Vehicles park: the effects from future transformation in urban areas

Contents

- Today's vehicle park in swiss cities
- Characteristics and potentials of an urban lorry
- Economical and ecological effects
- Barriers, suitable framework conditions and supporting measures
- Conclusion and outlook

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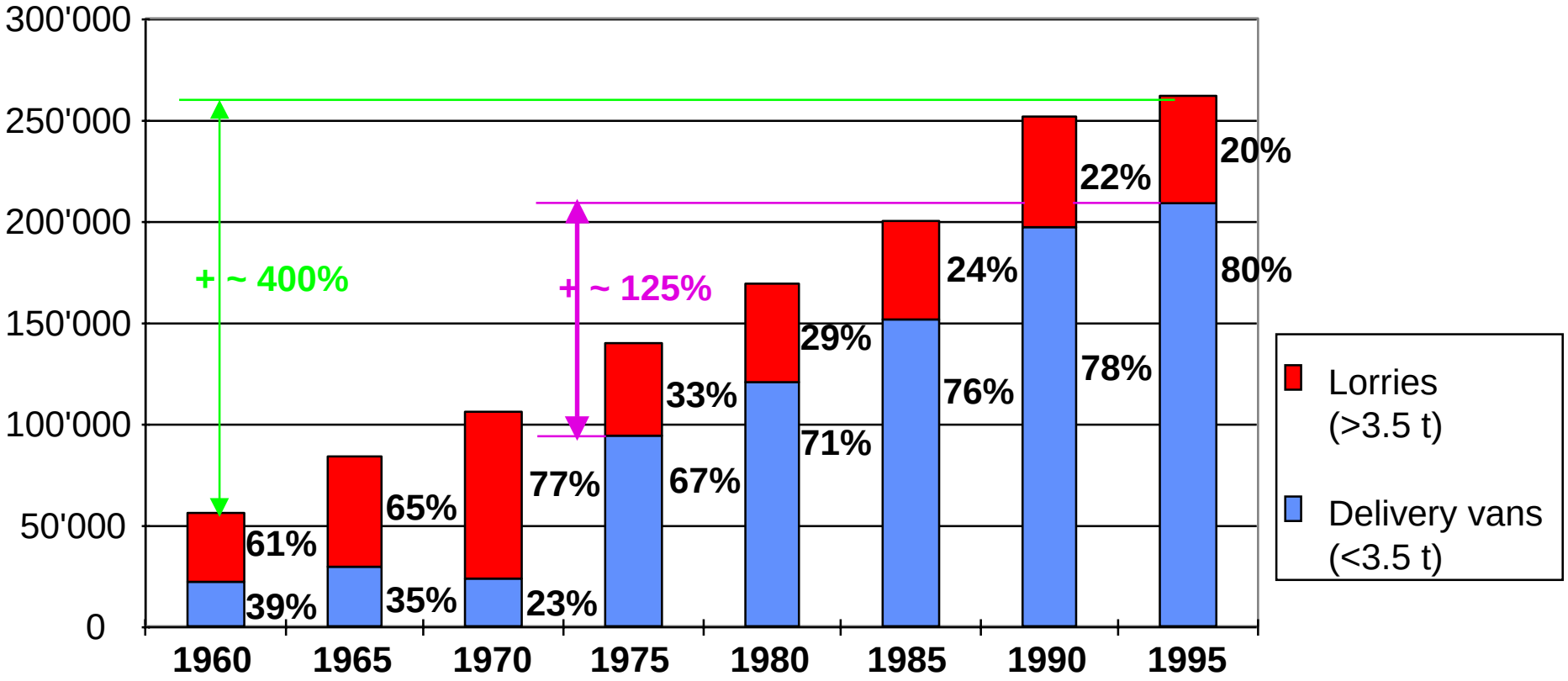
Framework of the study

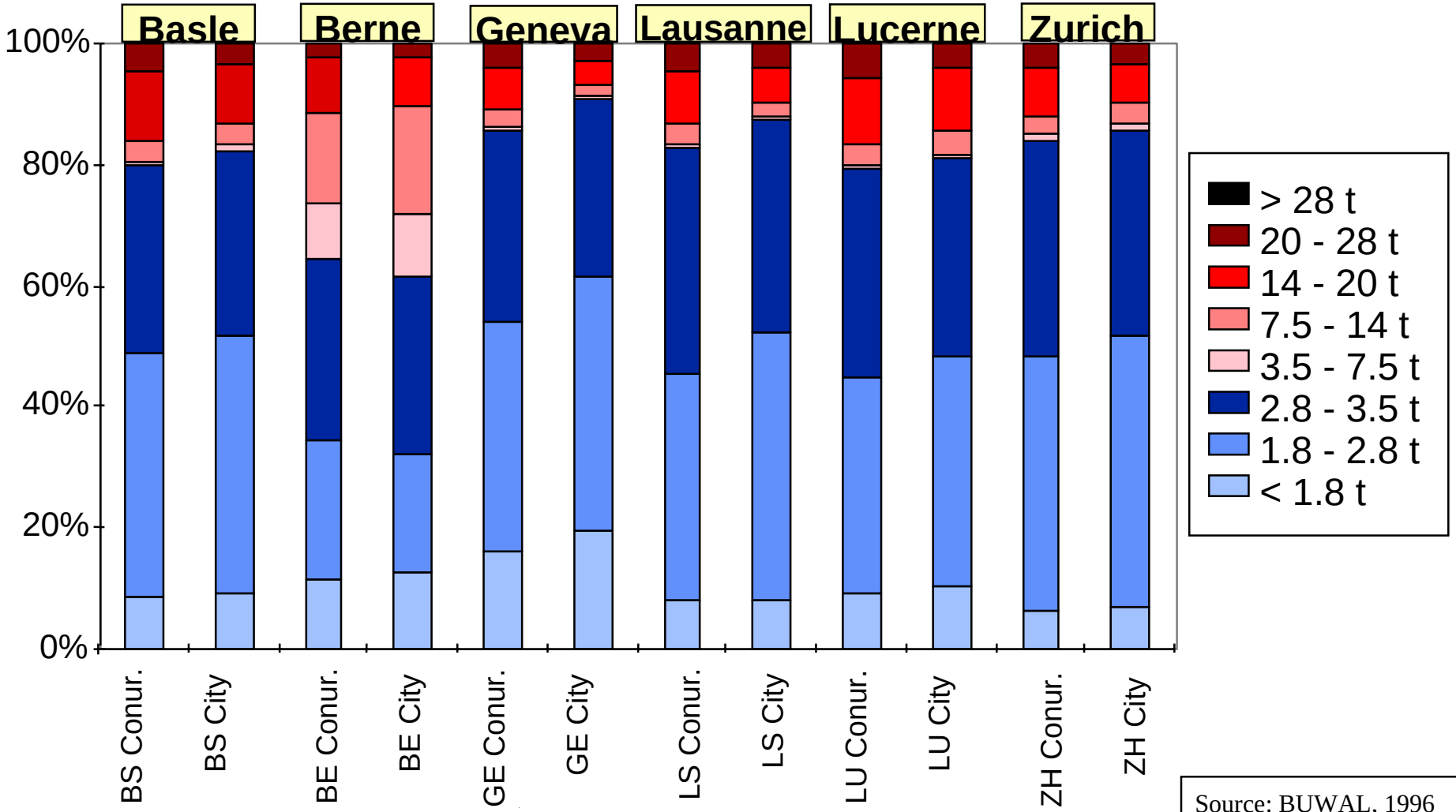
- **COST 321: Urban goods transport, 1994-1998**
- **Project IV in Switzerland:**
  - **Prove of effects by optimizing measures in urban goods transport:**
    - **Part A: Data and modelling urban goods transport**
    - **Part B: Effects of future transformation in goods vehicle parcs in urban areas**
  - **Duration 1997-1998**
- **Objectives of the project:**
  - **Characteristics of todays vehicle parcs**
  - **Definition of an Urban Lorry**
  - **Ecological and economical effects**
  - **Barriers, suitable framework and supporting measures**

