BRT planning - Egypt Delegation - Bogotá, July 2018
What is Bus Rapid Transit?

Bus Rapid Transit is high-quality, customer-oriented transit that delivers fast, comfortable and low-cost urban mobility.
What is Bus Rapid Transit?

Also called: Rapid Bus, Metro Bus, High Capacity Bus Systems, High Quality Bus Systems, Express Bus Systems, Busway Systems, etc.

Characteristics

- Segregated bus-ways
- Rapid boarding and alighting
- Efficient fare collection
- Comfortable shelters and stations
- Clean bus technologies
- Modal integration
- Sophisticated marketing identity
- Excellence in customer service
Segregated bus lanes

BRT systems move from 5000 pax/hr up to 45000 pax/hr
Rapid boarding/alighting

At level boarding reduces boarding time and increases safety
Prepaid fare collection

Coin operated Turnstiles
Trole, Quito

Smartcard
Turnstiles
Transmilenio, Bogota
Bus Stations

Clean and attractive stations with clear maps and passenger information systems
High quality buses
High-quality design

- Trash receptacles
- Emergency call boxes
- Security cameras
- Security personnel
- Courteous and uniformed drivers
Intelligent Transportation Systems

Los Angeles bus control centre

Real-time Bus tracking
Metro-like terminals for fast transfer

Interchange station
Ecovia, Quito

Trunk line – Feeder Interchange
Transmilenio, Bogota
BRT-Bicycle Integration

Bicycle parking
Transmilenio, Bogota
Marketing identity
Step 1. Design a system from customer’s perspective
- Rapid travel time
- Few transfers
- Frequent service
- Short walk to station from home / office

Full network of destinations  Low fare cost

Step 2. Evaluate customer-driven options from municipality perspective
- Low infrastructure costs
- Traffic reduction benefits
- Environmental benefits

Economic / employment benefits
Social equity benefits
City image

Step 3. Decision
Technology decision based on customer needs and municipality requirements
Step 1. Choose technology

Technology chosen due to manufacturer lobbying efforts
Design chosen to please existing operators
Technology chosen to help property developer

Step 2. Fit city to the technology

Reduce size of network due to financing limitations
Charge higher fares in attempt to pay for expensive system
Operate infrequent services to reduce operating losses
Require large subsidies for lifetime of system’s operation

Step 3. Force customer to adapt to technology

Extensive marketing campaign to convince customers that system is in their interest
Old view of Capacity

- **Bus**: 6,000 passengers/hour-direction
- **LRT**: 12,000 passengers/hour-direction
- **Metro**
New View of BRT

<table>
<thead>
<tr>
<th>Mode</th>
<th>Passengers/hour-direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus</td>
<td>3,000 6,000 12,000</td>
</tr>
<tr>
<td>LRT</td>
<td></td>
</tr>
<tr>
<td>Metro</td>
<td>25,000 45,000</td>
</tr>
<tr>
<td>BRT</td>
<td>6,000 12,000</td>
</tr>
</tbody>
</table>
Criteria for system selection

- BRT
- LRT
- Elevated Rail
- Underground
- Metro

Capital cost (US$ million / km):
- BRT: 20
- LRT: 40
- Elevated Rail: 60
- Underground: 80
- Metro: 350

Passengers per hour per direction:
- 0
- 20,000
- 40,000
- 60,000

Passengers per hour per direction vs. Capital cost (US$ million / km)
Does it fit?
Mass Transit Project Plan

I. Project preparation

1. Project initiation
   - Idea generation
   - Political commitment
   - Statement of vision

2. Technology options
   - Intro to transit options
   - Selection criteria
   - Decision making

3. Project set-up
   - Project team/management
   - Project scope and timing
   - Planning budget/financing

4. Demand analysis
   - Background data
   - Sketching the system
   - Rapid assessment method
   - Full modelling method

5. Corridor selection
   - Corridor identification
   - Corridor analysis
   - Narrow roadway options
   - Comparison framework

6. Communications
   - Stakeholder analysis
   - Existing transit operators
   - Public agencies
   - Public participation

http://www.itdp.org/microsites/bus-rapid-transit-planning-guide/
Mass Transit Project Plan

II. Operational design

7. Network and service design
   - Open/closed systems
   - Service options
   - Route design

8. System capacity and speed
   - Corridor capacity requirements
   - Vehicle size
   - Station-vehicle interface

9. Intersections and signal control
   - Evaluating the intersection
   - Restricting turning movements
   - BRT turning movements
   - Traffic signal priority

10. Customer service
    - Customer information
    - System professionalism
    - Safety and security
    - Amenity features

http://www.itdp.org/microsites/bus-rapid-transit-planning-guide/
Mass Transit Project Plan

III. Physical design

11. Infrastructure
- Runways
- Stations
- Terminals and depots
- Infrastructure costing

12. Technology
- Vehicle technology
- Fare collection
- ITS

IV. Integration

13. Modal integration
- Pedestrians
- Bicycles
- Taxis, etc.

14. TDM and land-use
- Car restriction measures
- Land use planning

http://www.itdp.org/microsites/bus-rapid-transit-planning-guide/
Mass Transit Project Plan

V. Business plan

15. Business structure
- Business model
- Transforming structures
- Institutional set-up

16. Operational costs
- Operational cost items
- Revenue distribution
- Tariffs

17. Financing
- Financing options
- Public financing
- Private financing

18. Marketing
- System name
- Logo and slogan
- Campaign strategies

VI. Implementation

19. Evaluation
- Traffic impacts
- Economic, environmental, social, urban form

20. Implementation plan
- Construction plan
- Contracting plan

http://www.itdp.org/microsites/bus-rapid-transit-planning-guide/
Establish and Empower Government Project Management Team

