Eight pillars of Sustainable Public Transport and Mobility

THE PEP Symposium

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Chair, Working Group on Transport Trends and Economics

UNECE - Transport Division
It is one that can satisfy the numerous and diverse requirements of the metropolitan mobility, including minimizing travelling time between various locations, while at the same time internalises externalities to positively affect the well-being and the quality of life of the citizens of that area.
Sustainable urban transport system, supply of infrastructure and networks

Inputs:
- Land
- Financial resources

Demand for transport met

Externalities (traffic congestion, road accidents and environmental pollution) minimized
Sustainable urban transport system, influence on the demand side

Inputs:
- Land
- Financial resources

PT
Bus
Trolley
Tram
Metro
Light train
Urban train
Metro

Networks

Infrastructure

Individual cars and taxis

Cycling and walking

Demand for transport minimized

Authorities creating culture for mobility

Externalities (traffic congestion, road accidents and environmental pollution) minimized
Consumer preferences: superior vs inferior goods
Demand for Public Transport and Quality of Service

Land use and transportation funding policies

Source: UNECE secretariat

Source: EEA, 2013

Source: Chester and Horvath 2008

Source: Kenworthy and Laube 2000
Eight pillars towards sustainable public transport and mobility

Urbanization & Public Transport demand
The world urban population is expected to increase by 72 per cent by 2050, from 3.6 billion in 2011 to 5.5 billion in 2050. Urbanization needs efficient and sustainable public transport networks.

Accessibility and Congestion
Access of the urban population in total with the most efficient and effective way to employment opportunities, health and education facilities by reducing congestion and its negative effects, should be the main objective of a sustainable public transport network.

Road Safety
The development of Sustainable public transport is interrelated with the reduction of road fatalities and therefore increase of road safety. Residents of public transport-oriented communities with high rates of use have significantly lower per capita traffic fatality rates compared to residents of more automobile-dependent, sprawled communities.

Climate Change
Hundreds of millions of people in urban areas across the world will be affected by climate change. More than half of the world’s greenhouse gas emissions come from urban areas. Sustainable public transport leads the fight against cities air pollution.

Affordability
Sustainable public transport implies availability for all. Calculation of fares based on population purchasing power and on the need to ensure profitability of public transport is a difficult exercise. The main message of Sustainability should be that all citizens afford public transport tickets.

Public Transport Financing
Sustainable public transport financing should focus on projects that improve the integration across urban services, increase public transport capacity and increase the access of the urban poor to employment opportunities and health and education facilities.

Well being: Cycling and Walking
The promotion of non-motorized transport (cycling and walking) for everyday physical activity is a win-win approach; it does not only promote health but can also lead to positive environmental effects, especially if cycling and walking replace short car trips. Sustainable Public Transport promotes cycling and walking.

Intelligent Transport Systems (ITS)
Intelligent Transport Systems play a significant role in shaping the future of mobility and the transport sector. They are integral part of any strategic activities and actions towards Sustainable public transport and mobility.

Source: UNECE secretariat
Urbanization & Public Transport demand

Urbanization Correlation between urbanization rate and the level of GDP per capita, 2011

Relation between rides with urban public and private motorized transport in 27 ECE capitals, as per size of capital area, size of the capital population and capital density

Source: UNECE secretariat
Accessibility and Congestion

Number of urban public transport options in 33 ECE capitals, 2011

Length of urban public transport network in relation to the size of the metropolitan area and its population, capitals grouped by their population density, 27 capitals, 2011

Source: UNECE secretariat

Source: UNECE secretariat
**Accessibility (comfort) and Congestion**

Availability of options for urban public transport ticket purchase, average number of options for all modes, 29 capitals, 2011

Source: UNECE secretariat

Average daily number of cars on metropolitan roads, capitals grouped by their population density, 21 capitals, 2011

**Bus average speed and differences in speed, capitals grouped by their population density, 23 capitals, 2011**
Road Safety vs public transport safety

