, Operator, Bus suppliers, Banks, Development banks	Cities can allocate a percentage of their annual budget to establish residual value guarantees that secure the value of the asset at the end of the concession period. (Transport Scotland Comdhail Alba, 2021)	Using concessional loans from MDBs to develop an instrument that offers a residual value guarantee to investors. As for example the GCF that under the UNFCC can offer concessional loans to governments for the roll-out of ZE Bus projects. (GCF, 2022a)
6. Smaller-sized fleets require financing with smaller budgets	◆◆◆ HIGH	◆◆◆ HIGH	Bulk purchase through federal government management or through city alliances to reduce CAPEX for small to medium cities	OEMs, Transit Authorities, Transport companies, Banks	Alliances between cities to jointly negotiate and purchase ZE Buses to obtain better prices and contract terms., as the E-Bus Declaration that aims to adopt electric buses in Europe where together Amsterdam, Barcelona, Lisbon, London, and Paris to achieve together 6,000 buses by 2030. (International Council on Clean Transportation, 2022)	National policies with explicit mandates on ZE Bus fleets to ensure the purchase of a minimum number of buses. In Chile there is a national program for the bulk purchase of E-taxis that demonstrates this type of national management approach (ASE, 2023).
7. The gap to financing E-bus CAPEX is more challenging in small-medium cities	◆◆◇ MEDIUM	◆◆◆ HIGH	Bulk purchase through federal government management or through city alliances to reduce CAPEX for small to medium cities	OEMs, Transit authorities, Transport companies, Banks	Small and medium size municipalities can also implement alliances between them to jointly negotiate and have access to preferred prices and conditions. ZeEUS is an example of a success partnership on ZE Bus projects, where 40 cities across Europe conformed an alliance to jointly purchase E-Buses. (Zero Emission Urban Bus System, 2022)	Government mandates for long-term transport regulation to financially support smaller cities in the purchase of ZE Bus fleets (Council of Europe Development Bank, 2018).

1. FINANCIAL RISK (3/3)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
8. Lack of formal transport operators in small-medium cities	◆◆◆ HIGH	◆◆◆ HIGH	Design of Credit Guarantee Schemes focusing on public transport systems that catalyze the formalization of the sector, reducing lending risks.	OEMs, Transit authorities, Transport companies, Banks	Using Municipal Credit Guarantee Schemes through the municipality that issues the bonds. This mechanism would help secure funds to finance projects. (Zero Emission Bus Rapid Accelerator, 2020).	Using Government funds, NDBs or government agencies could provide Credit Guarantee Schemes to encourage lending by potential investors (Zero Emission Bus Rapid Accelerator, 2020).
9. Transport operator (new and existing) lacks access to finance	◆◆◆ HIGH	◆◆◆ HIGH	Private Guarantee Schemes (in which a private company acts as a third-party between the municipality and the lender, thus providing a guarantee for the loan.	OEMs, Transit authorities, Transport companies, Development banks	Municipal bond insurance offered by private institutions. The private company could provide a guarantee for the municipal bonds on ZE Bus projects, with existing success cases as for example in Los Angeles where the BAM institution provided insurance to Zero Emission bus projects. (Build America Mutual (BAM), 2022)	A government agency or body can act as a matchmaker to facilitate these partnerships and articulate these alliances. The Green Investment Group, invest in sustainable projects in Scotland and its government articulates alliances between the entity and municipalities. (Green Investment Group, 2023)
			Structure Partial Credit Guarantees (PCG) to cover a share of the debt instrument used in a ZE Bus project	OEMs, Transit authorities, Transport companies, Development banks	Municipalities can use a part of their Annual Budget for the launch of a Partial Credit Guarantee to be used for ZE Bus projects (International Finance Corporation, 2021)	The government could partner with a financial institutions and launch Partial Loan Guarantee for financial institutions that lend resources to the municipality of a small to medium sized city. As the Nordic Investment Bank (NIB) that provides in Nordic and Baltic countries an instrument (partial loan guarantees) for Zero Emission bus projects through its Green Transport Financing Framework. (Nordic Investment Bank, 2023)

