From Pilots to Scale

Development finance for e-bus transition

Lessons from the World Bank in Latin America and the Caribbean

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E-buses pay off. Financing them is the hard part.

The economics work

2–3x Higher vehicle price (pre-tax) of an e-bus vs. a diesel bus

40–70% Lower lifetime operating costs, from cheaper energy and maintenance

US$120K Net economic benefit per e-bus (up to), with health and climate gains

The financing does not

3–7 years Typical tenor of OEM vendor finance in LAC, far short of asset life

18–22% Interest on OEM finance operators fall back on (Brazil), on 60-month terms

3.5% Of 10,000 targeted buses financed on Brazil's 6% concessional line, as weak operator credit blocked uptake

The bottleneck is not technology. It is bankability: weak operators, costly capital, and contracts lenders cannot rely on.

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Our LAC study: an e-bus is a stress test of the whole system

Financing feasibility and cost depend less on technology risk and more on the structure of the transport system. Electrification raises capital intensity and stretches repayment over longer horizons, so it exposes every weakness in contracts, payments and institutions.



Governance

Clear mandates and coordination



Contracts

Enforceable, aligned with asset life



Formality

Auditable, traceable operations



Revenue

Predictable fares and subsidies



Macro

Sovereign risk, currency



Regulatory

Clear e-mobility rules



Technical-operational

Capacity to run e-fleets

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Who finances e-buses in LAC, and what role they play

Active today

Concessional — MDBs, DFIs and national development banks: long loans, guarantees, first-loss

Supply — OEMs: vendor and export-credit-backed finance on 3–7 year terms

Lease — Leasing firms and FleetCos: own fleets, paid via 10–15 year availability payments

Largely on the sidelines

Invest — Debt and equity funds: senior or subordinated debt, equity targeting 12–18% IRR

Lend — Commercial banks: senior debt at 10–15 year tenors; the most risk-averse

Refinance — Institutional and ESG investors: bonds and securitization of mature, investment-grade assets

Development banks and OEMs carry e-bus finance today; private capital has yet to scale.

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The financier pyramid: capital widens as systems mature



Instruments	What unlocks this tier
10	Credit enhancement and market depth
8	Ring-fenced revenues and operating track record
5	Enforceable concessions and payment discipline
2	Formal contracts and basic institutional capacity

De-risking compresses the climb: guarantees, payment trusts, ECA cover and FX hedging can bring capital in earlier than the tier suggests.

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Four lessons for moving from pilots to scale

1. Start with what is available

Grants, vendor finance, concessional and sovereign loans, and leasing can launch electrification in many cities. The binding constraint is deployment capacity, not instruments.

2. Fix the cash flow, not the product

Scale depends on the quality, predictability and enforceability of cash flows: revenue traceability, credible payments, lifecycle risk allocation.

3. Use de-risking as an accelerator

Guarantees, first-loss and payment security can bring commercial capital in earlier, but they complement, not replace, sound structures.

4. Build on existing channels and track record

Operators, OEMs and lessors with sound balance sheets can finance fleets. Market familiarity takes years. Pilots matter.

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What development finance at the World Bank brings

Lend long

Sovereign and subnational loans with tenors aligned to asset life. IPF or results-based PforR.

Reach through intermediaries

Credit lines via national banks to reach medium-sized cities and private operators.

Share risk

Guarantees and risk-sharing to crowd in banks, with IFC and MIGA across the WBG.

Reform contracts

Unbundle fleet from operations, clearinghouses, payment hierarchies, lender step-in rights.

Prepare and aggregate

Project preparation, technical assistance, and aggregated procurement to cut costs.

World Bank e-mobility since 2016

32

countries supported with lending and knowledge work

~US$2.3B

committed to transport projects with e-mobility elements

Examples: Dakar, India, Brazil

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Brazil: from city pilots to a national market

Brazil Electromobility MPA: a ten-year program of over US$1 billion that tests financing models city by city, then scales them nationally.

São Paulo

PforR with IDB

US$248.3M

Results-based viability-gap subsidy

Approved

Phase 1: Caixa

Financial intermediary

US$500M

Credit line for medium-sized cities

Approved

Phase 2: Salvador

e-BRT, large city

US$75M

Unbundled fleet and operations

Approved

Phases 3–5

Boa Vista, Rio, Florianópolis

US$420M

E-bus, PforR and e-BRT models

Pipeline

Phase 6

Ministry of Cities

US$100M

National program to leverage private finance

Pipeline

From city-level subsidies and loans → intermediated credit → unbundled models → national risk sharing

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São Paulo: paying for results to close the viability gap

