



A Sustainable Urban Transport System for Surabaya

Revision 31 January 2001



GTZ's Sustainable Urban Transportation Project (SUTP) in Surabaya aims to work with related agencies and the people of Surabaya to devise and implement policies to establish a sustainable urban transportation system.

This will result in a broad range of "local" economic, social and environmental benefits, and will also contribute to a stabilisation of "global" carbon dioxide emissions from Surabaya's transport sector. The project is expected to provide a model of how to reduce such emissions from the transport sector in large cities in developing countries.

GTZ SUTP has embarked on an ambitious and multifaceted program, including development of sustainable transport policies in intensive consultation with counterparts, design and implementation of a public awareness campaign, technical measures to reduce vehicle emissions, enhanced air quality management capability, adoption of appropriate fiscal instruments, improvement of conditions for non-motorized transport and pedestrians, strong promotion of the use of CNG, a public transport improvements pilot including regulatory and institutional reforms to be applied nationally if successful, and thorough dissemination of international experiences.

GTZ SUTP commenced in Surabaya in 1998.

2

Structure of paper

- 1 THE CURRENT SITUATION, AND OUTLOOK FOR 2010
 - International comparison
 - Outlook for Surabaya
- 2 A SUSTAINABLE URBAN TRANSPORT SYSTEM
 - Sustainable urban transport: the idea and principles
 - A vision and targets for Surabaya
 - Reaching the targets: policy proposals

3



The current situation, and outlook for 2010

4

International comparison

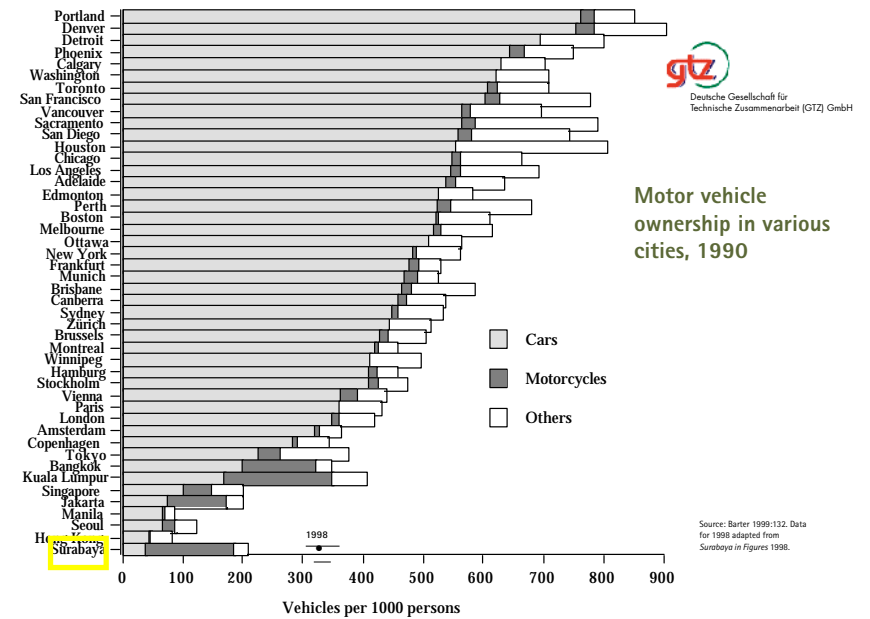
International comparison: regional perspective

SURABAYA COMPARED TO OTHER BIG CITIES IN ASIA

- Surabaya, Jakarta, Manila
- Bangkok, Kuala Lumpur, Seoul
- Singapore, Hong Kong, Tokyo



Surabaya's transport challenges are not unique. Similar circumstances, including deteriorating traffic conditions and air quality, are being faced in many cities in developing countries.



Motor vehicle ownership in various cities, 1990

Source: Barter 1999:132. Data for 1998 adapted from Surabaya in Figures 1998.

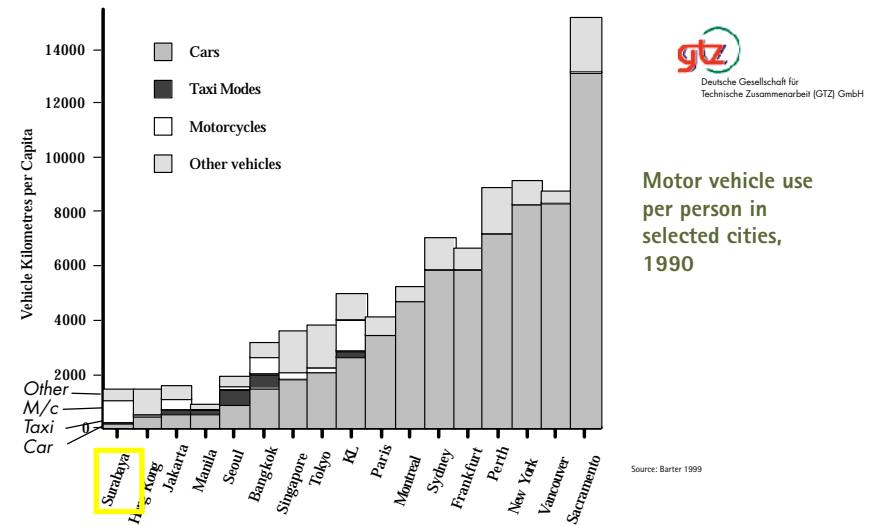
- Regional differences (highest in the US, then Europe, and lowest in Asia)
- Position of Surabaya: Already higher than Singapore and Jakarta, and twice as high as Manila, Seoul and Hongkong.

Car ownership and trends, 1960–1993

	Car Ownership (cars per 1000 persons)					Average Annual Change ^a (cars per 1000 per year)			
	1960	1970 ^b	1980	1990	1993	1960-70	1970-80	1980-90	1990-93-98
Hong Kong	11	27	42	43	46	1.6	1.6	0.1	1.4
Surabaya	?	14	20	40	47	-	0.7	2.0	2.3 4.2
Manila	?	38	55	66	79	-	1.7	1.1	4.3
Jakarta	?	22	38	75	92	-	2.0	3.7	5.9
Singapore	39	69	64	101	110	3.0	-0.5	3.7	3.5
Seoul City ^c	?	6	16	83	123	-	1.0	6.8	13.3
Kuala Lumpur	46 ^d	72	86	170	206	2.6	1.4	8.4	12.0
Bangkok	14	54	71	199	220	4.0	1.7	12.7	7.3
Tokyo ^f	16	105	156	225	236	8.9	5.1	6.9	3.8
European	122	243	332	392	?	12.1	8.9	6.0	-
Canadian	274	348	447	524	?	7.4	9.9	7.7	-
Australian ^e	223	321	443	491	?	9.8	12.2	4.8	-
United States	376	460	547	608	?	8.4	8.7	6.1	-

Source: Barter 1999. Data for 1993-98 adapted from Surabaya in Figures 1998.

