

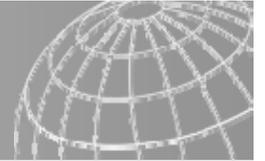
# Low-Carbon Land Transport Options towards reducing Climate Impacts and achieving Co-Benefits

Fifth Regional EST Forum in Asia  
Bangkok, 2010

23-25 August, 2010  
Manfred Breithaupt

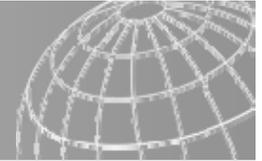
GTZ – Water, Energy, Transport





# Overview

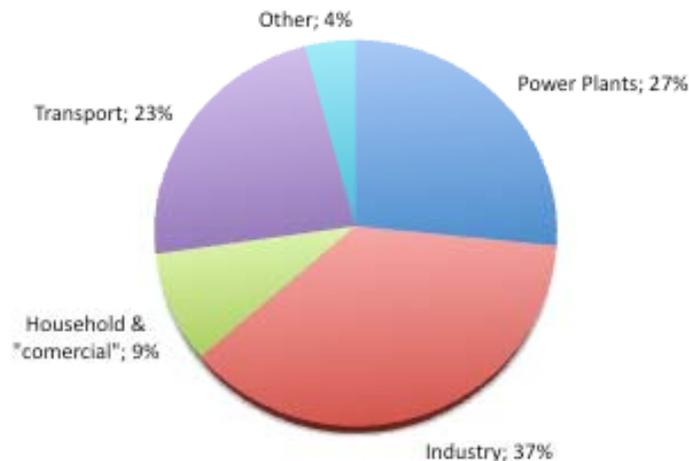
1. Challenges in Urban Transport
2. Mitigating Emissions: Measures and Policy Options
3. Towards Transport NAMAs
4. Selected GTZ Projects



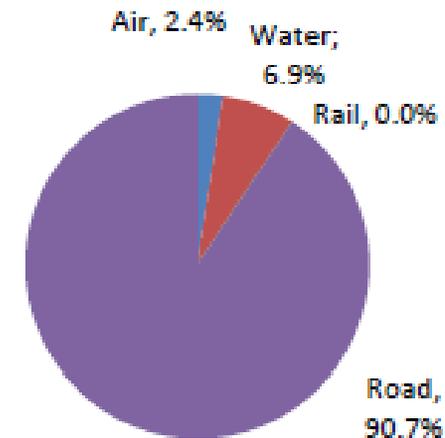
Transport accounts for 13% of global GHG emissions; in developing countries energy consumption and CO<sub>2</sub> emissions from transport are increasing rapidly.

E.g. in **Indonesia**, 2005, Transport contributed to 23% of the total CO<sub>2</sub> emissions from the energy sector or 20.7% percent of the country's overall CO<sub>2</sub> emissions. Many developing countries experience the same situation.

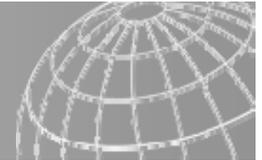
**CO2 Emissions from the Energy Sector 2005**  
[million ton]



