Contracting and Procuring E-Buses: The Rio de Janeiro experience

How electric buses are moving cities: Contracting and Procurement

ITDP Webinar. April 06, 2022

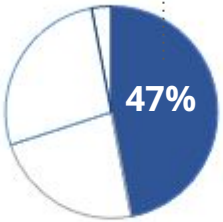
Agenda

1. **Background**
   - Current Public Transport challenges
   - City's GHG emissions reduction commitments
2. **Planning for e-buses**
   - Pursuing the separated business model
3. **How the process went out**
   - Setbacks and lessons learned
4. **Next steps**
   - Learning from the previous experience

Rio de Janeiro Transport Overview

Population
6,7 mi hab.
(Brazilian Statistics Institute - IBGE, 2020)

Modal Split (2011)



Public Transport

27% Walk
23% Car
3% Others

Transport passengers day
2,8 mi (2019)

Average distance traveled (total fleet)
43 millions km/month (2019)

Number of urban routes
566 conventional system (SPPO) routes + 26 BRT routes (2021)

BRT Transport passengers day
350 thousand (2019)

Rio de Janeiro Transport Overview

Rio has been on the lead of environmental commitments.

Main targets related to sustainable mobility and electric buses:

Plano de Desenvolvimento Sustentável

Green and Healthy Streets Declaration (C40)

from 2025 onwards, only zero emission buses

Climate action and sustainable development plan

by 2030, 20% of zero emission buses in the fleet

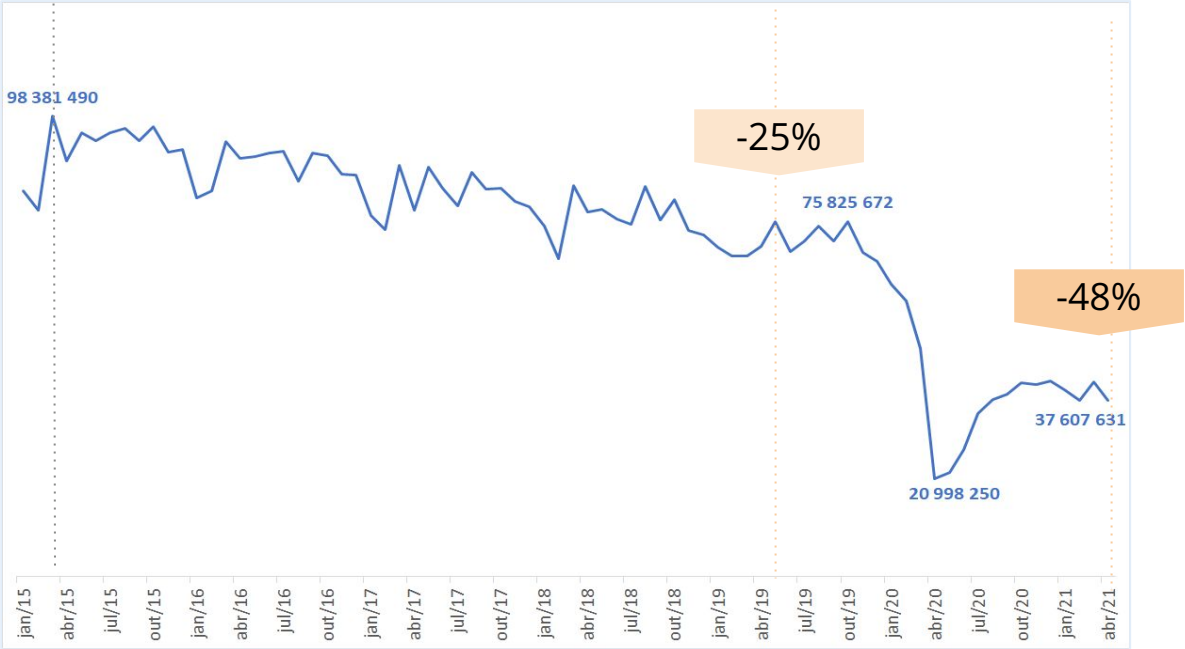
Low emission zone (Programa Reviver Centro)

by 2030, zero emission area in the downtown

Transport system crisis in numbers

Current demand situation

- Continuous drop in demand since 2015 and compounded by the pandemic ⇒ **around 52% of pre-pandemic demand**
- **48% of the operating fleet** compared to that determined before the pandemic (GPS on 23/09/2021):
  - 42% of the **Santa Cruz** fleet;
  - 43% of the **Intersul** fleet;
  - 55% of the **Transcarioca** fleet;
  - 53% of the **Internorte** fleet.

