UNIFE Impact Assessment of a Future EU Directive on Urban Rail

1. Introduction

2. Supply industry position in 2004 and general trends

3. The road ahead - joint industry and legislative approach

4. How and why an EU legislative action will help the urban rail industry

5. Benefits for the supply industry (or cost for non-regulatory framework)

6. Impact on European and non-European overseas markets

7. Conclusion: Basis for regulatory action
In mid-2002, there were some 6.2 billion people living on this planet. According to the latest UN population forecast, the world population is set to increase to about 9.3 billion by 2050. In the next 30 years, this growth will take place almost completely in conurbations. From 2007, there are likely to be more people living in towns and cities than in rural areas for the first time. On a global scale, the population is therefore not only growing generally but also becoming increasingly concentrated in a few locations. In 2002 for example, metro networks carried some 150 million passengers per day, or 34 times the average daily number of air passengers. This comparison alone demonstrates the economic and social importance of further developing adequate urban rail systems. By 2015 there will be some 560 cities worldwide with populations over 1 million, 300 of them in Asia alone.11111

According to the ERRAC (European Rail Research Advisory Council) study “Light Rail and Metro Systems in Europe: Current market, Perspectives and research implication” there are 170 LRT networks and 36 metro networks in Western Europe. It is expected that the number of new LRT systems could expand by more than 50% over the next 20 years. For metros, the number of new systems is expected to be limited to around 5, whereas 55% of existing metros networks are currently extending existing lines or planning new lines. Most of the existing metro systems will have their rolling and signalling equipment replaced over the next 20 years and/or transformed from driver to driverless operation. These figures are in line with the target of the ERRAC Railway Business Scenario 2020 and will be dwarfed by the number of new systems being put into operation in the rest of the world being built using European norms and know-how. This could account for more than 50% of the production of the European Rail Industry over the same period.

Passenger trips are expected to grow by 40% over the next two decades, across all transport modes. ERRAC’s vision is that the rail market share could double and that the rail market volume could increase by more than 150% in passengers over current volumes. To meet this expectation – which means a reverse in the current trends of the last 20 years – it is of utmost importance to develop reliable, affordable, attractive and even more energy efficient urban rail systems for use in European cities. This calls for innovative and interchangeable constituents and subsystems with common harmonised interfaces. This will reduce the cost of ownership as well as the operation and maintenance of rail installations. It is vital in view of the growing complexity of new IT based subsystems - that new products are developed along common interchangeable modular principles for the entire range of urban transit applications. This must be based on a common European regulatory framework.

UNIFE fully supports the new approach to standardisation being developed in recent railway packages. The major urban railway stakeholders are united in their proactive approach to producing common proposals and solutions with the goal of reducing the legislative burden of the European institutions. A step forward in this direction is also facilitated by European research, where both UNIFE and UITP have been involved, with their members, in EU funded R&D projects focusing on the European harmonisation of urban rail systems. For example, the thematic network LibeRTiN for light rail, the UGTMS project for urban rail (Urban Guided Transport Management System), and more recently the proposal for an integrated project MODURBAN (Modular Urban Guided Rail System)².

---

1. UITP, 11 December 2003
2. MODURBAN partners are the main European railway system integrators (Ansaldo-Breda, Alstom, Siemens and Bombardier), sub-systems suppliers (Alcatel, CSEE, Knorr Bremse, Invensys, IFE, Frensistemi, Eurotelec and others), public transport operators from Paris (RATP), Berlin (BVG), Madrid (Metro de Madrid), Barcelona (TMB), Roma (ATAC), London (LUL), etc., highly skilled research centres and professional associations like UNIFE and UITP
The rail supply industry has come a long way over the past 10 years and has made a tremendous contribution to the vitality of the European economy. The European rail supply industry is also one of the EU’s largest exporters of capital goods. The consolidation process in the industry has favoured the emergence of a limited number of Europe-based suppliers that have gained a large share of the global market. The rail industry is the showcase of European technology, and European rolling stock and signalling systems are increasingly becoming a benchmark for the global market. Furthermore, the railway supply industry is investing Euro 500 million per year in R&D.3 The European rail supply industry still occupies the dominant position in the world market, yet the average returns are often below the cost of capital.

