MEDIA BACKGROUNDER

Buses today and tomorrow

In 2009, UITP launched its PTx2 strategy to double the public transport market share worldwide by 2025 with the vision of making cities better places to live and work*.

Bus systems account for 80% of all public transport passengers worldwide and are the main carriers in public transport. In this respect, buslines are key to contribute to the PTx2 target.

Public transport offers many advantages over individual transport modes. It:

- costs less to the community,
- needs less urban space,
- is less energy-intensive,
- pollutes less,
- is the safest mode,
- improves accessibility to jobs, and
- offers mobility for all.

Space

The unitary capacity of buses is around 80 passengers for a single bus, and around 120 for an articulated bus.

Space is at a premium in urban areas so it needs to be used sensibly. Buses use nearly 20 times less space to transport the same number of people than private cars. To carry 50,000 people per hour per direction it is necessary to have:

- 175 m wide road used only by cars, or
- 35 m wide road used only by buses.

If everybody travelled to work by car, the total space needed for parking cars would be as great as the space needed for business activities. Indeed employees need approximately the same amount of space to work in their offices as they need to park their car (about 20m² per person). In peak hours, it takes 60 cars to carry 75 people, whereas the same number of passengers can be carried by just one bus.

* Read the full UITP strategy for the public transport sector and download your advocacy toolbox at: http://www.uitp.org/advocacy/public_transport.cfm
The transport capacity per vehicle depends on the size of the bus, ranging from mini or midi buses (9 to 11 metres in length) to standard, articulated and double-articulated buses (up to 25.5 metres). It depends on the interior lay-out and the ratio of seats versus standing passengers. As far as the standing passengers are concerned, this depends also on the number of standing passengers per square metre (usually four in Europe, depending on operator’s policy).

### Emissions and energy

As far as the greenhouse effect is concerned, buses perform much better than cars since the emissions per passenger/km of CO₂ equivalent gases are reduced, as shown in the Figure 2.

![Figure 2 - Emissions per passenger-km of CO₂ equivalent gases](image)

A favourable balance for CO₂ emissions for buses in peak hours, but also for bus transport on average, as compared to individual motorised transport.

---

† Source VDV
In addition, the energy consumption of the bus per passenger/km is one-third of that of a car.

In Europe, buses account for 50-60% of the total public transport supply and demand, ranging from a 50% share in large cities with multimodal networks up to 100% in smaller towns and medium-sized cities. Buses have been a testing ground for alternative fuels, engines and drivelines for many years. However, 95% of all buses still use fossil fuels.

Long-term decarbonisation efforts obviously include electric buses, including the robust and reliable trolleybuses, but also second-generation biofuels from biomass and waste valorisation. The fragmentation of this 5% share of alternative fuels and technologies today (CNG, LPG, biofuels and biogas, ethanol and electric) or tomorrow (hydrogen, hybrids, full battery electric, fuel cells, etc.) places the manufacturing industry in an uncomfortable position when prioritizing R&D investments; which technology will be the “mainstream successor” of diesel?

An alternative to diesel buses will come with a price tag. The precise cost increase is not known today, but early empirical indicators suggest +30% for CNG and +50/100% for hybrid vehicles. It is premature to derive full life cycle cost estimations.

Bus fleets in Europe for Public Transport purpose, i.e. 16,000 buses produced annually in Europe for the European market, could be massively modernized into electric fleets without disruption to the existing grid and installed power.

Operational efficiency gains can also be achieved with training and voluntary corporate schemes. Eco-driving has proven to be a useful tool to increase passenger comfort and reduce energy consumption and GHG emissions by 5-10%. Many companies have already developed such schemes, contributing to a reduction of thousands of tons of CO2 equivalent.

Increased commercial speed through a better provision of operational environment in the city also contributes to reducing consumption and emissions: An increase of 5 km/h of commercial speed on a busy line leads to 20% less consumption, thus of GHG emissions.

