

**Wuppertal Institute**  
for Climate, Environment  
and Energy

# **Navigation towards Efficient Urban Transport:**

## **A compilation of actor oriented policies and measures for developing and emerging countries**

Presentation at the  
**eccee summer study 2011**  
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# The Challenge

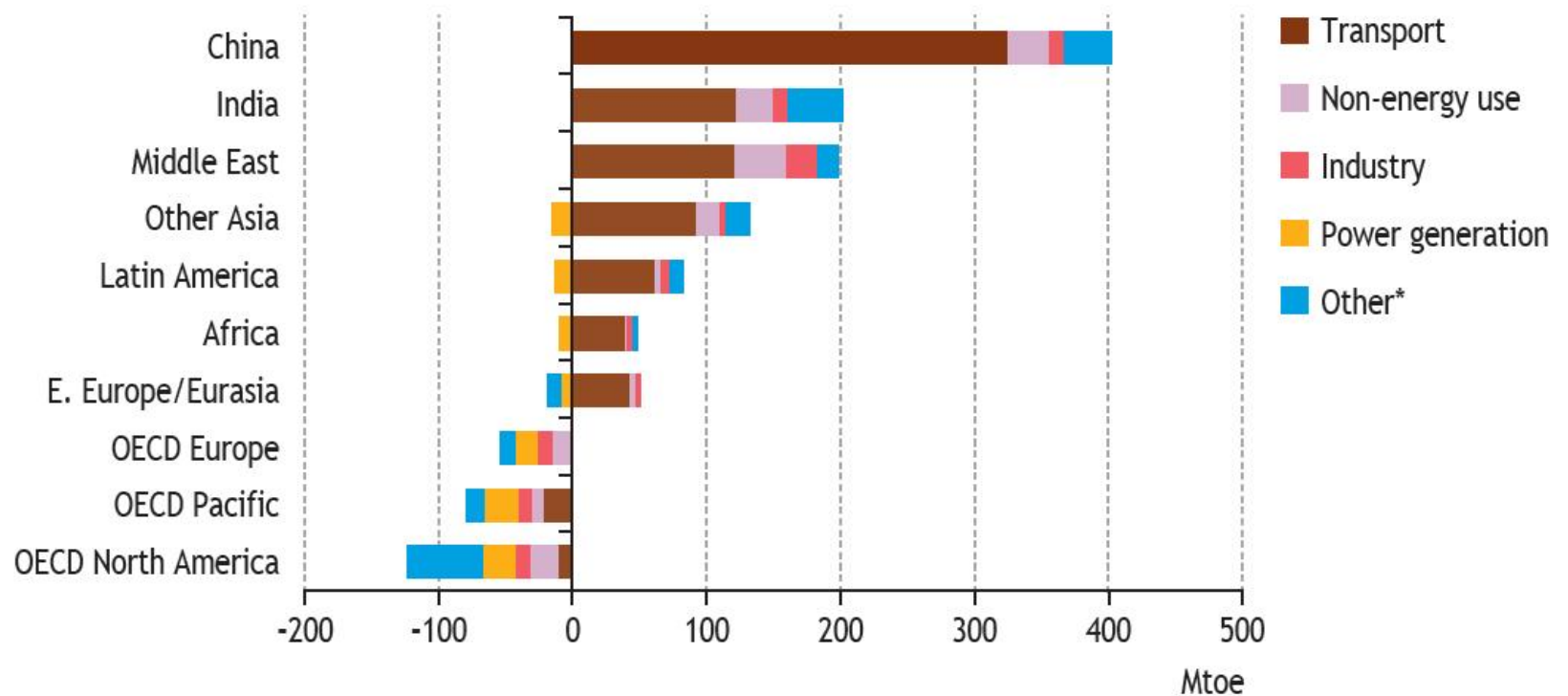
- The transport sector is responsible for 27% of the global final energy consumption and for 23% of the total fossil fuel related CO<sub>2</sub> emissions
- Strong growth in transport energy demand is projected for developing and emerging countries
  - High population growth → growing transport needs
  - Rising per capita income → increasing motorisation
- Problems:
  - Energy security
  - Peak oil
  - Increasing prices
  - Local air pollution
  - GHG emissions
  - Cities crowded with cars



There is a necessity for an efficient transport system especially in developing countries and decision makers need planning advice

# The Challenge

- The IEA projects that oil demand will increase by 25% till 2030
- Transport is expected to account for 97% of this increase
- The future development of oil demand varies highly between regions:



Projected change in  
primary oil demand by  
region and sector  
(2007-2030)