**Modal Mix in terms of Energy Consumption 2005**

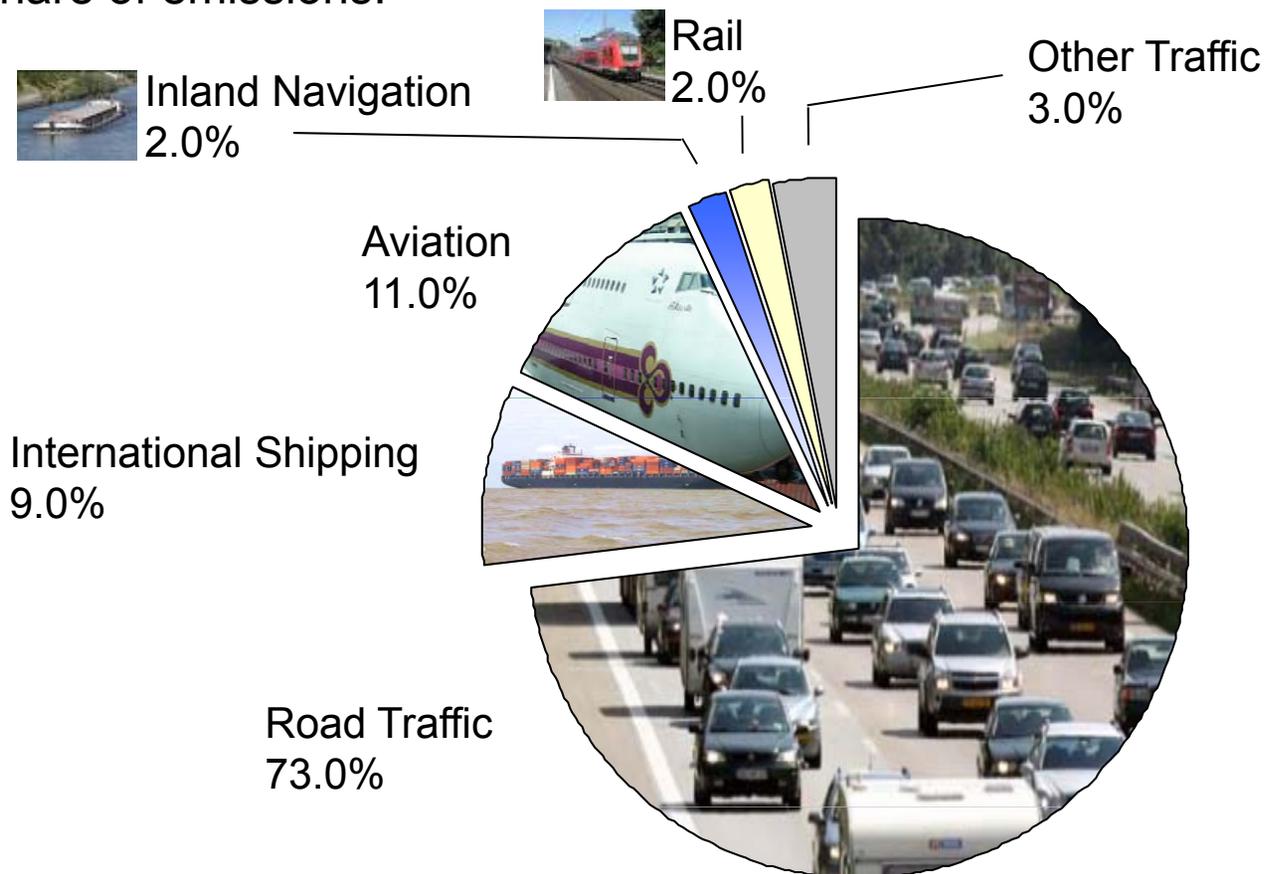


Source: ICCSR 2010

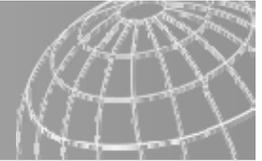


## Transport CO<sub>2</sub>-Emissions by Mode (2005)

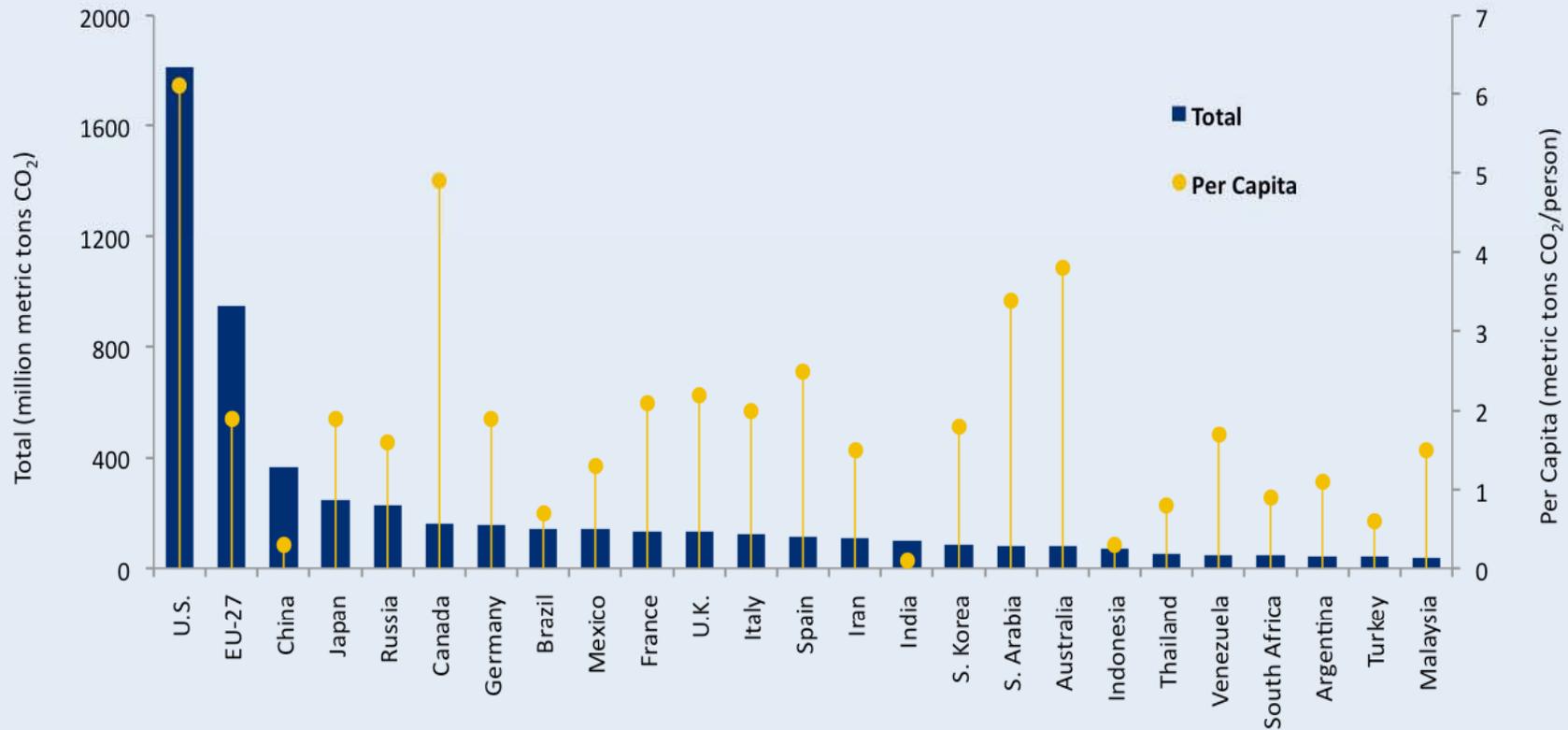
Within the transport sector, road traffic is responsible for the largest share of emissions:



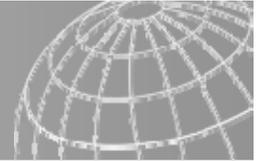
Source: ITF/IEA



### Top Emitters of CO<sub>2</sub> from Transportation, Total and Per Capita, 2006



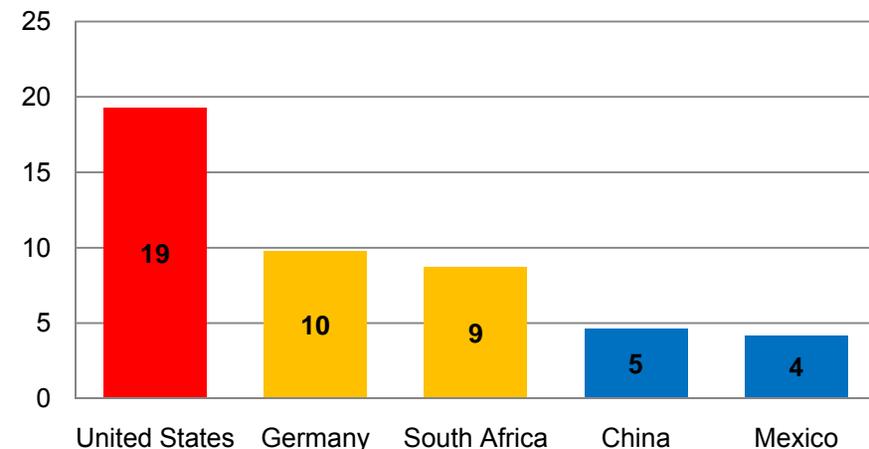
Source: WRI, CAIT v. 7.0 (<http://cait.wri.org>) based on IEA, 2008. Adapted from Figure 12.4 in *Navigating the Numbers* (Baumert et al., 2005).



- Global warming limited to below  $2^{\circ}$  C in relation to pre-industrial times (before 1900)

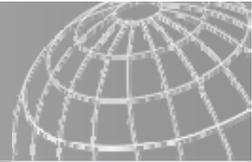
- Tolerable **2 t CO<sub>2</sub>** per capita and year over all countries

CO<sub>2</sub> emissions per capita (tons/year) 2006



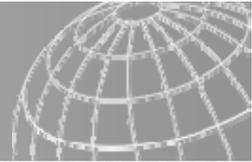
Source: World Bank online database, 2010

- Required reduction until 2050
  - in industrialized countries: **80-90 %**
  - In developing countries: **50 %**



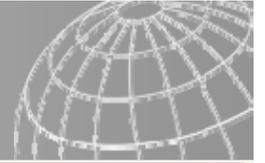
**Humans love to move, travel, discover...**  
by different ways and modes...





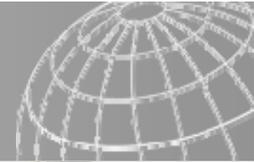
In most cities, **mobility** is dominated by **personal motorized transport**.  
Many people choose **cars** to move around...





Road transport is a major contributor to **air pollution** and **climate change**.  
Transport contributes to **23%** of energy-related CO2 **emissions** and is still growing!





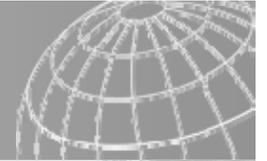
Worldwide, 1.2 Million **road deaths** and more than 20 Million **people injured** per year





**10-25%** of urban areas are taken by **road** transportation infrastructure  
a lot of space for cars but...





...where is the **space** for people?

the **silent** pedestrian, the **invisible** cyclist must be **seen**... and **heard**



There is an **alternative** to automobile dependency:

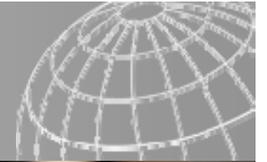
- Compact cities
- Mixed land use

Redesigning urban space



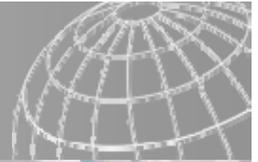
Sustainable transport modes:

- walking
- cycling
- public transport



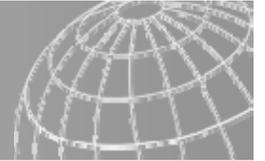
We can **simply share** our space: pedestrians, cyclists, vehicles...  
**public** and private, motorized and **non-motorized**





...we can even **reclaim** our space and **enjoy** the people's mobility!  
making our cities full of **life** and **happiness**





Seoul, 2005: the City **tore down** 5.8 km of elevated **freeway** and exhumed a buried river...

less space for cars and more space for people!

