

Lyon Truck & Bus World Forum

Best practices for greater accessibility
in urban areas - 5th edition

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White book

Truck and Bus World Forum – Synthesis Report

The world is currently going through a major crisis that appears to be endless. However, these difficult times can also be taken advantage of to analyze the products and solutions which could constitute the future prosperity and economic growth of international truck and bus groups.

Indeed, the development of both public transport and the transport of goods is a catalyst for new business growth.

At the same time, the development of megacities, (cities with a population of more than 10 million people) will accelerate new logistical requirements. Growing cities are facing several challenges:

- ▶ Traffic growth
- ▶ Energy and water storage
- ▶ Environment and health
- ▶ Security

Additionally, historic cities and new towns are not confronted by the same issues and therefore do not have to adapt in the same way. Indeed, their environmental concerns and infrastructure frameworks are already different and such differences increase with the development of urbanization

Major events, such as the Soccer World Cup or the Olympic Games, are also a huge driver for development.

The Fifth edition of the Truck and Bus World Forum, which took place in Lyon on 30 November and 1 December 2011, was held, for the first time, at the same time as the Solutrans trade fair.

It brought together international decision-makers in the commercial vehicle industry around the theme "*Transport of passengers and goods: towards a better accessibility of urban areas.*"

1 Today: environmental concerns!

Today, various players in public transport as well as in the transport of goods are preparing for what is going to be the main challenge for the development of sustainable public transport networks in our urban centers, as well as the introduction of greener trucks, without compromising air quality.

European-scale projects are already underway to find and develop solutions to reduce energy consumption in the transport of goods and people.

Challenges in transport are the same as those facing our industrialized societies: economic growth, competition and the obligation to innovate.

The main factors at stake are greenhouse gas emissions, oil resources, quality of life and public health:

- ▶ Greenhouse gases: the increase in greenhouse gas emissions is among the main causes of global warming.

- ▶ Oil resources: trees don't grow to the sky, and oil resources are not limitless either.
- ▶ Quality of life: a balance has to be found between the development of urban centers, goods transport infrastructure and day-to-day life
- ▶ Public health: environmental concerns are directly linked to public health considerations

How can we improve the quality of transport and the quality of life at the same time? How can we protect our world from the increase in greenhouse gas emissions and at the same time develop a new, viable network infrastructure for people and goods?

The protection of the environment can be achieved through reducing oil needs to nil

At European level, the aim is to halve the utilization of vehicles using fossil fuels by 2030, and the utilization of such vehicles should be reduced to zero by 2050. These ambitious objectives will require rapid, fundamental, drastic change in our industry infrastructure, transport infrastructure and, of course, individual as well as corporate behavior.

The Truck and Bus industry will play a big part in meeting these challenges.

Improving diesel quality

The reduction of greenhouse gases starts with simple actions such as eco-driving, the regulation of speed in cities or the facilitation of access to public transport.

Can we improve our diesel vehicles?

There have been huge improvements in the last 20 years:

- ▶ -97% between 1990 and 2014 in NOx and particulates
- ▶ -20% in fuel consumption in the last 20 years

There is still enormous potential for improvements in fuel consumption/CO2 emissions

- ▶ Better engine efficiency
- ▶ Heat recovery
- ▶ Energy management
- ▶ Better aerodynamics
- ▶ Driver “coaching” through electronics
- ▶ Order of magnitude: -20% in the next 20 years

Another method is to increase public transport incentives

Driving improvements in quality of life and quality of air through attractive and efficient bus systems

Our cities are already going greener with improved carbon footprints, the introduction of different types of hybrid vehicles, compliance with the Euro 6 standard by 2014, and taking the health impact into account according to Green Public Procurement.

Would a greener city have to change from light hybrid vehicles to full electric? Hybrid buses appear to be a way of meeting environmental concerns, but is the best solution hybrid buses, or plug-in without diesel, or buses with batteries?

→ *The IC engine will still dominate in 2030 (>80% according to the ERTRAC report)*

Developing “non-oil” solutions

When can alternative solutions be found and used?