Number of delivery vans and lorries



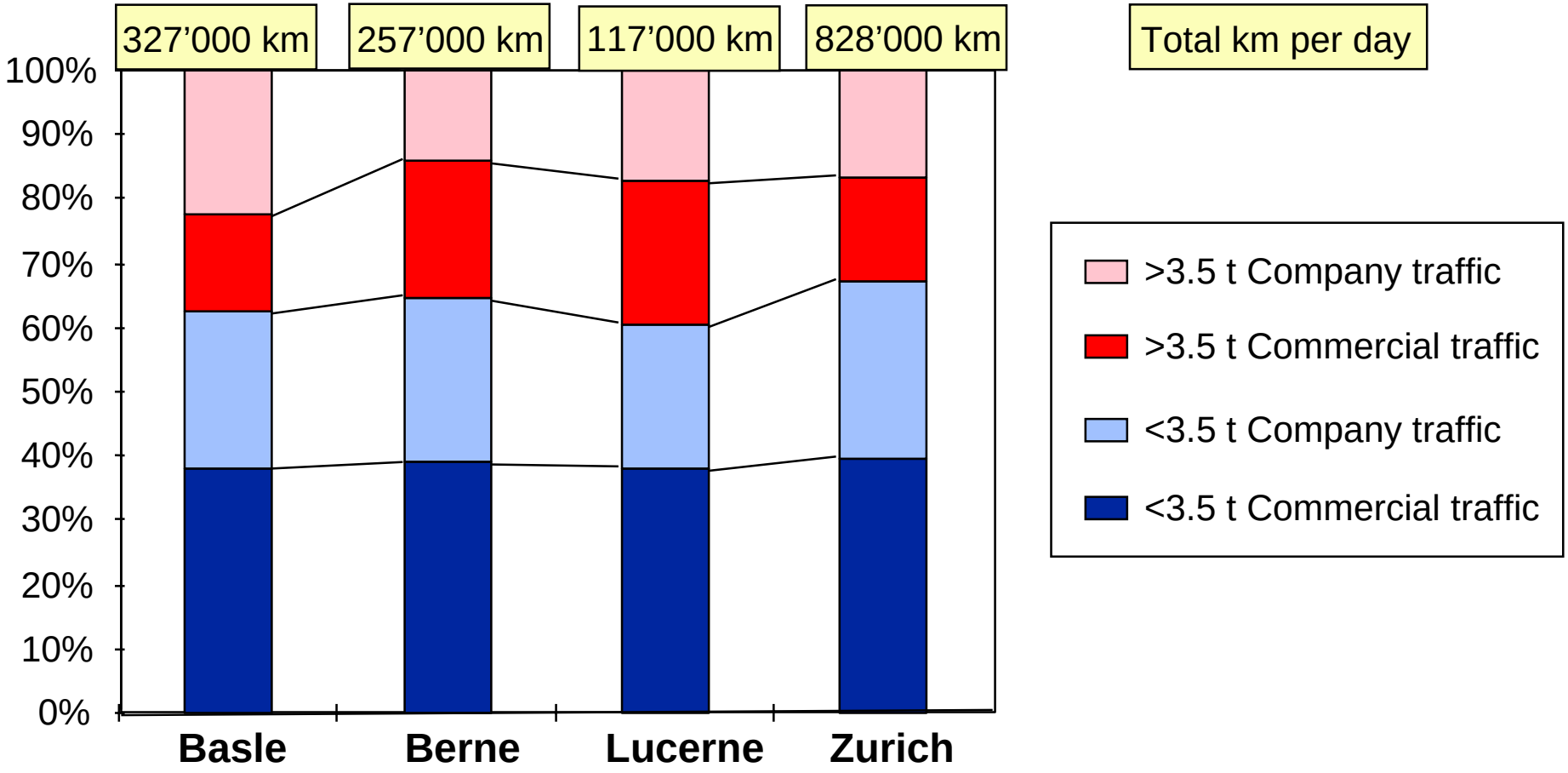
Source: BFS, 1996

Commercial vehicles by total weight



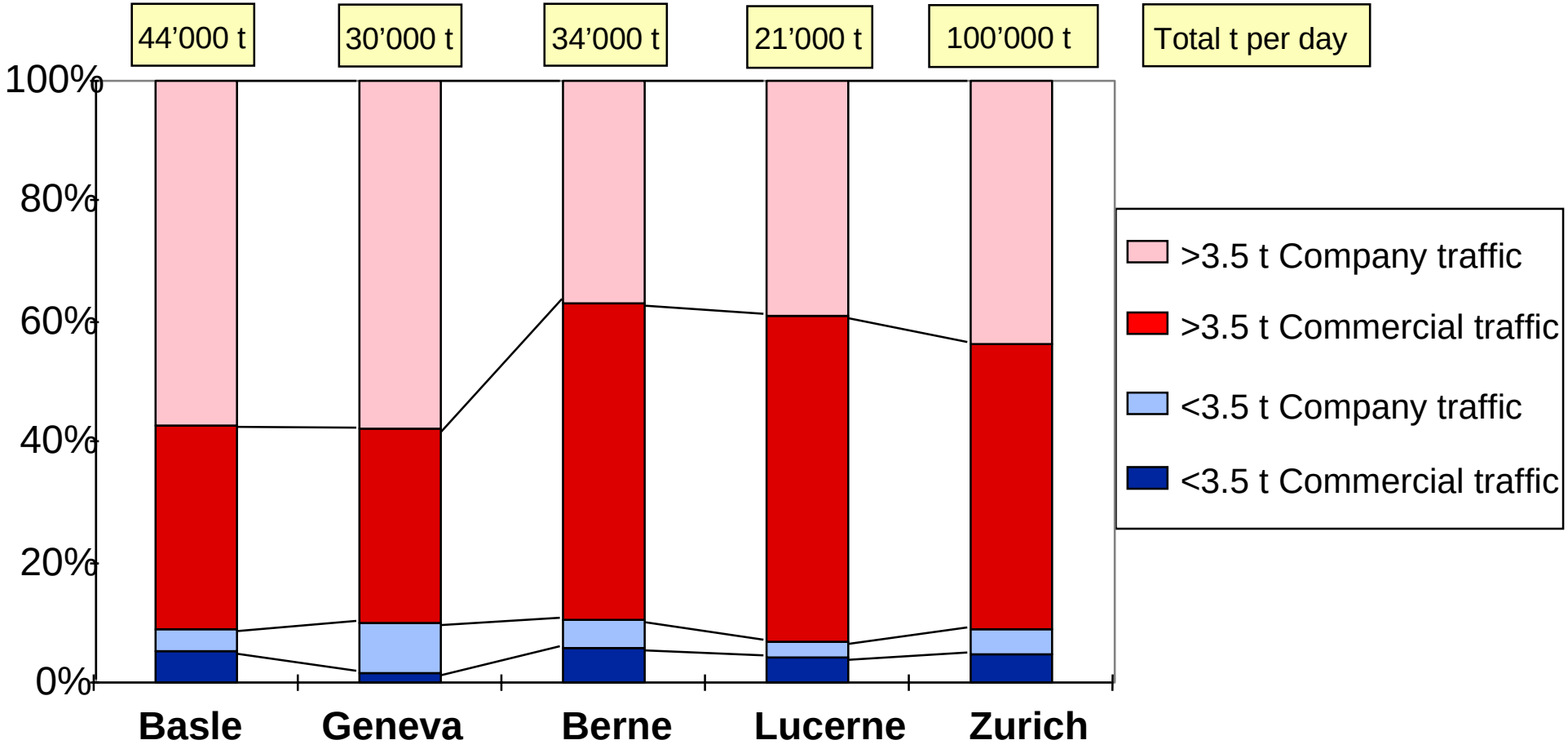
Source: BUWAL, 1996

Mileage in conurbation



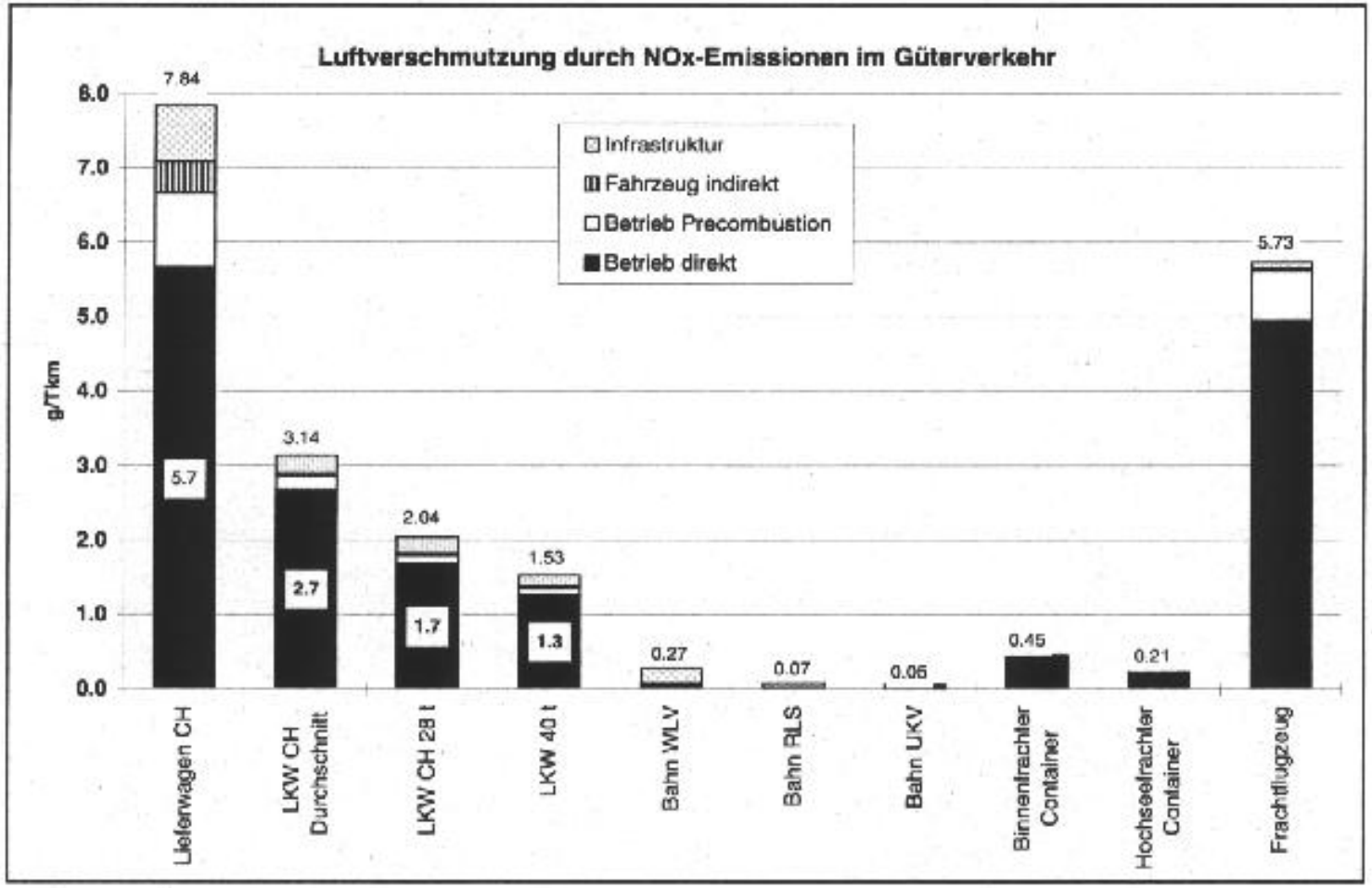
Source: Albrecht & Partner AG, 1997

Transport volumes in conurbation



Source: Albrecht & Partner AG, 1997

NOx-Emissions per tonne-kilometre



Source: INFRAS, 1995

Effects on the composition of the vehicle parc

- Changes in commercial traffic demand
- Logistics concepts of business enterprises
- Legal framework conditions
- Local delivery conditions

→ **Delivery vans are favoured over trucks**

Ecological and economical conflicts

- **Ecological conflicts**
  - high air polluting emissions
  - high energy consumption
  - high area utilisation

compared to the haulage capacity

- **Economical conflicts**
  - high vehicle requirement
  - high costs

Need for improvement

Requirements for an urban lorry

