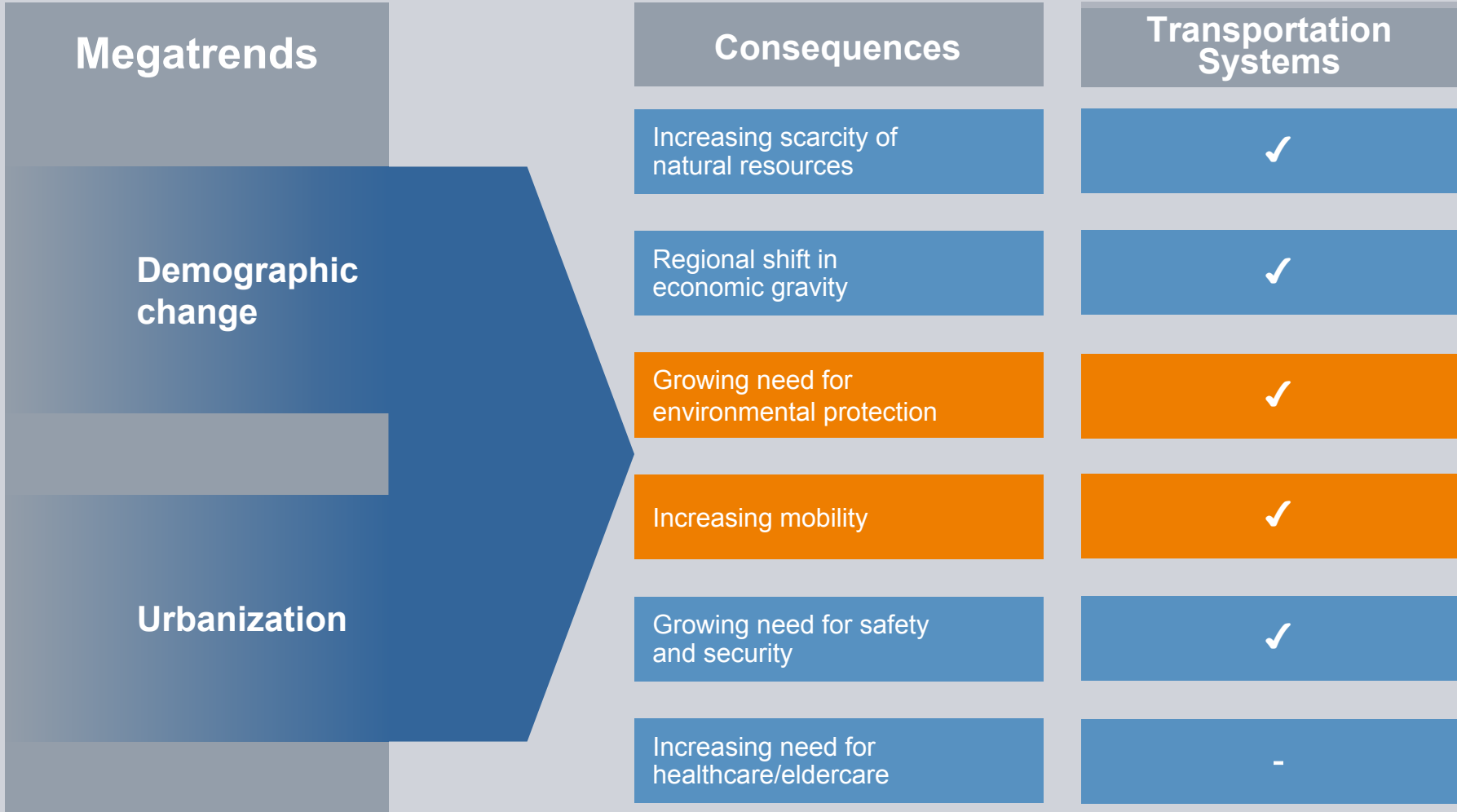


# Urban Transport in the 21<sup>st</sup> Century

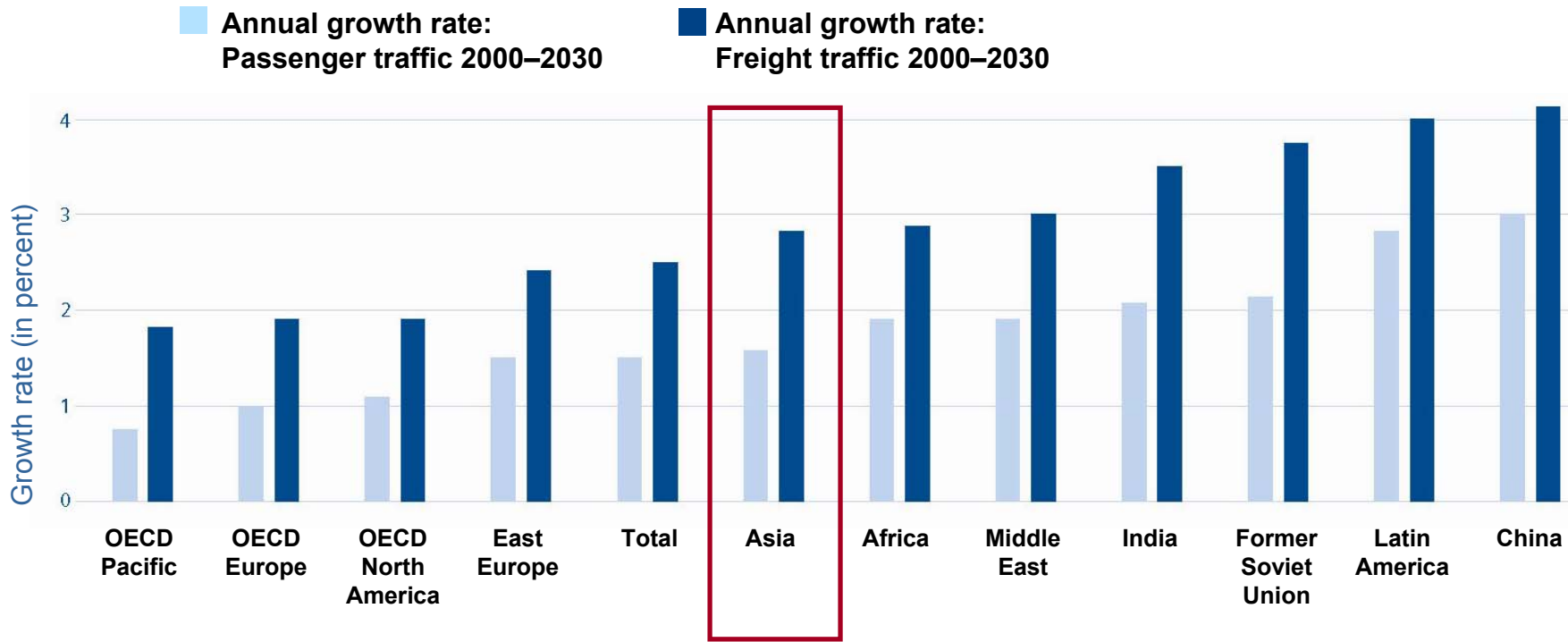
– Challenges and Complete Mobility Concepts –

Hans M. Schabert  
Group President Siemens Transportation Systems  
Asia-Pacific Weeks Berlin 2007  
September 12

# Megatrends shape our society



# Consequences of demographic change and urbanization: Increasing mobility



▶ **Passenger