Today, hybrid technology is operational, well-proven and highly reliable. Using hybrid buses would reduce city consumption by 35%, and could be paid back in five to seven years (depending on fuel prices). New battery technology is now considered as being mature and its price accessible.

Several external drivers such as fuel prices, global CO2 regulations, new logistics set up in cities and local incentives/restrictions need to be taken into account.

Biomethane is considered as a potential feedstock. The Compressed Natural Gas cars currently being developed are partial zero-emission vehicles with an autonomy of approximately 400km and at accessible prices. By 2030, compressed natural gas vehicles could make up 5% of the total number of vehicles worldwide.

In Europe, Low Emission Zones (LEZs) are areas or roads where the most polluting vehicles are restricted from entering. The emissions that are aimed to be reduced by LEZs are mainly fine particles, nitrogen dioxide and indirectly ozone. All LEZs affect heavy duty goods vehicles (usually over 3.5 tonnes Gross Vehicle Weight (GVW)), and most buses and coaches (usually defined as over 5 tonnes GVW). Some LEZs also affect vans, cars and motorcycles.

Compressed Natural Gas vehicles or vehicles using biogas are already in use in a few cities, such as Lille (France). Investments are focused on the local effect, with the use of vehicle technologies for buses, waste collection, goods delivery and vans.

Fuel quality is also being improved and alternative fuels are being developed, from AgroFuels and Biodiesel to the next generation of fuel.

A denser city also needs to act to change the modal split between car users and potential and captive users of public transport. Each category of passengers has a different need, whether they be young students, disabled people, business workers or remote commuters.

We need to find a way to attract passengers, with comfortable and attractive buses, that are easily accessible, reduce journey times and provide constant passenger information. At the same time, it is necessary to optimize public spending in modern vehicles, off-board ticketing, traffic control and exclusive lanes, the development of feeders with trunk line grids, and, finally, green efficient technology.

Finally our cities need to be smarter, i.e. attractive, efficient and evolutive. Buses can be used as a driver for urban mutation, offering comfortable transport “just like home”, adaptability and modularity according to obsolescence, fleet management and the monitoring of operating costs.

Drivers of change	Challenges	Imperatives
Volume Growth	Capacity & Congestion : Meet the growing, changing demand efficiently, consistently and profitably.	Better utilize physical investments
Urbanization & Legislation	Infrastructure Changes : Deliver the greatest choice, convenience and living conditions to consumers.	Adapt to Landscape
Green & Cost	Efficient Systems Operations :Improve efficiency, reduce costs, improve service, reduce environmental impact.	Improve efficiency of systems
Reliability & Availability	Safety and Security : Unobtrusively reduce exposure to risks and increase the safety of operations.	Visibility and Planning

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Environmental concerns go hand in hand with quality of life

Public health and stress – driving improvements in the quality of life through attractive and efficient bus systems

An efficient bus network design, together with efficient traffic control and an efficient layout are keys to the successful management of an urban bus network.

Stress linked to public transport cannot be ignored, and a better temporal and spatial coverage, as well as a fast and reliable bus system is needed.

Smart lane management may improve the quality of life with reduced congestion and the extension of the bus network, through the development of bus lanes with intermittent priority. These are virtual lanes temporally and exclusively reserved for buses: once the buses have passed through the section, other vehicles can use the shoulder lane again.

Quiet Delivery

Quiet delivery systems are being developed in European cities; these consist of a scheme to investigate and promote the environmental, social and operational benefits of “out-of-hours” deliveries.

This activity is not yet regulated, but the UK Department for Transport is studying how to manage late evening or early morning deliveries. The tests conducted take into account planning, noise and local voluntary agreements, as well as the variety of stores and locations involved.

The first trials conducted in the UK demonstrate numerous benefits such as:

- ▶ Reduced fuel consumption (up to 5.7% saving in night-time versus day-time);
- ▶ Reduced emissions, small but positive, driven by reduced fuel consumption, extrapolated area-wide;
- ▶ Improving stock availability at the store opening time, which leads to an improved “customer experience” in-store;
- ▶ Improved working relationships between retailer and local authority;
- ▶ Finally, the perception of noise is reduced.