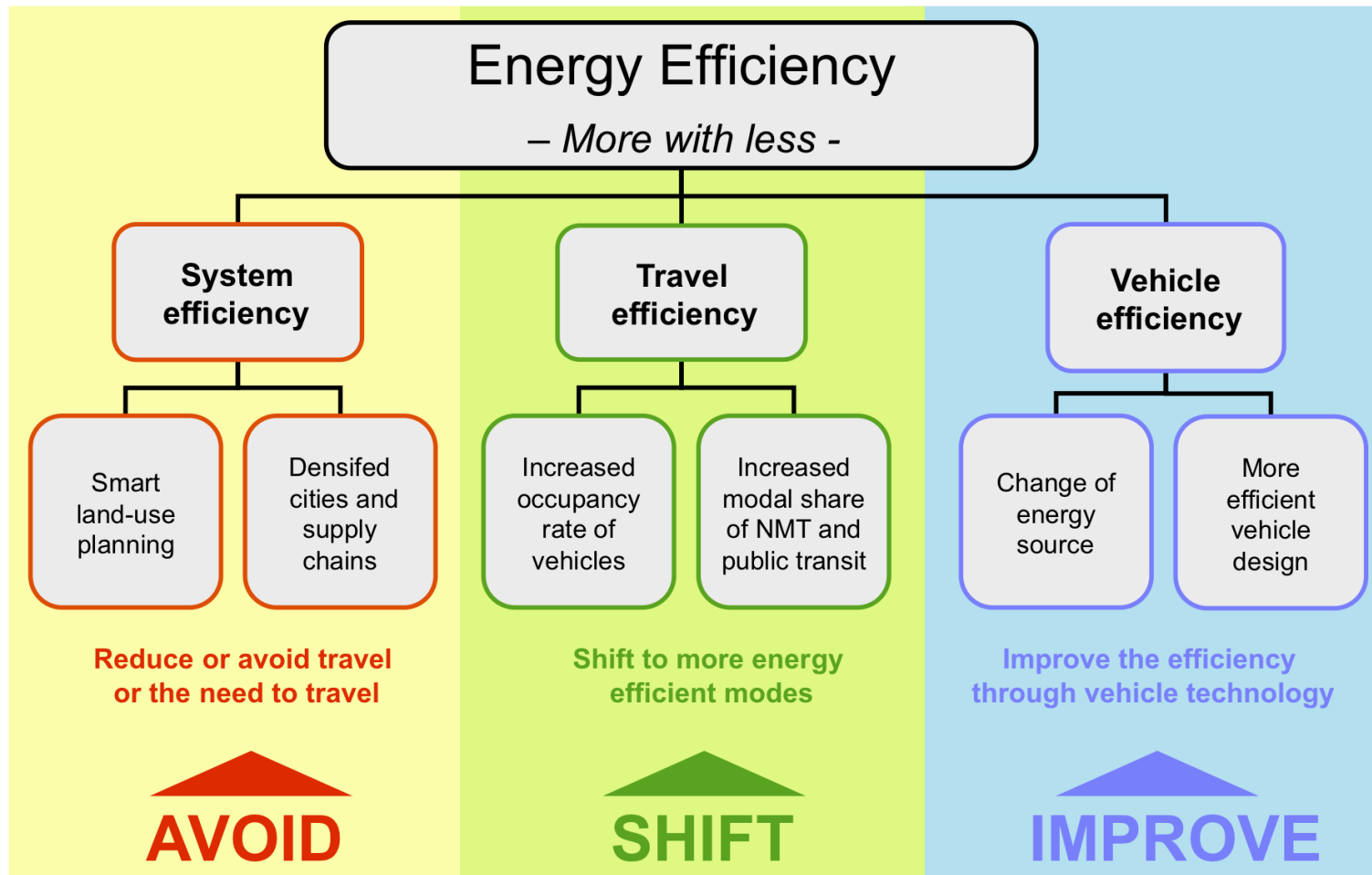
Source: IEA World  
Energy Outlook 2009

\* Includes residential, services, agriculture and other energy sectors.

# The Strategy

## Increasing energy efficiency in urban transport

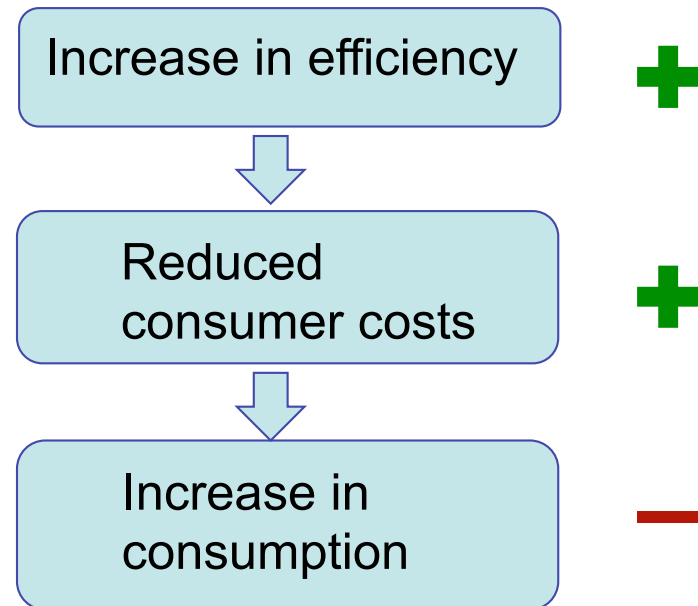
$$E_{\text{urban transport}} = \text{vehicle efficiency} \times \text{travel efficiency} \times \text{system efficiency}$$



# Barriers

Be aware and overcome!