Railway World Market Share 2003: Euro 36.1 billion
(excluding infrastructure +/- Euro 25 billion)

Of the Euro 36.1 billion rail market, roughly 50% can be accounted for by urban and regional rail. This is the market share that would benefit from the effects of a future EU Directive for urban rail.

The business sector split and growth rates are as follows:

<table>
<thead>
<tr>
<th>Sector</th>
<th>bn Euro</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrification</td>
<td>2</td>
<td>+0-2%</td>
</tr>
<tr>
<td>TTS</td>
<td>2.5</td>
<td>+0-2%</td>
</tr>
<tr>
<td>Telecomm.</td>
<td>1.1</td>
<td>+3-5%</td>
</tr>
<tr>
<td>Signalling</td>
<td>4.5</td>
<td>+0-2%</td>
</tr>
<tr>
<td>Services</td>
<td>11</td>
<td>+3-5%</td>
</tr>
<tr>
<td>ROS</td>
<td>15</td>
<td>+0%</td>
</tr>
<tr>
<td>Total</td>
<td>36.1</td>
<td>+0-2%</td>
</tr>
</tbody>
</table>

The geographical breakdown:

Europe 54%
NAFTA 27%
Asia / Pacific 12%
Others 8%

The potential market for rail related products remains relatively significant, especially in the urban rail sector. However, current growth rates are relatively low, and do not reflect this potential and the clear need that our cities have in a balanced transportation system. The reason is relatively clear: In a time of global economic slowdown, most governments, local authorities and other stakeholders have drastically reduced and sometimes scrapped all investment in urban rail projects.

3. European Railway Review, 2004, André Navarri, President Bombardier Transportation and UNIFE Presiding Board Member
Currently, five major trends can be identified in the rail supply industry

1) Consolidation without sufficient rationalisation
2) Decrease in prices of up to 30% over the past 10 years coupled with a significant increase in product complexity
3) First steps towards harmonisation and standardisation, however the degree of harmonisation of interfaces and modularisation remains low and largely insufficient
4) Innovation with regard to new products and joint industry research
5) Only limited transfer of responsibilities from operators to the supply industry with regard to maintenance and refurbishment

Some daily challenges for the industry are shown in the following picture:
Each of the three columns have to be seen as a constituent to achieving a fully liberalised and open Urban Rail market – currently lagging behind most other manufacturing sectors, and also compared to the conventional rail sector.

UNIFE and UITP are already closely working together on the third column, joint Research. However the first column sets the regulatory environment in which the second column - standardisation – is currently only working on a voluntary basis, due to the lack of a legal and official framework. Therefore, UNIFE strongly supports the concept of “common prescriptions” within the framework of a future directive on Urban Rail.
An Urban Rail Directive, based on the ‘New Approach’ to regulation (essential requirements and mutual recognition) will trigger the following positive effects:

1. Homogenous safety rules and methodologies;
2. Single, One-Stop-Shop conformity assessment and procedures for total systems;
3. Simplified and faster voluntary standardisation; (Currently it takes around 4 years in the rail industry versus 6 months in the aeronautic industry!)
4. Mutual recognition for conformity for systems and sub-systems while avoiding duplication for testing procedures.
5. An EU regulatory action will:
   - Overcome coordination-inability for common regulation from the Member States and local authorities.
   - Overcome lack of voluntary harmonisation in the domain and its associated costs.

A future Urban Rail Directive will foster technological changes and international standards that are aimed at increasing modular and interchangeable approaches.