traffic will post an annual growth rate of 1.6% worldwide up to 2030, while freight traffic is expected to increase by 2.5%.\***

\* "Mobility 2030" report compiled by the World Business Council for Sustainable Development (WBCSD), the International Energy Agency (IEA), and the CRA International

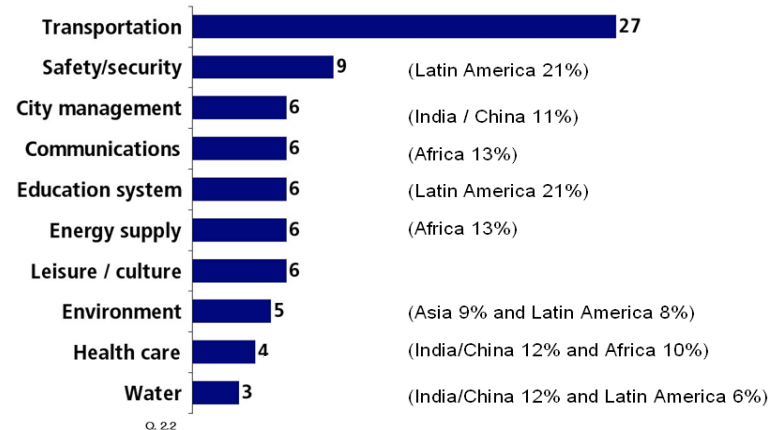
# Mobility is the No. 1 challenge for the sustainable growth of megacities



