Urban Transport Financing: How to find a balanced Mix of Economic Instruments

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Transport Advisor
Challenges in developing cities

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

The financing challenge – Why financing is important

- Major actors
- The real costs of transport – who is paying what?

Financial Instruments

- Local Instruments
- National Instruments
- Global Instruments

Combining the financing Options
Introduction: The Module and the financing Challenge

Why financing is important?

Gap between local needs and the available financial resources

- Car-orientated investment
- Poor provisions for pedestrians and cyclists
- Lack of resources for high quality public transport systems

Sustainable Urban Transport
Major Actors

Financing of urban transport

City administration

National and regional governments

Private sector

Citizens

Donors and International Organisations
The real costs of transport – who is paying what?

- Time costs
- Vehicle and vehicle operating costs
- Public transport fares
- Private accident costs

Paid by transport users

- Infrastructure
- Accidents – health treatment, loss of family income, grief and suffer.
- Air pollution, noise, vibration and associated health costs
- Climate Change
- Congestion & urban space consumption

Paid to a large extent by the society through general taxes. Leads also to increased health costs, decreased quality of life, etc.
Correct prices lead to better mobility choices

„Prices for transport services are currently set without reflection of their full costs, thereby permitting car users to travel without being fully aware of the costs of his/her travel activity“

Source: The True Costs of Automobility: External Costs of Cars - Overview on existing estimates in EU-27, TU Dresden

Each car in Germany is subsidised with annually 2.100 € by the society (not considering infrastructure costs)

Source: The True Costs of Automobility: External Costs of Cars - Overview on existing estimates in EU-27, TU Dresden
Major problem of transport financing

High cost of investments and operation vs. the lack of capital

Funds can and should be mobilised from within the transport sector (fuel and vehicle taxes, user fares & charges)

Therefore:

Polluters should pay more!
Transport finances Transport

Revenues from increased costs of using private cars can be used to:

- **MAINTAIN**
  - Appropriate transport infrastructure

- **IMPROVE**
  - Sustainable mobility alternatives

**BENEFITS FOR MULTIPLE STAKEHOLDERS**

Lowered congestion and parking pressure leads to increased accessibility for individuals, businesses and cities.
Financial Instruments can be integral part of TDM and...

are vital to create high performance, cost-effective transportation systems

- recognize that travel demand is not given, but is a function of transportation policies, pricing, investments and choices

They aim at

- creating more revenues to set up a sustainable urban transport system
- Reduce car usage in city centers and shift demand to SUT modes
<table>
<thead>
<tr>
<th>Type of incentive or disincentive</th>
<th>Possible Economic Instruments</th>
<th>Selected Economic Measure(s)</th>
</tr>
</thead>
</table>
| Discourage motorized vehicle ownership | - Tax/charge on vehicle purchase/ownership/scrappage | - Annual vehicle tax  
- Registration tax/charge  
- (Re)sales tax/charge  
- Scrappage tax/charge |
|                                  | - Restricting the number of vehicles and/or new registrations | - Auction schemes competitive bidding for new licenses  
- Licensing car ownership |
| Discourage motorized vehicle use  
Encourage switch to public or non-motorized transport | - Tax/charge on vehicle use | - Fuel tax  
- Pay-at-the-pump (sur)charges |
|                                  | - Tax/charge on road and/or infrastructure use  
- Restricting access to urban centers or special areas | - Parking fees  
- City tolls  
- Road pricing  
- Bridge tolls  
- Cordon pricing  
- Congestion pricing |
| Subsidies for public transport and/or multimodal transport (modal subsidies) | - Subsidies for public transport fees  
- Subsidies for public transport networks and operation  
- Tax-deductible public transport expenses  
- P%R schemes | |
| Encourage lower emission technology use and innovation | - Taxes/charges on vehicle purchase/ownership/scrappage, Taxes/charges on vehicle use, Taxes/charges on road and/or infrastructure use | - Tax differentiations based on emissions  
- Carbon/energy taxes  
- Emission fees  
- Emission-based surcharges  
- Subsidies, tax rebates for low emission vehicles/technologies |
## Various financing options for different ranges of application