**Interchangeability of components and uniform regulation** in the light rail and metro market could result in the following benefits for the urban rail industry:

- A 25% reduction on average procurement costs for a new light rail fleet by use of common bid documents
- A 10% reduction in costs for light rail vehicle production because of “economies of scale” resulting from partial or complete interchangeability and a common safety approach
- Lower operation costs, maintenance and refurbishment of interchangeable light rail solutions based on the greater availability of standard equipment and man-machine interfaces

**Increased use of harmonised modular components could bring the following benefits:**

- Reductions in ownership costs of up to 30% for rolling stock
- Interchangeability of constituents, subsystems within a given system
- Interchangeability of rolling stock on different lines and networks
- Improved availability and reliability of vehicles and components
- Easy to maintain vehicle fleets
- Reduced costs of procurement
- Increased levels of safety by the use of well tried and tested combinations of vehicles and sub-systems
- Improved employment prospects for vehicles operating and maintenance staff through harmonisation of man-machine interface
Altogether these measures will improve the attractiveness of urban rail and therefore of public transport as a whole and contribute to the regeneration of urban centres. All societal benefits form a shift from private car to public transport in urban and suburban areas will be increased by a truly European regulatory framework. Benefits include improved accessibility to employment and skills, better use of urban land, better preservation of the environment, energy savings and also better health and quality of life for Europe’s citizens.

Moreover, this European regulatory framework will greatly improve the competitiveness of the European supply industry through drastic cost reduction.

**The Community added value is provided by:**

- The establishment of a fully functioning urban rail Internal Market
- Increased investment in urban rail systems through reduced cost of ownership and operation
- Encouraging the European harmonisation process by defining coming safety specifications, harmonised tender procedures, common environmental and RAMS (Reliability, Availability, Maintainability, Safety) assessment
- Passing the benefits of more attractive, affordable, flexible and sustainable urban rail systems to end users
- A modal shift from car-based transportation to public transport
- Improved attractiveness of urban areas as part of the competitive global economy
- Strengthening the dominant position of the European industry on a world-wide level

The exploitation of project results and an adequate regulatory framework will add to a stronger and more competitive component supply industry with major cost and reliability benefits for system integrators, subsystem suppliers, operators and ultimately the European citizen.

During the assessment of the UITP study performed by “Light Rail and Metro Systems in Europe: Current market, Perspectives and research implication”, UNIFE members have deemed the results of this analysis reliable and in line with the market forecast of the railway supply industry.

In such a given market environment (as described by the UITP assessment), UNIFE has assessed the impact of a possible New Approach Directive regulating sub-systems, components and their conformity assessment. This impact study is based on the rolling stock, and does not take in account the equipments needed for fixed installations such as infrastructure, signalling, or energy supply, new built or obviously for extension of a fleet on an existing one. In addition, most of the new instalments will be extensions to existing networks.
If a new approach directive was introduced, **UNIFE estimates gains in the following areas:**

- Tendering procedures
- Approval Process
- Sub component procurement savings
- Competitive advantage over Asian suppliers
- Internal/ manufacturing engineering savings
- Higher reliability
- Joint procurement by operators
  - Traditional
  - Lessors
  - Specialist train operating companies

