BHLS– Bus with High Level of Service

BRENDAN FINN

ETTS LTD, IRELAND
Spectrum of Bus-Based Transit

- **High performance, high capacity BRT**
  - Major infrastructure, rapid service, intensive services
  - Up to 1 million passengers/day
  - Bogota, Guangzhou, Istanbul, ...

- **High-performance, moderate capacity BRT**
  - Major infrastructure, rapid service, strong service
  - Range 100-250,000 passengers/day
  - Brisbane, Ottowa, Beijing, Mexico City, ...

- **Bus with High Level of Service (BHLS)**
  - Moderate/little infrastructure, focus on reliability and quality
  - Range 25,000-65,000 passengers/day
  - Amsterdam, Gothenburg, Paris, ...
What is BHLS?

- **BHLS?**
  - Derives from French term ‘BHNS’, maybe later another name
  - Generic term for a wide range of quality bus systems

- **Is it BRT?**
  - Not exactly, a different product in the spectrum of bus priority
  - Focus more on reliability/quality than on speed/capacity

- **Holistic approach**
  - Improved operating environment – reliability, better speed
  - Higher quality vehicles with better comfort and image
  - Improved passenger facilities – stops, terminals, ...
  - Branding, marketing, ‘repositioning the product’
BHLS role in Europe

- **European Context is different:**
  - Mass transit is often already well provided by metro and tram
  - Bus is rarely assigned the ‘mass transit’ role
  - Constraints of space, roadwidth and alignment in city centres

- **European cities have a different focus:**
  - Restore reliability and operational effectiveness to bus
  - Enhance image of bus, reposition the product
  - High focus on quality of vehicles and stopping places
  - In France, focus on “urbanism” – improve host environment

- **Strategic motivations for BHLS**
  - Mostly to upgrade quality and ridership of existing bus lines
  - Sometimes alternative to tram/LRT, especially if finances tight
### B HLS in Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>Cities with B HLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>Cambridge, Crawley, Dartford, Leeds</td>
</tr>
<tr>
<td>France</td>
<td>Lille, Lorient, Lyon, Nantes, Paris, Rennes, Rouen, Toulouse</td>
</tr>
<tr>
<td>Germany</td>
<td>Essen, Hamburg, Oberhausen</td>
</tr>
<tr>
<td>Ireland</td>
<td>Dublin</td>
</tr>
<tr>
<td>Italy</td>
<td>Brescia*, Pisa, Prato</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Alkmaar, Almere, Amsterdam, Eindhoven, Twente, Utrecht</td>
</tr>
<tr>
<td>Spain</td>
<td>Barcelona*, Castellón, Madrid</td>
</tr>
<tr>
<td>Sweden</td>
<td>Gothenburg, Jönköping, Lund, Stockholm</td>
</tr>
</tbody>
</table>
## European BHLS – Key Characteristics