**Commercial speed: a key challenge**

One of the main influential factors orientating an individual’s choice of transport mode is commercial speed/travel time, always door-to-door triptime. In this regard, the higher the average speed of public transport, the greater its market share.

Over the past decades, increased road space consumption by private individual motorised transport has contributed to tremendous congestion. This has a direct impact on the

---


§ As UITP members, bus operators and bus manufacturing industry jointly issued a comprehensive approach for bus systems and CO2 emission reduction. Read the Joint UITP Position here: www.uitp.org/mos/positionspapers/138-en.pdf
operation speed of buses, and hence their service quality, reliability, energy consumption, economy and overall profitability.

**Figure 3 - The Virtuous Circle**

The quality of public transport is influenced by congestion in cities. High average commercial speed reduces extra costs with a direct positive impact in terms of the market share of bus trips. To break the vicious circle and kick-off the virtuous circle, a renewed focus by urban and transport planners, decision makers (at local, regional and national level) and property developers on the relationship between public transport and urban planning is urgently required. Integrating public transport & urban planning: a virtuous circle [www.uitp.org/mos/focus/FPUrbanplanning-en.pdf](http://www.uitp.org/mos/focus/FPUrbanplanning-en.pdf)

<table>
<thead>
<tr>
<th>City</th>
<th>Bus speed</th>
<th>Reference area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athens</td>
<td>16</td>
<td>Attika region</td>
</tr>
<tr>
<td>Berlin</td>
<td>19.5</td>
<td>State of Berlin (Land Berlin)</td>
</tr>
<tr>
<td>Bern</td>
<td>20.2</td>
<td>Planning Region Bern (24 municipalities)</td>
</tr>
<tr>
<td>Budapest</td>
<td>16.2</td>
<td>Municipality of Budapest (Fopolgarmesteri Hivatal Budapest)</td>
</tr>
<tr>
<td>Copenhagen</td>
<td>21.6</td>
<td>Greater Copenhagen region</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dublin Region (Dublin City Centre and counties of Fingal, South Dublin and Dún Laoghaire-Rathdown)</td>
</tr>
<tr>
<td>Dublin</td>
<td>14.6</td>
<td>Yhteistyövaltuuskunta including Helsinki + Espoo + Vantaa +</td>
</tr>
<tr>
<td>Helsinki</td>
<td>26</td>
<td>Kauniainen</td>
</tr>
<tr>
<td>Lisbon</td>
<td>17.4</td>
<td>Area Metropolitana de Lisboa</td>
</tr>
<tr>
<td>London</td>
<td>18</td>
<td>Greater London</td>
</tr>
<tr>
<td>Madrid</td>
<td>21</td>
<td>Comunidad de Madrid</td>
</tr>
<tr>
<td>Paris</td>
<td>17.1</td>
<td>Ile-de-France Region</td>
</tr>
<tr>
<td>Rome</td>
<td>15.4</td>
<td>Commune of Rome</td>
</tr>
<tr>
<td>Stockholm</td>
<td>18</td>
<td>Stockholms Lan</td>
</tr>
<tr>
<td>Vienna</td>
<td>19</td>
<td>City of Vienna</td>
</tr>
<tr>
<td></td>
<td></td>
<td>City of Warsaw</td>
</tr>
<tr>
<td>Warsaw</td>
<td>21.5</td>
<td></td>
</tr>
</tbody>
</table>
The importance of dedicated spaces

The efficiency, speed and performance of buses depend heavily on the provision of dedicated lanes and stops. Various forms of traffic segregation are possible - from a mere painted mark on the road, to various forms of road treatments (elevated lanes, movable barriers, 'bus locks', virtual bus lanes e.g. queue jumpers, contra flow lanes etc), to dedicated dual lane infrastructure with 'metro-like stations'. The most advanced of such systems as referred to as 'bus rapid transit' (BRT).