**Three select examples for concrete cost reduction:**

1. **Harmonised tendering procedures:**

<table>
<thead>
<tr>
<th>LRT Systems</th>
<th>Metro Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Given a cost of Euro 2 million per vehicle is the average cost associated with tenders, and estimating that 25 vehicle sets are on average requested in each tender, each tender on average is worth Euro 100 million. The cost associated with the bidding process is <strong>Euro 1,5 million</strong> per competing bid. Assuming that at least 4 competitors are participating in the bids, this cost would total to <strong>Euro 6 million</strong> per bid. Increased harmonisation of sub-systems, components and interfaces together with uniform conformity assessment procedure would entail a saving worth between 20 and 30 per cent during the bidding procedure, [about <strong>Euro 1,5 million</strong> in saving per bid for the overall industry]. Estimating on average 320 bids up to 2020 in the EU25, the total gain for the industry would result in <strong>Euro 480 million (25% savings)</strong>.</td>
<td>Given a cost of Euro 1 million per vehicle is the average cost associated with tenders, and estimating that <strong>100 vehicles</strong> are on average requested in each tender, each tender on average is worth Euro 100 million. The cost associated with the bidding process is <strong>2% (Euro 2 million)</strong> per competing bid. Assuming that at least 4 competitors are participating in the bids, this cost would total to <strong>Euro 8 million</strong> per bid. Increased harmonisation of sub-systems, components and interfaces together with uniform conformity assessment procedure would entail a saving worth between 20 and 30 per cent during the bidding procedure; [about <strong>Euro 2 million</strong> in saving per bid for the overall industry]. Estimating on average 130 bids up to 2020 in the EU25, the total gain for the industry would result in <strong>Euro 260 million (25% savings)</strong>.</td>
</tr>
</tbody>
</table>
### Design and production processes

<table>
<thead>
<tr>
<th>LRT Systems</th>
<th>Metro Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>A European Directive based on the New Approach regulating sub-systems, components and their conformity assessment would create the regulatory and technical environment for the simplification of modules and interfaces of light rail systems and the associated procedures for conformity assessment. This would lead to mutual recognition schemes across the EU25. Estimated gains on the fleet to be renewed and systems to be newly built are around 10% of global costs, although this is a conservative scenario, given that the German and Austrian markets already display a satisfactory degree of harmonisation. However, the greater gains will be achieved in the newly built systems more or less 15%, which is still a smaller part of the market than the renewal one where saving expected are of 5% by 2020. Greater gains are progressively expected for the period beyond 2020. This gain is estimated (according to the UITP evaluation on renewed systems and newly built system) at about Euro 1600 million by 2020.</td>
<td></td>
</tr>
<tr>
<td>A European Directive based on the New Approach regulating sub-systems, components and their conformity assessment would create the regulatory and technical environment for the simplification of modules and interfaces of metro systems and the associated procedures for conformity assessment. This would lead to mutual recognition schemes across the EU25. Estimated gains on the fleet to be renewed and systems to be newly built are around 10% of global costs, although this is a conservative scenario, given that manufacturers have developed a platform-based production process which already presents some degree of harmonisation. However, the greater gains will be achieved in the newly built systems, which is still a smaller part of the market by 2020. Greater gains are progressively expected for the period beyond 2020. This gain is estimated (according to the UITP evaluation on renewed systems and newly built system) at about Euro 1200 million by 2020.</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL GAIN IN DESIGN AND PRODUCTION PROCESS: EURO 2800 MILLION**
3. **Reliability, Availability, Maintainability, Safety (RAMS)**

<table>
<thead>
<tr>
<th>LRT Systems</th>
<th>Metro Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modular aspects and harmonised interfaces, together with improved standardisation at the level of components and uniform assessment procedures, will increase the reliability (ready-to-service and time-to-market) aspects by about 15% on average.</td>
<td>Modular aspects and harmonised interfaces, together with improved standardisation at the level of components and uniform assessment procedures, will increase the reliability (ready-to-service and time-to-market) aspects by about 15% on average.</td>
</tr>
<tr>
<td>Maintainability and safety aspects are also improved due to standardised components, improved forecast for stocks of spare parts, more rigorous and uniform assessment procedures and safety cases. These gains will materialise in the order of savings worth 10% of operational costs, renewal of parts and refurbishment.</td>
<td>Maintainability and safety aspects are also improved due to standardised components, improved forecast for stocks of spare parts, more rigorous and uniform assessment procedures and safety cases. These gains will materialise in the order of savings worth 10% of operational costs, renewal of parts and refurbishment.</td>
</tr>
<tr>
<td>UNIFE estimates that between 2004 and 2020, and after the establishment of a New Approach Directive, the global gain will be about 3,5% of the residual value of the vehicles. [Euro 560 million as an estimate built upon the market trends as provided by UITP].</td>
<td>UNIFE estimates that between 2004 and 2020, and after the establishment of a New Approach Directive, the global gain will be about 3,5% of the residual value of the vehicles. [Euro 450 million as an estimate built upon the market trends as provided by UITP].</td>
</tr>
</tbody>
</table>