## Transportation seen as major driver of city competitiveness

### Importance for Economic Attractiveness

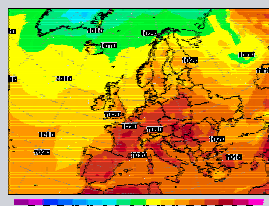
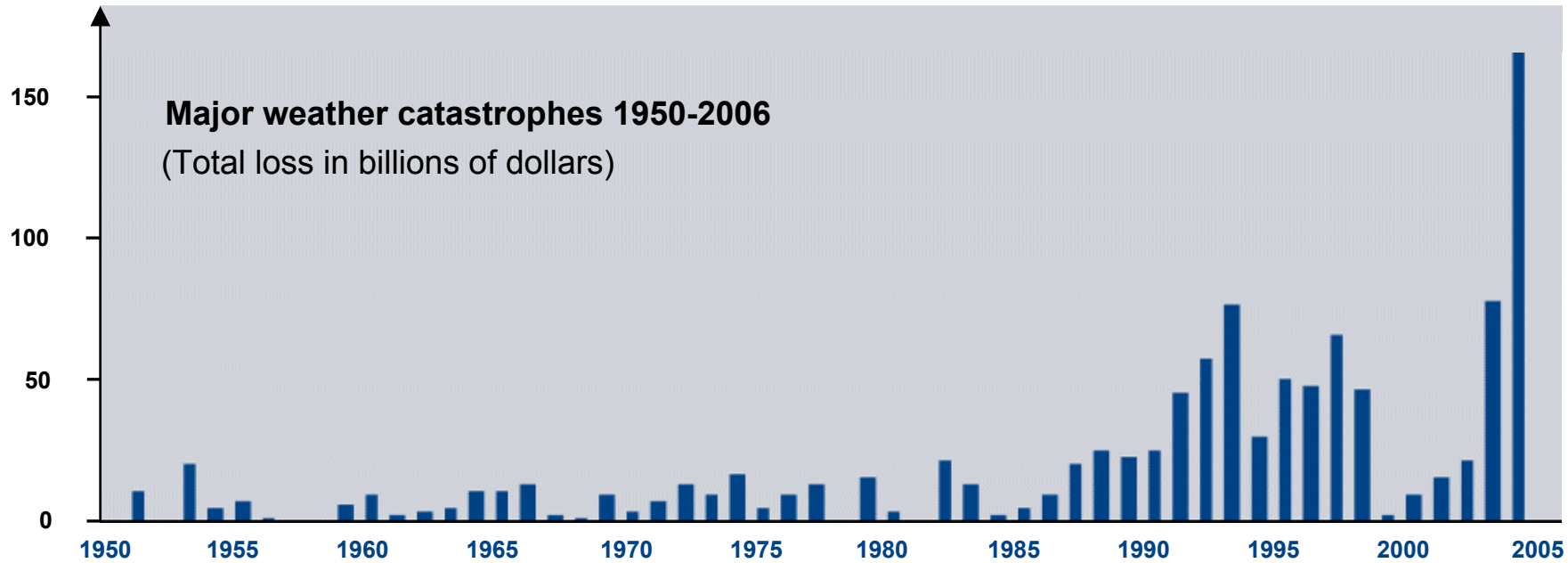
Unprompted Percentages (n=522)



▶ Transportation is perceived as by far the biggest infrastructure challenge faced by the cities – and is a key factor for city competitiveness.

