

EBSF VISION



This document is the first issue of the EBSF Vision. It constitutes a deliverable of the EBSF project. By September 2012, it will be completed by a set of *Recommendations* based on the results of the project.

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The European Bus System of the Future

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Dear readers,

Let us become the passengers of the European Bus System of the Future (EBSF)!

EBSF is a wide scale project co-funded by the European Commission under the Seventh Framework Programme for research and technological development and with an overall budget of EUR 26 million.

This *Vision of the European Bus System of the Future* contains the main message of the project consortium with regard to achieving an ideal European Bus System. Produced initially by the main European experts on bus systems, this strategic document introduces a new level of urban bus transport and will lead you to a new generation of bus systems that are adapted to European cities.

EBSF Consortium welcomes you on-board!

Altogether we represent 46 partners including the five leading European bus manufacturers, transport operators, national and international transport associations, public transport authorities, the supply industry and also research centres, universities and consultancy organisations.

Different stakeholders, but one shared conviction. We believe the bus is the most versatile urban transport solution to deal with the new reality faced by European cities. The financial and energy crises clearly show that Europe has to change its consumption habits. Traffic congestion, pollution, and the new obligation to share resources with other continents in order to ensure a better worldwide balance, indicate a new age in which public transport will play a major role. Buses, which already serve 80% of the total European public transport, are crucial to all this.

The EBSF project complies with clear targets set by the European Commission in the Green Paper on urban mobility (SEC (2007) 1209- 25.9.2007). The cities of tomorrow must be more fluid, greener, smarter, more accessible and safer.

New technologies, new concepts, as well as substantial investment are essential to meet a wide range of issues and challenges facing bus systems:

- environmental challenges like air and noise pollution
- accessibility for all, everywhere in the city, and for all kinds of activities
- flexibility and adaptation of the service to stakeholders' needs
- speed and comfort of the bus
- safety and security inside and outside the bus
- cost of bus operations versus efficiency.

However, without a step change in urban mobility culture and behaviour, all efforts to introduce new systems will not reach expectations.

A cultural change is the *conditio sine qua non* to preserve good quality of life in our cities. The bus is still perceived as less attractive than other modes of transport and struggles to compete with the car.

Innovative and efficient bus systems already exist in other parts of the world. Europe is facing a major challenge – how to obtain similar benefits to the best performing systems in Latin America and Asia in the very specific European context of many of small and medium cities with important historical structures, complex topography and limited space?

With EBSF, the bus “renaissance” will happen in Europe!

For four years from September 2008, the EBSF project will apply a systemic approach, looking at “bus systems” consisting of state-of-the-art vehicles, specific European infrastructures and innovative operations in an integrated way. The total bus system resulting from the project in September 2012 will respond to the real needs of all stakeholders that benefit from bus services on a daily basis, namely passengers, public authorities and operators.

At project completion, operators, public authorities and suppliers will receive guidance via a set of *Recommendations* on how to implement attractive and efficient bus systems that meet European requirements. These *Recommendations* will be published in a final guidebook, the final component of the overall EBSF Vision.

Already, EBSF is acting as a trend driver to speed up the pace of change in urban mobility behaviour so critical for the new generation of people and cities. EBSF is also the main tool to collect all the necessary input to propose a Strategic Research Agenda that will coordinate and monitor the research programmes on bus systems for the next 10 years.

This project will aim to change public perception of public transport so that soon the bus can become:

- the favourite mode of urban transport of citizens; any journey around the city will be pleasant, reliable, safe and rapid
- a trendy mode of transport to enhance the good image of cities; efficient bus systems create civic pride and a sense of “productive space”
- a competitive mode of transport for operators.

Dear passengers - take your seat and enjoy your trip in the European Bus System of the Future! Your journey will pass by six main stopovers...

I ● Responding to passengers' needs

One of the main goals of EBSF is to shape the “shoe-box” with big wheels around passengers' needs. Regular and occasional users will see the bus not only as a cube rolling around the city. They will see a new tailor-made mode of transport matching their needs.