## Rebound effect



- E.g. 10% fuel efficiency gains have a rebound effect of 1 to 3%
- It's important to account for these effects in the planning process

## Investor-user dilemma

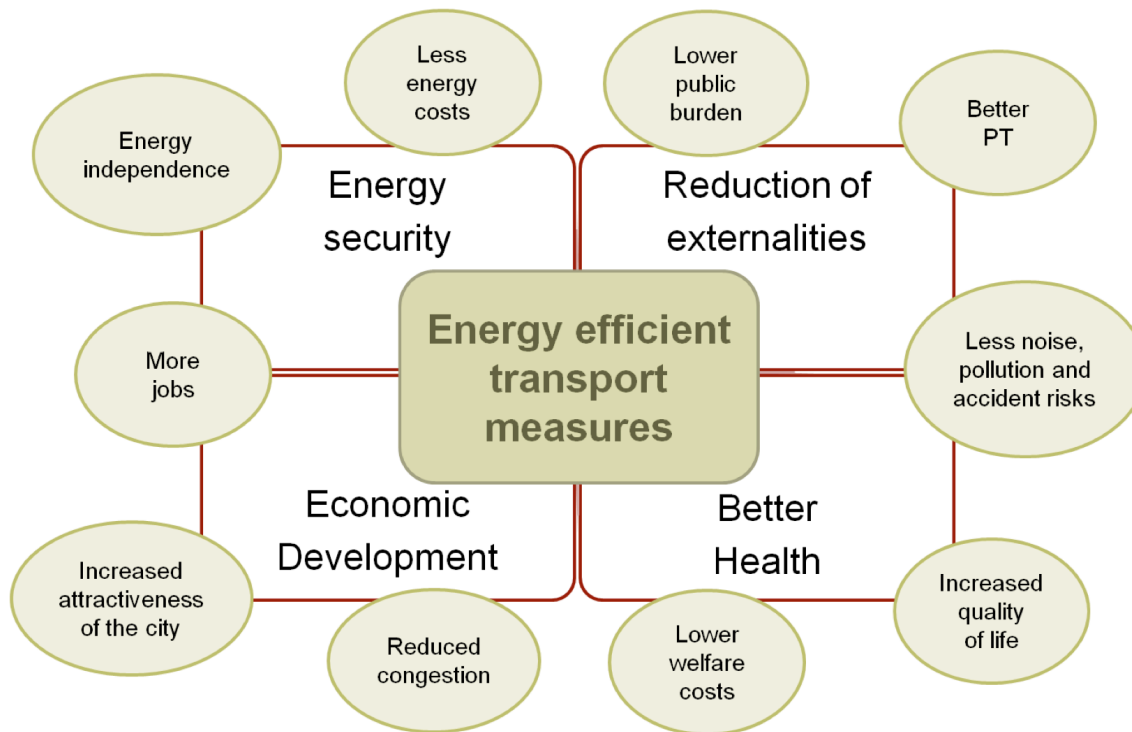
- Adopted from the residential sector
- Investor insufficiently benefit from the efficiency gains
- E.g. the municipality invests in cycling and walking infrastructure and the inhabitants benefit
- Co-benefits can help to overcome this dilemma!

# Co-benefits

- Improvements in energy efficiency can help to overcome transport related problems especially in developing countries.

- Positive effects can be triggered in several areas

- Economic development (e.g. smart urban transport systems attract foreign investors; reduced oil-import costs)
- Healthy and comfortable living environment (e.g. enhanced urban air quality, less noise, fewer accidents)
- Energy security (less dependency on oil imports and prices)
- Reduction of externalities (the municipality has to spend less budget on the negative effects of private motorised transport)