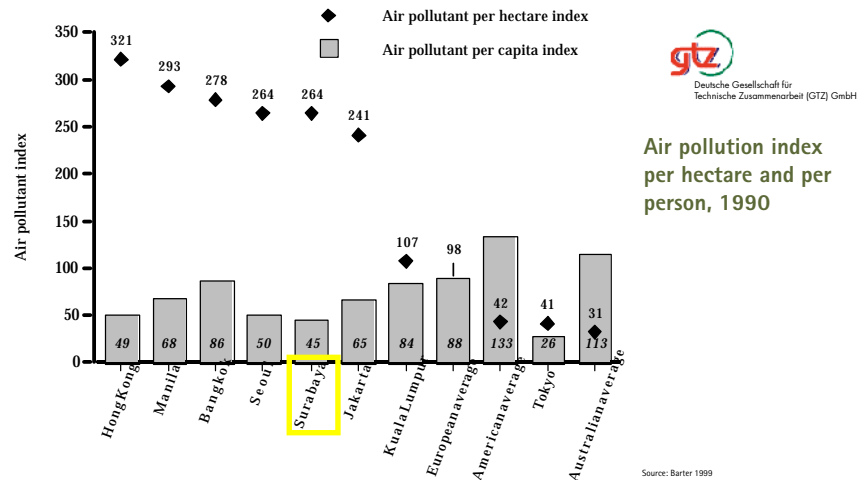
- The rate of car ownership in Surabaya in the 1990s continued to accelerate.
- This acceleration came despite the impact of the economic crisis of 1997–1999, in which urban areas in Java were amongst the worst affected. Ownership in the year 2000 is even higher: around 80 cars per 1000 people.



Motor vehicle use per person in selected cities, 1990

Source: Barter 1999

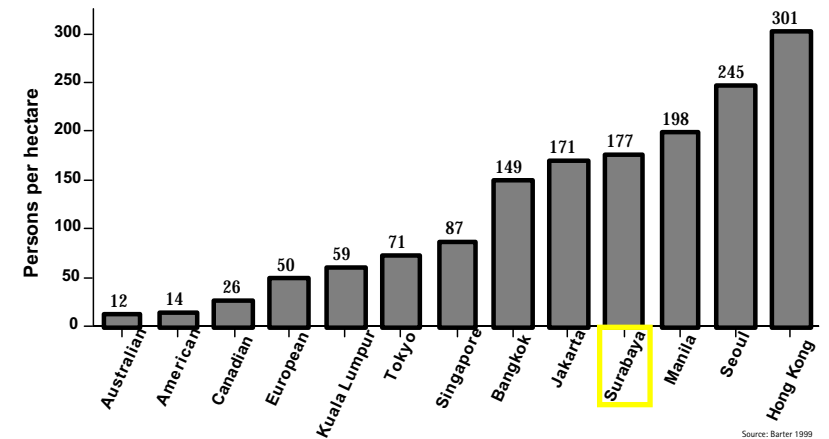
- Since 1990 large cities in Asia including Bangkok, Manila, Jakarta and Seoul have already faced notorious severe traffic congestion problems, along with various related problems such as air pollution.
- It is sobering to note that this has resulted from what is still rather low levels of vehicle use per person.



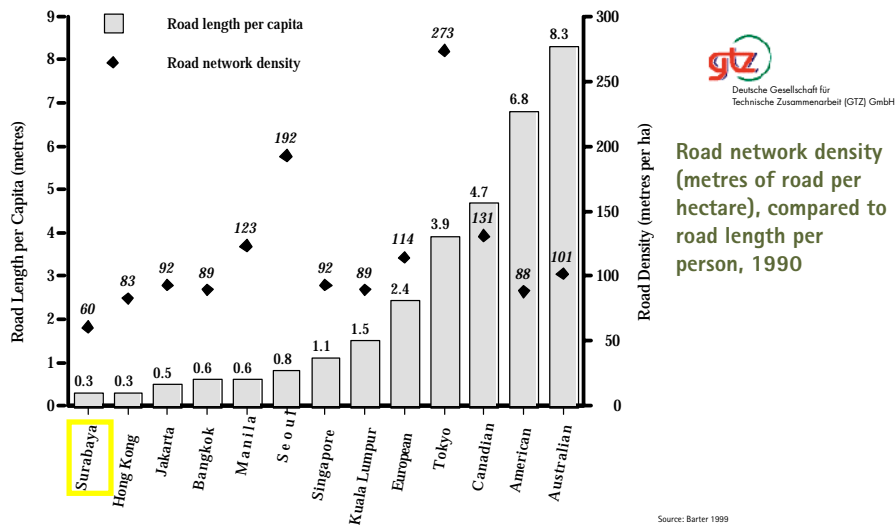
Air pollution index per hectare and per person, 1990

- Comparative table (value of 100 is average)
- NOx (nitrogen oxides), CO (carbon monoxide), SO2 (sulphur dioxide), VHC (volatile hydrocarbons), SPM (suspended particulate matter)
- Air pollution per hectare is already very high in Surabaya. This is alarming given Surabaya's relatively low—but rapidly rising—level of motorisation, and the fact that air pollution related morbidity is already very high.

Urban population density, 1990

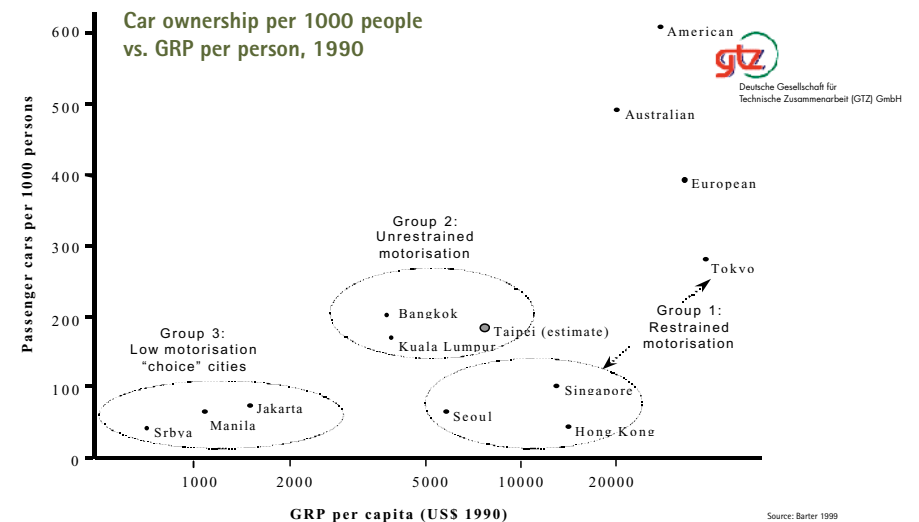


- High density: a challenge but also opportunity, esp. for public transport & mass transit.
- Rapid increases in congestion with per capita increases in car ownership.
- High densities should be maintained, including by limiting major trip attractor development in fringe areas and greenfields sites.