Creating integrated infrastructure

Historical urban centers were built without taking into account future development needs. The local specifics of a network are an important factor:

- ▶ Fixed infrastructures cannot be changed (tram, trolley bus, rail) and must be integrated into the solution
- ▶ Local specifics such as historical centres (Lyon, New York, Tokyo, etc.) must be respected
- ▶ Performance of the network – current traffic modelling will affect the capacity

Therefore, development is often chaotic, accentuating problems of all kinds, such as access to work, deliveries, pollution and increased road accidents.

For instance, if a truck stops every 10km due to traffic jams, those stops can increase urban air pollution by 30%.

In Rio de Janeiro, current congestion costs represent a yearly loss of R\$ 12 billion (10% of local GNP (Source: Coppe/UFRJ). In São Paulo: R\$ 33.1 billion in losses in 2008 (3 times more than in 2000 (Source: FGV/SP). Furthermore, a Brazilian professional worker is expected to spend three years of his life in daily 90-minute trips. He also loses 5% of his productivity due to traffic congestion.

How can we go from today's situation to the imagined world? Technology roadmaps help us to make changes faster.

City bus architecture and structure improvements

The **European Bus System of the Future** research project, financed by the European Commission and managed by UITP, is currently evaluating a new architecture at vehicle level, facilitating the integration of all new smart systems together.

Indeed, vehicle management has to be seen from a system point of view

- ▶ To optimize fuel consumption
- ▶ To decrease operating costs and total cost of ownership
- ▶ To increase the market share of public transport

Public transport users can be segmented into different target groups (business workers, young students, disabled people, remote commuters) which will not all need the same kinds of services (travel locators, speed, connections, accessibility, security, information, wifi, 220v plugs, etc.)

Access to vehicles, and embarking and disembarking times are real challenges. A vehicle alone is nothing without good physical interface with its environment. Attractiveness and acceptance are the key words

2 Tomorrow: intelligent, adapted urbanization

However clean trucks and buses become, the Truck and Bus industry also has to prepare for another inevitable change: the increase in global population and the urbanization of this population.

With approximately five billion people living in cities by 2030, new logistical requirements will emerge in inner-city and long-distance transport. Indeed, urbanization will continue globally and developed countries will continue to have a far higher share of urban population than developing countries. An increase in population requires a higher volume of transport as well as solutions for inner-city transport.

The development of mega cities (20 now, 35 in 20 years' time) will require new systems, which have to be developed now in order to be implemented tomorrow. The emergence of megacities requires changes in road infrastructure and new transport concepts for goods and people.

City tolls, driven by environmental and road financing considerations, will affect transport, as will increasing inner-city traffic density, which will require advanced traffic management and access control. Additionally, new product concepts will make it necessary to meet future demand in goods transport.

Adaptation could be approached by considering urban transport systems (trucks, buses and cars) as a whole

If the development of new transportation systems is mandatory in order to face demographic changes, these systems have to be developed as a whole in order to cope with

- ▶ The limits in terms of space available.
- ▶ The increasing demand for urban mobility concerning both people and goods.

A systemic approach to transport issues will enable the development of more adapted, more sustainable methods.

The different solutions adopted have to be integrated in order to be more efficient. For example, the Brazilian government is currently investing in a new program of accelerated growth as well as a mobility program for big cities, with the implementation of a Bus Rapid Transit (BRT) system. This is considered to be a good start but also has to be a first step integrated into a more global urbanization approach.

The characteristics of the BRT system are as follows:

- ▶ Exclusive routes
- ▶ Multiple bus-stop positions of bus stops
- ▶ Possibility of doubling buses;

Think globally, act locally

No global solution can be adapted everywhere. Every local situation needs to be resolved individually but we must all be aware that change is mandatory. Our modern cities such as Tokyo, Rio or New-York are built around a historic center, hardly adaptable to turnkey infrastructure solutions.

These local differences can concern:

- ▶ Geography: the solution in Rio de Janeiro cannot be the same as in New York. The Rio de Janeiro system will need to be adapted to the uneven landscape of this megacity.
- ▶ Development: the solution in an African megacity cannot be the same as in Tokyo. Indeed, in Tokyo, the problem will be to integrate new solutions into an existing infrastructure. A less developed megacity will have the opportunity to create an already adapted infrastructure.