# Policy Packages

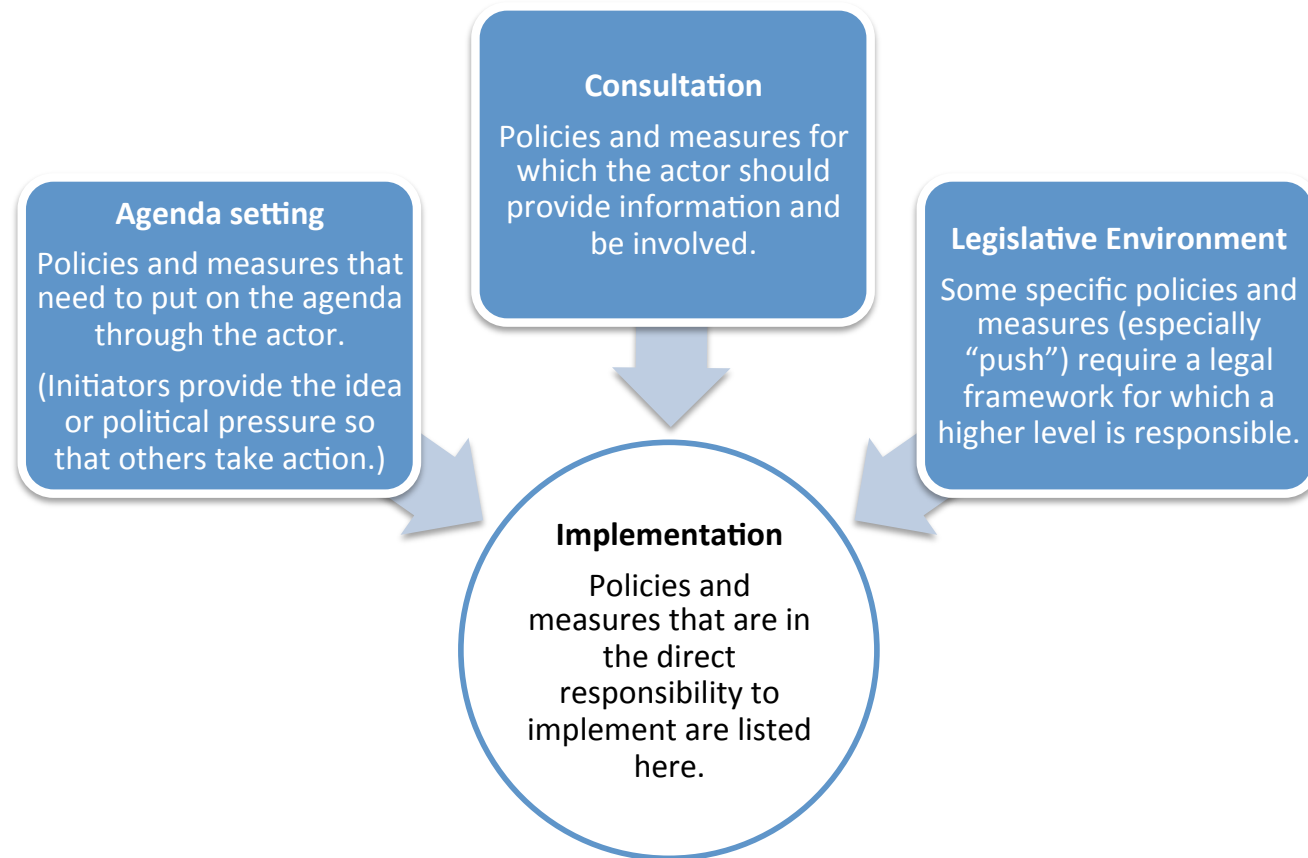
## Getting started with energy efficiency in transport

- Realising an energy-efficient urban transport system can be seen as a three stage process
- Each municipality has to analyse the current transport situation to identify suitable measures

	Basic measures	Advanced measures	Complementary measures
<b>Objective</b>	Remove factors that trigger inefficient transport	Lead to further increase in transport efficiency	Induce additional reductions in energy consumption and innovations in energy efficiency
<b>Characteristics</b>	Essential to enable a transition towards energy efficient transport	Support the success of the basic package or open up additional fields for energy efficiency	Additional effect might be smaller compared to the basic or advanced package
<b>Example measures national level</b>	<ul style="list-style-type: none"><li>∞ Removal of fuel subsidies</li><li>∞ Additional fuel taxation</li></ul>	<ul style="list-style-type: none"><li>∞ Vehicle fuel economy standards</li><li>∞ Annual vehicle registration tax</li><li>∞ License scheme for cars</li><li>∞ Financial incentives for energy-efficient modes</li></ul>	<ul style="list-style-type: none"><li>∞ Vehicle labelling</li><li>∞ Cap system for vehicle manufacturers</li><li>∞ Research and pilot projects</li><li>∞ National cycling plan</li></ul>
<b>Example measures local level</b>	<ul style="list-style-type: none"><li>∞ Proper public transport network</li><li>∞ Pedestrian and bicycle friendly infrastructure</li><li>∞ Densified city structure</li><li>∞ Transit oriented development</li><li>∞ Mixed land-use</li></ul>	<ul style="list-style-type: none"><li>∞ Parking / road pricing</li><li>∞ High quality public transport network</li><li>∞ Plate restriction schemes</li><li>∞ Continuous cycle network</li></ul>	<ul style="list-style-type: none"><li>∞ Job tickets and rideshare matching</li><li>∞ Procurement of energy-efficient vehicles</li><li>∞ Eco Driving</li><li>∞ Car free Days</li></ul>



# Assigning Responsibilities



Besides implementing specific measures, actors are often involved in other policies or measures.