2. DEMAND RISK (1/2)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
10. Decreasing demand for public transport services	◆◆◆ HIGH	◆◆◆ HIGH	Establish sustainable transport policies that promote modal shift from private mobility to public transit.	Transit Authorities, Public Authorities	Municipalities can lead the redesign of their public transport networks to improve the service. For example, by ensuring a reliable service with high-frequency on the bus network (C40, 2021a).	Public policies towards ensuring minimum demand by offering facilities to replace the use of fuel-powered vehicles for mass transit. For example, the case of Mexico City where one of its NDB's, NAFIN, is leveraging German resources through KFW Development Bank to help in the replacement of fuel-powered taxis with electric alternatives (Democrata, 2022).
11. Maintaining tariff fares for public transport users	◆◆◆ HIGH	◆◆◆ HIGH	Establish a tariff stabilization trust fund from national/local sources to avoid tariff increases as a result of ZE Bus projects	Transit Authorities, Public Authorities	Implementation of a trust fund, combining public and private funds, to ensure that public transportation remains accessible and affordable. This mechanism is demonstrated by Bogota's "FET" trust fund system (Alcaldía Mayor de Bogotá, 2019).	The government could raise transportation taxes to provide resources to trust funds to be managed by the city authority. In Chile, the budget law issued in 2020 has a specific section for the operation of the public transportation system (Ministerio de Transporte y Telecomunicaciones, 2020)
12. Routes/services must be exclusive rather than shared among several transport operators	◆◆◆ HIGH	◆◆◆ HIGH	Redefine public transport systems to define demand level by routes, services required, and optimize the contracting process for transport operators (number of companies and fleet size)	Transit Authorities, Public Authorities	City governments can restructure their current transport systems, as is the case in Bogota where the city had undergone changes to its public transport system, including the introduction of a BRT system known as Transmilenio. (Transmilenio, 2023)	Technical assistance provided by MDBs to governments in order to conduct a comprehensive analysis of the public transport system to ensure the right number of companies and size of fleets. The GCF has a percentage of its budget that includes technical assistance. (Green Climate Fund, 2022)
13. Fare collection systems are informal, decentralized, and lacking in transparency	◆◆◆ HIGH	◆◆◆ HIGH	Restructure public transport system to implement integrated tariff collection systems	Transit Authorities, Public Authorities, Digital providers for public transport management	Municipalities can implement an integrated tariff collection system as part of new concession tenders, with the objective of reducing the risk of fare evasion and fraud. Transmilenio system in Bogotá uses this method. (Alcaldía Mayor de Bogotá, 2019)	Government agencies can regulate fares for public transport but leave the responsibility of collecting fares to the transport operators. (Alcaldía Mayor de Bogotá, 2019)

2. DEMAND RISK (2/2)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
14. Fare collection systems are informal, decentralized, and lacking in transparency	◆◆◆ HIGH	◆◆◆ HIGH	Regulate the trust in charge of managing fare collection revenues, and the payment rules for ZE Bus financers and transport operators	Transit Authorities, Public Authorities, Digital providers for public transport management	Implement a reliable managing trust fund entity to oversee and coordinate public transport services, (World Bank, 2021)	Public bodies can be made responsible for setting and collecting fares for all modes of public transport. In Chile, the AFT is in charge of collect, manage and distribute revenues among the operators of the Metropolitan Mobility Network. (National Congress of Chile, 2008)