Transport company

- Maximum useful load capacity within a weight class
- Low price
- High comfort for transhipment
- High reliability / practical suitability

Authorities
Inhabitants

- Low fuel consumption
- Low energy consumption
- Safety
- Low area utilisation
- Low environmental impact (emissions, noise)

Characteristics of an urban lorry

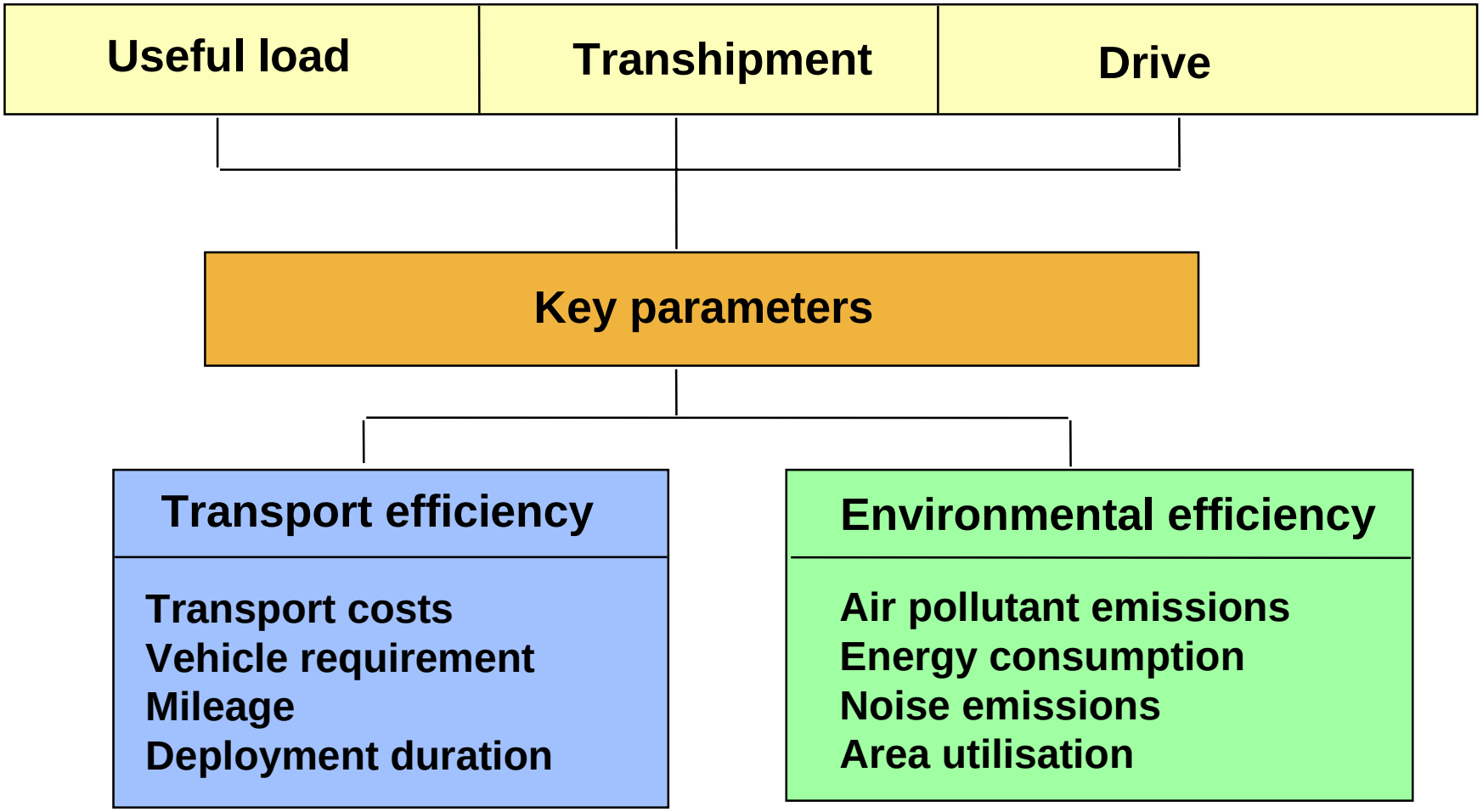
Basic type	Drive	Useful load optimisation	Transhipment
Car / Combi **< ca. 1.8 t**	electric	Minimum battery weight	No specific features (no relevant potential)
Delivery van **< 3.5 t**	Hybrid drive (electric/diesel)	Increase of useful load by 1.3t to a total weight of 5t (Increase of vehicle weight by 10%)	Direct access from driver's cabin to stowing area, lowered loading area and access height
Lorry / Truck **> 3.5 t**	Natural gas drive	None (low improvement poten-tial from lightweight construction)	Reduced chassis height and slanting engine for low floor height and loading area