Road network density (metres of road per hectare), compared to road length per person, 1990

- This factor has a severe impact on the level of congestion and vehicle speeds.
- Simply building more roads or widening existing roads does not provide a solution. New roads are often inefficient – generating new private motorised traffic – and inequitable, favouring private car owners over collective modes.



- Do not have to follow the curve to the upper right in the direction of a "traffic disaster" such as Bangkok. Can move to the lower right, as has been done by Singapore, Seoul, Tokyo and Hong Kong.
- More road length per capita and much lower population density translates into greater capacity for cars in Europe and American cities.
- Though still "with a choice," Surabaya will soon be in the "unrestrained" group.

Outlook: Congestion and pollution

By the year 2010 if action is not taken
(World Bank projections):

- More than half of main road links will be operating at or above capacity
- Average vehicle speeds on main roads will be less than 10km/hour
- There will be an increase of 120% in vehicle trips into the central city area, increasing from **243,000 pcu per day** in 1995 to **535,000 pcu per day** in 2010.
- Emissions of pollutants and fuel consumption of each vehicle will increase dramatically, due to the slow vehicle speeds and stop-go driving pattern.



GEJALA METRO — Karya Sukda Soemto dari Thailand, Serayu Gaya Bangkok, dalam Pameran Koran Asia ke-2 di Galeri Pasar Seni Ansof, Jakarta, tanggal 26 Juni 1991, menunjukkan gejala di berbagai metropoliten di Asia.
Sumber: Kompas 25 Juni 1998

Congestion and pollution as a part of life.

13

Outlook: Dangerous

Adults remember fondly when they used to walk or ride bicycles to school. They remember playing in the street and feeling quite safe.

Today's children in Surabaya face a very different reality. The freedom to travel, explore and play independently outside



the home is restricted. The street has become a dangerous environment for children. Aggressive drivers, fast-moving traffic, unsafe pedestrian environments, pollution, and noise make getting around not only difficult for children, but extremely dangerous.

14

Outlook: Damage to public health

The World Health Organisation (UNEP/WHO 1992*) says the following of air pollution:

* Quoted in Barter 2000

Air pollution can adversely affect human health, not only by direct inhalation, but also indirectly by other exposure routes, such as drinking water contamination, food contamination and skin transfer. Most of the traditional air pollutants directly affect the respiratory and cardiovascular systems...

The direct human health effects of air pollution vary according to both the intensity and the duration of exposure and also with the health status of the population exposed. Certain sectors of the population may be at greater risk, for example, the young and the elderly, those already suffering from respiratory and cardiopulmonary disease, hyper-responders and people exercising.



15

Outlook: Lifestyle and quality of life

An urban transport system dominated by cars and motorbikes is bad for our health.



Photo: GTZ SUFP 2000



But dependence on cars and motorbikes for transport also translates into more road deaths, increased noise throughout the city, sedentary lifestyles, and increased stress.

16



Bangkok Post

The World Bank *Urban Transport Strategy Review* (PADECO 2000) points out that one of the main reasons for the intractable transport problems in Bangkok is that policy makers were too slow to adopt measures such as promoting public transport.



Outlook: Modal split public transport

Public transport vs. private vehicles

Dorsch Consult in a study for the World Bank showed that in 1995 around 65% of motorised trips were done with private cars and motorcycles, and **only 35%** with public transport (including taxis).

It was projected that this will decline to 77% of motorised trips with private vehicles

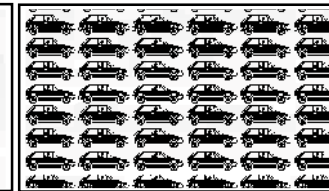
and **only 23%** with public transport by 2010, if measures are not taken.

GTZ SUTP surveys in January and February 2000 indicated that 70% of peak period trips in the main north-south corridor in Surabaya were done with private cars and motorcycles, with only 30% by public transport. Of this 30% only one third was by large bus.

Transport 11,200 people with:



130 large buses ...

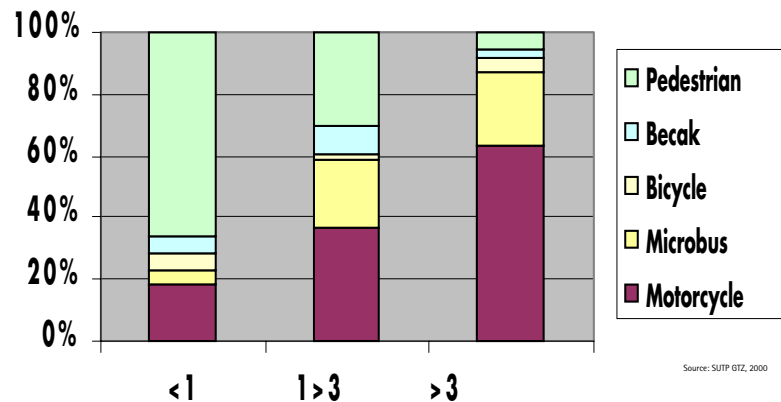


... or 8,000 private cars.

Source: Singapore Transport Master Plan, Singapore Transport Authority

Outlook: Modal split NMT

Kedungdoro: Mode of travel vs. trip length, 2000

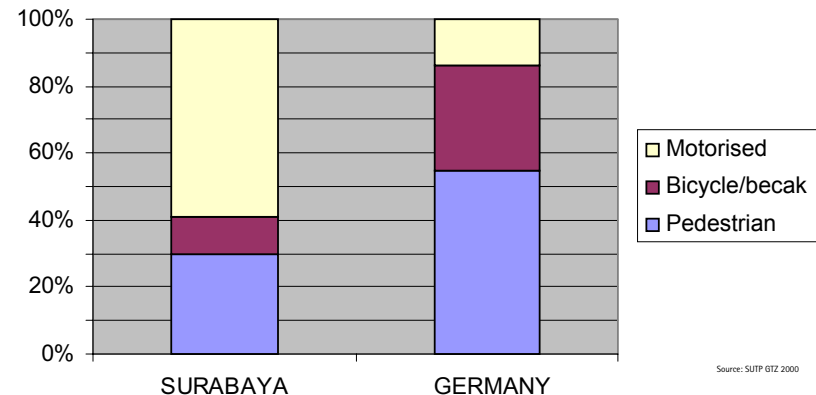


Source: SUTP GTZ, 2000

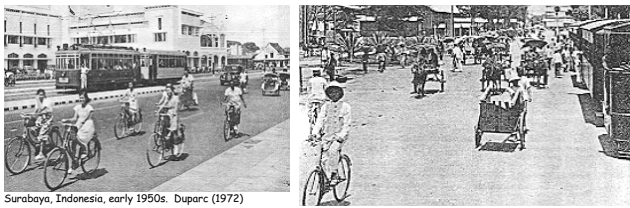
Around 60% of short trips (1-3 km) are done with a motor vehicle. This very high percentage is caused largely by the poor conditions for cycling and walking. Similar figures are found in the Jemursari area. Short trips in Surabaya are very difficult.