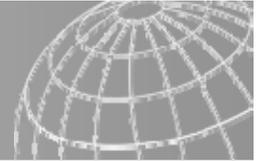
**Before**



**After**

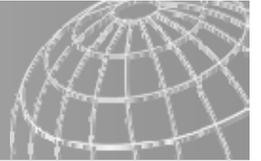


**Can you find the 29,475 differences?**

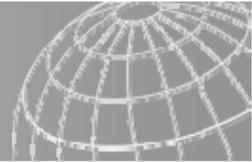


### *Sustainable Low Carbon Transport ...*

- Increases energy security
- Reduces congestion and high public health costs
- Reduces land demand
- Increases international visibility and acknowledgement of cities that demonstrate leadership
- Opens new sources for funding (e.g. carbon related funding schemes)
- Enables political co-benefit: In London the popular major Ken Livingston was elected mainly because of his innovative transport policies.



- **Dense** but **green** and **mixed** land use
- Modern, high quality links and **good integration**
- High quality **alternatives** to individual car-use, esp. efficient public transport and good non-motorized infrastructure and its proper integration;
- Efficient, inter-modal freight transport and smart urban logistics
- Vehicle and fuel efficiency
- Managing transport demand



© Lloyd Wright 2004-2006

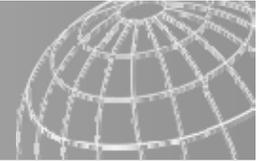


- ✓ Bogotá
- ✓ Curitiba
- ✓ Copenhagen
- ✓ Zurich (#2, Mercer)
- ✓ Freiburg
- ✓ Vienna (#1, Mercer)
- ✓ Seoul
- ✓ Singapore (most livable city in Asia, Mercer)
- ✓ Hongkong



All of these successes featured an **integrated and packaged approach**:

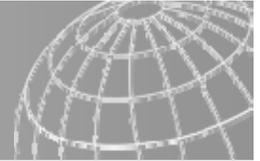
1. High-quality public transport
2. Improved conditions for walking and bicycling
3. Effective integration of modes
4. Supportive land-use policies
5. Car-restriction measures



## CO<sub>2</sub> emissions from passenger transport vs. modal split: Selected cities

	Share (%) of public transport, walking and cycling	CO <sub>2</sub> emissions (kg per capita per year)
Houston	5%	5690 kg
Montreal	26%	1930 kg
Madrid	49%	1050 kg
London	50%	1050 kg
Paris	54%	950 kg
Berlin	61%	774 kg
Tokyo	68%	818 kg
Hongkong	89%	378 kg

Source: UITP



## AVOID/REDUCE

**Reduce or avoid travel  
or the need to travel**

- Integration of transport and land-use planning
- Smart logistics concepts
- ...

**1**

## SHIFT

**Shift to more environmentally  
friendly modes**

- Transport Demand Management
- Mode shift to Non-Motorized Transport
- Mode shift to Public Transport
- ...

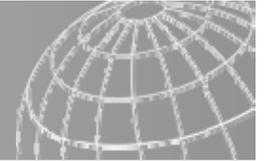
**2**

## IMPROVE

**Improve the energy  
efficiency of transport  
modes and vehicle  
technology**

- Low-friction lubricants
- Optimal tire pressure
- Low Rolling Resistance Tires
- Speed limits Eco-Driving (Raising Awareness)
- Shift to alternative fuels
- ...

**3**



# 1. GHG reduction through land use



**Example: Carbon footprints (residential emissions only) in different neighborhoods in Toronto, Canada**



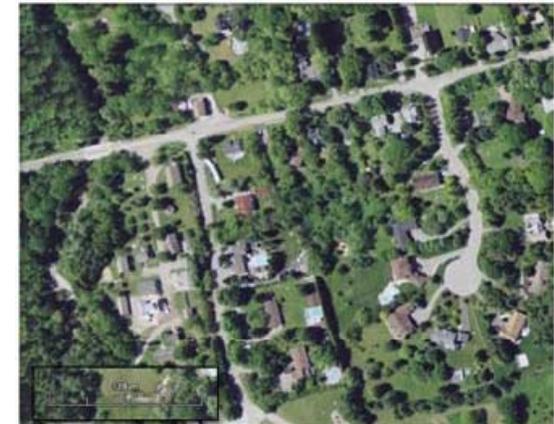
East York - 1.31 tCO<sub>2</sub>e/cap (residential only)

High-density apartment complexes within walking distance to a shopping center and public transit:  
**1,31 tCO<sub>2</sub>e/capita**



Etobicoke - 6.62 tCO<sub>2</sub>e/cap (residential only)

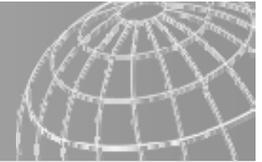
High-density single family homes close to the city center and accessible by public transit:  
**6,62 tCO<sub>2</sub>e/capita**



Whitby 13.02 tCO<sub>2</sub>e/cap (residential only)

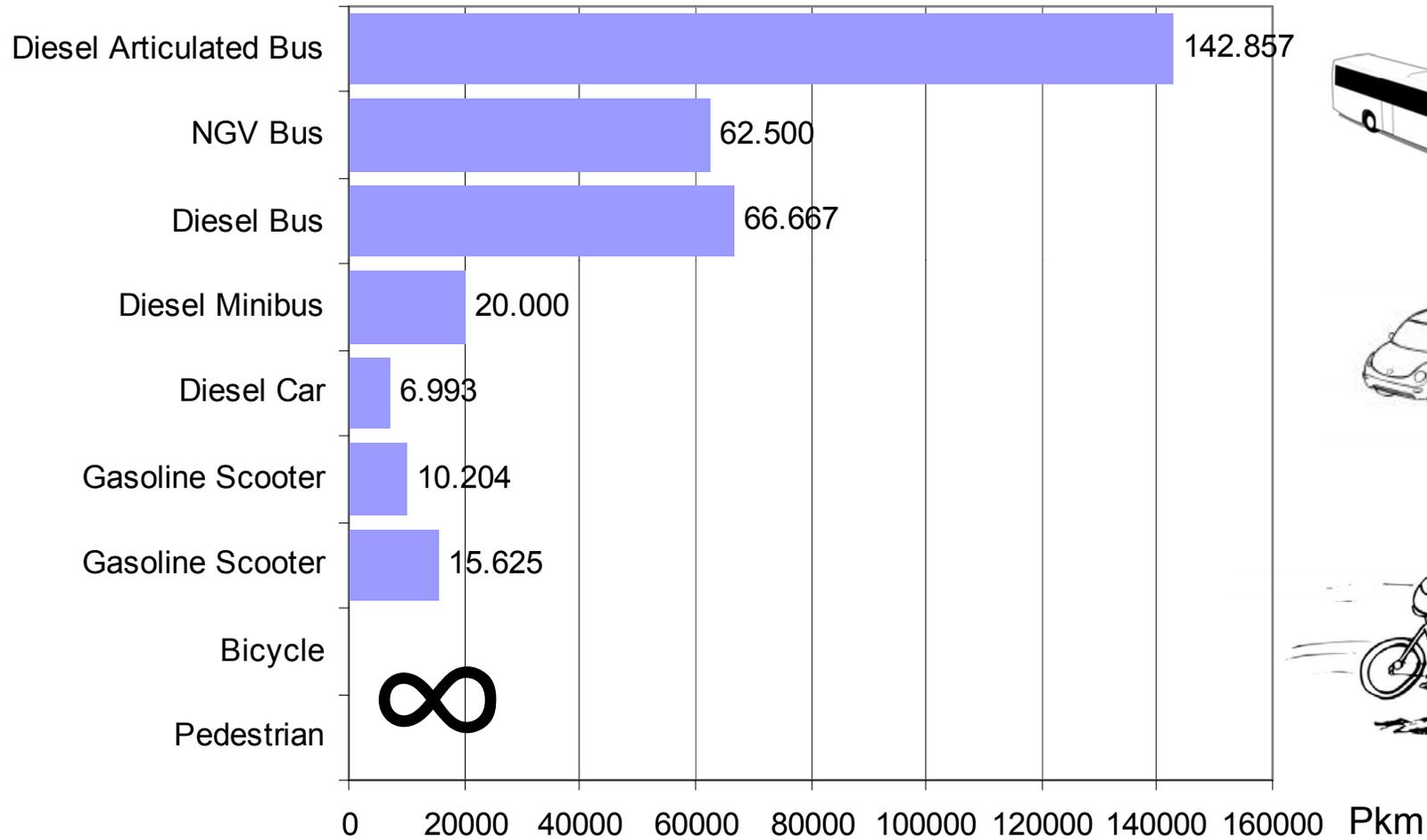
Suburbs with large, low-density single family homes that are distant from commercial activity and public transit:  
**13,02 tCO<sub>2</sub>e/capita**

