

## New solutions for collective transport in cities: *fuelling Bus Rapid Transit (BRT) for Europe*

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- The need:  
new urban mobility culture in Europe
- Solution:  
creating a European brand  
for high quality bus services

## Contents of presentation

- Reasonable
- Definitions
- Examples
- Way forward

Green Paper 2007

## The need: a new urban mobility culture

- free-flowing towns and cities
- greener towns and cities
- smarter urban transport
- accessible urban transport
- safe and secure urban transport

Solution:

## Bus Rapid Transit

- **It answers the need:**
  - Better flow, greener, smarter, more accessible and safer
- **It works**
  - South America, USA, China, Europe
- **It is NOT BRANDED in Europe**
  - No name product

## A bus revolution?

- Reference in Green Paper urban mobility
- Urban transport is priority for Structural Funds and Cohesion Fund, EIB
- Opening up EU state aid rules for mobile assets in transport, including clean buses
- New FP7 project: bus system of the future
- COST Action 663: Buses with high level of service

## What is BRT?

- a “green” public transport product
- high quality
- based on busses
- fast and frequent
- along dedicated corridors
- with dedicated stops and stations

## BRT definitions

“Bus Rapid Transit can best be described as a combination of facility, systems, and vehicle investments that convert conventional bus services into a fixed-facility transit service, greatly increasing their efficiency and effectiveness to the end user.”

*Federal Transit Administration  
Bus Rapid Transit Demonstration Program  
December 2002.*

“A flexible, high performance rapid transit mode that combines a variety of physical, operating and system elements into a permanently integrated system with a quality image and unique identity.”

*Levinson et al.  
Bus Rapid Transit - Implementation Guidelines  
CRP Report 90-Volume II*

“Bus Rapid Transit is a high-quality, customer-orientated transit that delivers fast, comfortable and low-cost urban mobility.”

*The Institute for Transportation and Development Policy*

# BRT system characteristics

- Stations
- Vehicles
- Services
- Corridors
- Route structure
- Fare collection
- Supporting technologies

## BRT Major Elements - Stations

- Level boarding and alighting
- “Branded,” consistent with appearance of BRT vehicles
- High-quality, attractive, functional amenities

## BRT Major Elements - Vehicles

- Easy-to-board (level with platform)
- Multiple-door boarding and alighting
- “Branded” exteriors that are distinctive and consistent with appearance of stations
- High capacity
- Pleasant interior conveniences
- Quiet
- Low or zero emissions

## BRT Major Elements - Services

- Frequent all-day service
- Short headways (10 minutes or better)
- Wide station stop spacing

## BRT Major Elements – Corridors

- Dedicated corridors, exclusive bus lanes
- Distinctive pavement treatment

## BRT Major Elements – Route structures

- Simple route layout
- Convenient transfers
- Station locations coordinated with land-use plans
- Service to major activity centers

## BRT Major Elements – Fare collection

- Off-vehicle fare collection
- Emphasis on prepaid fares

## BRT Major Elements - ITS and Technology

- ITS technologies (for example, real-time “next bus” arrival information signs at stations, “next stop” signs on board buses, smart fare payment media and technology, traffic signal prioritization, and traffic management)
- Automated guidance features for precision operations and docking

## History – examples from overseas

- Curitiba
- Mexico City
- Bogota
- Beijing
- USA

Fuel savings by BRT

Mexico City: 32%\*

Bogota: 47%

\*When simultaneously increasing  
the capacity by 60%

# History – examples – Curitiba, Brazil

Curitiba's implementation is one of the most successful, award-winning, and extensive BRT systems in the world.

One of the keys to the success was the early establishment of a master plan for growth and its strict implementation over the years.

The resulting BRT system is characterized by:

- Integrated planning
- Exclusive bus lanes
- Signal priority for buses
- Preboard fare collection

Easy boarding (raised platforms, multidoor buses, tube stations)  
Free transfers and discounted or free fares for the disadvantaged, elderly, etc.

Large-capacity, wide-door buses (up to 270 passengers per bus)  
An overlapping system of bus services

The Curitiba urban area with its 2.2 million population enjoys congestion-free streets and pollution-free air where 1.3 million passengers ride the system daily.



## History – examples– Mexico City

In 2005, Metrobus was opened, a BRT corridor along Avenida de los Insurgentes. At 18 miles in length, it is the largest avenue in Mexico City.