Outlook: Modal split NMT

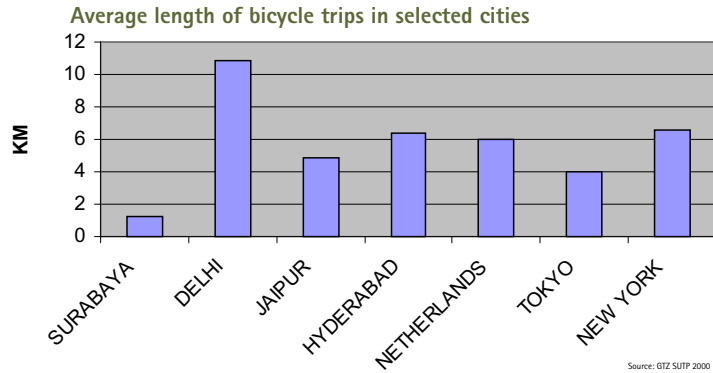
Mode of travel used for short trips (1-3km), 2000



Source: SUTP GTZ 2000



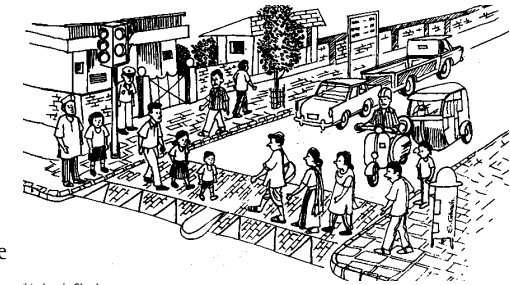
Surabaya, Indonesia, early 1950s. Duparc (1972)
Source: Barter 1999



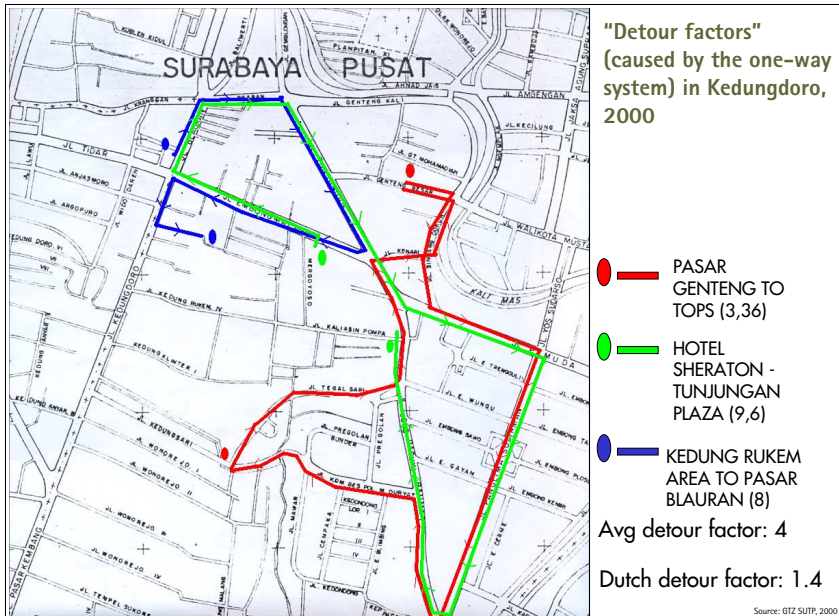
- Climate and weather are not the primary reason for such short bicycle trip lengths in Surabaya (note for example the long trip lengths in Delhi).
- Safety, comfort, and network continuity are more important.

Outlook: Economic disbenefits of an unsustainable system

- Businesses in the city centre will continue to decline
- Public transport as an industry will become unviable
- Energy consumption and the burden on the national budget, with dependence on more energy-intensive travel modes, will increase
- The transport economic burden on the poor will increase
- Large investment burden required to support private motor vehicles
- Increasing absenteeism attributed to the impacts of air pollution caused by motor vehicles.



hirshendu Ghosh



A sustainable urban transport system for Surabaya

SOMETHING IS WRONG WITH THE URBAN TRANSPORT SYSTEM ...



Source: Adapted from SUSTRAN 2000

IT DOESN'T HAVE TO BE THIS WAY! WE COULD HAVE ...



Source: Adapted from SUSTRAN 2000

Sustainable urban transport: The idea and principles



- Earth Conference in Rio, 1992
- UN Framework Convention on Climate Change, and its Protocols (1994/97)
- Vancouver Conference on Sustainable Transport (1996)
- Vienna Declaration of the UN ECE on Transport and Environment (1997)
- Conference between Indonesia, Mexico and Germany on Sustainable Transport, 1999
- WHO Charter on Transport, Environment and Health (1999)
- International Conference on Clean Air and Sustainable Transport, Jakarta (May 2000)
- Guidelines for Environmentally Sustainable Transport endorsed at the OECD Conference on Environmentally Sustainable Transport Futures, Strategies, and Best Practice (Vienna, October 2000)



Goals and targets which must be met for environmentally, economically, and socially sustainable urban transport

Sustainable urban transport: The idea and principles



#1: Access

- The city should be designed for people, not for cars.
- Access to essential goods, services, places and contacts should be available for everyone regardless of income level or abilities.
- It should be at least as convenient to live in a city without a personal motor vehicle as with one.
- Accessibility planning aims to ensure that destinations remain within easy reach and seeks to maintain the viability of diverse and plentiful transport choices.

#2: Equity

- Governments and communities must strive to ensure inter-regional and inter-generational equity, and meet the basic transportation needs of all people.
- Almost everywhere, transport priorities serve the poor badly and devote most investment to the mobility of affluent vehicle owners. The negative impacts of transport fall most heavily on disadvantaged people.
- Highest priority should go to public transport, walking and non-motorised vehicles that are accessible to almost everyone and have low impacts.

Sustainable urban transport: The idea and principles

#3: Pollution prevention

Transportation needs must be met without generating emissions that threaten public health, global climate, biological diversity or the integrity of essential ecological processes.

#4: Health and safety

- Transportation systems should be designed and operated in a way that protects the health (physical, mental, and social well-being) and safety of all people, and enhances the quality of life in communities.

- Safety is a preeminent concern affecting the viability of non-motorized transport.

#5: Public participation and transparency

People need to be fully engaged in the decision-making process about sustainable transportation, and empowered to participate. In order to do this, it is important that they be given adequate and appropriate support, including information about the issues involved, as well as the benefits and costs of the array of potential alternatives.

Sustainable urban transport: The idea and principles

#6: Integrated planning

Transportation decision makers have a responsibility to pursue more integrated approaches to planning.

#7: Economy and low cost

- The most sustainable, people-centred and equitable transport policies are low-cost and include restraint of the highest-cost mode of transport: the private car.
- Users of cars and motorcycles should be charged for the full economic, environmental and social costs of their transportation.

- Taxation and economic policies should work for, and not against, sustainable transportation.



The introduction of well run inspection and maintenance program is one of the most cost-effective ways to improve air quality.

