BASE

Driving investment in climate solutions

WEBINAR

Driving the Change: Accelerating Public Transport's Transition to E-Buses

#1: Learnings from Latin America

STARTING SOON

Please note that live translation in Spanish is available on Zoom

BASE

Driving investment in
climate solutions

WEBINAR

Driving the Change: Accelerating Public Transport's Transition to E-Buses

#1: Learnings from Latin America

WELCOME TO THIS WEBINAR!

Please note that live translation in Spanish is available on Zoom

Technicalities

- Duration: 60 minutes.
- Questions:
  - Please type them in the Zoom chat or as comments on the LinkedIn Livestream.
  - Q&A session of 10 minutes at the end of the webinar.
  - Depending on capacity, questions unanswered during the Q&A will be answered in a written format in the days following the event.
- Live translation in Spanish available on Zoom.

For LinkedIn Live attendees to sign up to the webinar mailing list:

The recording of the event, the panellists' presentations and the written answers to your questions will be shared with this mailing list.

WEBINAR
Driving the Change: Accelerating Public Transport's Transition to E-Buses
#1: Learnings from Latin America

BASE
Driving investment in climate solutions

Francisco Ramìrez Cartagena
Senior Sustainable Energy and Transport Finance Specialist at BASE
Moderator

Daniel Magallòn
Managing Director at BASE
BASE

Maria Fernanda Ortiz Carrascal
Public transport and e-mobility expert with experience at
VGMobility & TRANSMILENIO

Lara Zhang
Regional Director of BYD Latin America
BYD

Luis Andres Alandia
Senior Investment Officer and Global Lead Specialist for urban mobility at Proparco
PROPARCO GROUPE AFD

Daniel in a few words:

- Led e-bus projects in several countries with the implementation of 1,500 e-buses and 40 hybrid buses.
- Led design of business models and financial strategies for e-buses and smart charging infrastructure in Sri Lanka, establishing roadmaps in Costa Rica,and financial strategies in Argentina and Peru.