Transport fatalities and injuries in urban areas per 100,000 urban inhabitants, 13 ECE member countries, 2010

Public transport fatalities and injuries per 100,000 inhabitants of ECE capitals, 20 capitals, 2011

Source: UNECE secretariat
Climate Change and air pollution

Emissions of CO2 per capita in ECE capitals, 36 capitals, 2009

Concentration of PM10 versus ratio of public to private trips, 2011

Source: UNSTATS

Source: UNECE secretariat
Intelligent Transport System (ITS) (comfort)

Availability of ITS for passenger information in urban public transport options in 29 ECE capitals, 2011

Source: UNECE secretariat
Well being: Cycling and Walking

Bicycle use in ECE capitals per 1000 population, 19 capitals, 2011

Changes in relation between rides with urban public transport to private motorized transport by adding rides with bicycle in 18 ECE capitals

Source: UNECE secretariat

Source: UNECE secretariat
Affordability

Relation between bus single ticket fare and monthly wage at the country level in ECE capitals, 2011

Source: UNECE secretariat

Relation between bus monthly ticket fare and monthly wage at the country level in ECE capitals, 2011

Source: UNECE secretariat
Profitability (management of costs)

Number of total bus employees and bus drivers to bus fleet in operation during peak hours, 2011

Use of the available bus fleet, 2011

Source: UNECE secretariat

Source: UNECE secretariat
Public Transport Financing

World Bank’s projects in ECE region

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Country</th>
<th>Project ID</th>
<th>Commitment amount</th>
<th>Status</th>
<th>Approval Date</th>
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</thead>
<tbody>
<tr>
<td>Second Regional Development Project</td>
<td>Georgia</td>
<td>P130421</td>
<td>30.0</td>
<td>Active</td>
<td>November 6, 2012</td>
</tr>
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<td>Regional Development Project</td>
<td>Georgia</td>
<td>P126033</td>
<td>60.0</td>
<td>Active</td>
<td>March 20, 2012</td>
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<tr>
<td>AF - BISHKEK &amp; OSH URBAN</td>
<td>Kyrgyz Republic</td>
<td>P122811</td>
<td>15.8</td>
<td>Active</td>
<td>January 12, 2012</td>
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<tr>
<td>Regional and Municipal Infrastructure Development Project</td>
<td>Georgia</td>
<td>P110126</td>
<td>40.0</td>
<td>Active</td>
<td>October 2, 2008</td>
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<tr>
<td>Bishkek and Osh Urban Infrastructure Project</td>
<td>Kyrgyz Republic</td>
<td>P104994</td>
<td>12.0</td>
<td>Active</td>
<td>March 18, 2008</td>
</tr>
<tr>
<td>Second East-West Highway Improvement</td>
<td>Georgia</td>
<td>P094044</td>
<td>35.0</td>
<td>Closed</td>
<td>December 18, 2007</td>
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<tr>
<td>Istanbul Municipal Infrastructure Project</td>
<td>Turkey</td>
<td>P100383</td>
<td>322.15</td>
<td>Closed</td>
<td>June 28, 2007</td>
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</table>