# Unmitigated climate change will affect economic growth and quality of life

## First consequences of the climate change are already visible ...

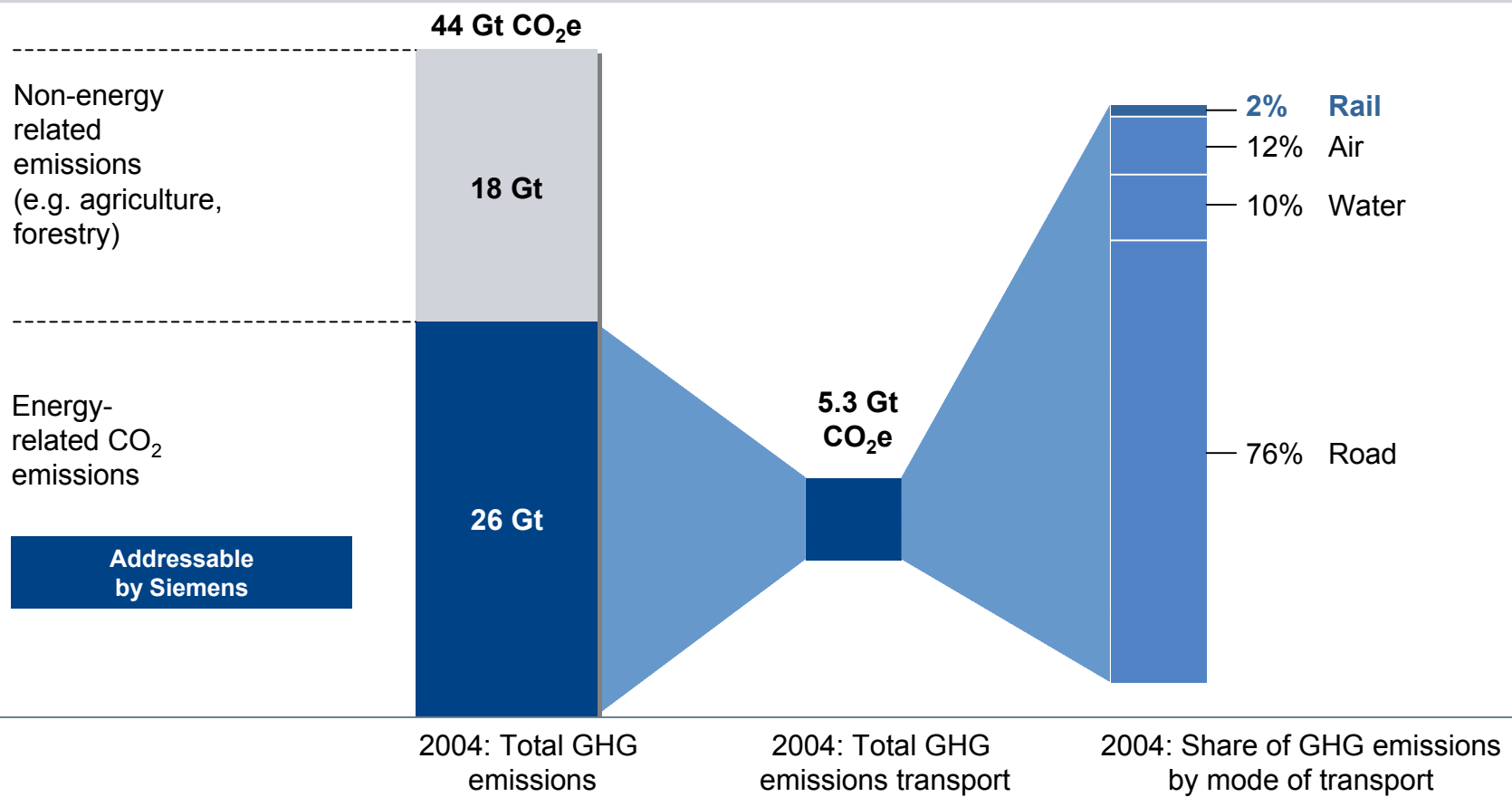


**Heat wave (2003):**  
Damage in Europe about  
10-17 billion euros



**Catastrophic floods (2007):**  
20 million people affected in Asia;  
more than 1,000 died

# Over 10 percent of the global greenhouse gas emissions caused by transport

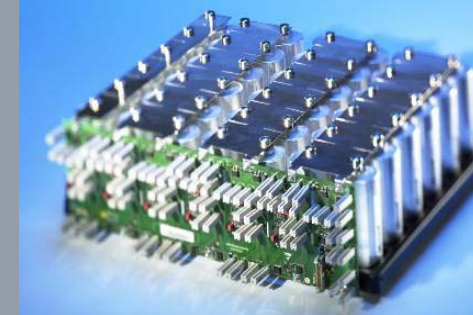


**▶ More than three-quarters of all CO<sub>2</sub> emissions in transport caused by road transport.**

# Complete Mobility: Three levers for mastering urban transport and climate challenges

## More efficient systems

- New products and solutions from Siemens Transportation Systems



## Change in modal mix

- Shift transport from roads and air to rail



## Traffic management

- Prevent congestion on roads and rail systems



# In Germany, annual savings of nearly 100 million tons of CO<sub>2</sub> can be achieved in transport

## Estimated CO<sub>2</sub> emissions 2010 "Business as usual"



## Estimated CO<sub>2</sub> emissions 2010 "Green Mobility"



CO<sub>2</sub> reduction potential:

- Total savings through
- More efficient systems: - 70 mil. t
  - Shift in transport: - 10 mil. t
  - Traffic management: - 14 mil. t

**Total: - 94 mil. t**



# More efficient systems benefit customers, society and Siemens

## TRIPLE-WIN

### Customers

- Cost savings
- Fast amortization of investments

### Society

- Safeguard the environment
- Improve quality of life
- Ensure sustainable generation contract