Vision and mission for transport in Surabaya

Short term goals

- Achieve an extraordinary improvement in ambient air quality in the whole city
- Road accidents causing fatalities and injuries must be reduced by 30%.
- A public awareness campaign must commence and the community should be given information regarding concern for transport and the environment.
- The first major improvement in public transport must commence, through improving bus service and reliability, and a "green route" (a route only operated with low-emission and low floor buses) introduced, after the

- tendering of the most profitable routes.
- Monitoring of pollution levels on roads must be carried out. An integrated bicycle and becak lane must be built. Unleaded petrol is promoted.



Vision and mission for transport in Surabaya

Mid-term goals

- World Health Organisation standards, except for limited days and areas, are met.
- A starting point for handling the problem of greenhouse gases is to limit the growth of greenhouse gas emissions to half of what would, without another strategy, would otherwise be expected.
- The renewed—particularly in terms of vehicles—public transport system is attractive, reliable, affordable, and a viable alternative to the private car or motorcycle.

- Strong efforts are made to promote the use of bicycles on a wider scale and in particular to make the city centre more interesting for pedestrians.
- Community awareness and participation leads toward further improvements in the transport system.
- Goods traffic is managed such that it does not damage the population or detract from the liveability of the city.
- Surabaya is currently trialling and promoting the use of natural gas as an alternative, clean fuels.

Vision and mission for transport in Surabaya

Long term goals

Long term goals must be developed to ensure a sustainable urban transport system. It is recommended to develop concrete goals after more detailed studies are conducted.

- Ambient air quality and the level of noise must not exceed values which have been established to avoid damage to human health.
- Greenhouse gases are reduced to the level needed to comply with global policy on this problem.
- The liveability of urban areas is increased to guarantee social and economic viability.



- The "precautionary principle" must be a guiding consideration in the determination of more precise principles.
- Road accidents causing injury and death per unit of population is not greater than cities in Europe or America.

33

Steps toward the goal: Policy measures

POLICY MEASURES FOR SUSTIANABLE URBAN TRANSPORT IN SURABAYA

An integrated approach

- Public transport
- Non-motorised transport
- Technical measures
- Economic instruments and transport demand management
- Institutional reform and public participation



34

1. Public transport

1.1 **Reform the public transport system.** Immediately begin pilot improvements in public transport high demand corridors (introduce licensing based on quality service criteria and distributed by tender, and based on stringent monitoring and enforcement, fixed wage for bus driver); Adjust the route system to more efficiently meet public transport demand; review the fare structure to support service quality, emission reduction and affordable fares; ensure operation of high demand corridors by advanced, low emission buses; develop supporting public transport infrastructure (well maintained bus shelters, customer information, footpaths and road crossings for bus passengers); ensure that one body has responsibility for provision of bus services in Surabaya.

Result achievable in: Short to medium term

Efficiency: Moderate; low to medium extra costs

Implementation: DLLAJ Surabaya (Transport Section); DLLAJ Jatim; DLLAJ Sidoarjo; Dir-Jen Perhubungan Darat
(Implementation of a pilot corridor project has commenced)

35

1. Public transport

1.2 **Establish a program for less polluting urban buses in Surabaya.** by a retrofit programs for in-use-buses with diesel soot traps and the introduction of CNG-buses complying with ULEV-or EEV standards.

Emission requirements (for example by introducing CNG-ULEV or EEV buses) are needed. As a first step: prohibition on operation of old, heavily polluting buses in the city centre. This will constitute a phased implementation of modern technology. Less-polluting buses can be introduced through a licensing system: for example in the medium term use of CNG fuel can become a pre-condition for participating in a route license tender.

Results achievable in: Mid – long term

Efficiency: High; moderate extra costs for bus operators, if fares are adjusted as well for bus users; lower operating costs

Implementation: DLLAJ KS, DLLAJ Jatim; BPTD. Cooperation of city, provincial and national government; public-private partnership should be established, consider subsidies for operators applying for this program, pilot project: import a European CNG-bus with catalyst for demonstration purposes.

36

1.3 **Improve driving behaviour, particularly of bus drivers.** Control of bus driver licensing needs to be tightened and the behaviour of drivers monitored and improved.

Rational driving can decrease fuel consumption (around 50% of all savings) and maintenance and spare parts costs (around 50%). The results of training indicate that on average 12 – 17% of fuel can be saved, after drivers take part in a economical driving course. Transport operators are interested because a reduction in fuel use has a significant impact on operational expenses, and other expense elements are also reduced with the reduction in braking. The relatively low cost of training, with two drivers operating one bus, can be recovered in 2 to 3 months.

Reduction in fuel consumption will in turn reduce emissions.

Bus driver license mandates a certificate of a course on "rational driving"; to be part of the environmental management of the companies.

Results achievable in: Short – mid term

Efficiency: Moderate, significant effects on safety; low extra costs for bus operators, savings on operating costs

Implementation: A training program should be commenced with **Operators & Damri**, and **Organda**, Traffic Police and DLLAJ. Good experience from Bluebird and other operators in Jakarta. Training material already prepared at GTZ SUTP. City government can mandate an obligation for bus line concessions; Mercedes-Benz of Germany, Hino and Mitsubishi offers courses for drivers of bus- and HDV-operators, good experiences in Spain, Germany and Mexico.

1.4 **Introduce obligations on taxi and angkot concessions, based on environmental requirements.** Granting of a new license or renewal of an existing license must be related to the level of pollution from the taxi or angkot armada concerned.

- Limiting vehicle age to 10 years.
- Only CNG vehicles permitted for new licenses.
- For license renewals, an inspection and maintenance certificate must be obtained twice yearly.
- Use of unleaded fuel is obligated when this fuel becomes available in Surabaya. Plans for accelerated renewal of the taxi and angkot fleet must be developed.

Results achievable in: Short term

Efficiency: Moderate – high; moderate extra costs for bus operators

Implementation: • In 3 months pre-conditions for granting of a license must be completed. Estimates for emission reductions must be carried out. In 6 months this system must have been implemented.
• Publication of an inspection and maintenance certificate must be prepared.
• Program for replacing old vehicles must be supported with low-interest credit from the Environmental Trust Fund. A retrofit program of relatively new vehicles (< 5 years) with CNG should be carried out.
• Announcement of the age limits on vehicles.
• **DLLAJ KS** (Transport Section, other sections); DLLAJ Jatim; BPTD.

2. Non-motorised transport



2.1 **Promote bike use and walking, and effectively regulate becak use in Surabaya.** Walking is an environmentally friendly, anti-congestion, and healthy transport mode. Every journey, even with a motorised vehicle, includes at least a short walking component.

Establish a bike and becak plan, which deals with improving safety, image, selected routes for recommended bike use, cycle paths, promotion of freight bikes for delivery, define standards for the construction, have a bicycle day a week e.g. Friday.