<table>
<thead>
<tr>
<th>Local Instruments</th>
<th>Main components supported</th>
<th>Amount typically involved</th>
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<tbody>
<tr>
<td>Parking charges</td>
<td>Infra-structure x</td>
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<tr>
<td>Road Pricing/congestion charge</td>
<td>Infra-structure x</td>
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<td>Employer contributions</td>
<td>Infra-structure x</td>
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<td>Fare box revenues</td>
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<td>Public transport subsidies</td>
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<td>Land development/land value taxes</td>
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<td>Public private partnerships</td>
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<td>Advertising</td>
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<th>National Instruments</th>
<th>Main components supported</th>
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<td>Fuel taxes/surcharges</td>
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<tr>
<td>Vehicle related taxes and charges, including auctioning of quotas</td>
<td>Infra-structure x</td>
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<td>Loans and grants</td>
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<th>Global Instruments</th>
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<td>GEF</td>
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<tr>
<td>Multilateral/bilateral climate funds</td>
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</table>
LOCAL Instruments

- Parking Charges
- License plate auction, vehicle quota
- Road Pricing/Congestion Charging
- Employer contributions
- Environmental Zones and related charging
- Land development / land value taxes
- Public Private Partnerships
- Advertising
Parking Charges

Characteristics:
- Strength in efficiency and equity
- Steady revenue stream
- Fostering of public transport use
Parking is a key issue in the push-and-pull approach towards better urban transport with fewer cars and more cycling, walking, and transit.

Parking control and pricing is the most commonly applied demand management measure.
Parking? Why Manage it?

Increasing emissions of greenhouse gases and noise caused by parking-space-search-traffic:

Cruising for curb parking generates about 30% of the traffic in central business districts.
Something is wrong with parking

In the car-dependent suburbs of Auckland, New Zealand

Near the center of Houston, USA (via Google Maps)
Considerations:
• Off-street parking should be cheaper than on-street parking
• Parking fees should be higher than a single bus fare
• Implementation of workplace parking levies
Poorly-managed on-street parking harms everyone
On-street pricing really does work

No meters (free parking)

Meters (Prices little too low)

Meters (Prices now too high)

Grosvenor Square, London

Source: TRL via ITDP (2011): Europe’s Parking U-Turn but based on a figure in Donald Shoup’s High Cost of Free Parking
Comparison of parking fees and single bus fares

“Parking fees should be higher than a single bus fare”

Cities with parking prices depending on occupancy

Examples include: Amsterdam, Rotterdam, Berlin, Budapest, Dublin, Taipei, Vancouver, San Francisco, Auckland, and various local authorities in Sydney and London

Part of Amsterdam’s parking price map
Example: London’s parking maximums

How much parking does London’s “Gherkin” building have?

None for private cars! Single basement for essential parking (bicycles, people with disabilities, loading/unloading). This also often in Hongkong.

Offices in Canary wharf: MAXIMUM of 1 space per 1100 m² (and zero minimum except spaces for people with disabilities)
Less city-centre parking, more space for people

- Focus on public parking
- Improve on-street parking management
- Relax about ‘shortage’
- Transit-oriented areas can even limit parking supply
- And win back public space

Gammel Strand in Copenhagen – before 1991
Source: Kristian Skovbakke Villadsen, May 2012

Gammel Strand in Copenhagen – after 1991
Source: Kristian Skovbakke Villadsen, May 2012
Comprehensive Parking Management

- Effectively manage available space in urban areas
- Especially in city centres parking should never be for free!
- Clear rules and communication of parking scheme and alternative travel options as part of urban mobility management

City of Amsterdam earns

150 mln. € annually through parking fees
used for public transport, walking, cycling
Vehicle Quota

Case Study: “license plate auction” in Shanghai, Guangzhou, Singapore and...