Example of an urban lorry

Example of an urban lorry

Example of an urban lorry

Effect chains of an urban lorry



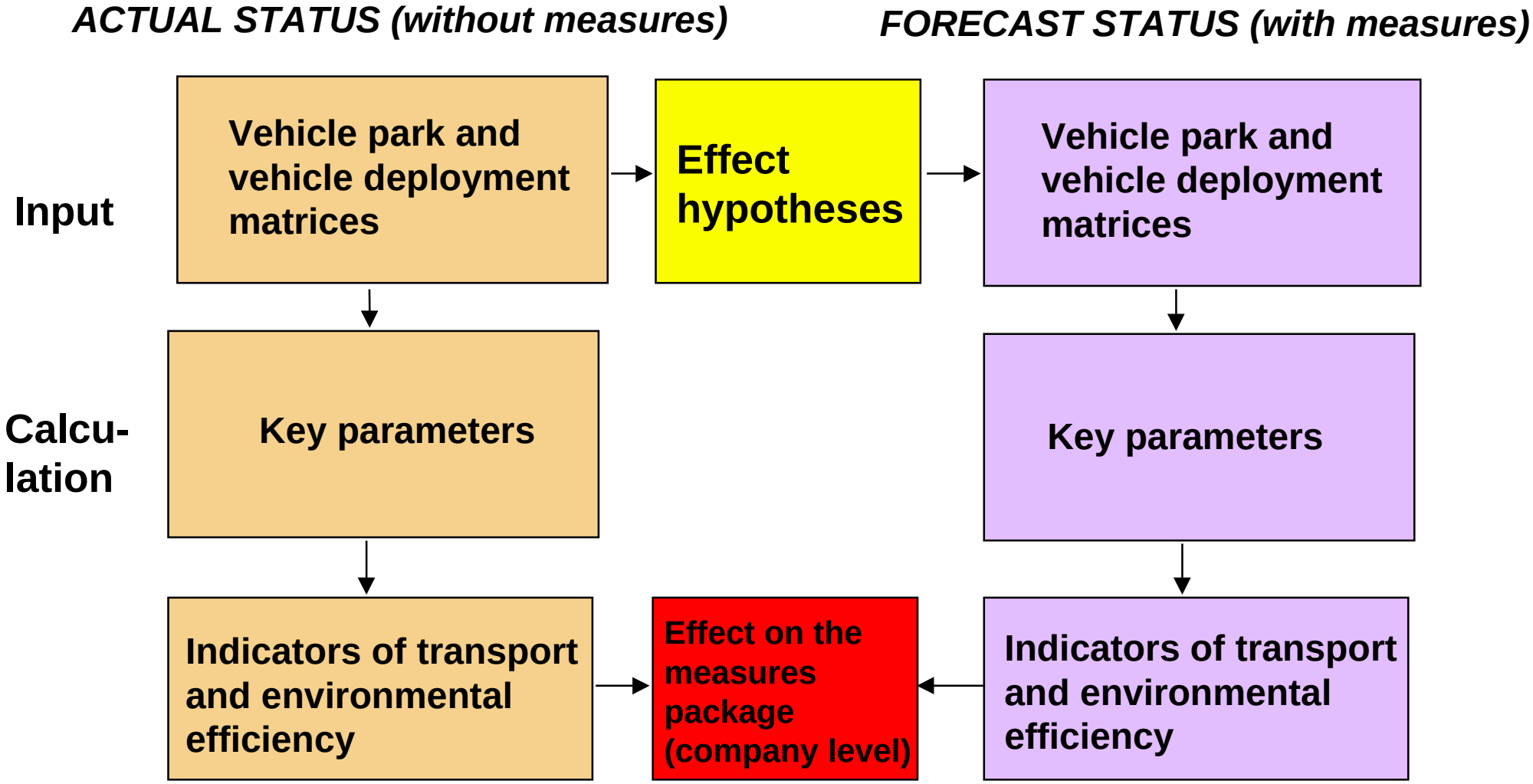
Potentials of an urban lorry

Optimisation area	Potential environmental efficiency	Potential transport efficiency
DRIVE	+ + (Reduced pollution and noise, reduced energy consumption)	+/- (Reduced fuel consumption, but often extra costs for alternative drives)
USEFUL LOAD	+ (Pollutant reduction, reduced energy consumption and area utilisation)	+ (Reduced transport costs, lower vehicle reqirement, shorter de-ployment time, shorter mileage)
TRANSHIPMENT	+ (Reduced pollution, reduction of area utilisation, reduction of energy consumption)	+ (Reduction of transport costs, lower vehicle reqirement, shorter deployment time)