TOTAL GAIN IN RAMS: EURO 1010 MILLION

### Summary Table – Gains for the Industry due to the Establishment of a New Approach Directive for Urban Rail-based Systems

<table>
<thead>
<tr>
<th>Aspects</th>
<th>LRT Gains in € million</th>
<th>Metro Systems Gains in € million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tendering costs</td>
<td>480</td>
<td>260</td>
</tr>
<tr>
<td>Design and production processes</td>
<td>1600</td>
<td>1200</td>
</tr>
<tr>
<td>RAMS (Reliability, Availability, Maintainability, Safety)</td>
<td>560</td>
<td>450</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2600</td>
<td>1910</td>
</tr>
</tbody>
</table>

---

3. SCI Verkehr, Autumn 2003
Compared to current practice, the application of thoroughly researched and commercially aware legislation could lead to the following anticipated technical/economic benefits, as identified in the European Commission’s Report “Obstacles to Internal Market in Rail Mass Transit”, dated 20th October 2000.

- Up to a 25% reduction in the average procurement costs of a new light rail fleet;
- Up to a 10% reduction in the cost of new light rail vehicles {….and mass rail transit systems…} once a good measure of infrastructure and safety harmonisation had been achieved.

Impact on European and non-European overseas market

The improved standardisation, modularisation and uniform assessment procedures will inevitably create substantial effects on contracts in overseas markets such as the most developing countries in Asia (China, India and South-East Asia), Africa, South and North America and Australia.

Industrial developments fostering economies of scale and the rationalisation of the supply chain will allow for major cost-efficiencies, which have been taken into account in the data previously presented. However, as more overseas markets absorb European standards, the more these gains will also materialise outside Europe even though it is difficult to estimate a precise result at this stage.

A positive scenario in which overseas markets absorb European standards will inevitably establish the leadership of European industries abroad with extremely positive consequences in terms of job creation.

The Light Rail Market

Nevertheless, the largest market for light rail vehicles is Western Europe. In Germany alone, there are almost 60 operators, with over 200 vehicles being ordered every year - albeit with great fluctuations. In recent years, however, France, the UK, Italy and Spain have supplied the greatest growth momentum. Unlike Germany, there are still comparatively large towns in these countries without light rail transit systems. Due to the great success of the systems built in the 1990s, further network expansions or even the construction of new systems can be expected in these countries in the future.

By far the most systems and vehicles in the light rail sector are to be found in Eastern Europe and the CIS, where there are in all some 160 systems and “officially” about 30,000 vehicles. If the customary procurement periods and vehicle costs for Western markets were taken as the basis for an estimate, astronomically high market volumes far removed from the reality would be the result.

In fact, very few purchases have been made over the past ten years, predominantly from manufacturers such as Skoda. In most cases, systems were operated until they wore out or the most serious deficiencies were kept under control through low-cost overhauls. In Eastern Europe especially, this picture has changed recently. The projects in Poznan´ und Łódz´ show that western type vehicles are preferred in the long term in these countries too, and the financial basis is consolidating owing to economic growth. In future, markets with exceedingly favorable growth prospects will develop here, especially in the CIS, but still at a low level for the time being.

4. SCI Verkehr, Autumn 2003
North America has developed into a genuine boom market for LRV in recent years. It was recognised in many places, especially the USA (the land of the automobile), that inner-city traffic congestion could no longer be dealt with using conventional means, above all motorcars. Extensive new systems and the upgrading of existing systems in Calgary, Salt Lake City, Portland and Houston, for example, have not only greatly boosted the vehicle market in the past but also served as a model for cities with similar plans.