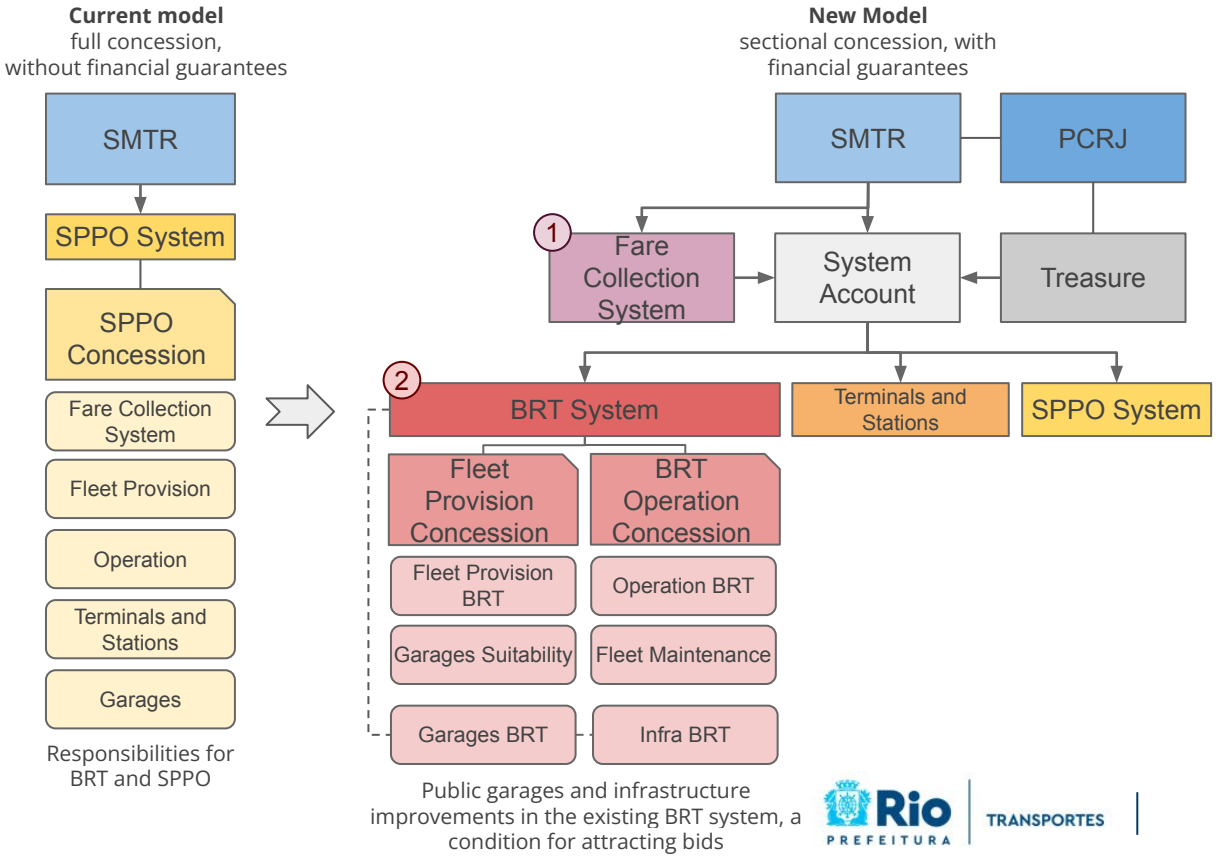


Structural Review of System Management

Separation of responsibilities and better allocation of risks

1. **Fare collection system** for centralized collection with independent management and eventual subsidy.

2. **BRT system bidding** with sectioning of fleet provisioning and operation activities, and New remuneration scheme, based on service provided and incentives to improve the service.



Support Gathered

Preparation:

- ITDP support:
  - Business Modeling with Maria Fernanda Ortiz
  - Feasibility analysis of the operational plan with Scipopulis;
  - Sizing of depot and electrical infrastructure with Light (local distributor) and electrical engineer
  - Financial modeling of contracts
- TUMI support:
  - Definition and review of vehicle, battery and charger standards;
- WRI and C40 support:
  - Price and interest research with manufacturers and investors

Pilot Project: Green Summer

Operation

- **Saturday and Sunday on Summer**, through 8 cultural points (related to samba) in the Neighborhood of Madureira,

Results

- **Research with drivers:** with support of CEFET/RJ.
- **Research with users and service indicators:** gathering data to analyse with the support of TUMI.