3. OPERATIONAL RISK (1/2)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
15. Poor performance of ZE Buses	◆◆◆ HIGH	◆◇◇ LOW	Establish training sessions delivered by OEMs for drivers and transport operators within the procurement process focused on maximizing energy performance and battery state of health	OEMs, Transit Authorities, Operator, bus providers	Local governments can develop and define the necessary training program and incorporate this in tender processes, covering key aspects of the operations and maintenance of ZE vehicles. The first hybrid fleets implemented in Bogota/SITP had serious problems with batteries due to not following good practices in driving (Maria Manriquez, 2022)	Public agencies can facilitate partnership between academy, municipalities and their transport systems operators, OEMs to certificate professional drivers as an upskilling program towards electromobility. The Faculty of Engineering (FCFM) from University of Chile certified professional drivers to prepare the first 100 ebuses that was implemented at the end of 2018 (FCFM, 2018)
16. E-buses are out of service due to a lack of spare parts	◆◆◆ HIGH	◆◆◇ MEDIUM	Establish the requirement for a stock of spare parts within the procurement process. Put special focus on chassis parts that may be damaged by impact (the main cause of E-buses being out of service)	OEMs, Transit Authorities, Bus suppliers	Development of a procurement plan within the concession tender with special focus on evaluating the supplier's expertise and experience in providing spare parts, in addition to conducting site visits and assessing the quality control processes of suppliers (DTPM, 2020)	Government publishes guidelines for ZE buses procurement and spare parts considerations (local governments are normally autonomous in regulating their public transport systems). In Uruguay, government publish an electromobility guidelines for local governments to promote electromobility adoption (MIEM, 2022) Create national programs or studies that provides diagnosis of failures, times of unavailability, critical spare parts, etc). The program "Electro Logistica-Chile" and "MOVES-Uruguay" for etrucks and eLCVs monitor several KPIs and in the first cycle, lack of spare parts for damage in body works (Electrologistica, 2023) (Moves, 2023)
17. E-buses are out of service due to a lack of trained technicians	◆◆◆ HIGH	◆◆◇ MEDIUM	Establish the requirement for training sessions delivered by OEMs for local technicians from operator and bus supply companies within the procurement process	Transit OEMs, Transit Authorities, Operator, Bus suppliers, Academia	Municipalities can partner with local educational institutions to offer training and educational programs for workers involved in Zero Emission. Related example of this collaboration is RUITEM (RUITEM, 2023)	Governments can use public funds to invest in training programs that are designed to build the skills and knowledge of technicians and engineers. (Hidalgo, 2022)

3. OPERATIONAL RISK (2/2)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
18. Decoupling of the procurement process for charging infrastructure and ZE Buses	◆◆◆ HIGH	◆◆◆ HIGH	Charging infrastructure supply conditions must be defined at the outset and be consistent with ZE Bus charging standards)	Transit Authorities, Operator, Bus suppliers	Tender processes that promote "ZE Bus fleet concessions" rather than "single permits" by integrating all necessary requirements to guarantee technical expertise. In the case of San Jose-Costa Rica electromobility transition, system may move from 36 operators companies to 10-15 companies, promoting consortium of the already existing companies to cover new "sectorization" (PNUMA-CURSA, 2021)	Establish national guidelines oriented towards the delivery of concession processes at the city-level. Based on Sustainable Mobility Policies and Principles. (MIEM, 2022)
			Procurement process for charging infrastructure should be undertaken at least 6 months prior to ZE Bus procurement	OEMs, Transit Authorities, Operator, Local energy distribution utilities	In Paraguay, the pilot with 2 Zhongtong operates in Asuncion since 2019. However, the operator MAGNO had problems with the charging infrastructure. The buses were in Asuncion long time without running affecting operational costs (Zuccolillo, 2021) .	Guidelines or national studies for charging infrastructure procurement strategies. E-motion, a multi-country electromobility program financed by the Green Climate Fund will provide this type of support through technical assistance in Panama, Paraguay, Uruguay (GCF, 2022)
19. Uncertainties in depot location and potential energy supply constraints	◆◆◆ HIGH	◆◆◆ HIGH	Early involvement with local energy utilities to provide city and transport authorities with technical data on potential depot locations. Undertake assessments of city electricity distribution networks to identify possible technical constraints for the deployment of electric bus depots	OEMs, Transit Authorities, Operator, Local energy distribution utilities	Philadelphia when decided to implement 25 ebuses had technical problems due to no further assessment in grid condition versus chargers technologies procured. Impact were more time and higher costs (WRI, 2019)	National government conduct studies to evaluate eBus depot potential, barriers, costs. Results for public access (RevistaEI, 2020)

