Perspectives for a Sustainable Mobility

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Slide Presentation
Gerd-Axel Ahrens
Perspectives for a Sustainable Mobility

Technische Universität Dresden
‘Friedrich List’ Faculty of Transport and Traffic Sciences
1. Introduction

2. The myth of increased mobility

3. Recent trends in motorisation, car use and multi modal behaviour

4. Integrated sustainable mobility planning – the perspective to more sustainability?

5. Conclusion
World perspective

- 7 billion people of today might be more than 9 billion in 30 - 40 years
- By 2020 car sales in developing countries will increase by the factor 6 (Booze & Company 2009)
- By 2025 China will be the largest automobile market and pass the United States (Goldman Sachs 2006)
- By 2030 the number of cars in the world will double
- Since 1990 CO$_2$-emissions of the transportation sector rose by almost 30 % in the EU (Eurostat 2010)
- Worldwide the transport sector causes about 13 % of all CO$_2$-emissions, this amount will continue to increase until 2030 by 40 % (IEA 2009)
- Megacity Beijing: Almost 50 % of the air pollution is caused by traffic (z-punkt 2010)
Modal Split Los Angeles and Berlin

TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Trips are caused, when different activities have to take place at different locations. The location has to be changed to conduct the next activity.

Activities of people are

- Living at home
- Work
- Shopping
- Education
- Recreation

Activities of goods are

- to gain of raw materials
- Production
- Processing
- Storage
- Consumption
Definition of daily mobility

Mobility of people:

Ability of activities away from home though motorised or non motorised trips. ¹)

Descriptors of daily mobility:

1. Trips per day
   • 3 - 3.5 trips per day in Germany

2. Required time for daily trips
   • 70 – 80 min per day in Germany

3. Trips length in km per day
   • 1991 still 20 km, 2003 already 29 km per day
   (Mobility in activities, SrV)

¹) Transport planning has the task to enable the participation of population and goods in individual activities or exchange of goods. The use of resources and negative effects have to be minimized. So we try to achieve as much as possible mobility with the least amount of traffic and effort.
Challenge of the future – decoupling traffic growth from economical growth
The data base

Examination area SrV 2008

- Total sample: 115,525 people
- 74 towns and communes
- 36 initiators
- 4 coordinated town-and-urban hinterland surveys
- 5 co-operations between town and local transport association
- One survey in rural area

Source: TU DRESDEN/VIP: Survey 'Mobility in German towns – SrV 2008' (www.tu-dresden.de/srv)
Development of motorisation in East German towns

![Graph showing the development of motorisation in East German towns from 1972 to 2008. The number of cars per 1000 people increases over time, from 79 in 1972 to 413 in 2008.]

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Modal split development in East German towns

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Modal split of 2008 of several German towns

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Age dependent modal split in Berlin and smaller towns

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)

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Development of daily trip lengths by modes in East German towns

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Relative modal split shifts in East German towns (2003 = 100)

Source: TU DRESDEN/VIP: Survey 'Mobility in German towns – SrV 2008' (www.tu-dresden.de/srv)
Increasing number of seniors travels less

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Increasing number of households without a car

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Change of values: new mobility preferences

- Living in cities becomes increasingly attractive (reurbanisation)

- Car use gets more important than car ownership

- Better information and new life styles allow choice of cheapest, fastest or most comfortable way to travel (with smart phones to individualised mobility concepts)
Modal split and trip lengths

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Car possession – main determinant of modal choice

Source: TU DRESDEN/VIP: Survey ‘Mobility in German towns – SrV 2008’ (www.tu-dresden.de/srv)
Multi modality is more intelligent

49.4%: two or more modes within one week

N = 19,449 persons, min. 10 years old

Source: Hausdorf, 2009; Data: MOP 1995 - 2006
Requirements, methods and measures are not new

(1) Avoid unnecessary and ineffective trips

(2) Shift trips – where it makes sense – to the most sustainable modes

(3) Operate the remaining, necessary road traffic safe, with minimal emissions and space
Integrated Mobility Planning

• “Anticipated systematic preparation and conduction of decision processes with the intention, to influence trips in a certain planning area according to goals and objectives through land-use measures, construction of facilities, police measures, operational management, price and information measures.” (FGSV 1985)

• Generally as an interdisciplinary task orientated to the future.

• A continuous, iterative and transparent process.

• A process on different planning levels (federal, state, regional and local transport planning).

• An informal co-operative process, not regulated by laws.