2038

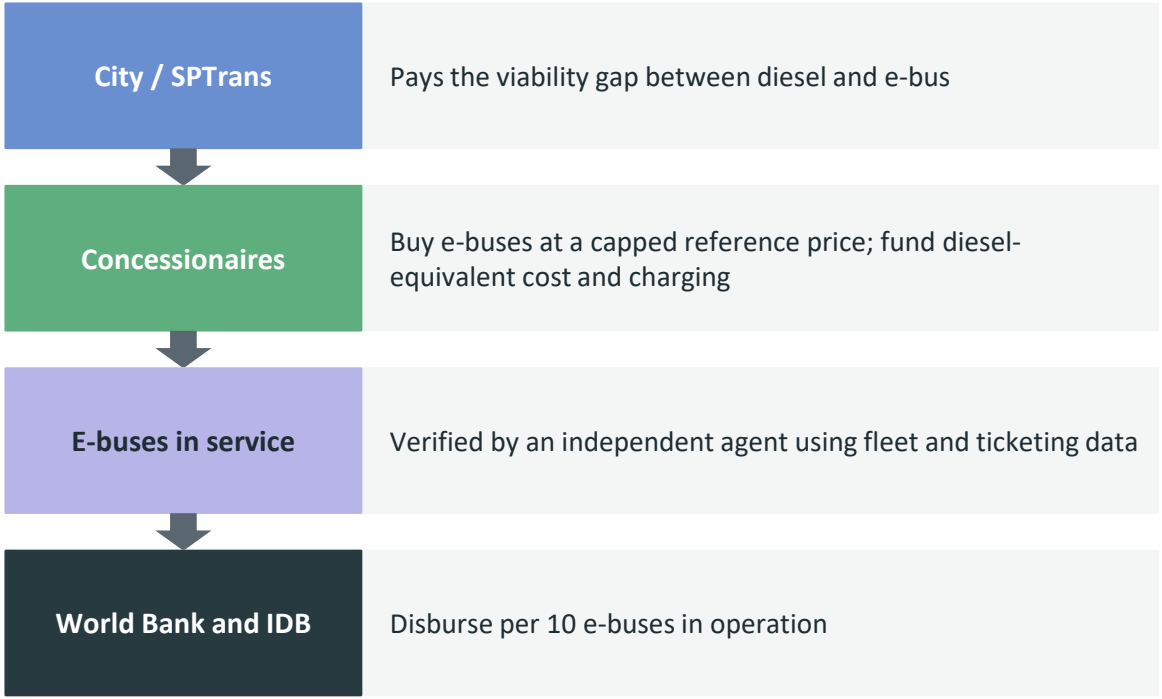
Target year for a fully electric municipal bus fleet

US$248.3M

IBRD, matched by US$248.3M from IDB

US$124.9M

Private capital mobilized



Why it works: formal concessions, a central clearinghouse (Bilhete Único) and a binding climate law.

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Caixa: reaching medium-sized cities and operators

How it works

- US$500M IBRD loan to Caixa, Brazil's federal bank present in 99% of municipalities
- Lends to public and private borrowers for e-buses, depots, charging and grid upgrades
- Tenors aligned to asset life: up to 15 years (public), up to 12 years and 90% financing (private)
- Project preparation facility to turn ideas into bankable proposals
- Aggregated procurement marketplace and carbon-credit platform

Four eligible business models

Public procurement

City buys, leases or transfers to concessionaire

Viability gap

Concessionaire buys with public subsidy

Direct private

Operator buys and finances

Third-party leasing

Asset company owns and leases the fleet

~540	~US$126M	US$2–100M
e-buses expected	private capital expected	eligible project size

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Next frontier: unbundle assets, share risk at scale



Salvador (Phase 2, US$75M IBRD)

- Problem: long, bundled concessions and operator-controlled ticketing limit fleet renewal and revenue transparency
- Proposed model: an SPV fleet provider owns the e-buses and leases them to operators. It is more creditworthy than individual operators
- Risk mitigants: centralized revenue account, subsidy guarantees, stronger governance, step-in rights on default

National scale

- Ministry of Cities phase: a national program and risk-sharing mechanism to mobilize private investment
- Complements market initiatives such as the EUR 80M Brazil E-Bus Credit Enhancement Fund (first-loss to unlock bank lending)

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How MDBs help

1 **Entry: grants and capacity**
Fund first fleets; formalize contracts to climb

2 **Intermediate: lend long**
Sovereign loans, PforR; ring-fence revenues

3 **Full-spectrum: share the risk**
Guarantees and first-loss to crowd in banks

4 **Capital markets: enhance credit**
Back bonds and securitization, then step back

+ **All tiers: share knowledge**
Peer learning and capacity, e.g., LAC E-Mobility Salon

Thank you | Yang Chen, ychen3@worldbank.org