Making the bus choice! Taking the bus by choice and not by obligation is still rare for European passengers. There are too many constraints when taking urban buses to put them on an equal level of user satisfaction with cars. Today, private modes of transport provide more customised journeys than public ones. Reversing what looks to be an urban transport principle is however feasible: constraints must be removed from bus systems! Only a total system approach by decision makers will enable the change-over:

*Citizens
making the
BUS choice*

- operators have to re-orient bus service provision to the needs of all passengers
- public authorities have to adopt policies that favour public transport and influence passengers' choices. Issues such as urban planning, road traffic priorities and car parking should be part of public transport policies.

Promoting a new and high standard European public service. In EBSF, users' expectations are not seen just as “needs” but as the minimum level of quality to define the public bus service.

All barriers of prejudice and perception need to be removed. Being a **bus for all** means at least **easy boarding** facilities for all kind of passengers, dedicated spaces, e.g. for prams, wheelchairs, luggage, and priority seats for the less able bodied.

Occasional users are particularly sensitive to all issues related to the network accessibility. Thus, EBSF promotes a **user-friendly** approach, irrespective of travel time or destination. Door-to-door guidance and information must





be easy to find and to understand, with dedicated help for elderly, less experienced and disabled users. **Good visibility** of the stops with easy access is also fundamental to enable people to identify the system.

Comfort is a crucial element to win and retain new passengers. The vehicle must be clean, not over-crowded, with efficient heating, ventilation and air conditioning. The **reliability and frequency** of the service on wide coverage day-night schedules also constitute comfort criteria. Obviously, greater **speed** will lead to the bus being able to compete better with the car. Boosting bus speed will generate a more **efficient**, more **punctual** and more **frequent** service for users. These factors are essential to convince non-users to take public transport and to increase the confidence of those who are already using it. For operators, boosting bus speed will lead to a more productive and a more efficient system, with higher revenue!

The perception of insecurity affects the freedom and pleasure of travel by public transport. Any disruption to information or the journey affects the perception of security. Staff and passengers require **security** for the **entire journey**, starting outside the vehicle at bus stops. **Accurate and real time information on board and outside the vehicle** about services, delays and destinations, improves passengers' comfort and enables them to remain in control of their time.

EBSF pursues the ideal of high quality bus networks throughout urban areas, like spider webs from city centres to remote and low density zones. The system approach of the project integrates the multiple transport modes, public or private, in a **total network**. To provide seamless mobility between all modes, EBSF will encourage support to **car parking policy and intermodal ticketing systems**.

*High standard
public BUS
services for
passengers*

II Responding to social and environmental needs

Public transport plays a major role in society. It contributes to reducing the risk of social exclusion of isolated people and gives the whole population access to employment, education, recreation, shops and services. To fulfil its social mission, public transport has to reflect the changes in society.

The European Bus System of the Future will help European society to mirror the evolution in citizens' expectations due to:

- demographic changes: elderly people are more numerous, more active and more mobile, they need transport services adapted to them
- the growing separation of activities, such as residential areas, shops, and administrative centres, results in more frequent and more complex trips
- the travel patterns of workers during the week and in the day change rapidly.

*New BUS
identity
mirroring
the evolution
in society*

Reconciling citizens' mobility needs with quality of life and the environment to ensure sustainable mobility is a daily target of European society. Only a **smart use of energy sources** can help to face the consequences of climate change and the limitation of energy fossil sources, which will become increasingly scarce and expensive.

Transport is responsible for 30% of CO₂ emissions in OECD¹ countries. Without a strong sweeping change in the sector, this rate will continue growing. Solutions to limit the negative effects of gas emissions should be encouraged such as:

- decreasing distances between activities, physically or virtually
- promoting environmentally-friendly mobility modes
- reducing fuel consumption of vehicles





- acting on the flow of vehicles with better traffic monitoring and control, thanks to dedicated bus lanes, low speed zones and high speed zones in cities.

The European Bus System of the Future will be energy-responsible. To help European society to become more sustainable, EBSF will promote and reinforce a new **bus identity**. On social aspects, the image of the bus is very positive. It contributes to improving the quality of life in cities and it is a convivial mode of transport. Furthermore, buses provide flexible services. Most criticisms are about some functional aspects like performance and reliability.

Still, too often today, buses are considered as providing services for captive passengers who have no other transport or people who do not have time constraints. On the contrary, the image of other modes of transport is more positive in different aspects. Heavy, rail, transport modes symbolise modernity as well as economic dynamism of cities, and cars reflect trends and freedom of people.