They should recognise these responsibilities and should be aware of the additional possibilities to exercise influence.

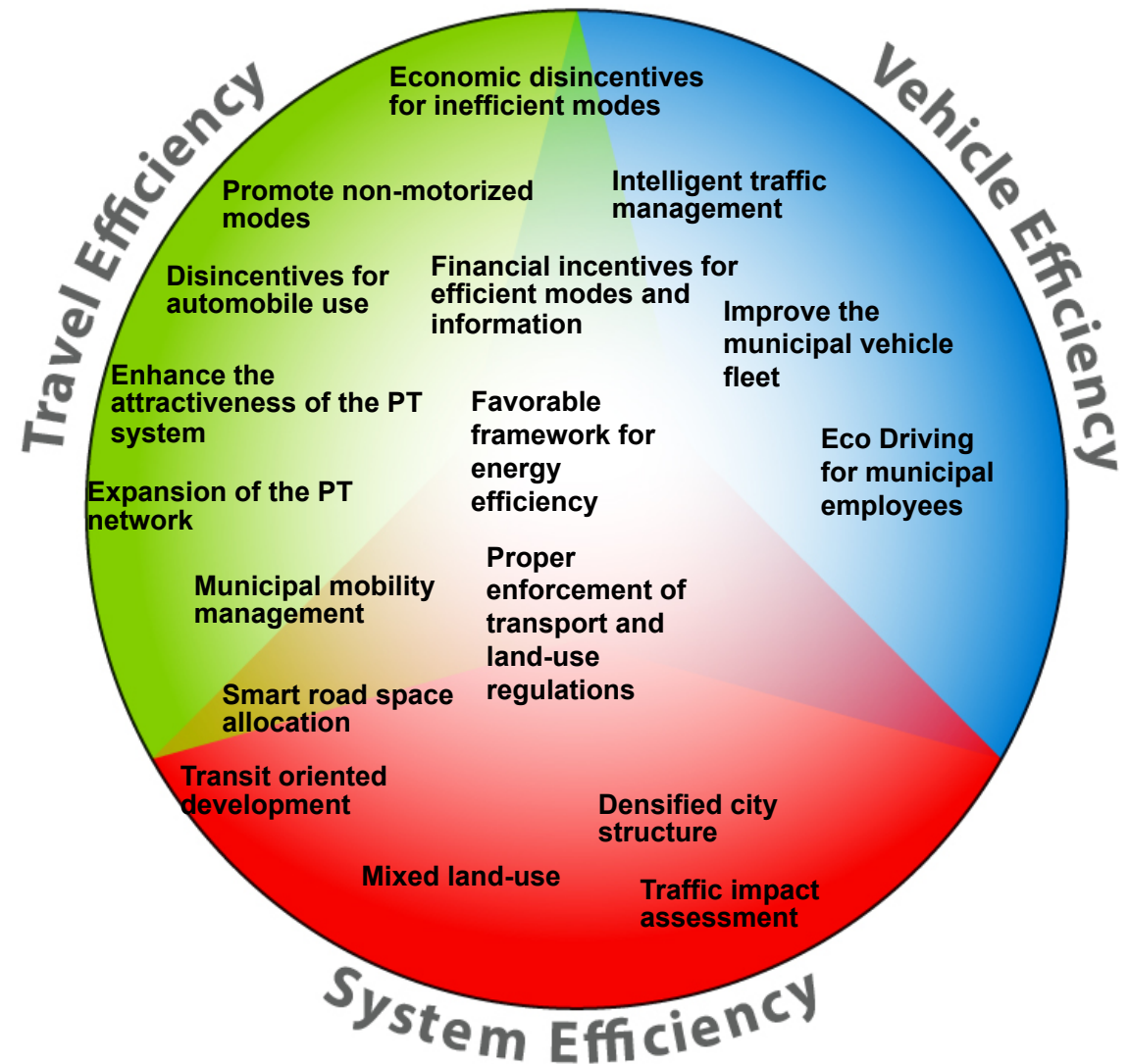
# Local Measures for the Public Sector

## Key Actors

- Municipal transport authority
- Land-use planning authority
- Mayor and city government
- Local companies and organisations
- (assuming that the PT system is operated by a private company)