Results achievable in: Mid-term

Efficiency: Moderate; low costs

Implementation: **DLLAJ KS** (Infrastructure & Facilities Section), Public Works, Parks Office. Form a "non-motorised transport" commission in the BPTD. Based on surveys in the field, determine problem locations. Develop plans and detailed designs for improvements. Implement improvements in two pilot locations (Kedungdoro and Jemursari). Monitor and perfect implementation. Develop similar interventions for other areas in Surabaya.

2. Non-motorised transport



2.2 **Improve facilities and safety for pedestrians:** restored and widened sidewalks, more pedestrian zones, improved signalisation; define conditions for street vendors, define standards for the construction.

Improving conditions for pedestrians entails: • Allocate sufficient space for pedestrians; • Continuous footpath (not with holes or descents, not interrupted by vendors or misplaced trees and so on.); • A dense network to ensure short trips; • Interesting routes – increase the recreation value of walking; • Appropriate shade trees – offers protection from both heat and rain; • Not noisy – increases the social value of walking; • Restrict other disturbances: dust pollution, odours or smoke, etc.; • Ensure easy access to destinations (for example without having to cross a wide road to get to a shop or bus stop, and so on.)

Results achievable in: Short - mid term

Efficiency: Low (but improves the city attractiveness); mostly low costs

Implementation: **DLLAJ KS** (Traffic Section), Public Works, Parks Office. Based on surveys in the field, determine problem locations. Develop plans and detailed designs for improvements. Implement improvements in two pilot locations (Kedungdoro and Jemursari). Monitor and perfect implementation. Develop similar interventions in other areas.



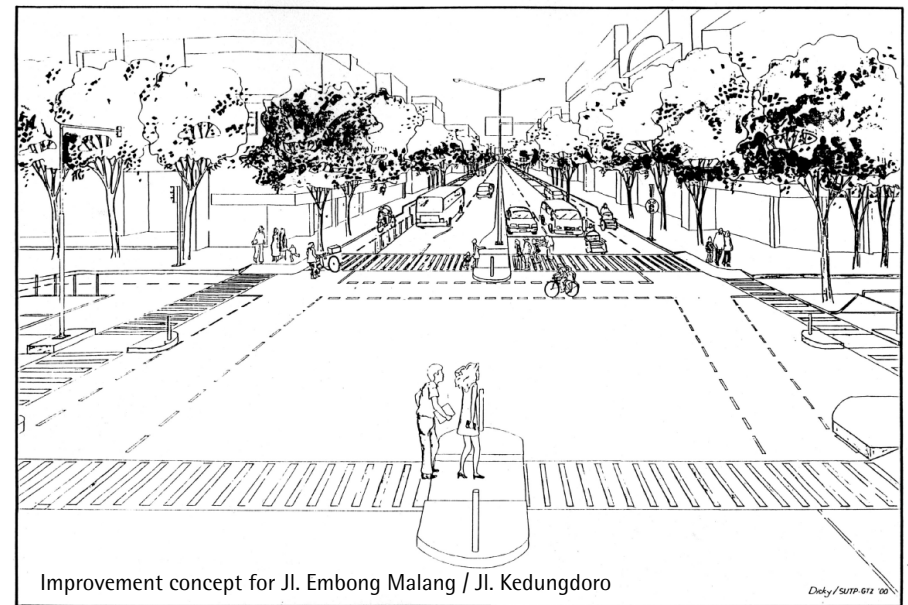
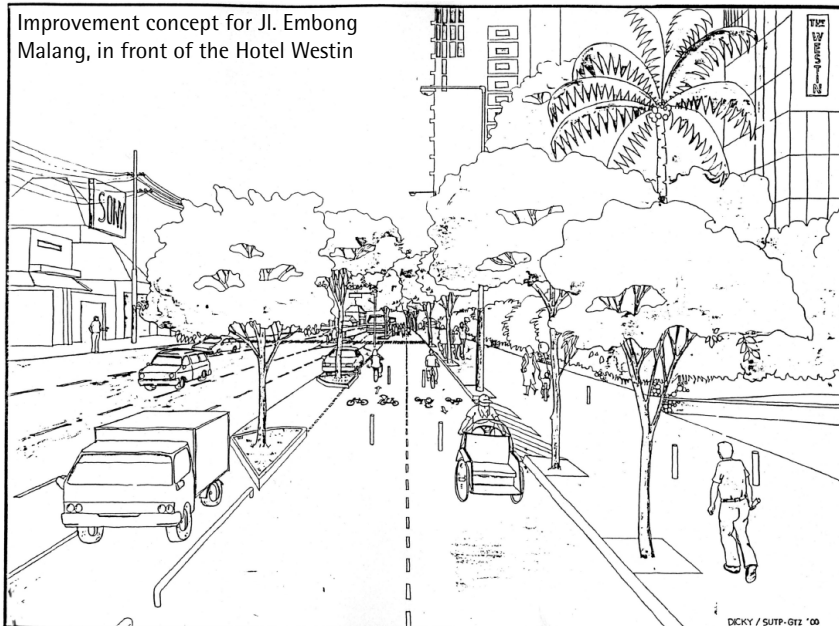
Source: GTZ SUTP 2000

Pedestrian-friendly areas, Singapore and Germany.



Source: GTZ SUTP 2000

Pedestrian unfriendly areas in Surabaya.



2. Non-motorised transport

2.3 Develop a strategy for traffic calming in residential and mixed districts: Traffic calming measures can achieve reduced vehicle speeds, increased safety, reduced noise and air pollution, re-greening, and revitalisation of shops at the edge of roads. This will eventually provide a strong contribution to boosting the local economy and environmental value, especially for sensitive areas such as housing, hospitals, schools, and so on. These measures will not just promote walking and use of non-motorised vehicles, but will also enhance the local economy and social value of road space.

Results achievable in: Mid – long term

Efficiency: Moderate, costs may be high for investments

Implementation: **DLLAJ KS** (Traffic Section), Public Works, Parks Office. Based on surveys in the field, determine problem locations. Develop plans and detailed designs for improvements. Implement improvements in two pilot locations (Kedungdoro and Jemursari). Monitor and perfect implementation. Develop similar interventions for other areas in Surabaya.

45



Source: GTZ SUJP 2000

Traffic calming:

- Makes the environment more friendly to pedestrians
- Decreases the number and severity of accidents
- Reduces local air pollution and noise
- Can increase roadside activity.



Source: GTZ SUJP 2000

Use of bicycles should be encouraged and facilitated, for example through construction of dedicated NMT lanes.

46

3. Technical measures

3.1 Improvement of I&M programs: An effective inspection and maintenance program must be implemented in stages. A timetable for different types of vehicles must be drawn up. Operation of a centralised I/M facility must be implemented by a private company selected through a tender process.

- Prepare supervision by Local Government;
- Determine emission limits for diesel vehicle exhaust;
- Determine emission limits for petrol vehicle exhaust;
- Develop a fraud-proof sticker system;
- Carry out on-road inspections.