But, in recent years, bus manufacturers have made great efforts to make the bus more attractive, stressing all the factors that can improve the feeling of wellbeing outside and inside the bus. Huge progress has been made on bus and stations' design, accessibility, on-board comfort, noise and pollution reduction. Efforts must continue especially to develop the pleasure of travelling by bus.

EBSF is the first step to promote the new bus identity. Education, campaigns and marketing are fundamental to change the mobility culture of our society. By means of a snowball effect, the bus image will become greater and greater, convincing occasional users to join the bus network!

*BUS for
sustainable
mobility*

¹ OECD: Organisation for Economic Co-operation and Development

III • Responding to the needs of cities

To understand how citizens move in streets, between buildings, or how they come and go in the urban area, cities must first observe them and their new mobility habits, like car-sharing, and then analyse how they use transport modes according to their relative advantages. The needs of cities reflect the needs of their citizens, but when developing new public transport systems, public authorities have also to pay attention to the local infrastructure, architecture and the environment.

Cities are the heart of EU sustainable development efforts². To fight urban congestion, bus networks must be tailored to all citizens' movements, both in the centre and in outlying districts, reclaiming spaces that are currently occupied by cars. With this objective, the bus of the future will be conceived not as a vehicle in isolation, but as an integral part of a transport system that blends in with the life of the city.

*BUS
for better
quality
of life*

In addition to good interconnections between all transport modes, public or private, and soft modes such as walking and cycling, the **integration of bus networks** with other transportation hubs (train stations, airports, ferry terminals, etc) is a fundamental aspect covered by the project. EBSF will enhance intermodal passenger transport to make European cities **more fluid** and **less congested**.

European cities are **modern** and at the same time have old **history** and **architecture**! The versatility of the bus of the future will be adapted to and respectful of European historic city centres and architectural heritage. One key asset of the European Bus System of the Future will be to modernise the city while respecting its history and architecture.

Today many European cities want to develop a new **“spirit of place”** to improve quality of life in urban areas. Urban planners try to find new solutions to limit urban sprawl, for example in developing “compact cities”, creating green





areas or eco-quarters. Efficient bus networks can be a key asset of the ambition of cities to “**be greener**”.

Public transport plays a central role in the **image** cities want to reflect, in particular public buses which can be easily adapted to local infrastructures. Reciprocally, to enable cities to ensure a real sustainable mobility, urban planners have to take into account all the conditions needed for high-performance bus systems: keeping room for stops along streets, spaces for platforms and bus lanes, appropriate geometric features of roads and infrastructure in new neighbourhoods.

*BUS
promoting
the image
of cities*

² EU Thematic strategy on the Urban Environment, 11 January 2006.
http://ec.europa.eu/environment/urban/pdf/com_2005_0718_en.pdf

IV. Promoting political support and relevant legislation

The major responsibilities for ensuring an attractive and competitive bus system lie in more **political support at regional and local levels**.

Efficient bus systems are fundamental to preserve and guarantee a good quality of economic and social life in European cities by ensuring sustainable and affordable mobility for all citizens. Buses have to cope with all the negative impacts of traffic congestion which reduce the commercial speed of services and sharply increase operational costs³. Urban mobility systems based on public transport are more energy and cost efficient than those based on the use of private cars⁴, thus political will must support them.

A high level of political support is the *conditio sine qua non* to enable bus systems to deploy their full potential. Policy makers have several levers to improve public transport's competitiveness in cities such as deterring excessive car use, developing and promoting high-quality public transport systems and creating the conditions for optimised use of motorised modes of transport. In particular:

*Strong
European
regulatory
framework for
BUS systems*

- encouraging travel behaviour change with the creation of an urban road charging system reflecting the real external costs of modal choices
- increasing the decision-making power and consultation rights of public authorities and operators in urban planning, road investment and traffic management
- redistributing road space in favour of pedestrians, cyclists and public transport, to limit traffic volume and improve bus speed and regularity through the creation of bus lanes and reserved routes
- developing public transport services fast and reliable enough to compete with the car through the creation of public networks running on reserved routes and completely separated from all other traffic
- ensuring good coverage of the entire conurbation by high-density public transport services easily accessible on foot.





To ensure the conditions of effective sustainable mobility and the efficient performance of public transport networks in cities a **single authority** responsible for all mobility actions at the local level should be created. This authority would cover all issues linked to all urban modes of transport and would have real power to take decisions related, for example, to traffic management, priorities, dedicated lanes, transport infrastructures, fines for violation of traffic rules, etc.