- ▶ Priority at intersections controlled by traffic lights;
- ▶ Loading and unloading at the same level;
- ▶ Universal accessibility;
- ▶ High capacity vehicles (articulated);
- ▶ Payment and ticket control before boarding;
- ▶ Modern, covered bus stops;
- ▶ Passenger Information System;
- ▶ Operational Control Center (OCC);
Capacity up to 45,000 passengers per hour per direction

The development of the BRT system and, at the same time, electromobility will incur low infrastructure and vehicle costs and is environmentally friendly.

We can estimate that for an investment of EUR1billion, 400kms of BRT can be built, while the same amount will provide only 10km of metro or 50km of LRT .

BRT ensures high flexibility and low operational costs, with an initial investment that is one third of the investment needed for LRT, and a new BRT line could be completed in half the time.

New Chinese cities that have grown up around newly created industries and factories, are already developing new infrastructures such as that of e-buses. This technology uses a complete infrastructure of battery swapping stations and smart grid technology for storage power. E-stations are located in the center of these new cities with large, dedicated premises for the storage of battery banks and battery swapping robots with a significant number of battery packs and a battery exchange system. These new Chinese towns are developed with this fully integrated e-bus technology.

Even if a complete e-bus system as described above cannot be directly transferred to a dense city, this integrated system can inspire smaller changes. Thus, although local specifications need to be taken into account, the creation of an NGO in charge of these issues could be a guarantee of success, by promoting the general interest without losing sight of the interests of the individual, through both collaboration and leadership.

Encouraging collaboration between the different stakeholders, with strong leadership to further cooperation

Even if each stakeholder has specific needs and expectations, what is at stake is so important that collaborative programs between the different stakeholders (shippers, residents who are also the end consumers, freight carriers and public institutions such as administrations at national, State and city level) will have to be developed in order to create adapted, sustainable solutions for the transport of both goods and people.

In the case of goods transport, competition between carriers will have to be based on last-mile logistics in order to avoid duplicated traffic, by creating new solutions such as cooperation. Integrated logistics platforms are a good way to reduce traffic volumes if they are implemented within an adapted infrastructure.

As regards people transport, public transport needs to match consumers' expectations in order to become a

real alternative to private cars. The main expectations concern accessibility, safety, efficiency, comfort, and spatial and temporal coverage. City tolls and increased inner-city parking costs could also be good ways to make people give priority to public transport.

In addition to this change in human behavior, technology could offer new possibilities.

And the question of financing? We need to keep in mind that these changes will require a high level of investment and that each solution will have a cost. Thus, two financial issues will have to be resolved: investment and profitability. A new business model could be developed in order to encourage manufacturers and/or operators to invest now in order to save money tomorrow

Using technology to create an intelligent infrastructure

Technology is not a restrictive factor. It already exists and just needs to be efficiently integrated in order to be a strong lever.

Telematics for efficient bus systems deal with vehicle management (towards higher vehicle uptime), fleet management (vehicle and fuel efficiency) and traffic management (traffic efficiency and passenger information).

Firstly, the development of on-board and roadside units will lead to the automation of urban mobility by creating communication between vehicles and between vehicles and infrastructure. This will increase safety by reducing the human factor.

Secondly, on the basis of cooperative mobility systems, which already exist, IT companies are working on the development of global mobility systems based on:

- ▶ Seamless connectivity.
- ▶ Standardized wireless technology.
- ▶ Real-time data-sharing.

This could notably lead to improved predictions in order to be able to adapt the systems and infrastructure in real time.