Metrobus serves roughly 12 miles of Insurgentes with 36 stations and two terminals. It replaced about 350 standard buses with 97 new articulated BRT vehicles. These vehicles dock at enclosed, rail-like stations, and passengers may enter or exit the vehicles at any one of four, double-wide doors.



Vehicles have a maximum capacity of 160 passengers and run at extremely high frequencies, roughly 56 per peak hour.

The maximum capacity is nearly 9,000 passengers per hour. Currently, Metrobus is carrying roughly 250,000 passengers per day.

Prior to Metrobus, the travel time along the route was roughly 1.5 hours at an average speed of 14 km/hour. Metrobus has increased the speed to 21 km/hour and reduced the travel time to 1 hour.

According to a recent study (2005-'06), Metrobus has reduced the CO2 congestion by 35,000 tons annually. At the same time the passenger exposure to CO, benzene, and PM 2.5 has been reduced by up to 50 percent, as compared with previous bus service in the corridor.



Fares are collected via automatic ticketing machines located at the entrance to stations.

The fare is roughly US \$0.30, which enables passengers to travel any distance they choose along the corridor.

## History – examples – Beijing

During its first pilot year 2005 the Beijing BRT was 5.5km long and carried <1,500 passengers daily. With only left-side doors the fleet of BRT busses could not be used outside the BRT corridor.



Station



ITS center



Exclusive right of way



South gate of Tiananmen

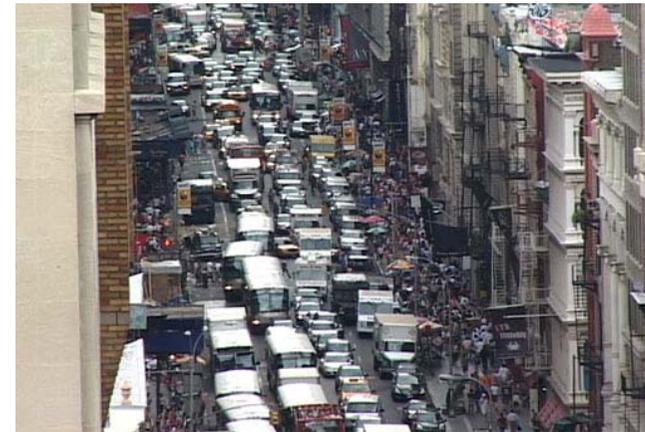
The first corridor is now 16km and in January 2006 several competing bus lines have been closed the ridership has increased to around 75,000 passenger boardings per weekday in March 2006, and on some days has reportedly exceeded 100,000 passengers.

# History – United States

1960s: Before it even had the name, BRT first got major backing in the United States with the rise of federal funding for urban mass transportation during the 1960s.

1973: The first exclusive busway the El Monte Busway, an exclusive bus lane between El Monte and Los Angeles, California.

Today, American BRT initiatives receive a great deal of support from the Federal Transit Administration (FTA). Planned BRT lines are now eligible to be included in the FTA's New Starts program, which was formerly reserved only for rail projects.



Broadway north of Houston St. New Yorkers want the Mayor to fix it.



The beginning of Boston Transit System



Boston MBTA Silverline today

## History – examples from Europe

- BRT implemented or discussed in:
  - Lyon, Rouen and Nantes (FR)
  - Eindhoven (Netherlands)
  - Madrid (Spain)
  - Leeds, Edinburgh and Manchester (UK)

# Examples from Europe – France

## Nantes

- BRT (named BusWay) implemented December 2006.
- Buses runs every 5 min during peak hours.
- Operated by specific branded buses.
- Ticketing machines are located at each station.
- The patronage was averaging 19 000 per day by December 2006.