Daniel Magallòn

Managing Director
at BASE Foundation

BASE

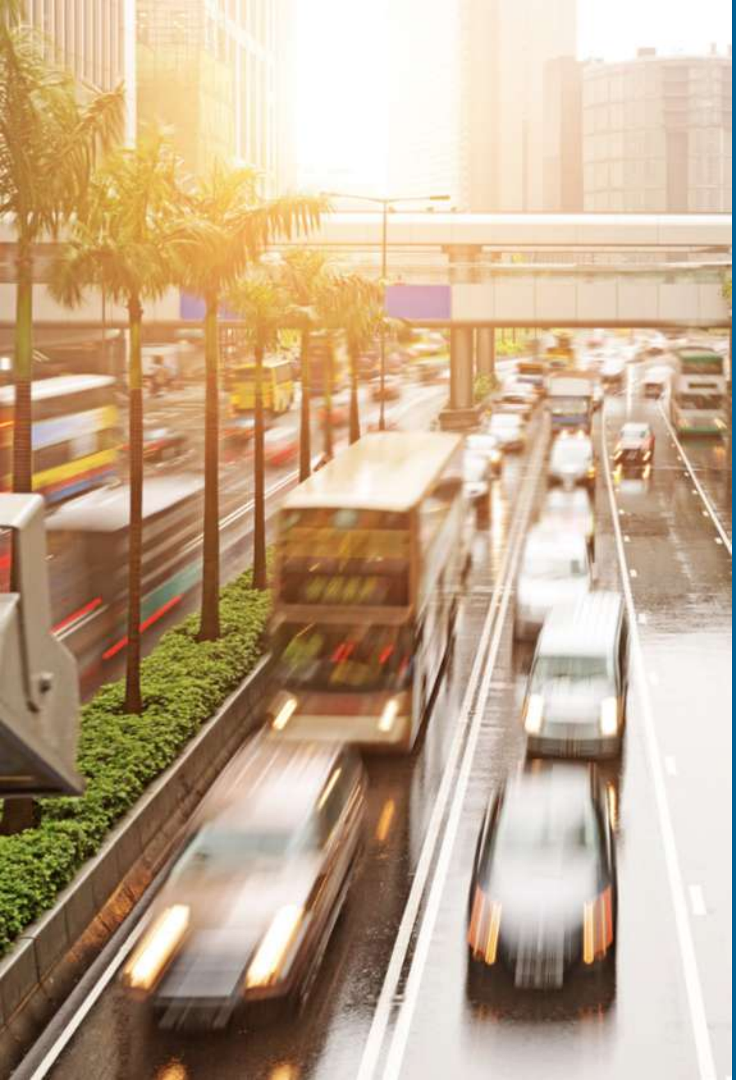
Opening Remarks

ABOUT BASE

BASE is a Swiss not-for-profit foundation and a Specialized Partner of UN Environment.

BASE develops innovative, actionable financing strategies and market-driven solutions to unlock investment in sustainable energy and climate change solutions.

BASE has been developing innovative financing strategies and business models for e-mobility for 7 cities in Latin America, Africa and Asia.

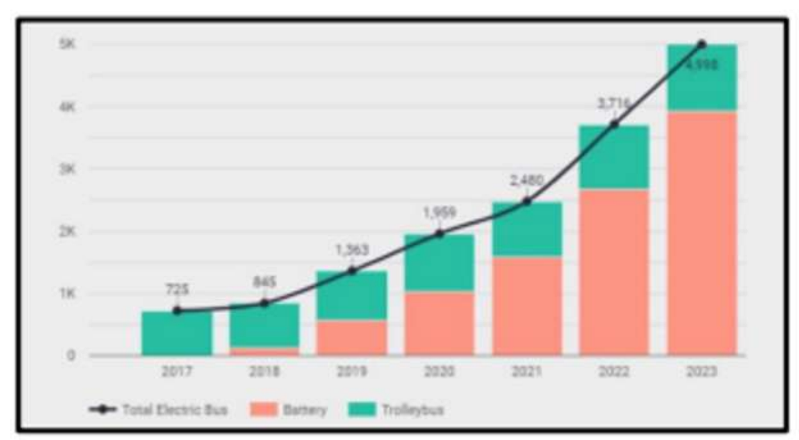


Why E-Buses?