- Only a given number of vehicles can be registered per month
Vehicle License Quota/Auctioning

In Shanghai since 1998:

- Limit number of new vehicles: 7000 – 8000 per month
- Auction system, current price around $10,000 US

City Income $800 million US per year

Vehicle quotas in Singapore

• Each car registered requires a Certificate of Entitlement (valid 10 years, extendable), with the COE price determined by auction

• Available quota for new vehicles depends on the targeted growth rate in vehicle population

• Growth rate target was 3% (prior to 2009), 1% (from 2012) and finally 0.5% in Feb 2013)
# Bidding Results, Quota Premium and Prevailing Quota Premium in Singapore

<table>
<thead>
<tr>
<th>Month of Bidding Exercise</th>
<th>Vehicle Category</th>
<th>Category A Cars up to 1600cc &amp; 97kW</th>
<th>1st Bidding</th>
<th>2nd Bidding</th>
<th>Category B Cars above 1600cc or 97kW</th>
<th>1st Bidding</th>
<th>2nd Bidding</th>
<th>Category C Goods vehicles &amp; buses</th>
<th>1st Bidding</th>
<th>2nd Bidding</th>
<th>Category D Motorcycles</th>
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<td>Successful bids</td>
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<td>1.345</td>
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1 PQP: Premium Quota Premium

Road Pricing/Congestion Charging

Direct charging for using public road space

Types:
• Cordon pricing
• Time-independent tolling
• Electronic road pricing

Characteristics:
• Directly charges use of scarce public space
• Flexibility
• Leads to reduction of congestion, pollution, noise, traffic accidents
• Political acceptability often difficult

Considerations:
• Revenues should be used for public transport improvements to foster a modal shift and increase of public and political acceptability
Case Study: Particulate matter emission -
Emission zones in Germany

- An emission zone:
  - is an area from which highly polluting motor vehicles are banned
  - these will be excluded from the city centre in three stages
  - to enter the Zone, vehicles must display a permit disc (‘Vignette’)

- As of January 2008: Berlin, Hannover, Cologne, meanwhile all major cities in Germany followed; **55 cities in Germany by now**
Not only in Germany: More than 200 cities in 10 countries across Europe are now operating Low Emission Zones where the most polluting vehicles are either banned or charged an access fee.

- This is to improve the air quality in the city centres and to protect the health of residents. Road traffic is the main source of noxious substances, like fine dust (PM 10) and nitrogen dioxide (NO₂).

- Just an example for information related to travellers: If you're planning a road trip you’ll want to know where these LEZ are, what types of vehicle they affect, what emissions standards are required, and whether registration is required or not, see https://www.theaa.com/european-breakdown-cover/driving-in-europe/european-low-emission-zones
Employer Contributions

Financial Support of local public transport by employer’s and by businesses

**Case Study:** Brazilian Vale-Transporte

- In cities employers are required by law to buy and provide public transport tickets
- Thereby the employers can withhold 6% of salaries to cover these costs
**Case Study: Versement Transport in France**

- The French Versement Transport (VT) is a tax levied on employees’ salaries to pay for improvements in public transport in the local area. In return, employees receive subsidies or free travel on public transport.
- Organisations with more than 9 employees in a district with more than 10,000 inhabitants are legally required to pay the VT.
- The rate currently ranges from 0.55% to 1.72% of the total wages of each eligible company.
- Revenues have been used to fund small- and large-scale infrastructure projects across France.
- The VT has played a major part in funding the upgrading and expansion of the Paris Metro.

**Sources:**
- [http://www.indigguide.com/france/paris-metro.htm](http://www.indigguide.com/france/paris-metro.htm)
Land Development and Land Value Taxes

- Financing mechanism where land owners, directly benefiting from new public infrastructure, have to pay
- Tax payers are not penalised
- Businesses located near the new infrastructure can increase their trades and profits
Public Private Partnerships (PPP)

- Utilisation of private sector know-how
- Risks are allocated to the party best able to manage each particular risk
- Enhanced budgetary predictability
Advertising

- Efficient and highly accepted instrument
- Can be used to bridge shortfalls in financing
- Little benefit towards sustainable transport

Case Study: Advertising on bus stops in London
National Instruments

- Fuel taxes and surcharges
- Vehicle related taxes and charges, including auctioning quotas
- Loans and grants
National sustainable transport financing facilities should be developed along the complete chain towards Sustainable Transport:

A country’s **sustainable development, climate & energy goals**

**Institutions and a legal framework** supporting these goals

The country’s **transport policy & strategy – including the national sustainable urban transport policy**

**Transport taxation and charging policies** (Where the money comes from?)

**Appropriate spending** - based on standardized evaluation criteria, urban mobility plans (Where the money goes?)

Contraproducive counter measures, such as funding for private transport through cheap loans for buying vehicles, too low fuel taxes or even fuel subsidies, etc. should be avoided!
Fuel Taxes and Surcharges

Characteristics:

- Simple, cost-efficient and reliable way of charging
- Most appropriate way to focus on the user-pay-principle
- Political acceptability sometimes problematic

On a global level between 80 to 90% of all revenues derived from the transport sector are being raised from fuel taxes
International Fuel Prices (November 2016)
Country Category 1:
High Subsidies (up to 28 US-Cents)
The retail price of Gasoline is below the price of crude oil on the world market.

Country Category 2:
Subsidies (29-70 US-Cents)
The retail price of Gasoline is at least as high as the price for crude oil on the world market and below the price level of the United States.

Note: The fuel prices of the United States are average cost-covering retail prices inclusive of margin VAT, sales tax and excise, approx. 10 US-Cents for the 2 road funds (federal and state). This fuel price may be considered as the international minimum benchmark for a non-subsidized road transport policy, though not yet covering external costs for health and environmental damages.

Country Category 3:
Taxation (71-166 US-Cents)
The retail price of Gasoline is at least as high as the price of the United States and below the price level of Poland.

Note: In November 2016, Gasoline prices in Poland were the lowest in EU-28. Prices in EU countries are subject to VAT, specific fuel taxes as well as other country-specific duties and taxes. The EU sets minimum taxation rates for fossil fuels.

Country Category 4:
High Taxation (107 and more US-Cents)
The retail price of Gasoline is at least as high as the price level in Poland.
Note: At these levels, countries are effectively using taxes to generate revenues and to encourage energy efficiency in the transport sector.
Country Category 2: Subsidies (23-64 US-Cents)
The retail price of Diesel is at least as high as the price for crude oil on the world market and below the price of the United States.
Note: The fuel prices of the United States are average cost-covering retail prices incl. industry margin, VAT/taxes and incl. approx. 10 US-Cents for the two road funds (federal and state). This fuel price may be considered as the international minimum benchmark for a non-subsidized road transport policy, though not yet covering external costs for health and environmental damages.

Country Category 1: High Subsidies (up to 26 Cents)
The retail price of Gasoline is below the price of crude oil on the world market.

Country Category 3: Taxation (65-102 US-Cents)
Retail price of Diesel is at least as high as the price of the United States and below the price level of Luxembourg.
Note: In November 2016, Diesel prices in Luxembourg were the lowest in EU-28. Prices in EU countries are subject to VAT, specific fuel taxes as well as other country specific duties and taxes. The EU sets minimum taxation rates for fossil fuels.

Country Category 4: High Taxation (103 and more US-Cents)
The retail price of Diesel is at least as high as the price level in Luxembourg.
Note: At these levels, countries are effectively using taxes to generate revenues and to encourage energy efficiency in the transport sector.

Red Benchmark: Price of crude oil on world market = 29 US-Cents/Litre (US$ 46.7/Barrel)

Grey Benchmark: retail price of Diesel in Luxembourg = 103 US-Cents/Litre

Green Benchmark: retail price of Diesel in the United States = 65 US-Cents/Litre

Data as of mid-November 2016
giz.de/fuelprices
Low or even subsidized fuel prices encourage...

...Inefficient vehicles

...Urban Sprawl with high travel distances

...Low quality fuels

...Excessive car use

...Under-recovering of refineries with fuel shortages

...Lack of innovation in car industry
Some fuel taxes and surcharges are local!