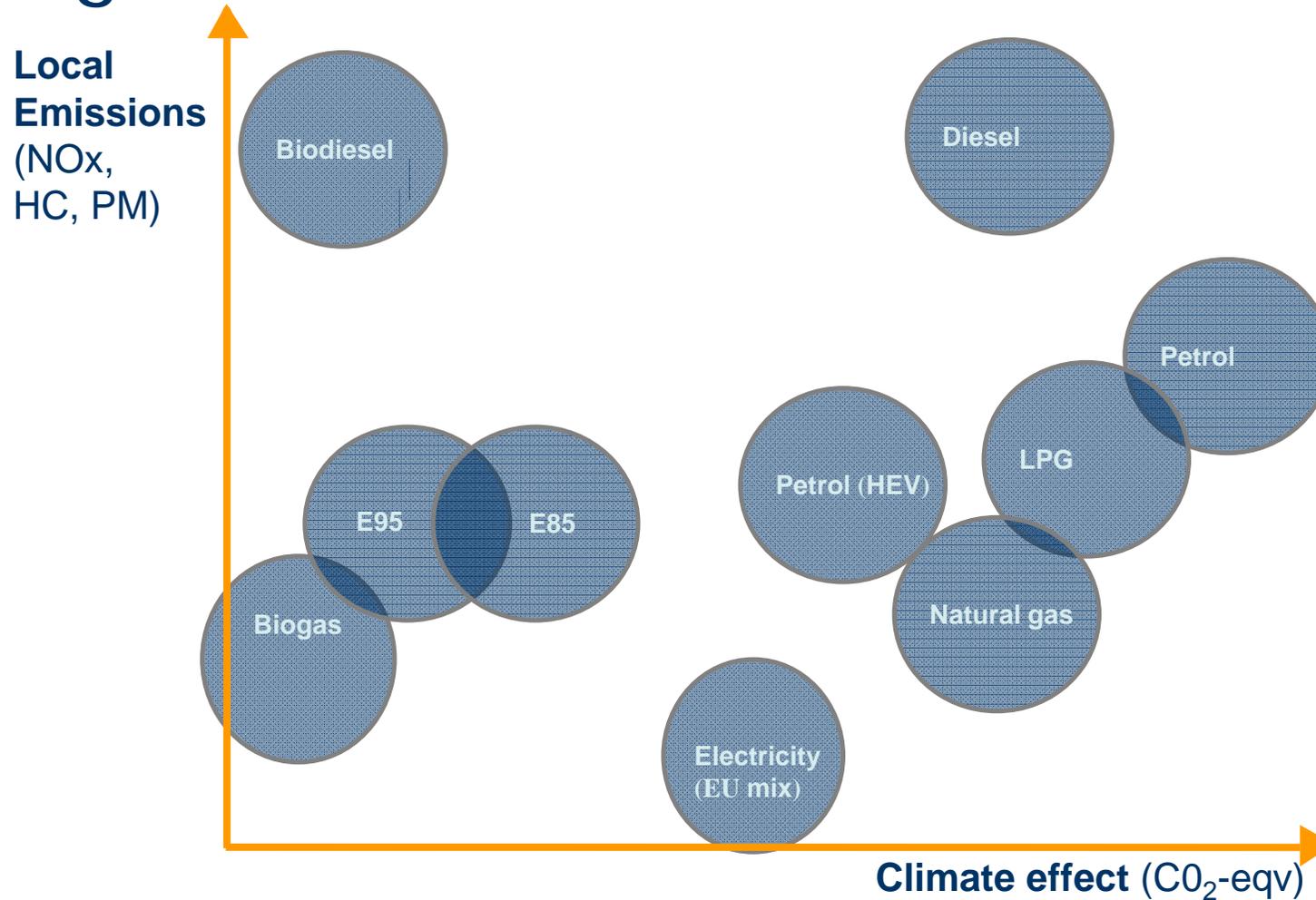
The Nantes BRT bus stops have been equipped with modern design that attracts passengers from the less environmentally friendly modes of transports



## Rouen

- 3 BRT lines (named TEOR, Transport Est Ouest Rouennais) in operation since 2001.
- TEOR consists of 16 miles and 41 stops.
- In 2004, TEOR travelled more than one million miles and made 7.2 million trips, carrying 30,000 passengers to their daily destinations.
- The buses are equipped with an optical guidance system.
- All buses have low floors and clean diesel engines fitted with catalytic converters using desulphurised diesel fuel.
- The busses have an on-board system to give priority at traffic lights.
- Buses operate either in separate lanes, bus lanes or in mixed traffic.
- There are specific video and audio information and ticket vending machines at all stops.

# Fuelling BRT



Source: Miljöfaktabok  
för bränslen, IVL  
, Svenska miljöinstitutet

## Fuelling BRT

- Biogas is an interesting solution:
  - Relevant for NMS due to available energy source
  - High standards

## Biogas as a fuel

Example: Stockholm

Production and distribution:



The Henriksdal plant is designed to serve 130 gas buses.

Direct supply to depot for inner city buses

*Fuelling Bus Rapid Transit for Europe.*

Sylwia Klatka, ConVoco Ltd.