Source: Dan Hoornweg/World Bank 2010, <http://blogs.worldbank.org/climatechange>

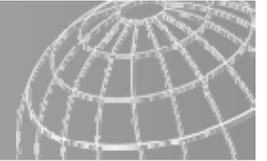


# How far can I travel on 1 ton of CO<sub>2</sub> ?

2



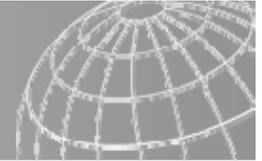
Source: GTZ Sourcebook Module "Transport and Climate Change", 2007, based on Hook / Wright, 2002



## Inefficient use of urban road

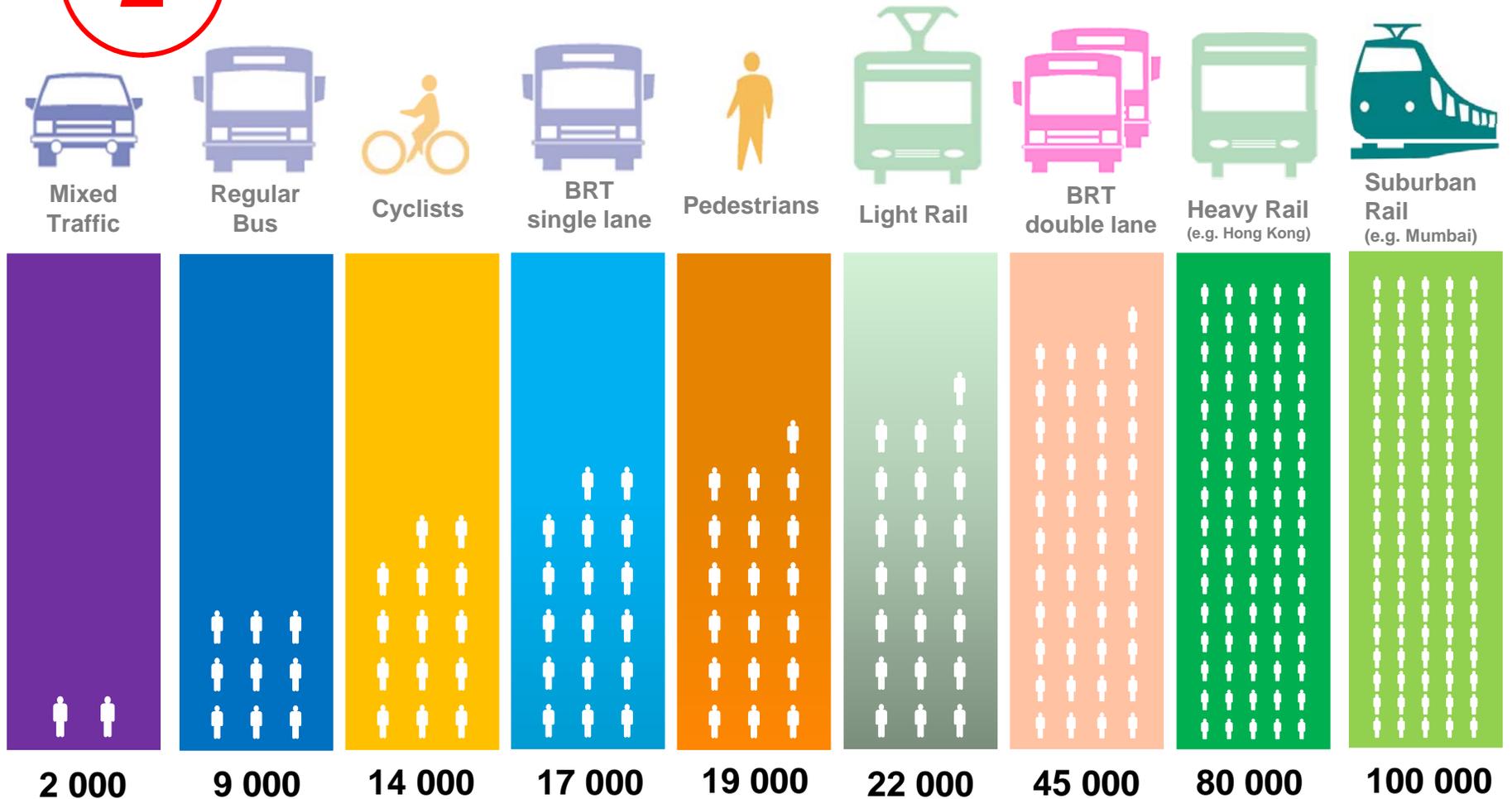


# Corridor Capacity

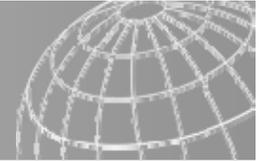


2

(people per hour on 3.5 m wide lane in the city)