Sources: UNEP

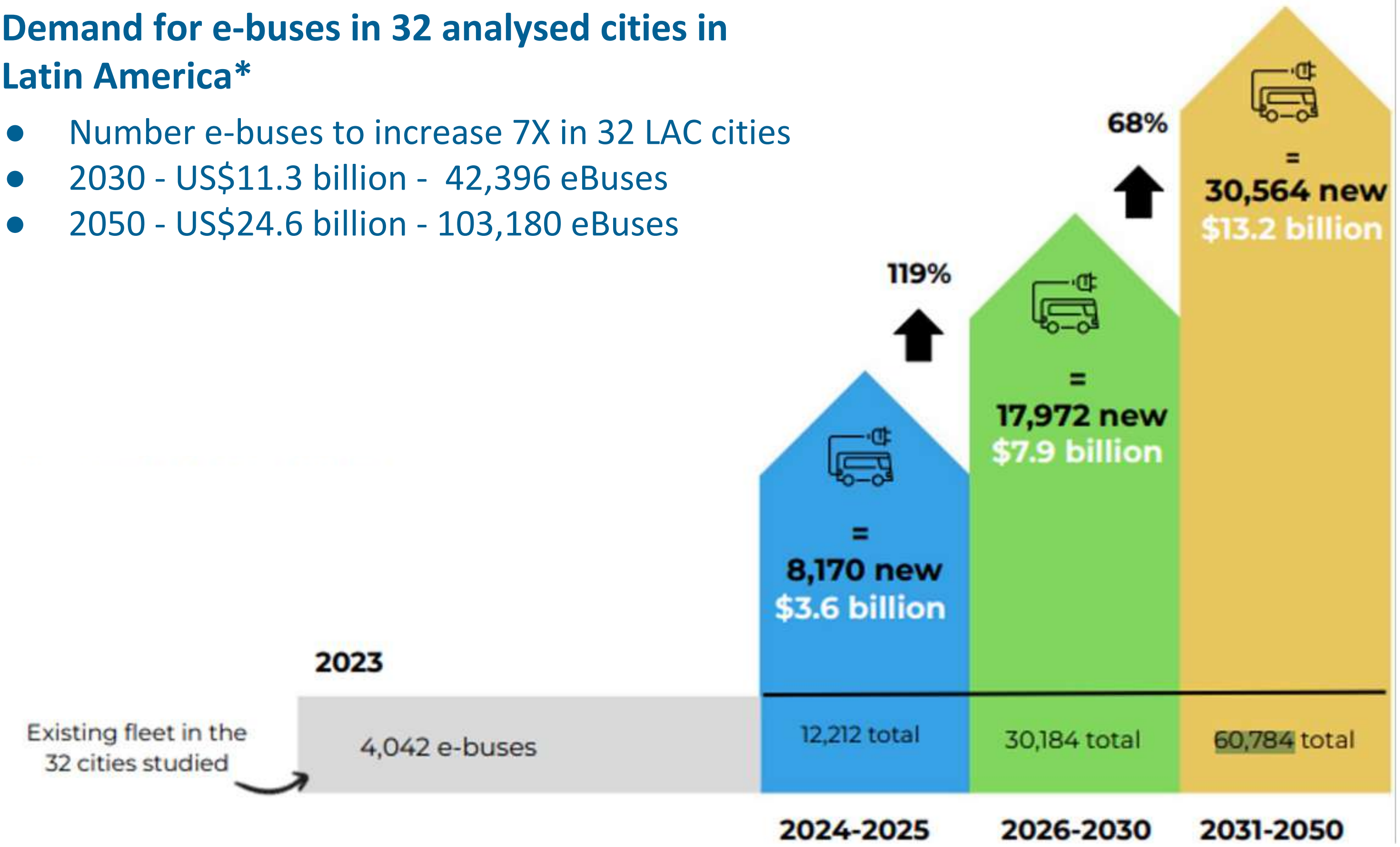
- Transport sector is fastest-growing GHG expected to reach 30%+ of total emissions in the future.
- Meeting targets of Paris Climate Agreement requires a global shift to Zero emissions electric mobility.