Case Study: Colombia URBAN fuel surcharge
- Colombian cities have a 25% surcharge on gasoline sales
- Half of Bogotá’s surcharge revenues are for Bogotá’s TransMilenio System
- Private vehicle owners finance one third of mass transport system
Tax or charge on car purchase and/or ownership (Vehicle taxes)

**Characteristics:**

- Taxes are flexible, can be varied depending on engine size, carbon emissions, environmental standards, weight or number of axles.
- Taxes are able to reflect externalities.
  - Generally surprisingly high political acceptability (up to a point).
  - Usually set nationally.
Vehicle-Related Taxes and Charges - EU Countries

- 20 out of the EU’s 27 member states apply CO₂-based car taxation
- 15 countries also offer cash incentives for buying electric vehicles

### Case Study France

Environmentally-oriented bonus-malus system for new cars

<table>
<thead>
<tr>
<th>Vehicle Emittance</th>
<th>Bonus</th>
<th>Malus</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20g CO₂/km</td>
<td>Max. €6.300</td>
<td>-</td>
</tr>
<tr>
<td>21-60g CO₂/km</td>
<td>Max. €4.000</td>
<td>-</td>
</tr>
<tr>
<td>61-126g CO₂/km</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>127-190g CO₂/km</td>
<td>-</td>
<td>€50 - ca. €10.000</td>
</tr>
<tr>
<td>&gt; 191g CO₂/km</td>
<td>-</td>
<td>€10.000</td>
</tr>
</tbody>
</table>


Photo by Manfred Breithaupt

Case Study
Dutch vehicle taxes

- One of the lowest shares of diesel vehicles among its new cars
- By far the highest percentage of electric vehicles (mainly plug-in hybrids) among new car purchases at 5.3% of all sales
- Market for fuel-efficient cars is also influenced by the very high rates of tax and duty on road fuels
  - For petrol, Dutch tax rate is highest found in the EU, with more than €1 of tax on every litre sold
  - Tax on diesel is lower, but still among the highest levels found in Europe
Dutch vehicle registration taxes

**Step 1: Otto**

<table>
<thead>
<tr>
<th>The CO₂ emission is higher than</th>
<th>but not more than</th>
<th>Calculate the tax for a petrol car as follows:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 g/km</td>
<td>76</td>
<td>▪ deduct the value from column I from the CO₂ emission of the car</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ multiply that sum by the amount in column IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ add to that sum the amount from column III</td>
</tr>
<tr>
<td>76 g/km</td>
<td>102</td>
<td>€353</td>
</tr>
<tr>
<td></td>
<td></td>
<td>€66</td>
</tr>
<tr>
<td>102 g/km</td>
<td>150</td>
<td>€2.221</td>
</tr>
<tr>
<td></td>
<td></td>
<td>€145</td>
</tr>
<tr>
<td>150 g/km</td>
<td>168</td>
<td>€9.181</td>
</tr>
<tr>
<td></td>
<td></td>
<td>€238</td>
</tr>
<tr>
<td>168 g/km</td>
<td>-</td>
<td>€13.465</td>
</tr>
<tr>
<td></td>
<td></td>
<td>€475</td>
</tr>
</tbody>
</table>

**Example:**
Otto 100gr/km: \((100 - 76) \times €66 + €505 = 2089 €\)
Diesel 100gr/km: \((100 - 65) \times €86.69 = 3034.15 €\)

Data from 2017:
Singapore – Cost of Vehicle Purchase

Open Market Value (OMV)

- OMV is assessed by the Customs & Excise Department, taking into account the purchase price, freight, insurance, handling and all other charges incidental to the sale and delivery of the car from country of manufacture to Singapore.