In Asia too, the inner-city traffic problems are leading to increased demand for rail-based solutions. Owing to the size of the cities, an even more efficient metro system is preferred in many places in this region. However, light rail transit projects are being tackled in numerous cases.

For example, Siemens has gained acceptance internationally, having secured over 500 orders for different variations of its Combino vehicle.

![Dominance of Europe-based manufacturers:](image)

Source: SCI Verkehr

**The Metro Market**

Similar to the light rail and tram systems, the market for metro vehicles is also benefiting from the growth of urban conurbations and the associated increase in commuter traffic. There are some 90 metro systems in operation worldwide, most of which are in Western Europe (36) and Asia (24), ahead of North America (13) and the CIS (12).

The dominance of the major Western systems is reflected in the market share distribution among the leading system suppliers, namely Alstom, AnsaldoBreda, Siemens and Bombardier – all UNIFE members.

For example, in the USA, orders in 2004 for Europe-based companies for ‘Heavy Rail’ (APTA description for Metro cars) account for 86.8%!5

---

5. www.apta.com, “US vehicle orders by manufacturer market share”
Dominance of Europe-based manufacturers:

![Pie chart showing world market shares in metro vehicles.](source: SCI Verkehr)
Regulatory developments in the urban rail market will inevitably have to draw on the conclusion of past and ongoing projects and initiatives in the sector.

One of the studies that better recognises the fragmentation of the internal market for urban rail is the “Obstacles to the Internal market for Rail Mass Transit” (OIM Report by AEA Technology). Of course other studies and R&D projects like Crossrail, Safetram, UGTMS, LibeRTiN and the possible MODURBAN project all constitute a basis for the regulatory framework.

Regulatory actions will need to consider previous EU Commission supported initiatives such as MARIE (Mass Transit Rail Initiative for Europe) aimed at establishing better conditions for a fully functioning Urban Rail market.

Future legislation shall also build upon the “second railway package” and especially directive 2004/50/EC on interoperability and directive 2004/49/EC on safety. The former excludes from its scope local rail, which is functionally isolated from the rest of the rail system, while the latter allows Member States to exclude from the measures they adopt in the implementation of the safety directive:

(a) Metros, trams and other light rail systems;
(b) Networks that are functionally separate from the rest of the railway system and intended only for the operation of local, urban or suburban passenger services, as well as railway undertakings operating solely on these networks;
(c) Privately owned railway infrastructure that exists solely for use by the infrastructure owner for its own freight operations.

It is also important to note that for both UNIFE, UITP and its members believe that urban rail should not be regarded as a possible extension of “conventional rail”, but that it requires a specific approach. This is why they have closely worked together from the beginning in a working group establishing this draft for an urban rail Directive. The principle of such a directive is therefore endorsed by both organisations.

This impact study is based on an analysis of the urban rail rolling stock market, and does not take into account the civil works and equipments needed for fixed installations such as infrastructure, signalling or other equipments, for which significant savings can also be expected. Therefore, UNIFE expects similar savings in this field once a common approach comparable to the one taken with this future Directive is taken.

In conclusion, UNIFE has estimated the potential gains for rolling stock in only three specific areas (tendering, design and production processes and reliability, availability, maintainability, safety – RAMS) at a combined Euro 4500 million for the industry until 2020. This potential for saving will grow even faster beyond 2020 when the different systems and networks have had time to adapt to new and changed standards.

These potential savings and further harmonisation are essential for the European based rail-system suppliers and UNIFE’s members’ survival in the short to medium term. It is furthermore a critical element in a well functioning Internal Market, which ultimately strengthens the position of European know-how and European manufacturing skills.

Therefore, UNIFE strongly supports the concept of “common prescriptions” within the framework of a future Directive on Urban Rail.
Avenue Louise, 221
1050 Brussels
Telephone: +32.2.626.12.60
Fax: +32.2.626.12.61 or +32.2.649.27.85
Website: www.unife.org
E-mail: mail@unife.org