A Critical look at BRT Systems in India:

Early Progress & Lessons Learned

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Bangkok, Thailand

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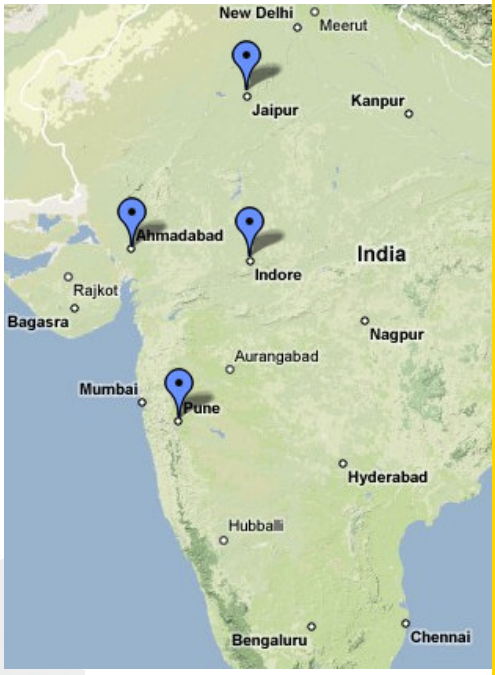
Four J*n*NURM funded BRT projects in India (Under Implementation)

1. Ahmedabad (Janmarg)
2. Indore (MetroJet)
3. Jaipur
4. Pune



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Project Highlights

- Project Owners – Ahmedabad Municipal Corporation
- Program Manager – CEPT
- Other partners ITDP, LEA Associates
- BRTS – Master Plan – 88 km
- 12 km Pilot – 58 km Phase I – 34 Phase II
- Pilot corridor will be inaugurated in March 2009
- Innovation in traffic engineering design (split flyovers, square-about, one-way loop, elevated bus-way)
- Plans to operate system BRT trunk + BRT feeder + AMTS services with the BRT Trunk as a closed operation
- 900 mm floor height buses, level boarding's and doors on both sides
- SPV formed and are in the process of appointing full time staff
- 35% cost from J*n*NURM funds

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AHMEDABAD

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Project Highlights

- Project Owners – District Collectorate
- Program Manager – ICTSL
- Other partners IDA, Mehta & Associates, PMC, *EMBARQ*
- BRTS Master Plan – 88 km
- 12 km Pilot – 47 km Phase I – 39 km Phase II
- 12 kms sanctioned, 50% funds from J*n*NURM
- Plan to operate only ICTSL buses (5 routes) in pilot corridor
- SPV - ICTSL created & is managing operations for over 2 years
- Private bus operations under route concessions since inception in 2005
- Demonstrated use of GPS technology to track vehicles
- Pilot will be inaugurated December 2009

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INDORE

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Project Highlights

- Project Owners – Jaipur Municipal Corporation
- Program Manager – PDCOR
- Other partners CES Associates, Prof. Shivanand Swamy
- BRTS – Master Plan – 138 km
- 7.1 km Pilot – 47 km Phase I – 84 Phase II
- All 138 kms sanctioned
- 50% cost from J*n*NURM funds
- Pilot corridor will be inaugurated in March 2009
- Well planned and comprehensive tender procedures
- Some median stations and some staggered stations based on ROW available

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JAIPUR

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Project Highlights

- Project Owners – PMC & PMPML
- Program Manager – UMTC (IL&FS)
- Other partners WSA, Mott MacDonald, *EMBARQ*
- BRTS – Master Plan – 100 km
- 15 km Pilot – 58 km Phase I – 34 Phase II
- All 100 kms sanctioned
- 50% cost from J*n*NURM funds
- Pilot corridor will be inaugurated in December 2006

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Early Progress & Lessons Learnt

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Boost to Bus Based - Public Transport

- A need for bus based public transport and preferential treatment of buses realized by central government (Ministry of Urban Development)
- Change in perspective of senior city bureaucrats towards bus-based public transport system due to national workshops and exposure trips.
- Realization in city bureaucracy for restructuring state/municipal corporation owned bus companies and implementing organized bus based public transport in cities where IPT has major share.
- Internal capacity building for City staff