## Example:

- Bogotá successfully implemented a Bus Rapid Transit network that moves more than half of the city's population and covers not only costs, but is profitable



# Example: Land-use Planning Authority

## Implementation:

- Parking supply restrictions
  - Limit parking spots for new buildings
- Road space reallocation
  - For the benefit of PT and NMT
- Densified cities
  - Reduce travel distances and enhance efficiency and profitability of PT
- Transit oriented development
  - Commercial and residential developments along PT corridors
- Mixed land-use
  - Reduce the need to travel by establishing housing, offices, shops and public services in close proximity

## Agenda setting (e.g.):

- Park and Ride facilities
- Intelligent traffic management

## Consultation (e.g.):

- Expansion of the PT network
- Demand oriented PT system
- Traffic impact assessment
- Expansion of the infrastructure for NMT

# Case Study: Parking Restrictions

Parking supply restrictions are implemented in several cities:

- **Portland:** The City of Portland limited downtown parking spaces as early as 1975. The city believes that it as helped to increase transit use from 20-25% in the early 1970's to 48% in the mid 1990's
- **San Francisco:** The city allows parking to consume only up to seven percent of a building's gross floor and new buildings must have an approved parking plan. This policy has helped to prevent rising vehicle travel despite considerable growth in office buildings.

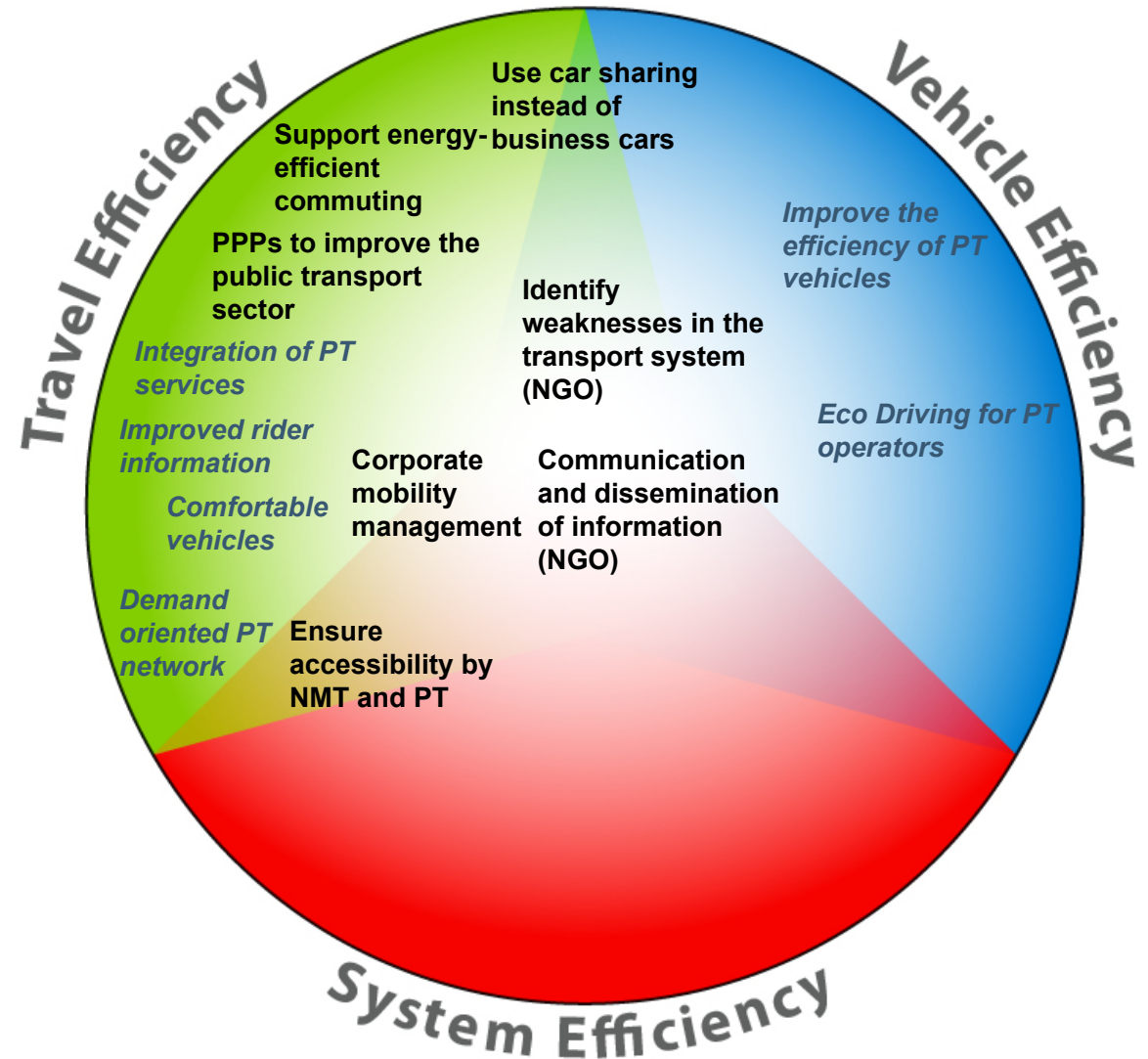
# Local Measures for the Private Sector

## Key Actors

- *Local public transport operator*
- Companies
- Non-governmental organisations

## Example

- Fuel consumption of bus drivers in Santiago de Chile could be reduced by nearly 20% after Eco Driving training