Total of e-buses in Latin America



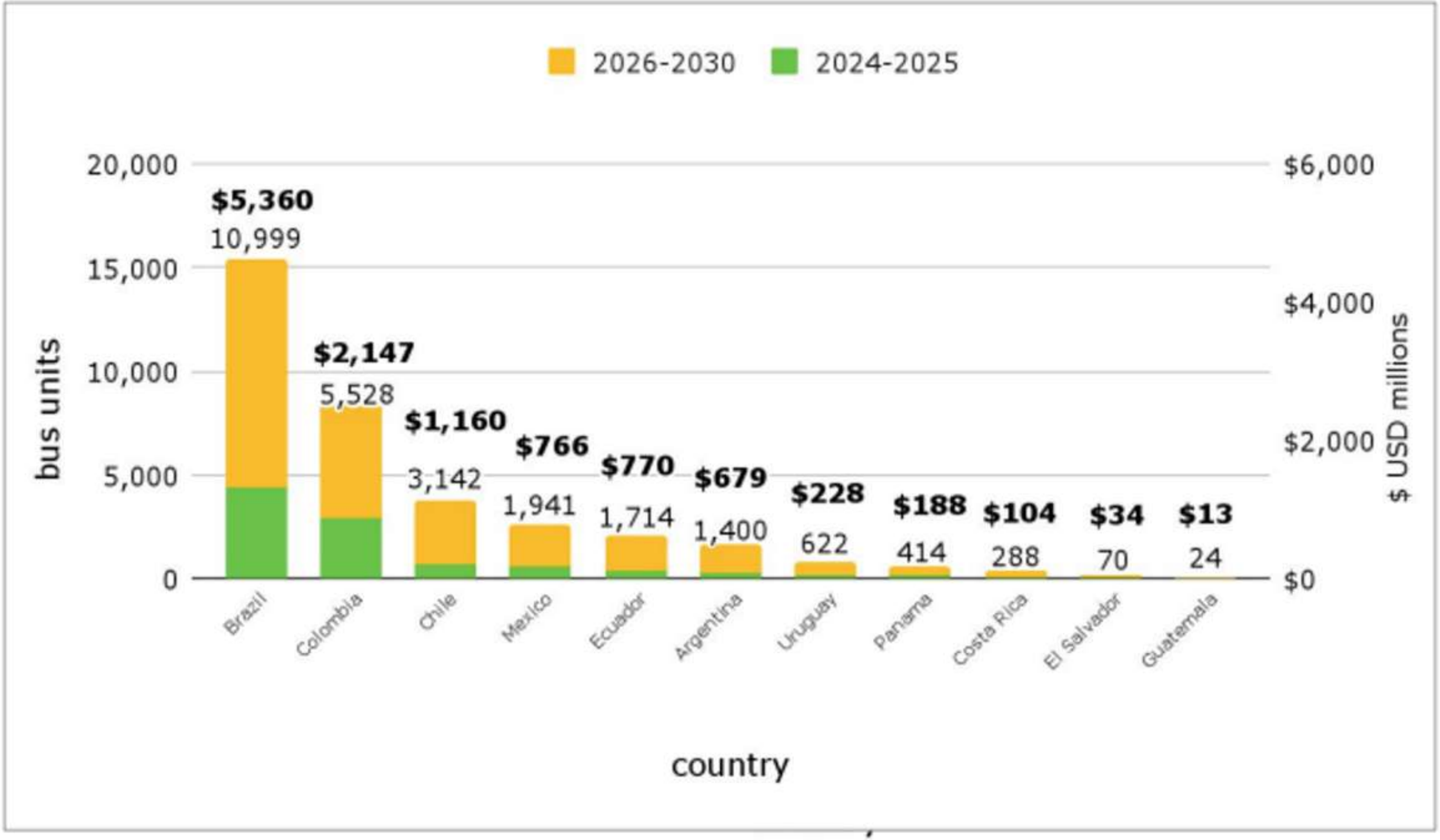
Demand for e-buses in 32 analysed cities in Latin America*

- Number e-buses to increase 7X in 32 LAC cities
- 2030 - US$11.3 billion - 42,396 eBuses
- 2050 - US$24.6 billion - 103,180 eBuses



* Source: C40 City interviews (2023), relevant public policies and E-Bus Radar

E-bus Projection and Investment Size Including Charging Infrastructure



eBus Adoption Landscape in Latin America: National Plans, Pilots, Initiatives and Fleet Implementations

BARRIERS

Political and Regulatory

- Lack of supportive regulations to promote electric buses.
- Widespread informal transport services
- Changes in government and transport authorities

Operational Risks

- Operational Adjustments for E-Bus Fleet Transition
- Challenges of Market Fragmentation
- Tailoring E-Bus Solutions to Local Conditions

Financial Risks

- Higher upfront investment in eBus
- Need of infrastructure investment to enable eBuses
- Absence of secondary market

Technology Risks

- Historical Data Scarcity and evidence - few success case studies
- Knowledge gaps, - charging infrastructure requirements, equipment/ performance and lifetime, operation conditions

Thank you!