| City          | System Identity       | System Length (km) | Nature of Running Way | Passengers per Day | Peak Headway (Minutes) | Dedicated Fleet?
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam</td>
<td>Zuid-Tangent</td>
<td>41 (33)</td>
<td>Bus-only road, bus lanes</td>
<td>40,000</td>
<td>6</td>
<td>Yes</td>
</tr>
<tr>
<td>Dublin</td>
<td>Quality Bus Corridor</td>
<td>12 (8.4)</td>
<td>Bus-lanes</td>
<td>34,000</td>
<td>&lt; 1.5</td>
<td>No</td>
</tr>
<tr>
<td>Gothenburg</td>
<td>TrunkBus</td>
<td>16.5 (7.5)</td>
<td>Bus-lanes</td>
<td>24,000</td>
<td>3.3</td>
<td>Yes</td>
</tr>
<tr>
<td>Hamburg</td>
<td>MetroBus</td>
<td>14.8 (4.0)</td>
<td>Bus-lanes</td>
<td>60,000</td>
<td>3.5</td>
<td>Yes</td>
</tr>
<tr>
<td>Helsinki</td>
<td>Jokeri Line</td>
<td>28 (6)</td>
<td>Bus-lanes (orbital route)</td>
<td>25,000</td>
<td>5</td>
<td>Yes</td>
</tr>
<tr>
<td>Madrid</td>
<td>Bus-VAO</td>
<td>16.1 (16.1)</td>
<td>Tidal segregated lanes</td>
<td>33,000</td>
<td>&lt; 1</td>
<td>No</td>
</tr>
<tr>
<td>Nantes</td>
<td>BusWay</td>
<td>7 (6)</td>
<td>Bus-lanes</td>
<td>24,600</td>
<td>3.3</td>
<td>Yes</td>
</tr>
<tr>
<td>Paris</td>
<td>TVM</td>
<td>20 (19)</td>
<td>Bus-only road (suburban/orbital)</td>
<td>65,800</td>
<td>3.5</td>
<td>Yes</td>
</tr>
<tr>
<td>Prato</td>
<td>LAM</td>
<td>42 (15)</td>
<td>Bus-lanes</td>
<td>n/a</td>
<td>7</td>
<td>Yes</td>
</tr>
<tr>
<td>Stockholm</td>
<td>Blue Line</td>
<td>40 (12)</td>
<td>Bus-lanes</td>
<td>36,575</td>
<td>5</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### European BHLS: Ridership gains

<table>
<thead>
<tr>
<th>City</th>
<th>System Identity</th>
<th>BHLS Ridership Change</th>
<th>Change in Operating Speed</th>
<th>Peak-Period Headway Reduction</th>
<th>Network Restructuring in the Corridor?</th>
<th>Major Tariff Restructuring as part of BHLS?</th>
<th>Unique Identity for BHLS Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam</td>
<td>Zuid-Tangent</td>
<td>+47%</td>
<td>Significant</td>
<td>Yes</td>
<td>Significant</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dublin</td>
<td>Quality Bus Corridor</td>
<td>+125%</td>
<td>Major</td>
<td>Yes</td>
<td>Minor</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Gothenburg</td>
<td>TrunkBus</td>
<td>+73%</td>
<td>Moderate</td>
<td>Yes</td>
<td>Significant</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Hamburg</td>
<td>MetroBus</td>
<td>+20%</td>
<td>Minor</td>
<td>Yes</td>
<td>Minor</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Helsinki</td>
<td>Jokeri Line</td>
<td>+100%</td>
<td>Significant</td>
<td>7 ⇒ 5</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Madrid</td>
<td>Bus-VAO</td>
<td>+70-100%</td>
<td>+80-100%</td>
<td>Yes</td>
<td>Minor</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Nantes</td>
<td>BusWay</td>
<td>+55%</td>
<td>Moderate</td>
<td>Yes</td>
<td>Significant</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Paris</td>
<td>TVM</td>
<td>+134%</td>
<td>Significant</td>
<td>5 ⇒ 3.5</td>
<td>Significant</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Prato</td>
<td>LAM</td>
<td>+57%</td>
<td>+5%</td>
<td>15 ⇒ 7</td>
<td>Major</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Stockholm</td>
<td>Blue Line</td>
<td>+27%</td>
<td>0</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Technical Performance of BHLS

- Peak and daily ridership are comparable to many tram systems, rarely operating at full system capacity
  - 1,000 – 2,500+ pphpd
  - 23,700 – 65,000 px/day
- Commercial speed and frequency are good
  - 16 – 35 kph (10-22 mph)
  - 12-40 vehicles/hour
  - equal to or exceed that of European street tramways
- Seating ratio at peak is medium to high
  - 34-84%
- Investment cost of facility is low and quite affordable
  - $3-16.5 million/km
Case Study 1: Nantes, France