# Example: Local Public Transport Operator

## Implementation:

- Integration of PT services
  - Adjusting schedules and the fare system to attract new customers
- Improved rider information and comfortable vehicles
  - Makes the use of PT more convenient
- Energy-efficient vehicles and Eco Driving
  - Improves the energy efficiency of the PT trips
- Demand oriented PT system
  - More attractive for the rider and can enhance profitability of the network

## Agenda setting (e.g.):

- Park and Ride facilities
- Bus priority and Bus lanes
- Expansion of the PT network
- Subsidised PT fares

## Consultation (e.g.):

- Expansion of the PT network
- Job tickets
- Bus priority and Bus lanes
- Car-free travel packages

# Case Study: Singapore's integrated bus system

- Different local public transport providers have set up a service company to integrate the public transport system
- Now, the systems function together as one single public transport network due to
  - Fare integration: The providers implemented a common ticketed systems that can be used on all forms of PT services and thus allows transfers between providers
  - Information integration: A common guide was implemented, which lists all information on bus routes and train lines independent of the provider
  - Network integration: Wasteful duplications of lines are reduced



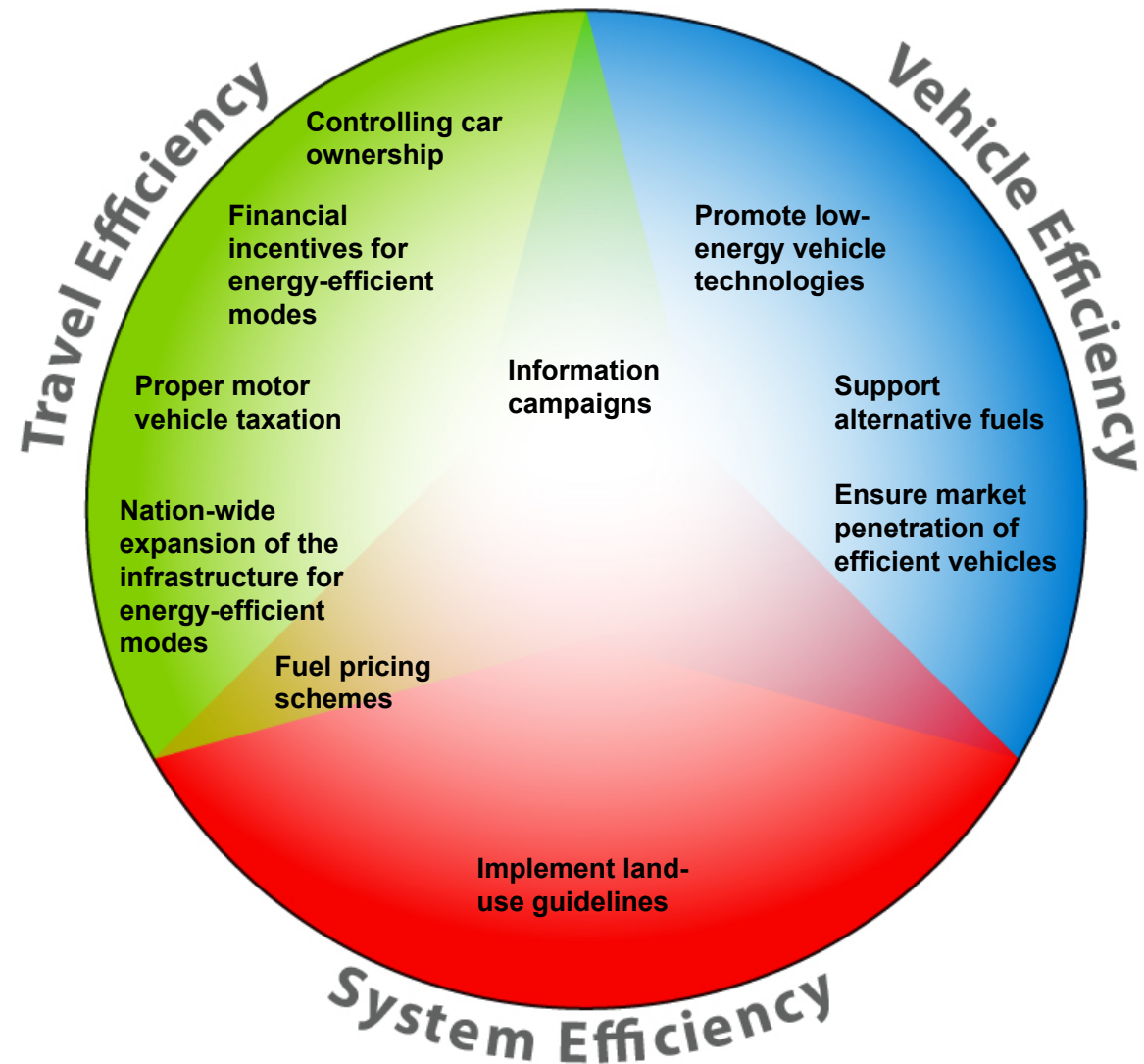
# National Measures

## Key Actors

- Transport Ministry
- Environmental Ministry
- Ministry of Finance
- Ministry of Energy
- Ministry of Economics

## Example:

- China's fuel economy standard implemented in 2004 was able to reduce the average fuel consumption of the new LDV fleet by more than 10%





# Example: Ministry of Financial Affaires / Treasury

## Implementation:

- Sales tax / Import duty for automobiles
  - Can reduce automobile ownership, but can also to induce a fleet turnover towards more efficient cars
- Fuel taxation
  - Beneficial to discourage car use, induce economic driving behaviour and promote efficient vehicles
- Annual vehicle registration tax
  - Addresses the existing automobile fleet
- Financial incentives for energy-efficient modes
  - E.g. tax deductible PT expenses make the use more attractive

## Agenda setting:

- Reduction of fuel subsidies

## Consultation:

- Reduction of fuel subsidies

## Legislative environment:

- Pay-at-the-pump surcharges
- Expansion of the public transport network