Maria Fernanda in a few words:

- 12+ of experience structuring processes for electrifying public fleets.
- Chosen as one of the fifteen Electric Women by TUMI and Women Mobilize publication.
- Led Bogotá's ascension as a leader in clean transportation.
- Recently appointed Director General of TransMilenio

Maria Fernanda Ortiz Carrascal

Public transport and e-mobility expert with experience at

VGMobility & TRANSMILENIO

Key elements of electrifying public transport systems

María Fernanda Ortiz Carrascal

January 2024

3 cases

Bogota, CO

- 1.485 e-buses
- 10 electroterminals
- 3 years operating

Mexico City, MX

- L3: 60 e-buses
- 1 electroterminal
- 1 year operating

San Jose, CR

- Strong legal framework
- Strong political view
- 1 pilot

Key elements in successful cases

- Political will
- Legal framework of incentives and disincentives
- Economical support from central sector: financial guarantees and payment methods
- Adequate distribution of risks between public and private: bankable business model
- Permanent conversation with private sector, financial entities, insurance companies and other stakeholders
- Strong technical skills inside of public entities
- Key partners from the energy sector

Bogotá

TRANSMILENIO

Concession contract

TRANSMILENIO S.A.

Concession contract

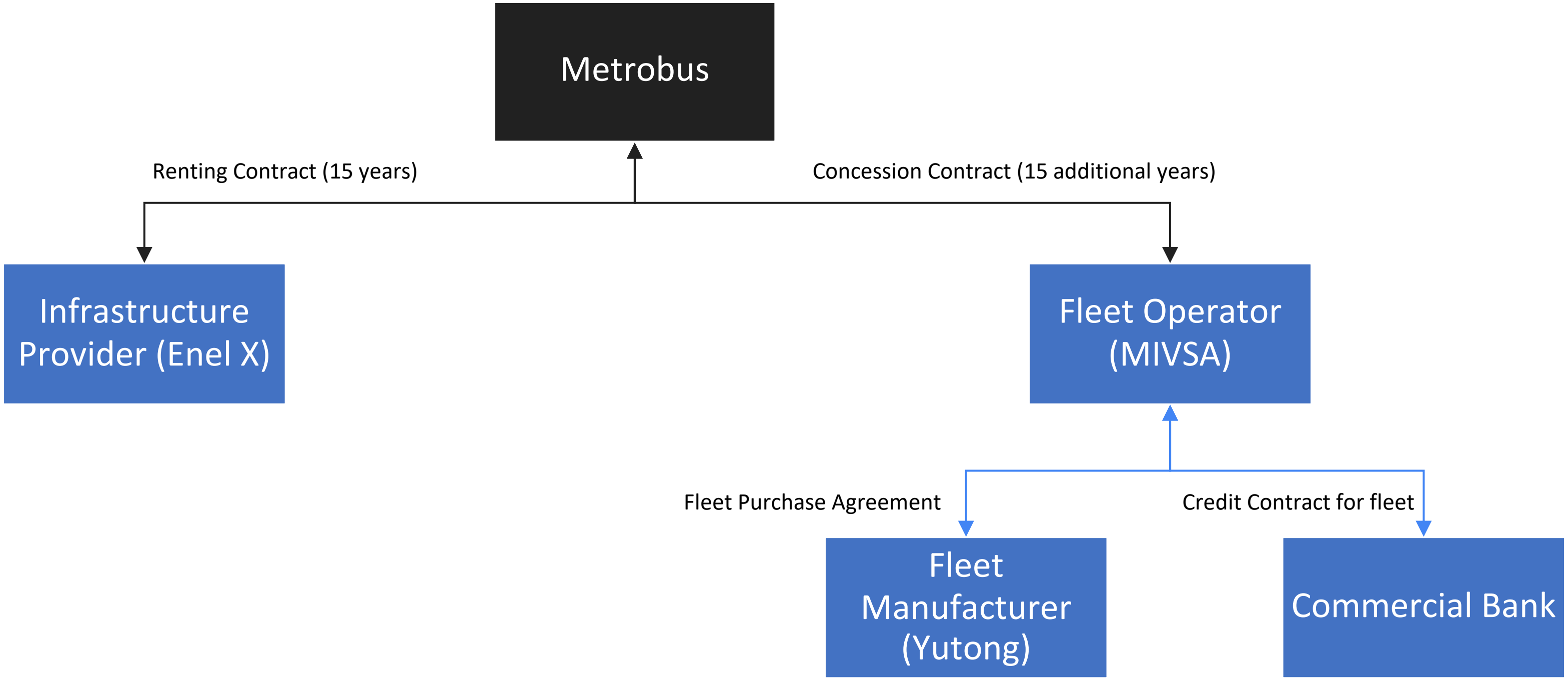
Fleet Provider

Fleet Operator

- Get financing
- Supervise fleet maintenance
- Provision of the fleet
- Build and provide the service of depots, including recharging infrastructure

- Operation and maintenance of the fleet and the infrastructure

Mexico City - L3 Metrobus



What is missing in San José

- Political will
- Legal framework of incentives and disincentives
- Economical support from central sector: financial guarantees and payment methods
- Adequate distribution of risks between public and private: bankable business model
- Permanent conversation with private sector, financial entities, insurance companies and other stakeholders
- Strong technical skills inside of public entities
- Key partners from the energy sector

Thank you!

Maria Fernanda Ortiz Carrascal

mf.ortiz34@gmail.com

Lara in a few words:

- 15 years of experience in the electric vehicle industry
- Led projects of electric mobility and sustainable development for over 500 million USD.

Lara Zhang

Regional Director of BYD Latin America

BYD