Source: Botma & Papendrecht, TU Delft 1991 and own figures



**3**

**engine stop at idling**



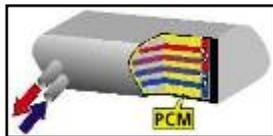
**gearbox with long transmission**



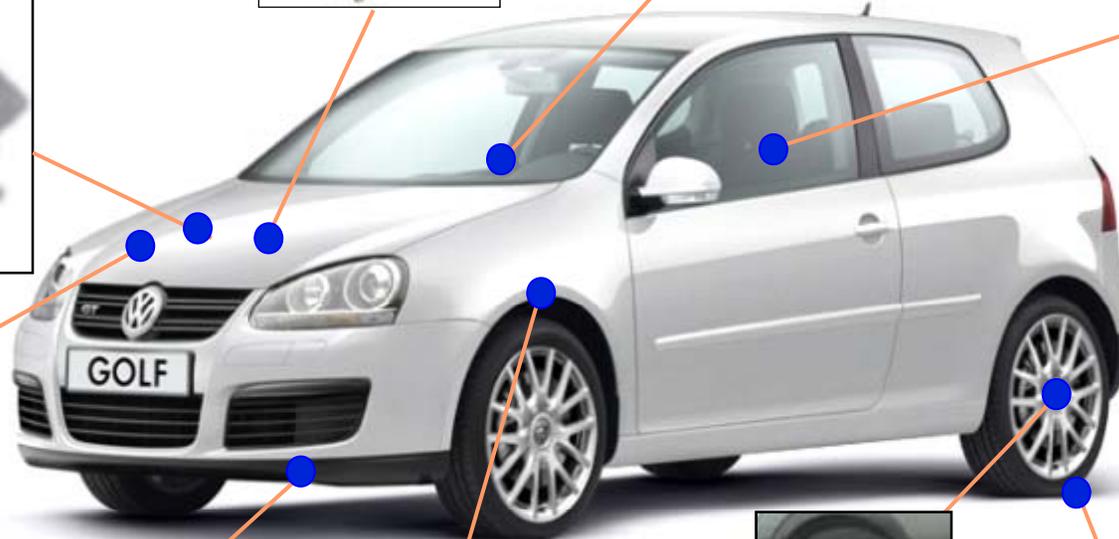
**gearshift indicator**



**Light weight seats**



**Latent- heat storage**



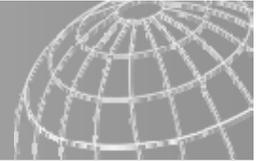
**smooth under flow**

**lower body**

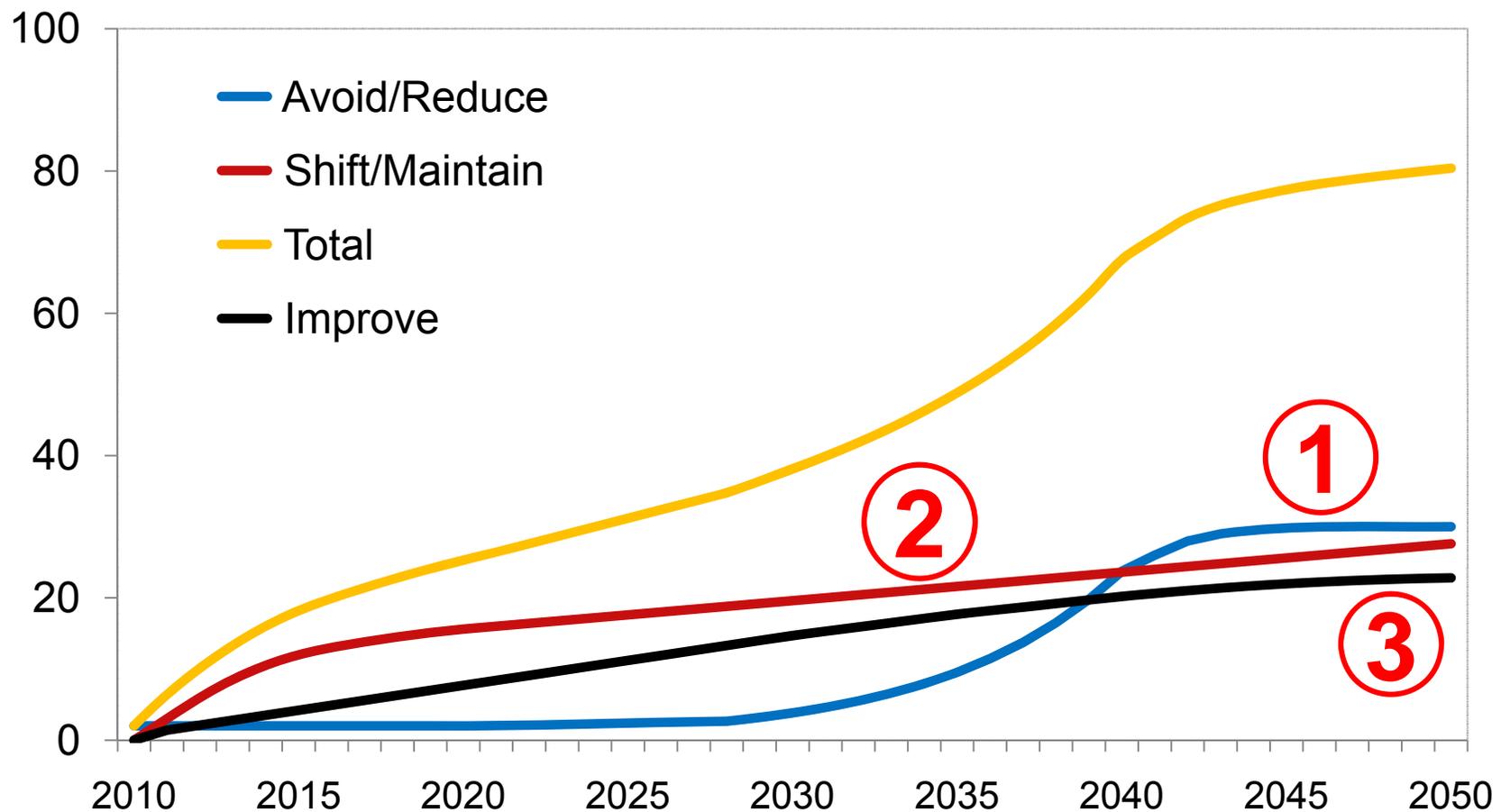


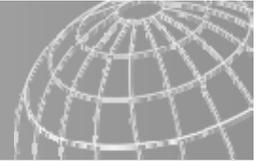
**smooth covers**

**narrower low rolling resistance tires**

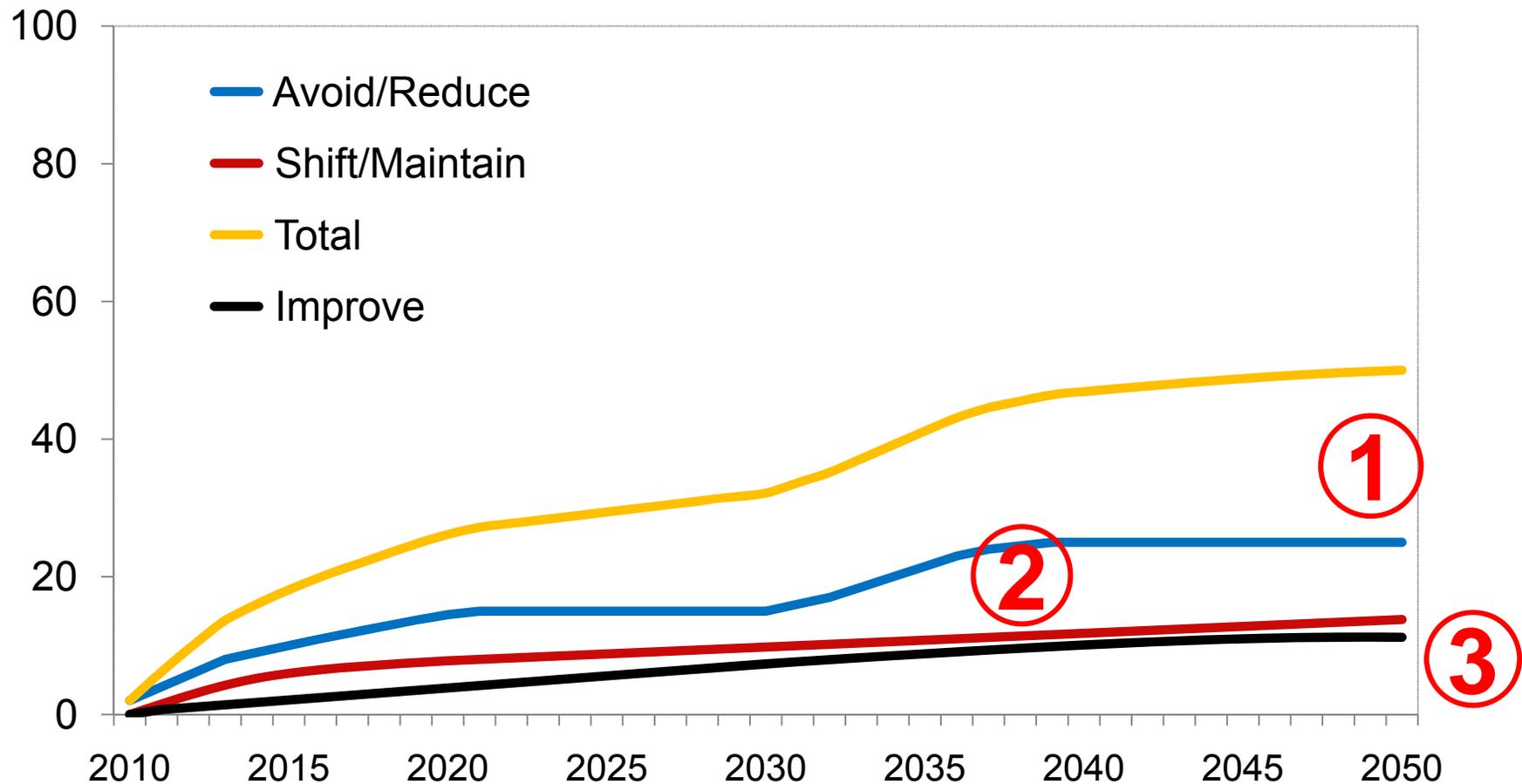


## How to achieve 80 percent GHG emission reduction by 2050 (in industrialized countries)?





## How to achieve 50 percent GHG emission reduction by 2050 (in developing countries)?



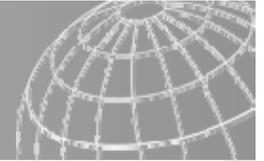


## Energy consumption and transport

	Modal share of walking, cycling and public transport		Average energy consumption per person (MJ)	
	1995	2001	1995	2001
<b>Athens</b>	34,1	40,9	12.900	12.600
<b>Geneva</b>	44,8	48,8	23.600	19.200
<b>Rome</b>	43,2	43,8	18.200	17.100
<b>Vienna</b>	62	64	10.700	9.050

**Cities which increased the modal share of walking, cycling and PT saw a decrease in the consumption of energy for passenger transport per capita.**

Source: UITP



Policies	Basic Package	Advanced	Deluxe Package
<b>1. Removal of fuel subsidies</b> Remove incentives for non-sustainable transport modes			
<b>2. Fuel taxation above European minimum taxation level</b> Give incentives to travel less, use low carbon modes and purchase fuel efficient vehicles			
<b>3. Low carbon long distance infrastructure</b> Earmark a considerable share of the transport investments in low carbon modes.			
<b>4. Efficiency standards</b> Regulate car producers and correct market failures			
<b>5. Removal of car-oriented subsidies</b> e.g. for business cars in order to remove barriers for sustainable transport modes; replace with job-tickets			
<b>6. Incentive Programme for municipalities</b> to set up TDM, public transport and NMT investments and integrated land-use and transport plans			
<b>7. Vehicle registration tax/ license auctioning</b> e.g. taxing fuel inefficiency or weight			
<b>8. Low-carbon fuel standards</b> Incentivizing low carbon fuels, e.g. electric cars			
<b>9. Research, Development and Demonstration</b> For fuel efficient cars, electric bikes, busses and smart public transit			

# Local Level Policy Packages

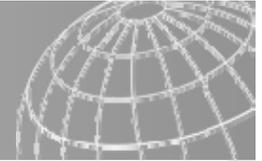


Area of Activity	Basic Package Minimum requirements	Advanced Package Standard approaches	Deluxe Package Premium low carbon approaches