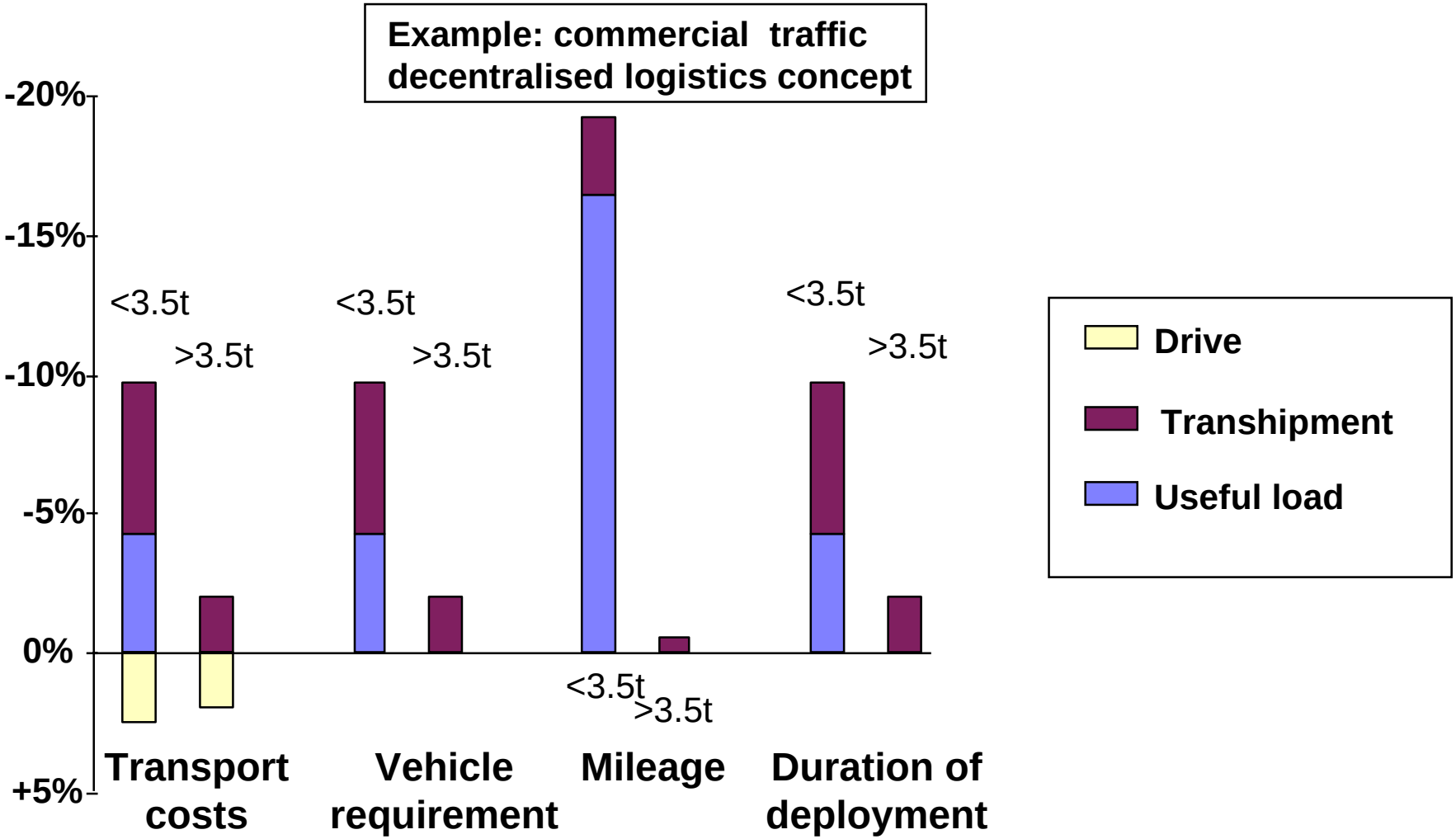
Main effects

- **Drive**
  - Reduction of the specific air pollutant emissions
  - Noise reduction
- **Useful load**
  - Reduction of tours --> reduction mileage --> . ....
  - Increase of number of stops --> reduction vehicle requirement
- **Transhipment**
  - Increase of number of stops --> reduction vehicle requirement
  - Reduction of area utilisation