TECHNOLOGICAL INNOVATIONS
FOR A BETTER LIFE

ABOUT BYD

1995

BYD was founded.

2003

BYD entered the automobile industry through the purchase of Tsinchuan Automobile.

2005

BYD released the F3 model.

2008

Warren Buffett acquired a 10% stake in BYD.

BYD launched the world's first plug-in hybrid electric vehicle (PHEV), the F3DM.

2010

BYD launched all electric e6 and put into service in taxi markets.

The Denza brand was created by BYD and Daimler.

2013

BYD launched "Qin" equipped with second generation dual mode technology.

2015

BYD launched "Tang" equipped with dual mode technology, first model of 5-4-2 strategy.

2018

BYD launched its automotive-grade IGBT 4.0.

2020

Established a joint venture with Toyota.

BYD released "Han" EV as well as the Blade Battery.

2021

BYD released its DM- i PHEV technology.

BYD released its pure electric vehicle platform- e-Platform 3.0.

BYD became the first Chinese automaker to sell more than 1 million new energy vehicles.

2022

BYD announced to discontinue ICE vehicle production.

BYD released the Cell-To-Body battery integration technology.

BYD Rolled off its 3 millionth new energy vehicle.

2023

BYD launched its High-end brand-YANGWANG.

FANGCHENGBAO was launched.

The 6 millionth NEV rolled off the production line.

4 MAIN INDUSTRIES

Auto

Rail Transit

Renewable Energy

Electronics

90,000+
R&D Personnel

11
Research Institutes

27
Patent Applications per day

15
Authorized Patents per day

* As of Oct, 2023

FULL INDUSTRIAL CHAIN AND FULL-MARKET STRATEGY

The **First and Only** company in the world to provide full-market new energy vehicle solutions, **7+4 strategy**

7

Conventional Applications

Consumer | *Buses* | *Coaches* | *Taxis* | *Logistics* | *Construction* | *Sanitation*

+

4

Specialized Applications

Port | *Warehouse* | *Airport* | *Mining*

40+
Branch Offices

600+k
Employees

Over 400 cities across 70 countries & regions in 6 continents

EUROPE

UK
Netherlands
Sweden
Finland
Italy
Spain
Norway
Germany
Hungary
Denmark
Ireland
Belgium
France
Portugal
Luxembourg
Poland
Greece
Romania
Iceland
Austria
Turkey
Malta

NORTH AMERICA

Canada
United States

CENTRAL & SOUTH AMERICA

Mexico
Colombia
Ecuador
Peru
Brazil
Uruguay
Panama
Argentina
Barbados
Chile
Paraguay
Bahamas
Guatemala
Curacao
Jamaica
Bolivia
Costa Rica
Dominican Republic
the Caribbean
Republic of Trinidad and Tobago