<b>1. Make roads people friendly</b>	<ul style="list-style-type: none"> <li>• side walks</li> <li>• reduce barriers</li> <li>• speed limits</li> <li>• bicycle lanes</li> </ul>	<ul style="list-style-type: none"> <li>• pedestrian and bicycle short cuts</li> <li>• Diverse street environment</li> <li>• Trees along roads</li> <li>• Separated networks for bicycles and pedestrians</li> </ul>	<ul style="list-style-type: none"> <li>• Public bicycle scheme</li> <li>• Shared space concepts</li> </ul>
<b>2. Manage parking demand</b>	<ul style="list-style-type: none"> <li>• Prohibit side walk parking</li> </ul>	<ul style="list-style-type: none"> <li>• maximum requirements for parking places for cars</li> <li>• minimum requirements for parking spaces for bicycles</li> <li>• Pricing for existing parking places</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce/limit number of parking spaces in urban areas</li> <li>• Zero parking in new developments</li> </ul>

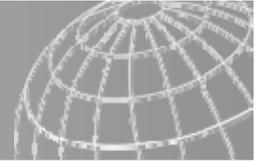
# Local Level Policy Packages



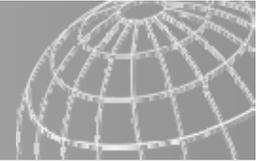
Area of Activity	Basic Package Minimum requirements	Advanced Package Standard approaches	Deluxe Package Premium low carbon approaches
<b>3. Move to high quality public transit</b>	<ul style="list-style-type: none"> <li>• public transit clean and convenient</li> <li>• Increase speed through priority signaling</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated ticketing / fares</li> <li>• Information / marketing</li> <li>• Green procurement of vehicles</li> <li>• Bus-only lanes along high-density areas</li> <li>• High quality interchange</li> <li>• Level boarding, and off-bus/metro fare collection to speed up transit</li> </ul>	<ul style="list-style-type: none"> <li>• Comprehensive bus rapid transit system</li> <li>• Urban rail network</li> <li>• Full integration of PT and NMT</li> <li>• Full integration with land-use</li> </ul>
<b>4. Provide inclusive information</b>	<ul style="list-style-type: none"> <li>• Information campaigns</li> </ul>	<ul style="list-style-type: none"> <li>• Cooperation with companies</li> <li>• Car-sharing</li> <li>• Bike-sharing</li> <li>• Car free days</li> </ul>	<ul style="list-style-type: none"> <li>• Travel information (Web 2.0)</li> </ul>
<b>5. Reap the benefits of technological advancement</b>	<ul style="list-style-type: none"> <li>• clean fuels and vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• ITS</li> <li>• Green procurement</li> <li>• Prioritization of PT and NMT</li> </ul>	