4. TECHNOLOGY RISK (1/2)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
20.Performance of ZE Buses	◆◆◆ HIGH	◆◇◇ LOW	Provide OEMs with route data (GPS, demand profile, operational scheme). OEMs have enough experience to adapt E-bus models to perform efficiently (power drive-train, battery sizing)	OEMs, Transit Authorities, Public Authority, Operator	Conduct studies to analyze energy demand by routes and results available for public access. Example, Centro Mario Molina has develop this type of study in several cities (Santiago, San Jose, Panama City) (MOVE, 2019).	Implement a data observatory with information on a country's public transport systems (GPS, demand, operational schemes, etc.). (Observatorio Logistico, 2023)
			Conduct performance analysis in ongoing ZE Bus projects within Latin American cities. Results have to be for public access	OEMs, Transit Authorities, Public Authority, Operator, Academy, Consultancy Teams	Public-Private-Academic collaboration to design MRV, pilot and then track performance. Also, public transport system can concession this type of service and publish reports for public access (Taborelli, DTPM lanza bases de licitación para gestión de flota RED con buses eléctricos en Chile, 2022).	Implement a data observatory with information on a country's public transport systems which includes battery track record once MRV Systems are in place city-by-city. (Observatorio Logistico, 2023)
21.Unreliable performance of charging infrastructure	◆◆◆ HIGH	◆◇◇ LOW	Improve energy distribution quality supply (SAIDI, SAIFI, CAIDI)	Transit Authorities, Public Authorities, Utilities, Energy Distributor Entities Academy, Consultancy Teams	In Dominican Republic, assessment for last mile eTrucks adoption for the National Dominican Brewery has important challenges in terms of energy availability within the different cities and related energy distributor companies (Hinicio, 2022)	Provide National studies for more resilience electric grid system to sustainable electromobility uptake. The IDB multi-country electromobility program, financed by the Green Climate Fund will provide technical assistance for this purpose (GCF, 2022a)
22. Uncertainty around the management of battery performance at year 7-8 (first cycle)	◆◆◆ HIGH	◆◆◇ MEDIUM	Establish conditions for OEMs in the procurement process that guarantee E-bus ranges (km) at the end of the first battery lifespan	OEMs, Transit Authorities, Public Authority, Bus Provider, Bus Operator	Service and maintenance agreements as well as battery warranty to be required in concession tenders by the city administration to ensure that E-bus fleets remains reliable throughout their lifetime. (DTPM, 2020)	Incorporate battery maintenance and replacement requirements in long-term public policies. This would increase testing and procedures to ensure better battery functionality. Governments can conduct research and test alternatives, providing laboratory testing (FING-UDELAR, 2021)

4. TECHNOLOGY RISK (2/2)

Identified Risks for Banks	Impact	Likelihood	Possible Mitigation Mechanism	Stakeholders	Example at a city Level	Example at a country level
22.Uncertainty around the management of battery performance at year 7-8 (first cycle)	MEDIUM	MEDIUM	Ensure that there is a stock of batteries available from OEMs for the replacement year (7th or 8th) by establishing contract agreements between OEMs and bus suppliers	OEMs, Transit Authorities, Public Authority, bus providers	Local government requires OEM guarantees within procurement terms that guarantee stock and funds in the replacement year (Gomez, 2022)	IGuidelines or national studies for procurement ebuses and battery guarantees (MIEM, 2022)
23.Uncertainty around the management of batteries following the first lifecycle	LOW	LOW	Increase readiness of regulation (existing/in development) preparing the ecosystem in the medium term for applications and final uses	Ministry of Environment, OEMs, Transit Authorities, Universities, bus providers	Public-Private-Academic collaboration to study second life use and/or recycling value chain depending on city needs. Volvo and Local authorities of Gothenburg have been working in the initiative "positive footprint housing" were 2nd life batteries from ebuses are used for energy storage (Volvo Group, 2018) (ChargED, 2020)	Governments have to develop regulation for final disposal, 2nd life uses, recycling procedures and reports that certifies well practices. E-motion, a multi-country electromobility program financed by the Green Climate Fund will provide this type of support through technical assistance in Panama, Paraguay, Uruguay (GCF, 2022)

