What IS BRT, Really?

2007 Winter TexITE Meeting
Presented by Jeff Arndt, TTI

Not BRT and RNY
What is Bus Rapid Transit?

• “A flexible, rubber-tired form of rapid transit that combines stations, vehicles, services, running ways, and ITS elements into a fully integrated system with a strong image and identity” (TCRP Report 90)

6 Major Elements

• Running Way
• Stations
• Vehicles
• Fare Collection
• Intelligent Transportation Systems
• Service and Operating Plans
Why BRT?

- Lower capital cost than LRT
- More cost-efficient at certain ridership
- Ease, flexibility, and quick timeframe of implementation
- Incremental upgrades as desired/required

Cost Comparison

- Houston METRO’s Southeast Corridor originally planned as LRT
- Concern regarding cost effectiveness
- Currently being designed as BRT-Convertible
- LRT infrastructure built in place; will be converted when ridership increases
Cost Comparison

<table>
<thead>
<tr>
<th>Item</th>
<th>Build Alternatives with Wheeler-MLK Alignment Option</th>
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<tbody>
<tr>
<td></td>
<td>LRT</td>
</tr>
<tr>
<td>Guideway and Track Elements</td>
<td>$45.1</td>
</tr>
<tr>
<td>Stations, Stops, Terminals, Intermodal</td>
<td>$18.8</td>
</tr>
<tr>
<td>Support Facilities: Yards, Shops,</td>
<td>$4.4</td>
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<tr>
<td>Administrative Buildings</td>
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<tr>
<td>Sitework and Special Conditions</td>
<td>$61.8</td>
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<tr>
<td>Communication Systems</td>
<td>$41.6</td>
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<tr>
<td>ROW, Land, Existing Improvements</td>
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<tr>
<td>Vehicles</td>
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<td>Professional Services</td>
<td>$79.3</td>
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<td>Unallocated Contingency</td>
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<tr>
<td>Finance Charges</td>
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<tr>
<td><strong>Total Cost (2006) Dollars (Millions)</strong></td>
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<tr>
<td><strong>Total Length in Miles</strong></td>
<td>6.03</td>
</tr>
<tr>
<td><strong>Cost per Mile (2006) Dollars (Millions)</strong></td>
<td>$54.6</td>
</tr>
</tbody>
</table>

Stages of Implementation

- **Stage I**
  - Mixed traffic on corridors and streets
  - Moderate operations management improvements
  - Some vehicle improvements
  - Improved stops
Stages of Implementation

• Stage II
  – Mixed traffic on expressway
  – Significant operations management improvements
  – Some vehicle improvements for ease of use
  – Upgraded stations and/or stops

• Stage III
  – Semi-dedicated lanes
  – Significant operations management improvements
  – Some vehicle improvements for ease of use
  – Upgraded stations and stops
Stages of Implementation

• Stage IV
  – Dedicated lanes
  – Extensive operations management improvements
  – Vehicles designed for ease of access and comfort (multiple doors, interior configuration)
  – Advanced station design

BRT in the United States

• TCRP Report 90: 13 U.S. case studies
• FTA demonstration projects (map below)
Examples

- Curitiba
- L.A. Rapid
- Las Vegas MAX
- L.A. Orange Line
- Eugene-Springfield EmX

Curitiba (Brazil)

- Considered the first BRT (began in 1974)
- About 70% of population use bus system
- 37 miles of median busway in 2001
- Traffic signal priority (TSP)
- Avg speed: 12 mph

- 11,100 passengers in peak period, peak hour on busiest busway
- 188,000 passengers daily on busiest busway
- Up to 90 sec headway
Curitiba (Brazil)

- Cylindrical high-level platforms
- 80-foot, bi-articulated diesel buses with 5 right-side doors
- Level, hi-floor boarding
- Off-board fare collection

L.A. Rapid

- Began in June 2000
- 15 routes in Jan. 2007, 3-10 min peak headway
- Distinctive, low floor buses (40-60 ft)
L.A. Rapid

- Limited stops with enhanced features
- On-board fare collection

L.A. Rapid

- Operates in mixed traffic
- TSP
- Initial routes had 29% reduction in travel time, 40% increase in ridership (1/3 new transit riders)
Las Vegas MAX

- Service began June 30, 2004
- European-made vehicle with 4 doors (right side only)
- Designed with optical station docking system, but had to use manual docking instead

Las Vegas MAX

- 7 miles in 4th busiest corridor (many residents with high transit need)
Las Vegas MAX

• Started Oct. 29, 2005
• 14 miles exclusive busway
• Stations with enhanced amenities
• Off-board fare collection

L.A. Orange Line

• Started Oct. 29, 2005
• 14 miles exclusive busway
• Stations with enhanced amenities
• Off-board fare collection
L.A. Orange Line

- 60-ft low-floor articulated buses, 3 doors on right side
L.A. Orange Line

Eugene-Springfield EmX

- Service began January 2007
- Connects two CBDs in 16 minutes
- Currently free fare
Eugene-Springfield EmX

- Mixture of dedicated lanes and transitways
- Queue jumping and TSP

Eugene-Springfield EmX

- Median stations necessitate 2 left side doors (also 3 right side doors for curbside stations)
- Low floor, level boarding
Implications of BRT on Traffic Operations

- Impacts of running way (capacity, access, parking)
- Supporting signing and pavement markings
- Supporting traffic operational strategies (queue by-pass, signal phasing and priority)
- Pedestrian safety

Resources