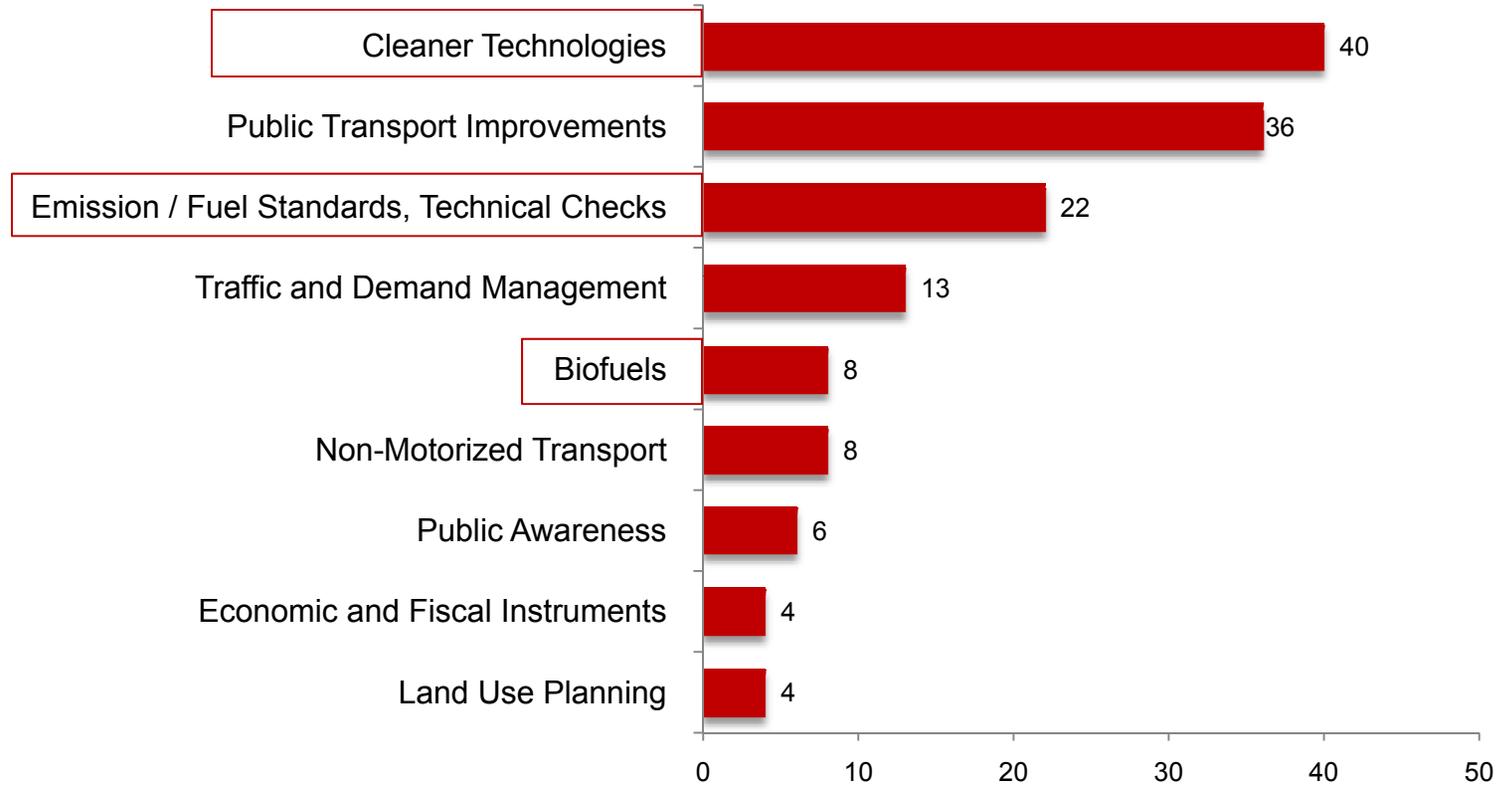
Area of Activity	<b>Basic Package</b> Minimum requirements	<b>Advanced Package</b> Standard approaches	<b>Deluxe Package</b> Premium low carbon approaches
<b>6. Change the role of cars</b>	<ul style="list-style-type: none"> <li>• Speed limits</li> <li>• Physical car restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce investments for motorized traffic</li> <li>• Low emission zones</li> <li>• ITS</li> </ul>	<ul style="list-style-type: none"> <li>• Limitation of access to city centers</li> <li>• Congestion charge</li> <li>• Advanced city toll</li> </ul>
<b>7. Reinvent mixed-used, high density cities</b>	<ul style="list-style-type: none"> <li>• Mixed land use</li> </ul>	<ul style="list-style-type: none"> <li>• Land use regulation</li> <li>• TOD</li> <li>• Green belts</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced integration of land-use and transport into planning</li> <li>• Accessibility of public transit</li> </ul>
<b>8. Create/ Live in urban spaces</b>	<ul style="list-style-type: none"> <li>• Wide side-walks</li> <li>• Pedestrian areas</li> </ul>	<ul style="list-style-type: none"> <li>• Urban greening</li> <li>• Diversity</li> <li>• Small public places</li> </ul>	<ul style="list-style-type: none"> <li>• Adapted architecture</li> </ul>



# 3. Towards Transport NAMAs (Nationally Appropriate Mitigation Actions)

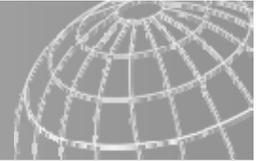


## An analysis of the transport chapters of 71 TNAs



Included in Annex 2 of the UNFCCC TNA Handbook

21 out of 71 analyzed Technology Needs Assessments do not have a transport chapter

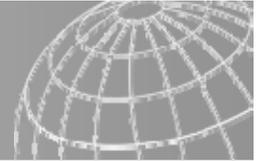


# (Sustainable) Transport NAMAs

*Nationally Appropriate Mitigation Actions*

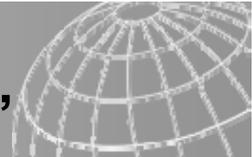
- When a new climate treaty is agreed, sustainable transport policies as listed above could be registered as NAMAs at the UNFCCC.





## 4. Selected GTZ Activities

# Selected GTZ Projects “Climate and Transport”



**Sustainable  
Mobility, Ukraine**



**SUT Support  
to Indian cities**



**E-Mobility, China**



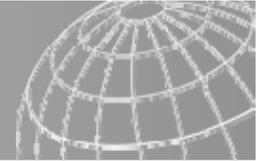
**Public Transport  
Improvement, Danang**



**BRT, Johannesburg**



**Urban Transport,  
Indonesia**



# Bridging the Gap- Initiative

## Pathways for Transport in a Post 2012 Process

www.transport2012.org



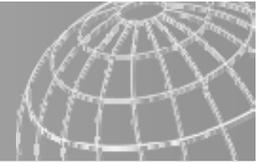
# Include transport in the climate agenda

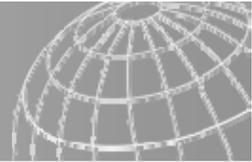
## Objective of the Initiative:

Integrate transport in the climate change negotiations



# Endorsing Organizations





# Website in 4 Languages serving 4200 members in 5 continents

Username    [Forgot Password?](#) | [Register](#)

## Sustainable Urban Transport Project

HOME | PROJECTS | UPCOMING EVENTS | PHOTO GALLERY | NEWS ARCHIVE | ABOUT US | CONTACT

**Sourcebook**

- Institutional and Policy Orientation
- Land use Planning and Demand Management
- Transit, Walking, Cycling
- Vehicles and Fuels
- Environment and Health
- Social Issues in Transport
- Training Documents
- Technical Documents
- BRT Planning Guide
- Further Downloads

**SUMA**

- Urban Transport in Eastern Europe
- Fuel Prices
- Climate Change
- SUTP-Indonesia
- CSD 18/19

**Sign up for our Newsletter**

### Welcome to the Sustainable Urban Transport Project



Policy-makers are facing demands to meet the changing mobility needs of citizens in ways which are economically, socially and environmentally sustainable.

The Sustainable Urban Transport Project (SUTP) Asia is a partnership between the German Technical Cooperation (GTZ), the Bangkok Metropolitan Administration (BMA), CITYNET and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). It aims to help developing world cities achieve their sustainable transport goals, through the dissemination of information about international experience and targeted work within cities.