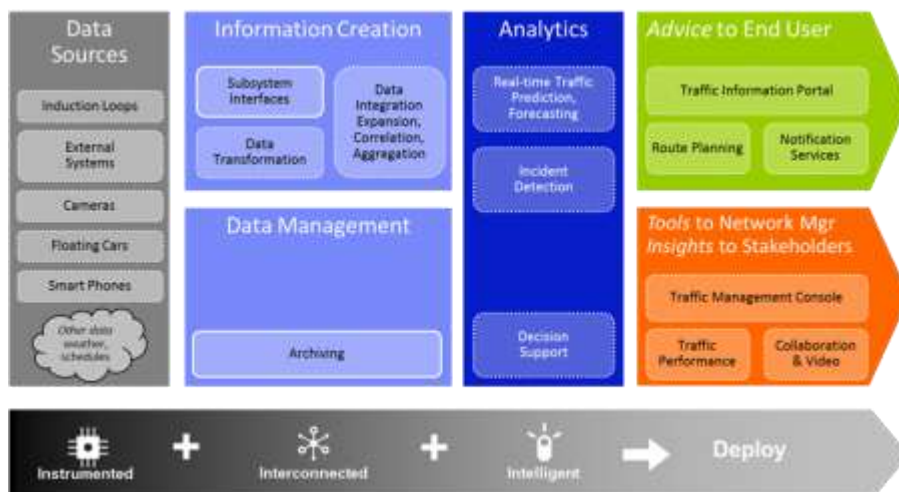
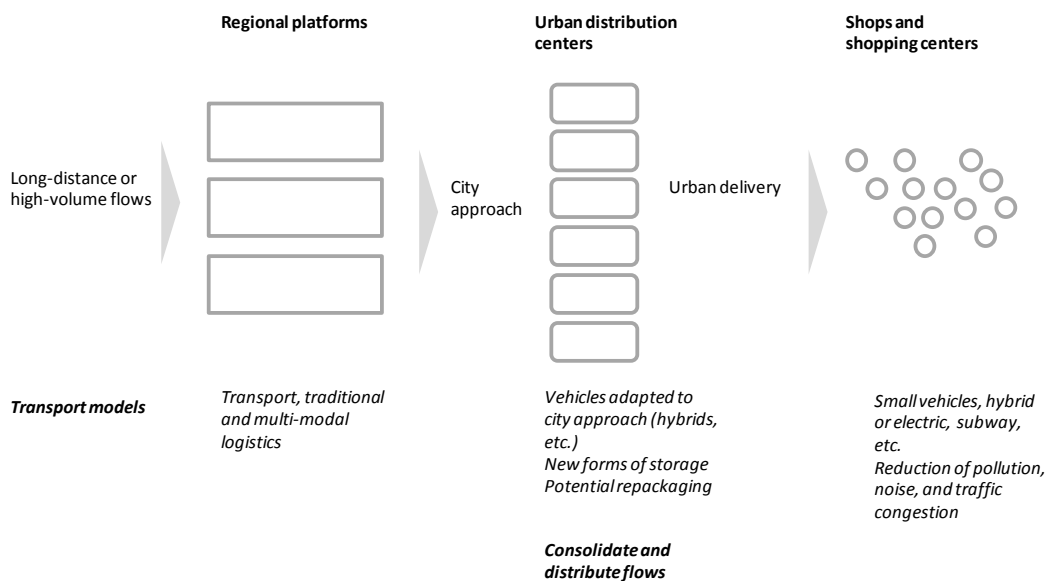


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3 Conclusion:

- ▶ The subject of urban logistics offers numerous opportunities and potential for growth in the sectors related to transport and logistics. At the same time, the challenges involved are huge, as they have to combine significant changes in terms of organization, supply chain and technology. In the face of these challenges, the business model is still to be defined.
- ▶ In this context, all initiatives concerning competitiveness clusters and competence centers will constitute an undeniable key factor of success, or even a necessity. Indeed, the competences required for urban logistics are varied and to be found among a large number of players, making the case for the sharing of know-how. Similarly, insofar as the business model is as yet uncertain, any pooling will help to make it viable.
- ▶ Several initiatives currently exist.
- ▶ The European project Freilot, which aims to improve the efficiency of the urban transport of goods, is deployed in four European cities (Helmond, Lyon, Bilbao and Cracow).
- ▶ In the Rhône-Alpes region, the LUTB cluster works actively on projects such as Geode (developing a number of hybrid commercial vehicle demonstrators), Mobiville (aiming to set up a mobile multimodal guidance service for urban public transport) or Fideus (seeking to develop a new urban supply-chain system involving vehicles equipped with optimal functions for the haulier, the driver, the customer, the infrastructure operator and the city's "supervisory" authority).



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