Project Management Structure

- **Project Chairperson**
  - Political leader
  - (Mayor or Governor)

- **Stakeholder Advisory Committee**
  - Other government agencies (Planning, Environment, Public Works, Health, Finance, etc.)
  - Existing transit operators
  - Transit worker representatives
  - Chamber of Commerce / business representatives
  - Civil society representatives
  - International expert representatives

- **Project Management Unit (PMU)**
  - Project director

- **Technical design team**
- **Legal team**
- **Marketing team**
- **Financing team**
If the Govt team is strong, they can hire individual experts. If they are weak, they should go with only one or two planning contracts to rely on outside management skill.
Managing the transition to competitive professional private modern companies

Single public monopoly
Mixed system (competitive market with public oversight)
Thousands of informal operators
Business Model for BRT (TransMilenio example)

TRANSMILENIO S.A. (public)
Planning, Management and Control

Infrastructure (Public)
- Corridors
- Stations
- Garages
- Complementary Infrastructure

Fare (Private)
- Equipments
- Smart Cards
- Trust Fund

Operation (Private)
- Multiple Companies on each trunk line.
- Buses
- Employees
## Basis of Private Company Revenue

<table>
<thead>
<tr>
<th></th>
<th>Curitiba: Integrated transport network</th>
<th>Bogotá: Transmilenio</th>
<th>Santiago: Transantiago</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trunk Operator</strong></td>
<td>Per bus kilometer</td>
<td>Per bus kilometer</td>
<td>Per passenger</td>
</tr>
<tr>
<td><strong>Feeder Bus Operators</strong></td>
<td>Per bus kilometer</td>
<td>50% per km, 50% per passenger</td>
<td>Per passenger</td>
</tr>
<tr>
<td><strong>Fare collection</strong></td>
<td>Public budget of URBS</td>
<td>Percentage of total revenue</td>
<td>Percentage of revenue</td>
</tr>
<tr>
<td><strong>Control Center</strong></td>
<td>Public budget of URBS</td>
<td>TransMilenio’s budget (4% of total revenue)</td>
<td>Per passenger</td>
</tr>
<tr>
<td><strong>Finance management</strong></td>
<td>Public Budget of URBS</td>
<td>Contracted fiduciary with payment proportional to revenue</td>
<td>Charged to the fare collection operator AFT</td>
</tr>
</tbody>
</table>
Distribution of TransMilenio Revenue (phase 1)

- Trunk-line operators: 66.5%
- Feeder operators: 20%
- Public company: 3%
- Fare collection company: 10%
- Fiduciary company: 0.5%

- Operator 1
- Operator 2
- Operator 3
- Operator 4
## Successful Bids: Feeder Routes, TransMilenio

<table>
<thead>
<tr>
<th>Zone</th>
<th>Company</th>
<th>Price / km (Col. pesos)</th>
<th>Price / passenger</th>
<th>Emissions Technology</th>
<th>Vehicles to scrap</th>
<th>Number of owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norte</td>
<td>Alnorte Fase 2</td>
<td>0.0</td>
<td>263.0</td>
<td>Euro III</td>
<td>3</td>
<td>240</td>
</tr>
<tr>
<td>Suba</td>
<td>Alcapital Fase 2</td>
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<td>260.0</td>
<td>Euro III</td>
<td>3</td>
<td>457</td>
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<tr>
<td>Calle 80</td>
<td>TAO</td>
<td>0.0</td>
<td>295.3</td>
<td>Euro III</td>
<td>3</td>
<td>1141</td>
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<td>Americas</td>
<td>ETMA</td>
<td>279.6</td>
<td>292.0</td>
<td>Euro III</td>
<td>3</td>
<td>807</td>
</tr>
<tr>
<td>Sur</td>
<td>Si – 03</td>
<td>0.0</td>
<td>332.2</td>
<td>Euro III</td>
<td>3</td>
<td>1333</td>
</tr>
<tr>
<td>Usme</td>
<td>Citimovil</td>
<td>0.0</td>
<td>347.1</td>
<td>Euro III (35%)</td>
<td>3</td>
<td>997</td>
</tr>
</tbody>
</table>
THE REVENUES GENERATED BY THE SYSTEM ARE MANAGED BY A TRUST

Pay passengers
User's fee

• Watches out for fulfillment of norms established for income distribution

TransMilenio

• Collects money from individuals
• Deposits money in trustee

Collector

• Pays parties based on control system data and contractual formulas
• Distributes collection among funds

Trustee

Main Fund

Trunk line operators
Feeder operators
Collecting operators
TransMilenio
Trustee

Contingency Fund
Welcome!

The Bus Rapid Transit Planning Guide is the most comprehensive resource for planning a bus rapid transit (BRT) system, beginning with project preparation all the way through to implementation.

Beginning with an overview of BRT, the Planning Guide proceeds to give a step-by-step description of the planning process, including operational design, financial modeling, physical design, multi-modal and land use integration, business plan development, communications and marketing, contracting, vehicle and fare collection technology, evaluation, and implementation.

The BRT Planning Guide is intended as a guidance document mainly for planning and engineering professionals. However, others, such as non-governmental organizations, national and regional...
Resources

GIZ Sourcebook for Decision-Makers in Developing Cities
http://www.sutp.org/en-sourcebook
Pre-paid boarding and alighting critical to reducing boarding and alighting delays
Size and number of doors is more important than bus size. TransMilenio buses have 4 x 1.1 meter doors.