**Latest News**

#### GTZ MD shares his vision on sustainable transportation



The internet platform Comment:Vision - a joint website of the TV station "Euronews", the Newspaper "European Voice" and SHELL - discussed in March the subject "As well as seeking alternative fuels, should we be changing our entire transportation culture?". A variety of experts gave statements to this key question of transport policy, among them GTZ managing director Hans-Joachim Preuß. He concluded that "we need a paradigm shift! (...) Changing the transportation culture is key for sustainable development and prevention of dangerous climate change". Furthermore, he proposed that "alternative fuels alone can't achieve ambitious reduction targets". In his vision, integrated actions that include "priority for walking, cycling and public transit, dense cities and appropriate taxation of fossil fuels" are necessary. GTZ supports several developing countries with training courses on sustainable transport and helps them in implementation of projects.

**Language**

English

search...









Sustainable Urban Transport Project

Language: English

德国技术合作公司 (GTZ) 总经理提出他对可持续交通的意见

网络平台Comment:Vision (包含“欧洲新闻 (Euronews)”、“欧洲之声 (European Voice)”、“欧洲商报 (EBC)”及“欧洲之声 (European Voice)”等网站) 有家公司联合网站) 在三月进行了一场关于改变整个交通文化”的讨论。与会专家就这一主题发表了看法。GTZ 管理董事 Hans-Joachim Preuß 表示，他认为“我们需要一个根本性的改变”。改变整个交通文化是可持续发展的关键。此外，他还提出，仅靠替代燃料无法实现雄心勃勃的减排目标。在他的愿景中，优先支持步行、骑自行车和公共交通，建设密集城市并合理征收化石燃料的税收，对于实现可持续交通至关重要。GTZ 支持多个发展中国家开展可持续交通培训课程，并帮助这些国家实施项目。

时讯订阅







Chinese

Sustainable Urban Transport Project

Language: Spanish

Bienvenidos a SUTP - Latinoamérica!

Los formuladores de políticas en Latinoamérica están enfrentando grandes demandas para satisfacer las necesidades de movilidad de los ciudadanos de manera económica, social y ambientalmente sostenible. El proyecto SUTP busca ayudar a las ciudades a manejar este reto y lograr sus metas de transporte sostenible, a través de la disseminación de información sobre experiencias internacionales y trabajo puntual con ciudades específicas.

Actualidad

MD de GTZ comparte su visión sobre el transporte sostenible

La plataforma de internet Comment:Vision - un sitio web conjunto de la estación de TV "Euronews", el periódico "European Voice" y SHELL - discutió en marzo el tema "¿Así como buscamos combustibles alternativos, ¿debemos estar cambiando toda nuestra cultura del transporte?". Una variedad de expertos expresó su opinión sobre esta pregunta clave de las políticas de transporte, entre ellos el director de gestión de GTZ Hans-Joachim Preuß. Concluyó que "necesitamos un cambio de paradigma (...) Cambiar la cultura de transporte es fundamental para el desarrollo sostenible y la prevención del peligroso cambio climático". Además, propuso que "los combustibles alternativos no pueden alcanzar por sí solos los ambiciosos objetivos de reducción". En su visión, las acciones integradas necesarias incluyen "prioridad para las caminatas, ciclismo y transporte público; ciudades densas e impuestos apropiados para los combustibles fósiles". GTZ apoya a varios países en desarrollo con cursos de entrenamiento sobre transporte sostenible y los ayuda a implementar proyectos.

Suscripción

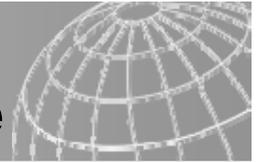






Spanish

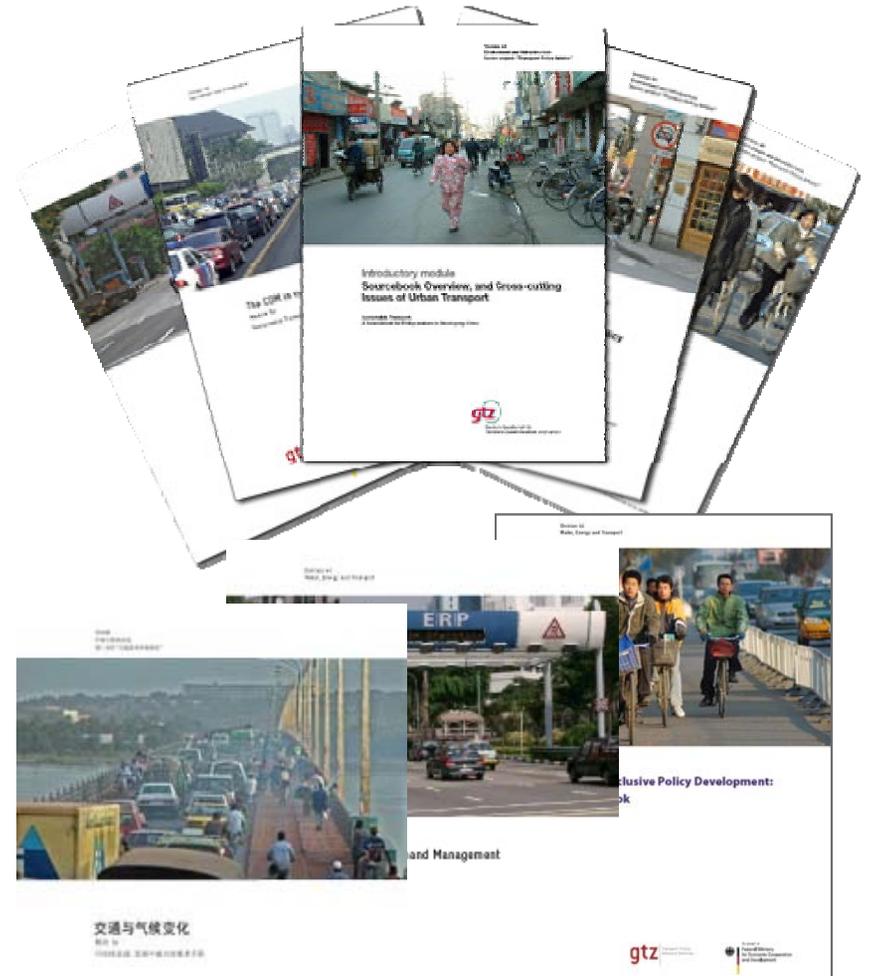
[www.SUTP.org](http://www.SUTP.org) (Chinese website: [www.SUTP.cn](http://www.SUTP.cn))

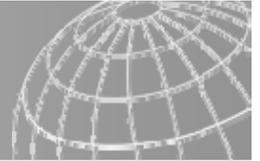


The key features of the Sourcebook include:

- A practical orientation, focusing on best practices in planning and regulation and, where possible, successful experiences in developing cities.
- Contributors are leading experts in their fields.
- An attractive and easy-to-read, colour layout.
- Non-technical language (to the extent possible), with technical terms explained.
- Updates via the Internet.

1. Institutional and Policy Orientation
2. Land Use Planning and Demand Management
3. Transit, Walking, Cycling
4. Vehicles and Fuels
5. Social Issues in Transport
6. Environment and Health





This afternoon the new Module  
“Financing Sustainable Urban  
Transport” will be launched at:

Plenary Session 2: Funding  
Mechanisms to Make it Happen  
(13:30 – 15:20)



gtz

Partner for the Future.  
Worldwide.

Thank you for your attention

GTZ SUTP project  
sutp@sutp.org  
transport@gtz.de

รับสมัครผู้จบ ม.3, ม.6, ปวช./หรือเทียบเท่าศึกษาต่อปวช./

โรงเรียน **วิมลพัฒนศึกษา**

โทร. 0-2660 5100