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Capacity Building

- Bus Industry
  - Bus body building was a cottage industry until a few years ago.
  - In the last four years manufacturers through internal research and joint ventures have rapidly built capacity.
- ITS Industry
  - Local manufacturers are working very hard to build capacity in manufacturing GPS devices, traffic signal technology and other ITS equipment.
  - Local manufacturers have managed to significantly drop costs
- Consulting Expertise
- Contractors
- Exposure visits, MoUD workshops and conferences like this have provided an excellent platform for exchange

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Difficulties of working with new vendors

- Costs for technology haven't stabilized, which makes financial planning extremely difficult
- Technologies (buses and equipment) haven't been fully tested and systems have endure a learning process as industry matures

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Routes in mixed traffic through city centers

Demand: 3,000 PPHPD

Speed = 8 km

cycle time	197
buses/hr	50
frequency	1.20
fleet	165

Speed = 20 km

cycle time	139
buses/hr	50
frequency	1.20
fleet	116

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Fare Levels

- Fare levels are low, one rupee per kilometer or lower
- Planned services maybe faster, more reliable and with better bus and information technologies, however planned bus occupancy is very high
- Fares at these levels alone are not sufficient to provide adequate level of service and make the system financially sustainable

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Financial Sustainability, Fare Levels & Bus Occupancy

cost per km (rs.)	34
average fare (rs.)	6
cost per bus per day	6800
fare box (80%)	5440
# of pax / bus / day	907
peak hour factor	10
pax per bus	91

cost per km (rs.)	25
average fare (rs.)	6
cost per bus per day	5000
fare box (80%)	4000
# of pax / bus / day	667
peak hour factor	10
pax per bus	67

- Alternate revenue sources
  - Fixed annual subsidy
  - Land development

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Convincing all City Staff

- There is buy-in from the main stakeholders of the project, Engineers, contractors, land development authorities implementing the project are not fully convinced.
- Logic of running the buses in median lanes continues to be questioned
- Buy-in and confidence in the project is required to make bold decisions
- Transfers of primary stakeholder has been a big concern
- Special efforts to emphasize the need for equitable allocation of road space to all its constituents (Pedestrians, Bicyclists, Public transport, IPT and Personal vehicles).

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Data Collection for System Planning

- Data collection on ROW and other infrastructure components including underground utilities is very comprehensive.
- Corridor selection was done based on existing documents, comprehensive traffic and transport studies, other detailed project reports.
- Comprehensive data for current demand isn't very good. It is essential for service planning.

  Data collected at a minimum should include -

  1. Demand at the peak location along each corridor
  2. Load profile along the route
  3. # of peak hours and # of non-peak hours at peak location
  4. Bus speed observations
- Data collected or gathered is not organised and archived for future reference and use.

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Data Collection for System Monitoring

- Earnings per kilometer (EPK) and cost per kilometer (CPK) by route is the data usually available.

Some recommended system monitoring measures -

- Demand: pax/day
- Peak loads: pax/hour/direction
- Commercial speeds: km/hr
- Operational productivity: pax boarding's/bus-km
- Capital productivity: pax boarding's/bus/day
- Annualized total cost per passenger: infrastructure + equipment (rupees/pax)
- User Fares (rupees/pax)

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* BRT Systems in Latin America & Asia: Results and difficulties in 11 cities

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Conclusions & Recommendations

1. Strive to achieve commercial speeds of 20 km/hr (Including stops and waiting at junction)
2. Simulate operations along your routes
   - by calculating delays for every stop and every junction for the planned bus operations
   - by calculating delays for motor-vehicle lanes along the routes
3. Comprehensive, performance based specifications in contracts to cover for lack of experience on the vendors side
4. Exposure trips, field visits and conference exchanges not only for decision makers but for staff working on the projects.
5. Archive all data collected

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¡Muchas Gracias!

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