MIDDLE EAST& AFRICA

Mauritius
Jordan
United Arab Emirates
South Africa
Morocco
Israel
Azerbaijan

ASIA PACIFIC

China
Hong Kong, China
Macau, China
Taiwan, China
Japan
South Korea
Philippines
Indonesia
Nepal
India
Thailand
Laos
Malaysia
Singapore
Australia
New Zealand
Brunei
Cambodia
Mongolia
Myanmar
French Polynesia
Uzbekistan

*As of Oct, 2023

Global NO. 1

NEV(BEV+PHEV) Sales

3.02 Million

NEV Sales during 2022 with 61.9% YOY Growth Rate

242,765 Units

Overseas sales in 2023, with 334.2% YOY Growth Rate

Insights from the manufacturer’s perspective for E-bus deployment

- Role of the manufacturer
- Gaps between expectations and reality for e-bus deployment
- Specific barriers and needs


BYD

Luis Andres in a few words:

- 12+ years of experience originating and structuring debt for infrastructure projects worldwide.
- Led the financing of three landmark e-mobility transactions, deploying a combined amount of circa USD 150M.

Luis Andres Alandia

Senior Investment Officer and Global Lead Specialist for urban mobility at Proparco

PROPARCO
GROUPE AFD

BASE

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PROPARCO: A LEADING EUROPEAN DEVELOPMENT FINANCE INSTITUTION (DFI) FOCUSED ON THE PRIVATE SECTOR

PROPARCO
GROUPE AFD

French Development Agency's (AFD) private sector financing arm

Proparco **finances private sector led projects** that have a **significant impact on local development**

€2.7bn committed in 2023

A global network of **23** local and regional offices

Present in **over 115** countries (countries eligible for public development aid, according to the OECD)

Over 450 employees (with **100** working on the field)

Urban mobility: at the center of AFD's activities

Over $7bn of transport projects financed by the AFD Group since 2010, **more than 60%** of which correspond to urban mobility projects

Proparco's increasing role in urban mobility is fully aligned with **an increasing role of the private sector in urban mobility** projects worldwide

Three flagship urban e-mobility projects financed:

- **Electribus** (Colombia, 2021) – 259 e-buses (50/80 pax)
- **GreenMovil** (Colombia, 2022) – 406 e-buses (50/80 pax)
- **Dakar Mobilité** (Senegal, 2023) – 121 e-buses (150 pax)

E-BUSES: THE FASTEST-GROWING SEGMENT OF THE EV MARKET

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The e-bus revolution – a key (and growing) segment of urban mobility

The rise in pollution and environmental hazards has compelled a transition towards e-mobility

- **70%** of **global GHG emissions** from cities and **1/3** of these emissions are caused by **transport**[1] *(C40)*
- Increasing urbanisation rates > use of public transport must double by 2030 *(C40)*

E-buses are surpassing the growth of every other electric-vehicle (EV) segment worldwide

43,1% CAGR

Global e-bus market size: from **112k** units in 2022 to **671k** in 2027, at a CAGR of **43.1%**[2]

Asia remains the largest e-bus market. All continents shifting towards a Zero Emission (ZE) urban mobility

LAC: a land of opportunities for e-buses

LAC is leading the transition to ZE (zero-emission) urban mobility

5,068 2023

5,068 electric buses in Latin America at YE2023 incl. **2000** in Santiago (city w/ largest fleet of e-buses outside China) and **1,485** in Bogotá[3]

$11.6b 2030

Electric bus market in Latin America: $11.6bn by 2030 and **$24.6bn** by 2050[1]

LAC represents a strong potential for e-buses :

- High **urbanisation rates** (**84%** living in cities)
- High **use of public transport** (**68%** of passenger travel)
- Public policies focused on **reducing CO2 emissions**
- **Clean energy matrices**

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Sources:
[1] C40
[2] Global Electric Bus Market 2023-2027, Business Wire
[3] E-Bus radar

THREE FLAGSHIP PROJECTS IN THREE YEARS: EUR 300M CONVEYED TO E-BUSES WORLDWIDE!