Calculation model
Company level

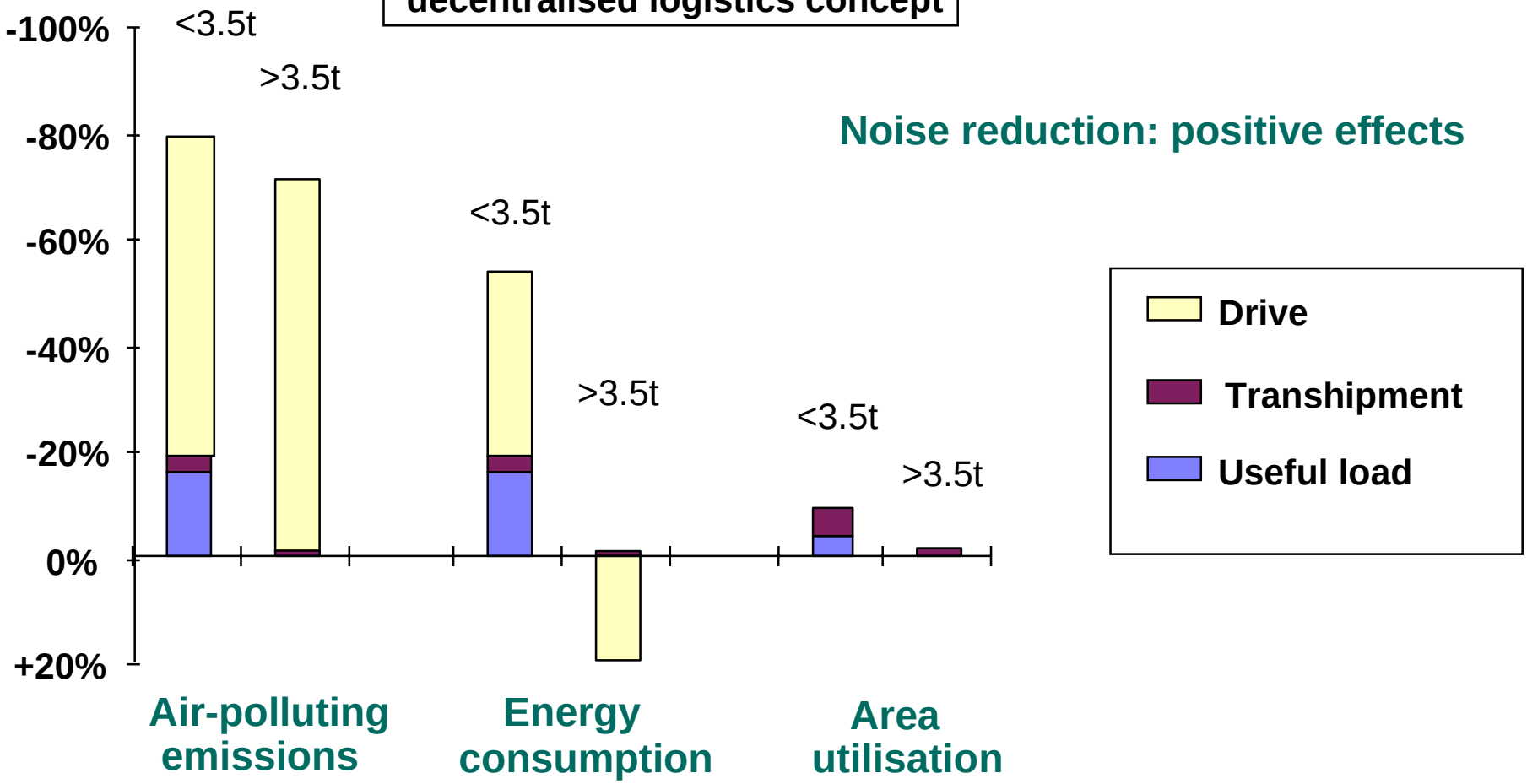


Results on company level
Transport efficiency

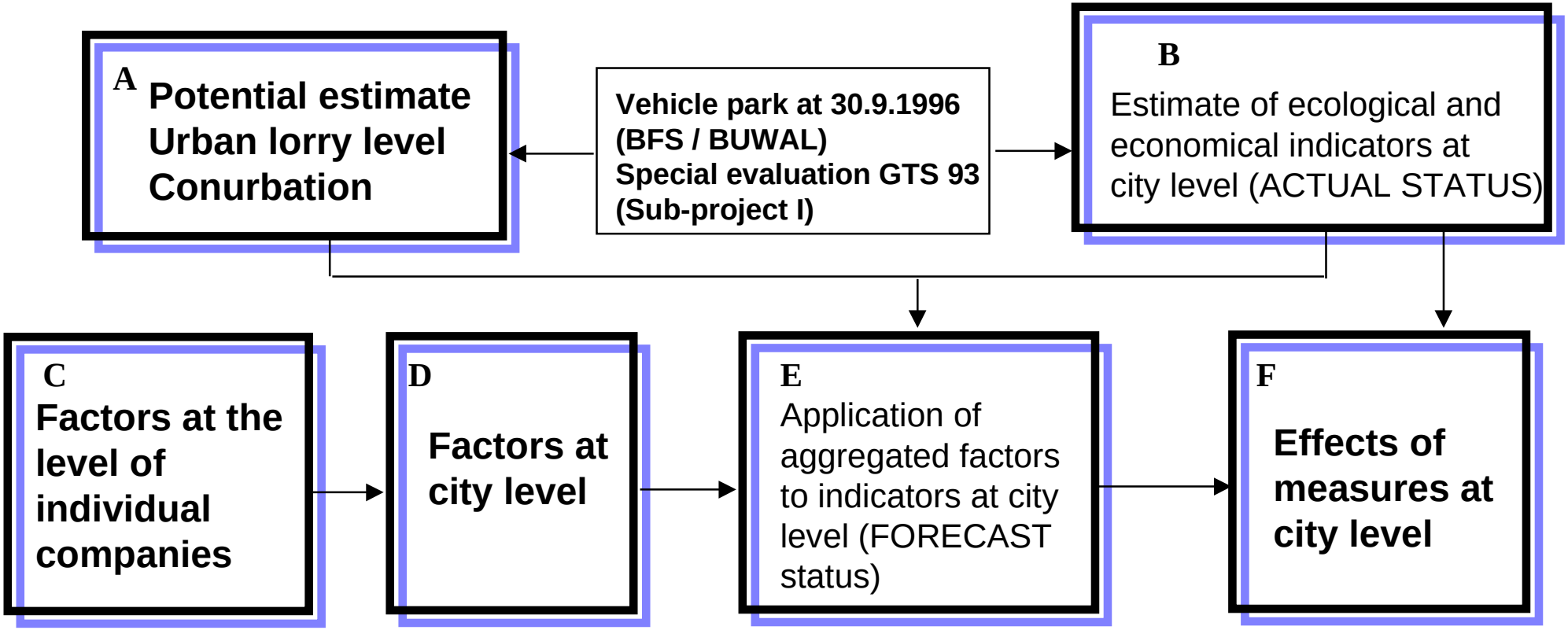