- Opted for Busway rather than additional LRT
  - Started 2006, 7km, 15 stations
  - Designed to tram-style specification
  - 4 min frequency, 20 km/hr
  - 25,000 px.day

- Key design features:
  - 4 park’n’ride facilities
  - Articulated buses, CNG
  - Priority at traffic signals
  - High quality design in city centre
  - High-specification vehicle

- Like BRT in style, not in volume
BRT Running Way - Nantes
Nantes – Station and Running Way
Nantes – city centre stops
Nantes - Vehicles
Nantes – high quality bus interior
Nantes – Precision docking
Nantes – Easy access
Nantes – park’n’ride
Case Study 2 : Zuidtangent, Netherlands

- **Priority channel for buses**
  - Dedicated lanes between Haarlem and Schiphol, then bus priority
  - 24 km, 1.8 km in tunnel, 35 km/hr
  - Intervals 6-8 minutes, 24/7
  - 40,000 passengers daily
  - Use normal buses, normal contracts

- **Additional features:**
  - Integration with rail at many places
  - Efficient stop dwell times
  - Euro 5 emissions, standard models
  - Unique design elements, identity
BRT running way - Amsterdam
Precision docking – Amsterdam
BRT Vehicle – Amsterdam
BHLS - Bicycle facilities

- Bike’n’Ride
- Extensive bike parking
- Amsterdam, Almere
- Bike on bus is rare
Case Study 3: Cambridge, UK

- **Bus-VAO / Bus-HOV lane**
  - Operates on inter-urban artery
  - Links suburban Madrid to City
  - Major interchange at Moncloa
  - Suburban, long-distance buses
  - 251 buses on 21 routes
  - Vehicles of 2+occupants

- **Key features**
  - Tidal flow lanes
  - Bus-VAO lanes carry 33,000 px in peak v. 18,000 in other 4 lanes
  - 16 km in 13.8 minutes
  - Few access points, no bus stops
Cambridge : Busway

Source : Cambridgeshire County Council
Cambridge : Busway track

Source : Cambridgeshire County Council
Cambridge : Park’n’Ride

Source : Cambridgeshire County Council
BHLS - Customer comfort - Cambridge

- WiFi on bus
- Socket for PC, phone
- Leather seats
- CCTV for security
Case Study 4: Lund, Sweden

- **Lundalänken**
  - Prioritised bus link from Central Station to University, Business Park
  - Total 6 km length
  - 600 m new build, some dedicated road

- **Priority to normal buses**
  - Services of City and Region
  - Regular bus routes, regular buses
  - Give the bus space, it will perform

- **Not just a pretty face ...**
  - Lundalänken extended to outer area
  - City owns the land, will benefit
Lund - Vehicle
Lund – bus information at train exit
Lund – train information at bus exit
Lund – access to dedicated bus link
Lund – dedicated bus link
Lund – key interchange stop
Lorient – running way in city centre
Lorient – roundabout cut-through in city
B HLS - Real-time information – at stops
BHLS - Real-time information – in-vehicle

- Next stop
- Transfer routes, times
- Announcements
Information resources for BRT, BHLS

- **ITDP** – [www.itdp.org](http://www.itdp.org)
  - Review of US BRT, case studies

- **EMBARQ** – [www.embarq.org](http://www.embarq.org)
  - Case study materials, usage guidance, evaluation

- **COST Action on BHLS** - [www.bhls.eu](http://www.bhls.eu)
  - Final report available 11/2011 (at POLIS Annual Conference)

- **US National BRT Institute** – [www.nbrti.org](http://www.nbrti.org)

- **SUTP** – [www.sutp.org](http://www.sutp.org)

- **Volvo Centre of Excellence, Santiago** – [www.brt.cl](http://www.brt.cl)

- **US TRB/TCRP** - [www.trb.org/TCRP/Public/TCRP.aspx](http://www.trb.org/TCRP/Public/TCRP.aspx)

- **World Bank, APTA, UITP, ...**