CEFET/RJ

TUMI
Transformative Urban Mobility Initiative

New bidding system goal

Separate models allow stakeholders to focus on what they are specialist at, with larger potential for **innovative business models** and increased **system efficiency**.

New ticketing system: increased city hall autonomy and responsibility

BRT System operation
Increased attractiveness through the provision of bus depots and commercial exploration of bus terminals

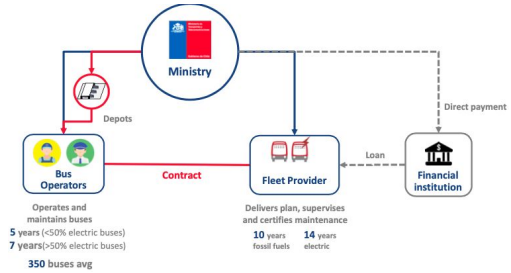
BRT Bus provision
Changing the public subsidy from user fare to bus provision by the City

Bidding Model and Preparation

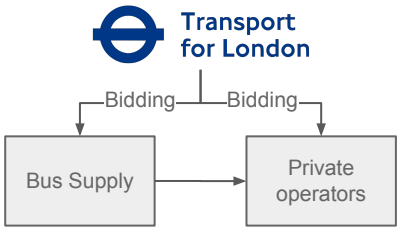
International best practices evidence indicates that the **separation between the concession of the system´s operation and the fleet provision** is the way to guarantee the quality of the services, reduce risks and increase the attractiveness of the bidding.

Santiago

Bid for 1200 buses

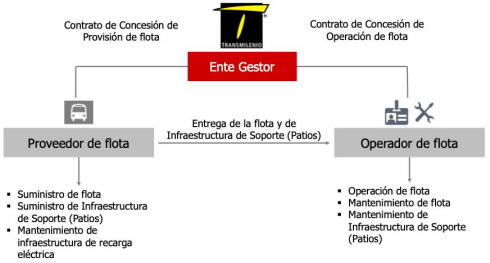


Londres

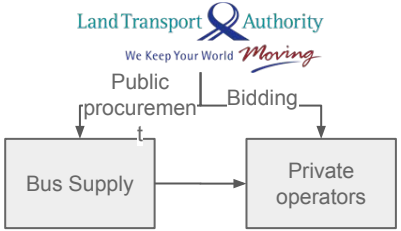


Bogotá

Bidding for up to 1314 buses



Singapura



Separation Model Option

Benchmark showed fleet operation and provision separation allow 3 options

Bogotá		Santiago
Joint	**Parallel**	**Sequential**
Joint proposal between provider and operator (formalised with a deal between both parts). Most of the proposals were received in this modality.	**Two separate and parallel proposal for provider and operator**. In case one of the biddings don't receive proposals, it would be only necessary to bid the other one again.	**First,a bidding for providers and then, a following bidding for operators,** that present their proposals based on a providers short list.
• Mitigate interface risks and facilitate the relationship. • Faster process	• More independency between actors • Risk of receiving no proposals can make the project more complex.	• Reduced costs of bidding but longer deadlines
Chosen model	Not prioritized	Not prioritized

Main barriers faced

how ideas have evolved…

1st. Bogotá model
(Joint concessions)

- **Not legally possible** to have 2 joint procurements, one depending on another

- Not possible to **frame fleet provision as a service subject of being concessioned**

2nd strategy. Renting model

- Not possible to offer **Financial guarantee** offered by City Hall under Renting scheme

- Only renting the electric buses was not **financially attractive** for energy companies (who wanted energy provision as well)

- Contract term limited to 10y.

3rd. strategy. Purchase buses

- Legal and technological **challenges imposed** by the new technology

- Current PT **crisis** and the **urgency** for fleet renewal

Each city will have its particular challenges.
The process takes time and, possibly, more than one trial.

Three sets of challenges

Business Model

- **Lack of legal framework to conceive attractive business model** separating providers and operators.
- Evaluating **proposals of different technologies** demand including **operational costs**.