Debt Financing for Zero Emission Buses in Latin America

3

Regarding to State of Play analysis outcomes from interviews provided **common findings** and a **strong cohesion between actors from the financial sector**

STATE OF PLAY- KEY FINDINGS

- Banks interviewed are familiar with ZE bus projects and technologies, both at regional level and within cities/countries where they operate. This knowledge has allowed some of the banks interviewed to make their criteria more flexible when evaluating the financing of this type of projects.

- The deployment of ZE Bus projects in smaller/medium cities would be less attractive for MDBs, mainly due to its higher administrative cost compared with total potential amount to finance when fleets are smaller. In general, IDB Invest declared that ticket size should be at least 20 MUSD , while IFC pointed out that it would prefer for investments with a total project cost around 50 MUSD. Regarding the NDBs interviewed, it was found cases where there are financial products for ZE buses such as BNDES in Brazil with specific credit lines for ZE Bus projects; and cases where finance already happened such as FDN in Colombia.

- Banks interviewed would be attracted to finance ZE bus project as public transport systems are restructured, showing greater leadership from the public sector in planning and regulation, as well as in establishing the rules that each party must comply with. On the other hand, banks need to see how the public sector is able to secure funds from multiple sources, not just ticket fare collection, to mitigate demand risk and to be clear in how to guarantee repayment sources to the lenders.

- NDBs and MDBs interviewed have been working in partnership to promote electromobility, which although not exclusive to ZE buses, it is highly probable that they will work on structuring concrete programs in the short-medium term.

Metrobus' model presents the ideal conditions for the involvement of banks, in this sense the **figure of Fideicomiso receives public funds from the Metropolitan Fund** (FM) that can be used to finance infrastructure projects

STATE OF PLAY- KEY FINDINGS

- The role taken by National Development Banks, such as NAFIN and BANOBRAS, will be key for leveraging international funds to provide additional sources of financing for ZE Bus projects. On behalf the PROTRAM program led by Banobras, which belongs to a national trust fund (FONADIN), federal resources are being channeled into different cities towards investments in public transport system infrastructure.

- PROTRAM is unable to finance buses, however, these are two strategies to complement PROTRAM to enable a new PROTRAM component that exclusively finances ZE Buses.

- Banobras aims to structure a funding proposal to the Green Climate Fund to implement the "Greener PROTRAM" concept (medium term). The "Greener PROTRAM" strategy will be piloted in 8 priority cities in 2023.

- Metrobus' model presents the ideal conditions for the involvement of banks. A key aspect identified in the interview is the "Fideicomiso" trust mechanism that characterizes Mexico City BRT system.

- In terms of the management of demand-side risks, the banks interviewed appreciate the new tariff fare stabilization scheme implemented by Metrobus for the operation of Line 3. This scheme, which uses public funds from federal resources, is a mechanism that sustains cash flow from demand and keeps tariffs affordable for passengers,.

The **Transmilenio** system in Bogota has implemented the **unbundled business model with clear conditions that guarantee repayment** to the bus providers and **FDN is the most active player in the ecosystem**

STATE OF PLAY- KEY FINDINGS

- FDN has been involved in two zero emission projects in Bogota, both with great success, the Colombian Government needs to address more concessional guarantees with Multilateral Development Banks in order to leverage international funds for other cities, like Medellin.
- On behalf of the Bicentenary Group, a strategy is being carried out for the Colombian Government to reallocate public funds through its National Development Banks. It is expected that during 2023, Colombian NDB's will know where to participate when it comes to the financing of ZE Bus projects
- All of the projects described in Bogota are examples of the successful implementation of the unbundled model in the concession tenders with involvement of development banks, such as AFD and IDB Invest.
- The biggest challenge when it comes to replicating this model outside Bogota, is to demonstrate a healthy balance sheet that allows a local government to access debt financing. Today, one of main financial benefits that the capital city possesses is the FET.
- As part of its last project, "Green Movil", the engagement of Transdev (French leader on public transport) and Fanalca (Colombian firm specialized in transport) validated the quality of the project sponsor in financing the operation