Results achievable in: Short term

Efficiency: Moderate – high, no extra costs for car owners, if car needs to be fixed moderate extra costs

Implementation: • Carry out a public awareness campaign;
• First year: I/M for buses, trucks taxis and angkots, for testing twice-yearly. • Second year: private vehicles tested once per year.
Short term: • Develop technical requirements for an effective I/M system; • Develop a tender procedure.
Mid-term: • Establish a centralised, privately operated testing centre; • Develop a control system by the Local Government.
DLLAJ Jatim; DLLAJ KS; BPTD

47

3. Technical measures

3.2 Start a pilot program with unleaded gasoline.

- Introduction of unleaded fuel is a precondition for the use of catalysts;
- Lead is a hazardous poison;
- Lead in fuel reduces muffler and spark plug life by a factor of two – three.

The Local Government can begin a demonstration project for use of unleaded fuel in all government vehicles which currently use leaded fuel.

Results achievable in: Short term

Efficiency: High; low extra costs for consumers,

Implementation: Conversion of a filling station for government vehicles. Public awareness campaign on the benefits of unleaded fuel, with reference to the positive experience in Thailand and the Philippines.

Dept. of Mines and Energy; Pertamina.

48



Sumber: GTZ SUITP 2000

The World Bank has warned that as many as 18 million children may face permanent brain damage due to excessive lead in the body.

49

3. Technical measures

3.3 Promote retrofit of angkots with CNG conversion kits, and ensure that new CNG-dedicated angkots are available for purchase. With interest between 10 – 16% microbuses consuming 25 liters of fuel per day can save Rp. 3.5 million every year if changed to CNG. As well as economically feasible, natural gas fuel is much less polluting than gasoline or diesel.

Results achievable in: Short term

Efficiency: High cost-effectiveness

Implementation: Makers and sellers of new microbuses; Organda; Kopatas; Conversion kit installation workshops; Pertamina; State Gas Co. Promote the sale of dedicated CNG angkots, and the availability of additional filling stations. Promote maintaining the subsidy of CNG. If both are unsubsidised, the price of CNG on the world market is less than half the price of gasoline.

- Information on the feasibility of CNG is conveyed to microbus owners and drivers organisations. These organisations will then distribute the information to their members. Sellers of conversion kits have stated they are ready to respond to demand for kits in Surabaya.
- The World Bank and other banks and credit providers should be approached so that a low interest credit scheme (as was done in Mexico City), which can assist in renewing the existing microbus fleet.

50

3. Technical measures

3.4 Implement a retrofit of city and provincial vehicles with CNG conversion kits. Natural gas vehicles have substantially lower emissions compared to gasoline vehicles. Through retro-fitting newer vehicles, which in general are in better condition, a significant reduction in emissions of official cars can be achieved.

Results achievable in: Short term

Efficiency: High cost-effectiveness

Implementation: Conditions at the time of installation need to be tightly controlled, and procedures centralised in just one office. Implementation is carried out after a Mayoral Decree (for City Government cars and trucks) or Gubernorial Decree (for Provincial Government cars and trucks) is issued, and special budget is provided for conversion to natural gas. The costs will later be recouped through fuel savings, and the government in this way can be a role model for other vehicle owners.

- Select existing official vehicles which are appropriate for a retrofit. Prepare a timetable for the retrofit program.
- Allocate budget for the retrofit program.
- An estimate of emission reductions is obtained.
- Implementation can commence in 3 months.

51

3. Technical measures

3.5 Air quality management. This shall include an air quality network (as already started in the Austrian project for the city of Surabaya) and provide the public regularly with this data, the establishment of an emission inventory, of air quality modeling (e.g. using the Umweltbundesamt-model) and the collection of related data (car fleet composition, traffic flows, industrial activity, etc.).

Results achievable in: Short - mid term

Efficiency: High, costs are depending on the decided actions and investments and may be high

Implementation: **Bapedalda Jatim** (management of air quality database, emissions inventories, control policy, ambient air quality monitoring), **Hiperkes** (stationary source testing), **Municipal Environment Division** (continuous ambient monitoring), **DLLAJ Jatim** (vehicle testing).

52

4. Economic & TDM measures

4.1 **Set fuel taxes in order to promote cleaner fuels.** Fuel and energy in Indonesia is currently subsidised. The fuel subsidy is around US\$4 billion per year, which is more than 2.5 times larger than the budget for health and education.

Use of cleaner fuels needs to be promoted through differentiating the quality of fuels. Differentiation can be done through a 5% vehicle tax provided for in Law No.18/1997. Unleaded fuel should be sold at a price slightly lower than fuels with lead. This policy is applied in all transitional countries.

Results achievable in: Short term

Efficiency: High, low cost for consumers

Implementation: Bappeko, City Economics Division, **Dispenda Tk.II, Dispenda Tk.I** and the central government

53

4. Economic & TDM measures

4.2 **Develop further parking management schemes:** consider measures like differential parking fees, taxes on parking (municipal tax).

Results achievable in: Short term –mid term

Efficiency: High; city parking revenues can increase substantially

Implementation: DLLAJ KS; **Parking Office**; BPTD; **Commission C of City Council**



Source: GTZ SLTP 2000

Surabaya Integrated Transport Network Project (SITNP), which was carried out by Dorsch Consult for the World Bank, in 1998 described and recommended a restricted parking zone in the city centre, as a precursor to an area licensing scheme. This recommendation was central to the SITNP proposed TDM program, but as of 2000 no action had been taken in response to the proposals.

54

4.3 **Create an environmental trust fund, in order to financially support measures towards sustainable transportation.** (E.g. bicycle lanes construction, bus lane construction, pollution monitoring stations operation, public awareness campaigns, sidewalk construction etc.).

- Lack of funds is often an obstacle to environmental improvements.
- A transport and environment surcharge should be imposed—for example through parking charges, taxi, bus and angkot operational licenses.
- This transport and environment trust fund must be used for pilot projects, financial assistance for taxi and angkot retrofits, and so on.
- The allocation of funds is managed by the proposed Surabaya Transport Authority.
- Use of funds is publicised for maximum transparency.

Results achievable in: Short term

Efficiency: High; no extra costs for consumers and government

Implementation: Establish a trust fund board, increase awareness amongst private companies, prepare sources of funds such as fines imposed for environmental infringements. Experience in US, Mexico, German, Sweden.

Short term: • Working Group is formed. • Scheme for establishing an environmental trust fund is prepared in 3 months. • A plan for use of the funds which are gathered during the first year must be compiled within 6 months.

Mid-term: Annual reports on the use of the transport and environment funds must be prepared. An independent control must be in place. Dispenda Kota Surabaya, Komisi C DPRD, Econ. Division, Bappeko

5. Institutional reform and public participation

5.1 **Establish a commission (consistent of designated experts from the affected authorities) to evaluate the performance of the administrative system in the transport and environment sector** (in and between national, provincial and municipal authorities); in particular analyze overlapping of responsibilities, competition between different levels of government on enforcement power, gaps in legislation and enforcement caused by incoherence of administration.