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Electribus (Colombia, 2021)

Project: concession (15y) for the supply of 259 e-buses to the SITP of Bogotá

Financing (c. $110m):

- Senior debt (13.5 years): $82m
- Equity: $28m

Actors:

- Grantor: Transmilenio
- Sponsors: Ashmore & SomosK
- Lenders: Proparco & FDN
- Supplier: BYD

GreenMovil (Colombia, 2022)

Project: concession (15y) for the supply of 406 e-buses to the SITP system, charging infrastructure and a logistics centre

Financing (c. $148m):

- Senior debt (13.5 years): $133m
- Equity: $15m

Actors:

- Grantor: Transmilenio
- Sponsors: Transdev & Fanalca
- Lenders: Proparco & FDN
- Supplier: BYD

BRT Dakar (Senegal, 2023)

Project: concession (15y) for the supply, operation and maintenance of 121 articulated e-buses (150 pax)

Funding (c. €139m):

- Senior debt (13 years): €92m
- Subsidies: €15m (EU & EAIF)
- Equity: €32m

Actors:

- Grantor: CETUD
- Sponsors: Meridiam & FONSIS
- Lenders: PROPARCO, EAIF (+ subsidies from EU and PIDG)
- Supplier: CRRC

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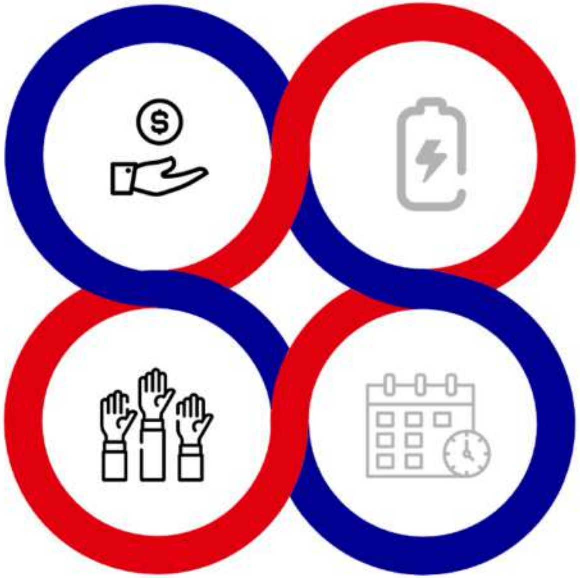
FINANCING E-BUS CONCESSIONS - CHALLENGES & LESSONS LEARNED

1. Higher CapEx meets Lower Opex

- CAPEX required is much higher for e-buses (**2x**) (and it's mostly upfront)
- OPEX, on the contrary is lower (but savings come year after year)

> Total Cost of Ownership (TCO) is lower for an e-bus than a conventional one



2. Tackle battery replacement

- Battery replacement = ~30% of CAPEX
- Key issue for Sponsors – how to ensure best terms for battery replacement in years 7-8? Safer to secure supply now?
- Different approaches for Electribus, Green Movil and Dakar Mobilité

3. Bankability and demand risk

- High financing needs: **bankability of business models is all the more relevant**

> Separating Asset ownership from O&M - no traffic risk borne by asset owners (e.g. Electribus or GreenMovil)

> Min. level of ridership guaranteed by Grantor (e.g. Dakar Mobilité)

4. Public sector: a critical role to foster the transition to ZE urban mobility

- **Mitigating ridership risk** to ensure bankability of concessions
- **Long concession terms required** ([15] years)
- **Consistency & track record in meeting obligations vis-a-vis concessionaires**
- **Fiscal incentives**

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THANKS FOR YOUR ATTENTION!

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Panel Discussion

Questions & Answers

Thank you!

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