• A process, mainly divided into 3 phases: problem analyses, development of measures, balancing and decision.
Integrated process of mobility planning

1. Pre-orientation
   Initial point: deficiencies and suggestions of concepts, legal requirements

2. Problem Analysis
   Status quo analysis
   Development of guidelines / goals and objectives
   Detecting deficiencies and chances

3. Development of Measures
   Development of concepts with measures
   Impact assessment
   Evaluation

4. Balancing and Decision

5. Implementation and Ex-post Evaluation
   Step by step realisation of the concept
   Ex post evaluation

LEGEND:
- decision or acceptance by policy maker
- exchange effects
- feedback loop

Source: FGSV: Leitfaden für Verkehrsplanung, Köln, 2001
Demand oriented planning versus influencing approaches

Demand oriented planning

- Transport demand (only car traffic)
- Measures
- Traffic performance (level of service)
- Desired quality
  - yes
  - no
  - Network to be constructed

Influencing planning

- Transport supply (car traffic, public transport, bicycles, pedestrians)
- Transport behaviour
- Transport demand
- Traffic performance of all modes, effects of traffic
  - yes
  - Objectives achieved
  - no
  - Networks to be constructed plus additional influencing management measures
Aspects of integration in a holistic process of mobility planning

Sector Integration:
- Transport planning
- Space and regional planning
- Environmental planning
- Social planning
- Economical development

Horizontal Integration:
- Neighbouring cities and districts

Vertical Integration:
- Higher and lower levels of planning (federal, state, region, community)

Modal Integration:
- Means of Transport
- Modes of Transport

Holistic Mobility Understanding:
- Integration of all mobility purposes, mobility times

Integration of People and Institutions:
- Integration of all institutions and people affected

Holistic Concepts of Measures:
- Integration of different areas for optional measures

Range of integrated measures of mobility planning

<table>
<thead>
<tr>
<th>0. Land use planning</th>
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<tbody>
<tr>
<td>Determination and control of land uses to reduce traffic demand</td>
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<td>New developments in &quot;integrated&quot; zones or areas with public transport access</td>
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<tr>
<th>1. Engineering</th>
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<tr>
<td>Construction of routes and transport facilities for all modes, multi-modal use</td>
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<td>Vehicle improvements</td>
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<td>Information technology, e.g., multimodal navigation systems</td>
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<th>2. Economy</th>
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<td>Taxation (vehicles, energy, ...)</td>
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<td>User-financed systems</td>
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<td>Road pricing</td>
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<td>Fares</td>
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<td>Land value capture</td>
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<td>Parking management</td>
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<th>3. Enforcement</th>
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<tr>
<td>Legislation, emission and other standards</td>
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<td>Access restrictions, car free zones, emission-control zones</td>
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<td>Speed limits</td>
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<td>Safety control</td>
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<td>Traffic guidance and control</td>
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<td>Police enforcement, fixed quotas</td>
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<th>4. Education, Information</th>
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<td>Transport behaviour issues in school</td>
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<td>Driver education</td>
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<td>Public awareness, public relations</td>
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<td>Mobility Management on all levels</td>
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<td>Involvement of media</td>
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<td>Public participation</td>
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<th>5. Organisational and logistic measures</th>
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<td>Improved efficiency (car-sharing, car-pooling, ...)</td>
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<td>Differentiated supply also for inter and multi-modal use</td>
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<td>Incentives, privileges for best practice approaches</td>
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**CO₂-reduction concept of the Swedish Transport Administration**

Reduced travelling with car  
*reduction of growth compared to business as usual*  
-40% = -20% *compared to traffic today*  

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<th>Potential to 2030</th>
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<tr>
<td>Urban planning for less car dependence</td>
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<td>Improved public transport</td>
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<td>Increased focus on cycling and walking</td>
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<td>Car sharing</td>
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<tr>
<td>Teleworking and internet-shopping</td>
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<tr>
<td>Congestion charge, parking policy and fee</td>
</tr>
<tr>
<td>Lower speed limits</td>
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<td>Fuel/CO₂ - tax</td>
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<td><strong>Total</strong></td>
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Conclusion – barriers and challenges

Lack of integrated co-operation and intermodality

- Transport systems and transport operators concentrate on their particular needs and avoid more linkage and networking

- Holistic concepts often fail due to a lack of co-operation of the operators and sectoral thinking within the administration

- Investment budgets are often defined narrow for new transport infrastructure with counterproductive traffic inducing effects. They have to be defined broader to achieve goals in an integrated way.
Conclusion – chances in urban mobility

Maximize

Individualised Public Mobility Coalition

- Public Transport
  - trains and buses
  - Public bicycles and pedelecs
  - Public (electric) cars
  - Taxis
  - Alternative services
  - Car sharing
  - Car pooling

One accounting system

- Walking
- Cycling

Minimize

Individual private car use
Thank you for your attention!