While strong political support is necessary, **excessive national and European legislation must be avoided**. Today, bus systems and their components have to comply with many different EU and national regulations³. The new EU Directive on the promotion of clean vehicles⁶ will help to clarify the environmental performance of buses during their lifetime. However, in addition to the promotion of the environmental efficiency of engines, it is necessary to increase the average travel speed of buses in order to significantly reduce energy consumption and emissions. To create a real market of clean mobility, the provision of economic incentives to promote new fuel and drivetrain technologies in bus operations would be more effective than new legislation.

EBSF will assess the need to further develop or adapt the existing regulations and will identify the potential for new efficient EU legislation and standards. The main objective will be to create a strong **European framework** for the bus sector to enable it to compete properly in a global environment. Burdens resulting from inappropriate legislation should be avoided or dismantled. With relevant public support, bus systems of the future will be financially viable for operators and authorities and will offer high levels of services to their passengers.

³ A study carried out in Brussels in 1999 evaluated the annual cost of traffic jam for operators at 18% of total production costs, UITP Position Paper December 2001 "A Congestion-Free Bus Network"

⁴ UITP Mobility in Cities Database

⁵ EU Bus Directive 2001/85/EC

⁶ http://ec.europa.eu/transport/urban/vehicles/clean_energy_efficient_vehicles_en.htm

V ● Securing global leadership

Europe can already claim to have public transport operators, vehicle manufacturers, suppliers, and information technology experts that form part of the very small number of global leaders. To keep Europe competitive on the world stage, medium and large European cities also play a significant role in working hard to improve the quality of life of their citizens, to develop goods and works, and their attractiveness for tourists.

Quality, competitiveness and cohesion of public transport services are a decisive asset in the ability to attract, promote and export European products, knowledge and expertise.

By giving the opportunity to the main European bus actors, including the five leaders of bus manufacturers, to work together during four years to reach clear and high targets, EBSF acts as a lever to maintain and further develop **European bus system knowledge and competitiveness**.

During the EBSF project, manufacturers will develop and demonstrate challenging and innovative solutions. Such solutions can be integrated, standardised and adapted to the specific needs of major cities around the world.

On their side, operators will find in EBSF answers tailored to the current constraints that they face in trying to reduce operational costs and provide flexible services.

EBSF will be the platform to support and anchor all European bus stakeholders in worldwide competitiveness. The new concept of “European Bus System” could soon become their best card to play in a global environment.

*Reinforcing
European
BUS systems’
worldwide
competitiveness*



VI. Strategic Research Agenda for urban bus systems

New global challenges, in particular a growing urbanisation coupled with the obligation to adopt more responsible use of energy to reduce the negative effects of climate change, are driving public transport into the front line. Bus networks play a central role in this new scenario as they are in most cities the backbone of local public transport.

Bus systems are experiencing important growth in ridership and at the same time passengers are demanding quick changes to improve the quality of the services. Without doubt, to greatly improve bus systems in the longer term, research into innovation must be boosted.

Today, the main research objectives for stakeholders of bus systems, such as manufacturers and suppliers, operators and authorities, are:

- to reduce production costs and increase bus competitiveness
- to enhance the effectiveness of investment and operating costs
- to improve bus systems' attractiveness for existing passengers and for potential new customers.

From all ambitious research programmes already carried out at the European, national and local levels, a convergent vision about public transport has emerged. A revolution in design, technology and organisation is inevitable.

The lack of resources to support the triple revolution is obvious: industry, operators and transport authorities are in a tense situation due to the financial and economic crisis. Without a powerful and collective effort coming from national and European levels, the bus renaissance will not happen.

A new 'Strategic Research Agenda for Urban Buses' is therefore fundamental to create for the next decade a framework of reflections and common actions. It will also be an opportunity to take advantage of potential synergies from the research efforts undertaken for all other transport modes, such as cars, trucks, energy storage, etc, as well as for public transport.

Through its wide reach and its capacity to bring together the key players of bus systems in the same consortium, **EBSF** acts as the nerve centre to orient and boost the common research approach that will give birth to the bus renaissance.



