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.
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

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

Daniel Magallón
Managing Director at BASE

Maria Fernanda Ortiz Carrascal
Public transport and e-mobility expert with experience at BYD Latin America

Lara Zhang
Regional Director of BYD Latin America

Luis Andres Alandia
Senior Investment Officer and Global Lead Specialist for urban mobility at Proparco
Daniel in a few words:

- Led e-bus projects in several countries with the implementation of 1,500 e-buses and 40 hybrid buses.

Daniel Magallòn
Managing Director at BASE Foundation
Opening Remarks
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?

- 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

Sources: UNEP
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
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

Concession contract

TRANSMILENIO S.A.

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

Fleet Operator
- Operation and maintenance of the fleet and the infrastructure

Concession contract
Mexico City - L3 Metrobus

- Metrobus
  - Renting Contract (15 years)
  - Concession Contract (15 additional years)

- Infrastructure Provider (Enel X)
- Fleet Operator (MIVSA)
- Fleet Manufacturer (Yutong)
- Commercial Bank

- Fleet Purchase Agreement
- Credit Contract for fleet
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
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 - ePlatform 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
Over 400 cities across 70 countries & regions in 6 continents

**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

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

**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
- Myanmar
- French Polynesia
- Uzbekistan

**MIDDLE EAST & AFRICA**
- Mauritius
- Jordan
- United Arab Emirates
- South Africa
- Morocco
- Israel
- Azerbaijan

**Branch Offices** 40+
**Employees** 600+k

*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
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
WEBINAR SERIES: « DRIVING THE CHANGE: ACCELERATING PUBLIC TRANSPORT’S TRANSITION TO E-BUSES »

#1 LEARNINGS FROM LATIN AMERICA

16/01/2024
PROPARCO: A LEADING EUROPEAN DEVELOPMENT FINANCE INSTITUTION (DFI) FOCUSED ON THE PRIVATE SECTOR

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**

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

- **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 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** 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

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!

**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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Luis Andres ALANDIA
Senior Investment Officer
Global Lead for Urban Mobility
alandiala@proparco.fr
+33153443089

THANKS FOR YOUR ATTENTION!
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Panel Discussion
Thank you!

Panellists’ contact details:
- francisco.ramirez@energy-base.org
- daniel.magallon@energy-base.org
- Mfo@vgmobility.com
- lara.zhang@byd.com
- alandiala@proparco.fr