Technical Viability

- **Finding and making terrains** available for future depots, considering the demand for **energy infrastructure**.
- **Lack of expertise in electrical infrastructure** vis-à-vis well known diesel requirements.
- **Unavailability of articulated electric vehicles** in the national market.

Legacy Issues

- Leveling the playing field for **attracting new agents**, in a context of well established **operators.**

Key lessons learned

Measure	*Expected benefit*
Consider the **technology overall operation costs**	**Increase** electric bus **competitiveness** **Reduce** eventual legal and political **constraints**
Predict **solid financial guarantees**	Reliability on the monthly payment by City Hall **Reduce the overall costs** and other **contract constraints**.
Plan **depot infrastructure** adaptation	Increases the process **reliability and competition** Reduces the pressure on bus operators, especially in larger fleets.

Ongoing activities

There is a lot to be done:

- Considering **alternative business models** for future biddings (e.g. including energy and spare parts provision)
- **Mapping** best **bus routes to be electrified** (identifying key depots to be electrified)
- **Studying depot** infrastructure **adaptation** (strengthening relationship with Light, local distributor)

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Bidding Model

Analysed Points	Integral Model	Separate Model	Comments
Specialization in tasks	X	✔	Specialized actors for each of the demanded tasks.
Monopoly control	X	✔	Market segmentation reduces the risk of dependency on specific actors.
Project Bankability	X	✔	Development banks and financial entities tend to prefer the separate model.
Competitiveness	!	✔	Larger potential for innovative business models, partnerships and proposals submission.
Service provision continuity	!	✔	The bankruptcy of current operators put the service continuity at risk.
Flexibility	!	✔	Actor specific contract conditions, scopes and regulation rules, enabling punishment or replacement by performance
Project Cost	✔	!	The entrance of a new actor will make the project more expensive and hard to manage, but there is more opportunities to access capital with the separation.
Interface with current model	✔	!	Market Studies and communication plan to draw and execute a strategy for attracting new players.
Public sector and legal know - how	✔	!	More pressure over the control institutions.

Current Remuneration Scheme: Adverse Incentives

- **Crisis of the BRT is worsening year by year** due to adverse incentives of the **fare based remuneration scheme**, and **it was severely aggravated by the COVID-19 pandemic**.

Passenger Drop → **Revenue Drop** → **OPEX Reduction** → **Loss in quality and consistency**

- Total number of passengers dropped year after year:

  2015: **1.3 Billion**

  2019: **1.0 Billion**

  2020: **552 Million**

- **16 out of the 45** bus operators went bankrupt.
- Other **8 operators face judicial recovery**.

- **Extinction of 161** of conventional **bus routes** and **20% of BRT services**
- System operating with **50% of planned fleet** (150 out of 300).
- **45 out of 134 BRT stations** are inactive, 34%.
- Almost **20% evasion rate**.

How to deliver increased quality of service in a crisis scenario?

New bidding system goal

Separate models allow stakeholders to focus on what they are specialist at, with larger potential for **innovative business models** and increased **system efficiency**.

New ticketing system: increased city hall autonomy and responsibility

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BRT System Bidding

Proposals presented jointly (Bogotá Model).
Lots would be opened for diesel OR electric proposals

Bidding	Actor Type	Responsibilities	Remuneration Cost Basis
BRT Fleet Operation 	• Bus Operators • Transport Operators	• BRT Operation • Fleet Maintenance	**OPEX** • Operation: Fuel, running-in, lubricants, parts and accessories. • Manpower: Crew wages and social charges, not including wage charges. • Management: Maintenance and inspection personnel, administration, operation of terminals, stations and CCO.
BRT Fleet Provision 	• Manufacturers • Bus Bodyworkers • Energy Companies • Asset Managers	• BRT Fleet Provision • Depots infrastructure (terrains provided by City Hall)	**CAPEX** • Fleet Investment: Remuneration on investment in vehicles and on-board equipment. • Management: Administration and personnel expenses. • Depots Infrastructure: Remuneration on infrastructure investments

Main barriers faced

First strategy: Renting model

Not possible to offer Financial guarantee offered by City Hall under Renting scheme

Only renting the electric buses was not financially attractive for energy companies (who wanted energy provision as well)

Alternative: Purchase buses

Current PT crisis and the urgency for fleet renewal

Legal and technological challenges imposed by the new technology

Each city will have its particular challenges. The process takes time and, possibly, more than one trial.