*Stimulating
common
actions...*

In the **research scenario**, EBSF represents the trunk from which European bus research activities will grow. In concordance with the global system design and the common specifications defined in EBSF, new research will grow like branches, developing specific aspects of the whole EBSF system, and contributing to enrich the total EBSF system definition. Three main bus research trends are already apparent, ie. system integration and standardisation; environmental performance; and modularity.

System integration and standardisation

Combining and linking end-users, vehicles, infrastructures and operations together with a high service quality is a daily challenge for operators and manufacturers. A “system” approach responds to increasingly demanding passengers regarding bus service quality, which includes as a minimum:

- customer services: reception, comfort, information, accessibility
- great transport offer: frequency, volume, operating speed, regularity
- good integration into the overall public transport network and the whole urban transport network: town planning, stations, intermodal areas
- identity of the vehicle and attractive image of bus networks.

In addition, “system integration” includes the ability of bus networks to complement the services of all other modes of transports and to adapt their characteristics to the infrastructures of cities.

Only efficient and harmonised information tools for operators and end-users, such as pedestrians, cyclists, drivers and commuters, will ensure the continuity of the information between all mobility solutions.

Good system integration would boost standardisation at European level, with positive impacts on development, production and maintenance costs.

Environmental performance of bus systems

Bus systems already have an excellent environmental performance compared to individual motorised transport but





further research must continue to:

- optimise clean diesel technologies
- develop alternative fuels and renewable forms of energy with particular attention to hybrid and electric solutions
- reduce noise and vibration
- produce new light-weight materials for vehicles and structural components.

A common platform to exchange experiences and best practices in bus propulsion technology and use of clean fuels needs to emerge urgently at the European level. It would generate economies of scale as well as funding instruments to help take decisions about:

- alternative fuels and renewable forms of energy, e.g. DME, biofuels, hydrogen, ethanol
- development of the second hybrid generation, combined with major efforts to make vehicles lighter.

Even if energy issues are not directly covered by EBSF, the project offers a unique opportunity to identify the expectations and assess the solutions vis-à-vis the global system through its wide consortium and its EBSF user group.

Modularity

Efficient modularity can create greater operational flexibility through a modular vehicle approach. Inside the vehicle, modularity means flexibility of the interior layout and rapid conversion from maxi capacity to maxi seating. Outside the bus, it involves high-capacity buses and “variable geometry” capacity.

Achieving modularity will contribute to optimising operating costs through:

- reduction of driving costs during peak hours
- optimisation of capacity, consumption and frequency in relation with traffic patterns
- better organisation of transport networks with the addition or removal of trailers at the strategic terminals, depending on levels of passenger demand.

*...based on a
strong Strategic
Research Agen-
da for urban
BUS systems*

VII. *Vision for future* ● *Recommendations...*

The European Bus System of the Future project is a very important opportunity for local authorities, bus manufacturers and operators to change the image of the bus and passengers' perception by making buses an integrated part of total public transport systems that will address climate change, the increasing price of fossil fuels, and reliable and accessible services in towns and cities for their residents.

This document is the result of a “visionary exercise” carried out by the experts of the EBSF project. **The EBSF Vision is a message about an ideal Bus System for the Future of European society.**

Produced in the first months of the project, it presents the cornerstones on which the project will be developed during four years. By September 2012 a set of *Recommendations* based on the results of the project will give guidance to operators, public authorities and suppliers on how to implement attractive and efficient bus systems.



EBSF is an initiative of the European Commission under the 7th Framework Programme for R&D. Starting in September 2008; EBSF is a four-year project with an overall budget of 26 million Euros.

For the first time, this project brings together the five leading European bus manufacturers (Evobus/Mercedes, Irisbus Iveco, MAN, Scania, Volvo) and 41 other partners including transport operators and national transport associations (RATP, Trambus Rome, Veolia, TEC, Bremerhaven Bus, Verona, Milan, RATB, BKV, VDV, ASSTRA, UTP, KNV), public transport authorities (Vasttraffik Gothenburg, Nantes Metropole, Consorcio Regional de Transportes de Madrid), the supply industry (Hübner, Init, Digigroup, Ineo, Pilotfish, Actia, Hogia, Vultron, Tekia) and research/consultancy (D'Appolonia, Berends, CERTU, Chalmers, CEIT, Fraunhofer, Transyt, FIT, Newcastle University, PE International, INRETS, University of Rome 3, University of Rome/DITS, TIS, CRE.

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