### Siemens

- Extend innovation leadership as environment friendly solution provider
- Attractive markets
- Value creation

## Example Energy storage systems:

- Increase attractiveness of mass transit by improving environmental compatibility and efficiency
- Utilize the braking energy of rail vehicles to save up to 25% of drive energy
- Reduction of CO<sub>2</sub> emission worldwide by 11.6 million tons annually theoretically possible if all networks were equipped with it
- Realistic potential of roughly 4.6 million tons since there are still old vehicles/fleets not suitable for energy recovery
- Siemens is the only supplier of all three of these energy saving systems (Sitras SES stationary storage unit; Sibac mobile energy storage unit; Sitras TCI inverter)
- Increased global interest in components in recent times

# Sitras SES – An example of an efficient energy storage system for local transport

Energy exchange between vehicles through energy storage unit



# More efficient systems: Metro Oslo with environmental product declaration

## Metro Oslo

- Complete environmental balance over entire vehicle life cycle
- 30% lower energy consumption than in vehicles used to date
- Emissions: 2 grams CO<sub>2</sub> per kilometer and per ton vehicle weight (Average car in Europe: 163 g CO<sub>2</sub>/km)
- 94.7% recyclable
- Substitution of materials harmful to health and the environment



“Green Mobility”

Holistic environmental protection – from development to recycling

## More efficient systems: New Syntegra direct-drive bogie

### Syntegra

- Full integration of traction, running gear and braking technology
- 96% energy efficiency
- Energy savings of about 20% achieved through:
  - Elimination of gearbox
  - Lightweight construction
  - Regenerative brake
- Fewer emissions: braking dust, grit, noise, oil-free operation



„Green Mobility“

Efficient components help protect the environment.

# Switching to environmentally friendly rail transport will reduce damage to the climate

Local transport sector (Germany):  
CO<sub>2</sub> emissions in grams per passenger kilometer\*

Car\*\* 141

Train\*\*\* 81

Source: DB AG, ifeu 2007

- Train produces 43% less CO<sub>2</sub> than car
- In local transport sector, CO<sub>2</sub> emissions per passenger kilometer for a car are almost two times higher than for mass transit train (Source: DB AG, ifeu 2007)
- In Germany, entire local and long-distance rail transport system uses less energy than all domestic freezers and refrigerators put together (Source: AGEB)

**Solution: Make railways more attractive to promote and ease public switch to rail.**

\* Figures are German averages

\*\* Passenger kilometer in rail mass transit (trains operating at 22% capacity)

\*\*\* Passenger kilometer in urban traffic (car with 1.5 passengers (= 30% capacity in 5-seat car))

## Making rail systems more attractive with...

### ...more attractive trains



#### Excellent design

International design awards

#### Comfortable

Convenient boarding and exiting thanks to 100% low-floor cars

#### User-friendly

Trains fully walk-through



### ...shorter train intervals



**Higher frequency** through fully automated systems:  
Example Nuremberg RUBIN metro



**Greater capacities** through powerful vehicles: Example Combino Plus Budapest

### ...better safety and security



**On the track** through fully automated systems and train controlling: Example Trainguard MT, ETCS



**In trains and railway stations** through e.g. Railsecurity Manager and Railcontrol Manager

### ...efficient regional/long-distance services



#### Desiro ML

- Flexible train configurations
- Inter-operability



#### Velaro

- Fastest production trainset in the world
- Consumption of only 2 liters of fuel per seat per 100 km

## Most decisive: Have all transport modes work well together – Complete Mobility

Airport links provide a reliable, congestion-free way to reach the city center.

Telematics applications ensure a smooth flow of traffic.

Efficient regional and long-distance services provide quick links between suburbs and cities.

Intelligent Information systems provide quick information about schedules any time, anywhere.

Intelligent parking control systems guide cars to open parking spaces.

Fully automated trains increase frequency of service in urban transport



▶ **Intermodal solutions are the key to safe, clean and reliable mobility.**

# Markets for intermodal solutions – Example London



## 2001: Order for 1,200 Desiro regional rail cars

This created effective regional service in London and other metropolitan areas in England:

- Optimized connections between suburbs and city.
- Reduced daily car commuter traffic.

**Effective rail system** was prerequisite for **reducing road traffic** by means of a “congestion charge” in the City two years later.

Toll monitoring system (video surveillance, registration number identification) also provided by Siemens.

Result: Traffic jams and overall traffic reduced by an average of over 20%; 150,000 tons of CO<sub>2</sub> emissions cut annually.



**SIEMENS**

**Thank you!**