Results achievable in: Short term (this task should be executed as soon as possible, as only the implementation of the recommendations of this commission would create environmental benefit)

Efficiency: High (the implementation of the recommendation); low costs

Implementation: Agreement between city and provincial government

56

5. Institutional reform and public participation

5.2 Institutional reforms (based on the finding of the commission): creating a Surabaya Transport Authority; merger of agencies. Involve provincial and city government of Surabaya. The new institution should have responsibilities for planning, managing and concessions of all public transport services and taxis, for planning and promoting non-motorized transport, for planning and managing road traffic.

The Surabaya Transport Authority will aim to increase the quality, scope, efficiency and demand-responsiveness of city transport in accordance with a city transport policy statement, through incentives and healthy competition. It will: • Be responsible for the provision of suitable public transport services in Surabaya; • Determine transport policy; • Produce 3-yearly public transport plans; • Regulate the administration of new procedures and regulations; • Professional support from agencies, esp. DLLAJ Sby.

Results achievable in: Short – mid term

Efficiency: High; low – moderate administrative and consulting costs

Implementation: Agreement between provincial, city and regency governments, through a Mayoral Decree or City Regulation. Implementation can commence with a body with limited scope, membership, and powers (for example planning and regulating particular public transport routes), and subsequently be expanded.

57

5. Institutional reform and public participation

5.3 Establish a monitoring within the administration regarding the transport related and environmental consequences of all newly considered regulations and legislation. Study of the consequences of a law or regulation for transport and the environment is standard practice in many countries, including the German Federal Government.

Results achievable in: Short term

Efficiency: Moderate, no extra costs

Implementation: Short – medium term. Before this proposal can be implemented in Surabaya, procedures in forming legislation and regulations need to be studied and developed, before the required more detailed steps can be formulated.

Bagian Hukum KS, DPRD

58

5. Institutional reform and public participation

5.4 Develop and implement a road traffic safety strategy, in order to reduce fatalities and injuries. The community will be protected from the negative effects of urban transport. This includes a comprehensive strategy to increase safety. Five areas of safety policy are proposed to be developed into action plans and implemented:

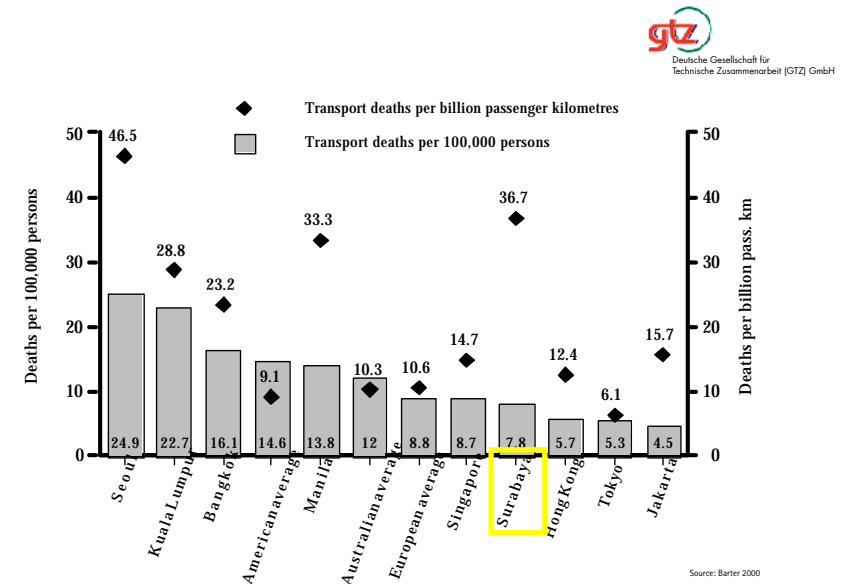
1. Use and store accident questionnaires in accordance with international standards for all recorded accidents; 2. Carry out blackspot analysis; 3. Record deaths according to the Vienna Convention; 4. Reformulate responsibility for traffic safety in East Java, with all primary stakeholders; 5. Improve school education programs, through applying existing training materials; and strengthen community awareness.

Results achievable in: Mid-term

Efficiency: High, no extra costs

Implementation: DLLAJ KS (Sie Lalin Subsie Bimkes) & Jatim; Private stakeholders; Traffic Police

59



Transport sector deaths per person and per unit of motorised mobility, 1990.

60

5. Institutional reform and public participation

5.5 **Raise public awareness of the need for a sustainable urban transport system in Surabaya.** Involve all sectors of the community, companies, and policy makers in the process of planning the campaign. Determine themes and objectives, messages, campaign phases, a prioritised list of target groups, and plan implementation of the various activities with campaign partners.

Results achievable in: Short term

Efficiency: Moderate, but essential for success

Implementation:

- Form a Working Group consisting of relevant government agencies, consultants, and community groups. Determine the topic, objectives, and campaign messages. Determine and prioritise target groups. Plan for 1 or 2 years ahead, and plan activities in detail closer to the time of implementation. Carry out activities based on a prior assessment of the efficiency of a proposed activity in reaching priority target groups. Seek out partners for each activity to contribute to the cost of implementation, and raise campaign funds.
- A Working Group chaired by the City Public Relations (Humas) office has been formed in April 2000, and the campaign launched on Earth Day, 22 April 2000.

Humas KS, DLLAJ KS, media, NGOs, academics, & community

61



Source: Pokja PAC 2000. ©

A public awareness campaign on sustainable urban transportation in Surabaya has already commenced. It is led and managed by the City Public Relations office and has been highly successful in 2000.

62

5. Institutional reform and public participation

5.6 **Apply international guidelines for environmental impact assessment (EIA) for all major transport infrastructure projects,** consider the introduction of a related legislation, consider the approach of a strategic impact assessment for an integrated transport development plan for Surabaya; take possible negative rebound effects into account if infrastructure improvements are considered.

Results achievable in: Short term

Efficiency: Moderate; consulting costs

Implementation: Central legislation; a pilot project could be evaluated on the proposed transport plan; experiences all over the world, SEA is projected to be further developed with the planning of the Trans European Network (TEN) of the European Union; building new roads enables more people to travel by car, this may offset the expected benefits from new access; all metropolitan areas observed this experience

63

Closing comment: New roads should be only a low priority

The main concerns of sustainable urban transport are **public transport, non-motorised transport, modern and clean technology, application of economic & fiscal instruments, and institutional reforms & public participation.**

Transport problems in dense cities in developing countries will in general not be solved by building new roads.

An approach focusing on new roads is often misguided. The World Bank, which previously funded many new urban road projects, in its *Urban Transport Strategy Review* (2000) acknowledges that

in practice construction of new urban roads is usually:

- **Inefficient**, because it is very expensive and the new road stimulates new traffic and congestion; and
- **Inequitable**, because it tends to favour car owners and be to the detriment of public transport and non-motorised modes.

If sufficient funds exist for large investment projects, they should be devoted to mass transit facilities such as light rail or busways (which can later be upgraded to light rail).

64