Recent innovations

Some key innovations include:

- 'Bus rapid transit' and 'Buslines with a High Level of Service' (www.bhls.eu)
- Clean engines and alternative fuels
- Low-floor architecture
- Double articulated vehicles: up to 210 passengers

** UITP SORT Project: Standardised On-Road Tests: UITP’s fuel consumption measurement system to compare buses in bids at tender stage. Available in 4 languages at the UITP webstore www.uitp.org/knowledge/projects-details.cfm?id=439
Guiding devices

The current trend is also to look beyond vehicle technology alone and to consider the wider system and its components, such as infrastructure and operations and their interplay. This is commonly known and promoted as the ‘bus system approach’ and as system thinking.

Image and perception: time to act!

Although genuine innovations have taken place in the field of bus manufacturing over recent years, they have mainly focused on technical performance and have not enabled customers or authorities to change their perception of bus transport.

Recently, and especially within the framework of the research EBSF project, the modernisation or ‘renaissance’ of the bus just like the modern urban tramway or the high-speed train has started. The aim is to capture the imagination and enthusiasm of politicians and customers.

Looking ahead: European Bus System of the Future (www.ebsf.eu)

In recognition of the importance of buses running in systems and the challenges ahead the ‘European Bus System of the Future (EBSF)’ project was launched in September 2008. It is one of the largest surface transport R&D projects ever started by the European Union, and is funded under the 7th Framework Programme (its total budget is around EUR 26 million).

The project is led by the International Association of Public Transport (UITP), which represents some 3,100 mobility actors from 90 countries.

For the first time, this project brings together the five leading European bus manufacturers (Evobus/Mercedes, Irisbus Iveco, MAN, Scania, Volvo) and 42 other partners including transport operators and national transport associations (RATP, ATAC Rome, Veolia, TEC, Bremerhaven Bus, Verona, RATB, BKV, VDV, ASSTRA, UTP), public transport authorities (Västtraffik Gothenburg, Nantes Métropole, Consorio Regional de Transportes Madrid), the supply industry (Hübner, Init, Digigroup, Ineo, Pilotfish, Actia, Hogia, Vultron, Tekia) and major research centres, universities and consultancy firms (D’Appolonia, Helmut Berends Consultancy, CERTU, Chalmers, CEIT, Fraunhofer, Transys, FIT, Newcastle University, PE International, IFFSTAR, University of Rome 3, University of Rome/DITS, TIS, CRF).

The main objectives of EBSF are:

- To conceive and develop an innovative high quality bus system which is fully integrated within the urban environment and that will demonstrate the full potential of a new generation of urban bus networks.
- To make a breakthrough design of vehicles, infrastructures and operations.
To maintain or improve the competitive position of the European bus manufacturers and operators by promoting a new concept under the brand ‘the European Bus System’.

EBSF is conceived as a driver to increase the attractiveness and raise the image of bus systems in urban areas, by means of developing new technologies for vehicles and infrastructure in combination with operational best practices. The project builds upon state-of-the-art clean vehicular technologies and concentrates on improving the bus system as a whole.

The development of a new generation of urban bus system stimulates European cities to deploy new bus lines making public transport more attractive.

Trials have been organised in seven European ‘showcase cities’: Rome, Bremerhaven, Budapest, Gothenburg, Brunoy, Madrid and Rouen, to validate and test the developed technologies and practices (cf. brochures).

**EBSF project contact**

Umberto Guida | Project Director, European Bus System of the Future | International Association of Public Transport (UITP), rue Sainte-Marie 6, BE-1080 Brussels

Direct phone: 32 2 7880124 | Fax: +32 2 6601072 | umberto.guida@uitp.org

***

**Note to editors**

The International Association of Public Transport (UITP) is the international network for public transport authorities and operators, policy decision-makers, scientific institutes and the public transport supply and service industry. It is a platform for worldwide cooperation, business development and the sharing of know-how between its 3,400 members from 92 countries. UITP is the global advocate of public transport and sustainable mobility, and the promoter of innovations in the sector. Visit our website www.uitp.org