Registration fees

- Registration Fee (RF) $140
- Additional Registration Fee (ARF):
  - 130% of OMV$ or 110% of OMV$ or 100% of OMV$
- Certificate of Entitlement (COE) Bid
- Customs Duty 20% of OMV
- Goods & Services Tax: 5% based on the CIF value (cost, insurance & freight)

<table>
<thead>
<tr>
<th>BMW 325i Convertible</th>
<th>S$</th>
<th>Euro</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMV</td>
<td>63061</td>
<td>33506</td>
</tr>
<tr>
<td>Duty</td>
<td>12612</td>
<td>6701</td>
</tr>
<tr>
<td>GST</td>
<td>5297</td>
<td>2814</td>
</tr>
<tr>
<td>ARF</td>
<td>63061</td>
<td>33506</td>
</tr>
<tr>
<td>COE</td>
<td>13389</td>
<td>7114</td>
</tr>
<tr>
<td>Total</td>
<td>157420</td>
<td>83614</td>
</tr>
</tbody>
</table>

National Transport Funding:
Example Germany

Focus on Investment - Federal Local Transport Financing Law

- Co-financing transport projects by 75% to 90%
- Co-financing large scale local rail infrastructure by 60%

Focus on operational subsidies for public transport - Federal Regionalize Transport Law

- 6.5 billion Euro annually (currently) ~ 80 € / inhabitant
- Channeling all funds to the provinces/Länder (according to a share based on the number of inhabitants)
Subsidies
Experiences from selected Cities

• Hongkong: cost covering PT system as a whole
• Singapore: at least all the operational costs are covered
• Frankfurt: covers operations costs of bus services, after they were completely tendered out
• BRT systems, with high occupancy rates can and do cover costs since they achieve higher average speeds, higher daily mileage and hence much greater passenger loads and revenues
• Tendering out of PT services also leads in general to lower requirements for subsidies
• Most bus systems in Latin American cities are presently not receiving operational subsidies
Global Instruments

• CDM
• GEF
• Multilateral/bilateral climate funds
Funding opportunities
Mitigation in Transport Sector

Existing opportunities
- Multilateral
  - NAMA Facility
  - Clean Technology Fund
  - Global Environment Facility
  - ADB Clean Energy Fund
  - ADB Climate Change Fund
  - Hatoyama Initiative
- Bilateral
  - German International Climate Initiative
  - Nama Facility
- Carbon market
  - Clean Development Mechanism
  - Carbon Facilities
- Bilateral and multilateral
  - Fast start financing
  - Mitigation fund / CGCF
  - Sectoral mechanisms

Future opportunities (NAMAs)
Clean Development Mechanism (CDM): Example Cable Cars, Medellín, Colombia

- Construction and operation of 10 cable cars in Medellín
- Registered by the CDM in 2010
- Integrated with wider metro network
- Estimated 17,290 tCO$_2$eq emission reduction per year
- Funding from:
  - District government
  - Operator (ETMVA)
  - Carbon credits
Global Environment Facility (GEF)

• Total US$ 8.8 billion (1991-2009)
• **US$ 201 million** allocated to transportation (1999-2009), stays behind expectation re transport
• GEF 5 (2010 – 2014) **US$ 250 million** assigned to transportation.
• **Activities:**
  – Full size projects (FSPs) (> US2Million)
  – Medium size projects (MSPs) (<US2Million)
  – Enabling Activities (< 150000 US)
• **GEF Agencies:** MDBs, UNEP, UNDP, IFAD, FAO, UNIDO.
• Consistent with national priorities & with GEF operational strategy, covers **incremental costs**, requires public involvement, endorsement by host country, eligible country.
Combining the Financing Options
Development of an **Urban Transport Fund**

“Urban transport is a complex system in which various components must work together effectively. This calls for **an integrated financing structure at the urban level.**”
Earmarking certain revenues may help to improve political acceptability and the financial stability of urban transport funds.”
Financing Sustainable Urban Transport

The Contribution of GIZ

You can download the module from www.sutp.org
First-hand knowledge on Sustainable Urban Transport

on www.sutp.org and www.capsut.org

GIZ Sourcebook on Sustainable Urban Transport

• addresses the key areas of sustainable transport policy framework
• consists of over 70 modules, technical papers and training packages
• intended for policy-makers and their advisors

Contact: transport@giz.de
“In terms of infrastructure, what differentiates advanced cities are not highways or subways but quality sidewalks and cycleways”

Enrique Penalosa, Mayor of Bogota, Colombia
Thanks!

Manfred Breithaupt
manfred.breithaupt@gmail.com

www.sutp.org

www.capsut.org