Results on company level
Environmental efficiency

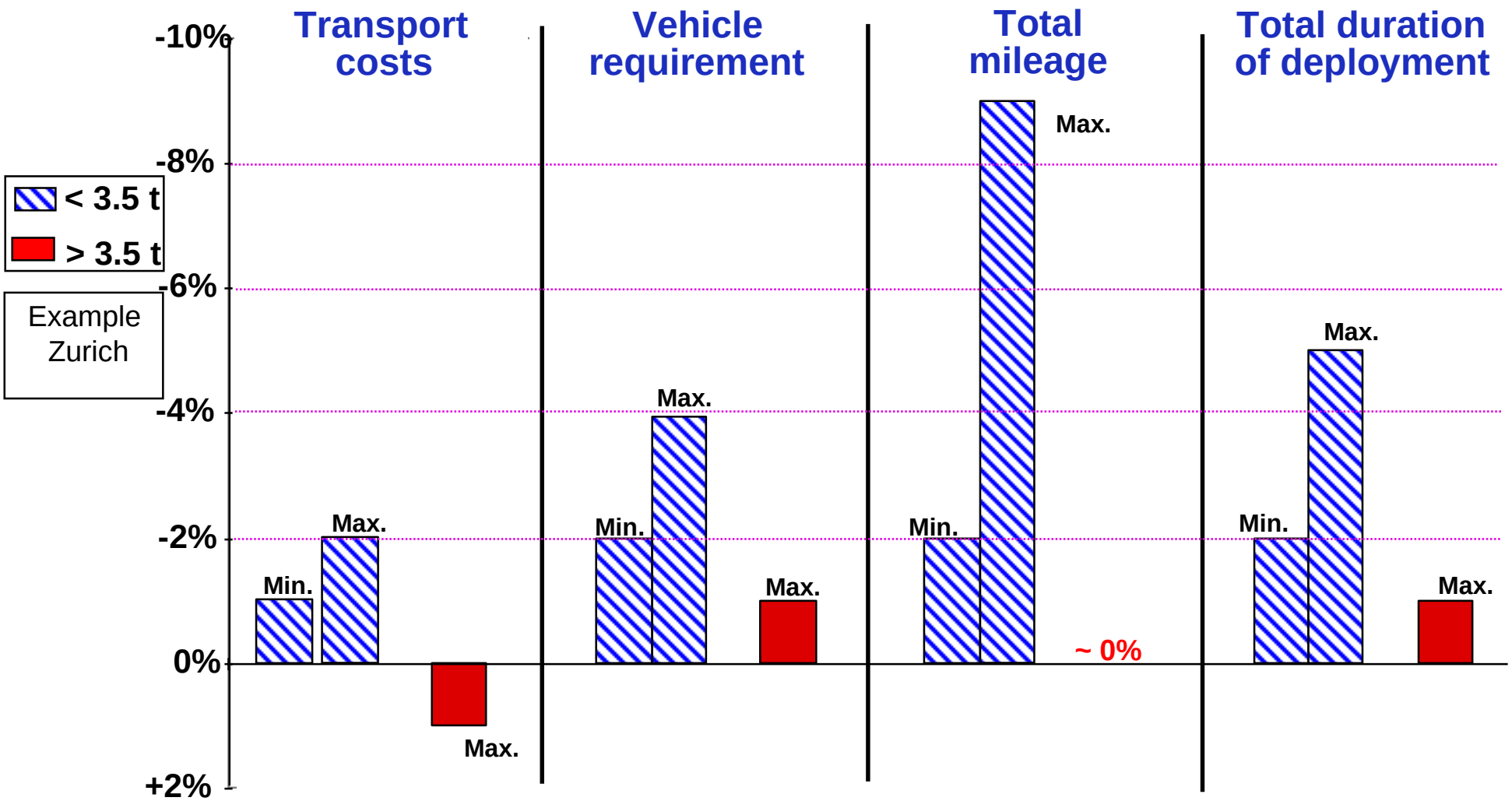
Example: commercial traffic decentralised logistics concept