EIB projects in ECE region

<table>
<thead>
<tr>
<th>Date of entry</th>
<th>Title</th>
<th>Country</th>
<th>Sector</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/12/2013</td>
<td>BERLIN INTERURBAN RAILWAY NETWORK &quot;RING&quot;</td>
<td>Germany</td>
<td>Transport</td>
<td>Under appraisal</td>
</tr>
<tr>
<td></td>
<td>Contract for provision of transport services including the procurement, testing and licensing as well as operation and maintenance of new rolling stock to be used on the Berlin &quot;Ring S-Bahn&quot; rail network with an approximate total transport service provided of 9.4m train-km.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13/11/2013</td>
<td>MARSEILLE TRANSPORT URBAIN II</td>
<td>France</td>
<td>Transport</td>
<td>Approved</td>
</tr>
<tr>
<td></td>
<td>Le projet a pour objectif de financer plusieurs composantes du programme d’investissements en transports publics de la Communauté Urbaine de Marseille (MPM) pour la période 2013-2016. L’opération permettra d’améliorer la qualité de service de l’ensemble des modes du réseau de transport public de l’établissement Public de Coopération Intercommunale (EPCI).</td>
<td></td>
<td></td>
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<tr>
<td>06/11/2013</td>
<td>CITY BY-PASS ZWETTL</td>
<td>Austria</td>
<td>Transport</td>
<td>Approved</td>
</tr>
<tr>
<td></td>
<td>Design, construction, financing, operation and maintenance of a by-pass road around the city of Zwettl, district capital in the State of Lower Austria, within a PPP Availability Scheme. The project will enhance the road and transport network of the city, alleviating its growing traffic by redirecting HGV and substantially reducing the related levels of congestion, emissions and noise. This will also lead to an improved quality of life for the inhabitants.</td>
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</table>
Quality of urban public transport in ECE capitals

Possible deviation in quality of public transport in ECE capitals, 2011

Source: UNECE secretariat
Armenia Yerevan

**Size:** 227 km²  
**Population:** 1,121,00

- **Density:** 4,896 inhabitants/km²
- **Tourist Season:** July - October

**Existing means of Public Transport in Yerevan:**

<table>
<thead>
<tr>
<th></th>
<th>BUS</th>
<th>TRAM</th>
<th>MELO</th>
<th>TROLLEY</th>
<th>URBAN TRAIN</th>
<th>LIGHT TRAIN</th>
<th>MINIBUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lines in km</td>
<td>1,324</td>
<td>Number of stations</td>
<td>750</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lines in km</td>
<td>12.1</td>
<td>Number of stations</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lines in km</td>
<td>-</td>
<td>Number of stations</td>
<td>-</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Lines in km</td>
<td>-</td>
<td>Number of stations</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lines in km</td>
<td>1,200</td>
<td>Number of stations</td>
<td>750</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Lines in km</td>
<td>-</td>
<td>Number of stations</td>
<td>-</td>
<td></td>
<td></td>
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<tr>
<td>Cost of one hour ticket</td>
<td>$0.246</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of one day ticket</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Please describe a strategy or initiative implemented by your organization with positive results for the public transport of the city.

The bus routes are served on a contractual basis by 13 private companies, “Autobus” CJSC and “Yerevan autobus” CJSC. To replenish the bus fleet of the capital in 2012, 249 Chinese buses of “Higer” KLD6170G model were imported to the capital and 18 intra-urban itineraries are already served by them. Due to the actions undertaken the number of intra-urban buses has significantly increased, and the volume of passenger transportation carried out by buses has grown in comparison with the previous year. As a whole, in 2012 a total of 49.3 million passengers were transported by buses which was 12.5 million more than the previous year, or an increase of 34%.

95 mini-bus routes are actually operated in Yerevan and are serviced by about 1900 units of different models. The mentioned routes are served by 43 private companies on contractual bases.

Though the trolleybus fleet wasn’t replenished in 2012, certain work has been carried out towards repairing electric rolling stocks, reticulating cable networks, repairing of traction substations, for construction of some new segments of reticular nets, reconstruction and re-operation of traction substations, production and technical re-equipment of trolleybus economy, as well as towards increasing of efficiency of trolleybus operations.
Towards sustainable public transport and mobility

1. Eliminating cars circulation by creating “zones of well being”
2. Addressing cities climate change mitigation and adaptation
3. Achieving Sustainable Urban transport and mobility

- Innovative financing solutions
- Purchasing of environmental friendly means of public transport
- Creating cycling and walking lanes
- Measuring decrease of congestion and of road fatalities / increase of citizens well being

Applying Intelligent Transport Systems

Source: UNECE secretariat
Thank you!