Curitiba and Salvador de Bahia are assessing the replacement of their **bus fleets with electric buses**. Both municipalities are working **closely with BNDES and KFW**

STATE OF PLAY- KEY FINDINGS

- Electric buses in Brazil are expensive. Import tariffs in Brazil are very high in comparison with other Latin American countries, making the cost of electric buses up to 3 to 4 times higher than diesel powered buses.

- BNDES can provide direct financing for ZE bus projects. However, for this type of project it is considered too risky to have the private operator as the direct borrower and public guarantees are needed to guarantee the sources of repayment for lenders. If city authorities are able to provide public guarantees, BNDES will be more comfortable participating in this type of project. As of today, BNDES needs the presence of a fiduciary agent to leverage its resources using this path.

- BNDES can also provide indirect financing for ZE bus projects. However, scaling-up these activities requires the involvement of an intermediate commercial bank. A lack of willing by commercial banks in the Brazilian ecosystem is a gap for manufacturers such as BYD and Eletra.

- Mercedes Benz Bank (commercial bank) indicate that they are in conversations with BNDES to support its indirect credit line. However, the Bank would only consider its own OEM that currently has over 50% of market share for bus fleets in Brazil.

- The World Bank has been supporting Brazil through technical assistance, with its most recent studies developed in Bello Horizonte, Salvador and Fortaleza.

As of the end of 2022, **Chile has over 800 electric buses in operation**, with a further **991 E-buses to be added to Santiago's public transport system**

STATE OF PLAY- KEY FINDINGS

- The successful experience in Santiago of with the purchase of 992 E-buses by Buses K Cuatro, shows that the unbundled model has marked a positive impact in terms of scaling up ZE bus fleets. It is expected that RED Metropolitan's bidding process, which should be published at the end of 2023, will include heavy involvement of some of MDBs interviewed

- Public transport systems in Chilean regions may be less attractive for MDBs like IFC and IDB Invest, as ticket size may be too small to be competitive. However, with the Ministry of Transport and DTPR, CAF is exploring pathways to finance the entire regional transport system rather than region-by-region.

- Banco Estado (commercial bank) has been implementing credit lines for electric vehicles but alternatives for public transport systems are still under development. Coordination is needed between DTPR and Banco Estado to establish operator/ asset owner conditions that align with the Bank's policies. This is expected to progress during 2023.

23 risks were identified based on the interview process undertaken, some of these **may vary depending on the type of bank and its respective location**

RISK RECOMMENDATION MECHANISM - KEY FINDINGS

- Regarding financial risks, the risk mitigation mechanism with the greatest impact on the potential involvement of banks in the financing ZE Bus projects is the transport system's capacity of providing diverse funding sources to guarantee repayments as well as national incentives for the roll-out of ZE Bus projects

- Regarding demand risks, there is a need to improve planning in public transport systems and adapt concession contracts to split services among operators, reducing uncertainties around revenue streams when banks analyze the financing of ZE Bus projects. On the other hand, public transport systems should provide broader KPIs to guarantee income to bus providers and operators.

- Operational risks were distinguished between those that relate to buses and those that relate to charging infrastructure. Banks understand that the lower OPEX of ZE Buses, as compared with diesel buses, is key to sustaining the financing of ZE Bus projects over the 15-16 years of the concession period. Regarding the project lifecycle of charging infrastructure (design, procurement, implementation), a high level of coordination with stakeholders is needed for around the deployment of ZE Buses in order avoid delays with entry into commercial operation

- Technology risk relates primarily to the lifespan of batteries during their first lifecycle (first 8 years). The performance of electric buses and charging infrastructure is perceived as low risk.

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