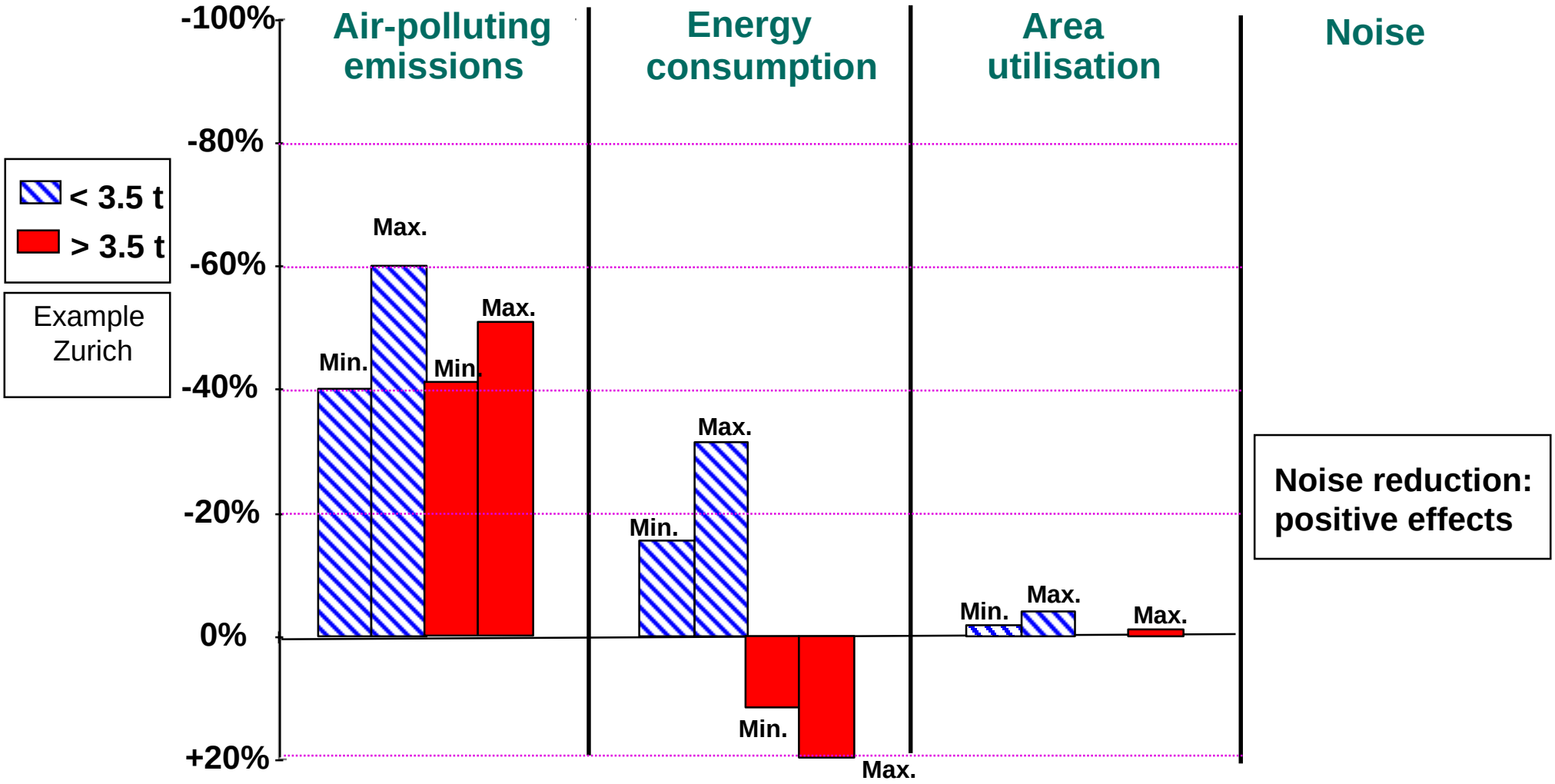
Extrapolation to city level



Results on city level
Transport efficiency



Results on city level
Environmental efficiency



Barriers for the introduction of urban lorries with alternative drives

- **Lack of an external and internal suitable infrastructure**
  - **tanking stations, service points, ...**
  - **Re-selling problem**
- **Non-serial manufacturing of vehicles (high unit costs)**
- **Reservations by the transport companies**
  - **reliability**
  - **costs**
  - **pracitcability (refuelling, maintenance, ...)**
  - **reduction of pay load**
  - **reduction of reach (radius of action)**
  - **improvement of conventional technologies**

Favourable preconditions

- **Specific urban lorries for professional service providers**
- **Urban lorry concept as a part of city logistics**
  - **Linking of bundling effects with the „vehicle“ effect**
- **Traffic telematics to improve the productivity of the vehicles**
- **Best Practices and Demonstrations ---> Confidence of User**

Supporting measures

- Temporal and spatial access regulations for urban lorries (to favour new technologies)
- Increase in the total allowed weight of delivery vans from 3.5 to 5 tons (Compensation of battery, second drive)
- Encouragement of collection and distribution plattforms close to city centres
- Economic incentives
- Road pricing (considering emissions)

Conclusions

- Urban lorry can make a contribution to improving the quality of the environment and the efficiency of transportation
- Integrated Approach (Size, equipment, drive)
- Reliability and practiability is a crucial point
- The extra costs for alternative drives can be compensated only in some companies
- Range limitations are of very secondary importance
- Supporting measures and incentives are needed at the beginning of implementation

Outlook

- **Fuell Cell technology**
- **Vehicles with box for integration in intermodal transport chains**
- **Technoloy transfer need time --> reduction of barriers --> user acceptance**

Urban goods vehicles and intermodal transport

Demonstration within the IDIOMA-Project
at the Validation Site Zurich
15.1.2001 untl 29.1.2001