## Biogas fuels busses

- Inner city buses in Stockholm
  - 50 (2007)
  - 130 (2009)

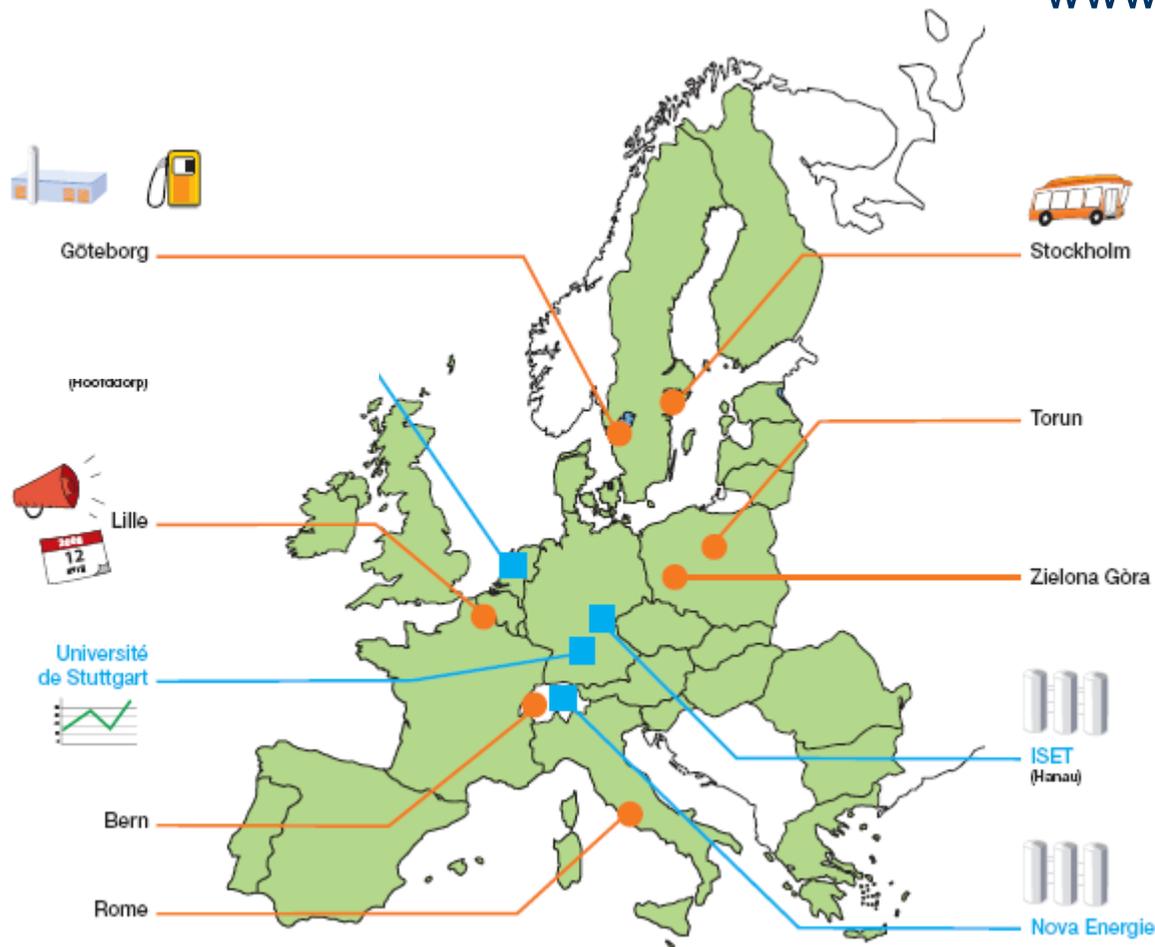


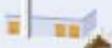
Fuel price is 10%  
below petrol price



Arlanda – first airport with  
biomethane vehicles

[www.biogasmax.eu](http://www.biogasmax.eu)



-  Partenaires de démonstration et de recherche
-  Partenaires transversaux
-  WP1 : Project Management
-  WP2 : Production de biogaz
-  WP3 : Upgrading
-  WP4 : Distribution
-  WP5 : Use in vehicles
-  WP6 : Evaluation
-  WP7 : Transferability studies
-  WP8 : Communication

## BRT is relevant for the NMS

- Network re-development in many cities
- Purchase of new buses
- BRT might offer solution for:
  - Upgrading of bus corridors to high quality bus corridors  
or
  - Maintaining high quality public transport services when tramlines are closed
  
- The problem remains: low profile

## Criteria of success

- Commitment to sustainability
  - Decisions and strategies for implementation
- High profile
  - European brand
  - High quality
  - Resulting in prestige for committed cities



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# Thank you for your attention

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