# Case Study: JNNURM in India

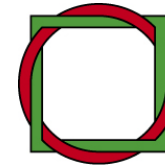
- JNNURM = Jawaharlal Nehru National Urban Renewable Mission
- The JNNURM provides financial support from the Central Government to selected Indian cities for urban infrastructure projects
- The cities have to outline comprehensive City Development Plans with concrete infrastructure projects
- The projects are financed by matching contributions from states and municipalities
- Supported infrastructure projects include for instance BRT projects and also grants in order to purchase buses for city bus operations were allocated

# Success Factors

- To succeed in tapping the full potential of energy efficiency in urban transport is useful to
  - Foster a close cooperation between all departments, administrative levels and types of stakeholders involved in the transport system
  - Develop a holistic concept to built a strategic foundation
  - Compile policy packages (push and pull)
  - Show strong leadership and political will and have continuity in political decision making
  - Join all stakeholders in round tables
  - Bring together different actors in thematic working groups
- Curitiba achieved significant fuel savings with an integrated urban master plan adopted in the 1960 (Today 30% less fuel consumption than comparable Brazilian cities)

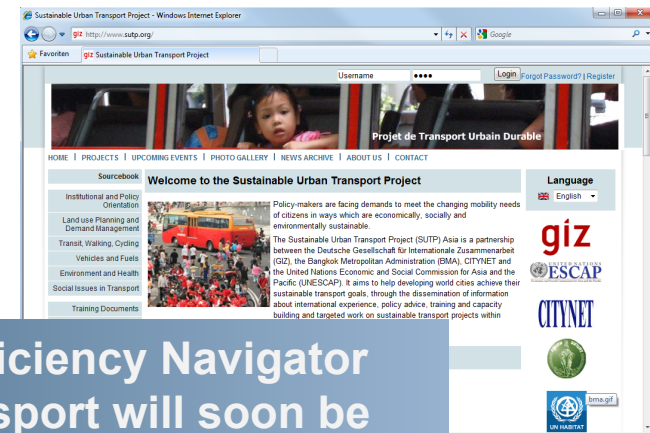
# Summary

- Transport related problems will become worse especially in developing countries
- Decision makers on local and national level need planning advice and can profit from existing knowledge and experience
- Various energy efficiency measures can be realised locally, but also a supportive national framework is needed
- Energy efficiency strategies should address different level (system, travel and vehicle) and should contain different measures (push/pull).
- An energy-efficient transport system is possible, affordable and beneficial for citizens, companies and public authorities as well as for the environment and the economy!



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**Many thanks for  
your attention !**



**The Energy Efficiency Navigator  
for Urban Transport will soon be  
published in the Sustainable  
Urban Transport Project**

**[www.sutp.org](http://www.sutp.org)**



For further information  
please visit our website:

**[www.wupperinst.org](http://www.wupperinst.org)**

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