

# ***Time to Change the Old Paradigm: Promoting Sustainable Urban Transport in Lahore, Pakistan***

By

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**ABSTRACT:** *Urban transport is one of the most important sectors having a direct bearing on sustainable development because of the high growth of the transport sector's energy consumption and greenhouse gas emissions. This becomes more important in case of Pakistan where the motor vehicle fleet is growing at two to three times the rate of population. Especially in Lahore, designed transport strategies and programs have resulted in high growth of urban road traffic, increasing air and noise pollution, and traffic crashes. The purpose of this paper is, to review the adequacy and deficiency of transport planning in Lahore and to recommend some measures for developing a sustainable urban transport system in the city.*

*In order to develop a sustainable transport system effectively, research has sought to refine the concept of sustainable transport to suit the particular case of Lahore according to the social, economic and environmental needs of this developing city. Sustainable transport guiding principles and a short list of indicators has been established for Lahore, as a methodological approach for the analysis of existing data. In analysis, the overall picture shows that Lahore is not only far away from sustainable having a transportation system but is also in some respects going in the opposite direction. The past approach of road building and road expansion is still continuing as a remedy for traffic congestion and environmental degradation. Even foreign aid projects are implemented as piecemeal approaches in certain domains of transport and environment. The situation is further complicated by the lack of a comprehensive urban transport policy. But some potential areas for improvement have been found during analysis, in the form of moderate to high density in the central area, mixed land use, a large number of pedestrian trips and low car ownership. All these will be helpful in establishing a sustainable transport system in future.*

*On the basis of analysis, and considering environmental, social and economic impacts, recommendations are proposed for Lahore. These also include town planning measures and the empowerment of all stakeholders in an integrated way. In conclusion, research has revealed that there is no single solution to achieve sustainable transport system in Lahore. Lahore's urban transport cannot be considered in isolation because it has intimate interactions with the whole pattern of urban development. So only those solutions should be adopted that are long term and integrated.*

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## **1. INTRODUCTION**

Urban transport is one of the most important sectors having a direct bearing on sustainable development because of the high growth of the transport sector's energy consumption and greenhouse gas emissions at global scale. By 2025, the transport sector's energy consumption and greenhouse gas emissions will have doubled and more and more people will become dependent on private automobiles (Whitelegg, 1993, p.5). The health and environmental implications of this rapidly growing and poorly regulated motorization are highly problematic at local scale as well. It has a permanent and often irreversible impact on the environment through land take and intrusion. So it requires rationalization and management of demand by shifting towards environment-friendly modes and collective transport and better utilization of existing capacity. Without proper planning of future transport systems we can't achieve principles of sustainability. Developing a sustainable transport system has been espoused as a potential

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solution to transport development. The idea of sustainable transport emerges from the concept of sustainable development having three basic components: environment, society and economy. It helps to reduce environmental impacts of transport infrastructure; contributes to economic prosperity by maximizing transport efficiency and enhances social well-being by providing greater mobility for people. This concept also provides a framework to reappraise social and governmental priorities and conceive a new vision in the transport sector.

Adopting principles of sustainable transport becomes more important in the case of Pakistan where the motor vehicle fleet is growing at two to three times the rate of the population, and motor vehicle usage even faster (NESPAK, 1997, p.6-13). The negative externalities of transport are likely to aggravate as the use of motor vehicles is growing at an alarming rate. Vehicular traffic threatens pedestrian safety especially in busy urban areas. Congestion lengthens traveling time, increases operating cost and tends to lead to a higher level of emissions as well. Especially in the city of Lahore, designed transport strategies and programs have resulted in high growth of urban road traffic, increasing air and noise pollution, and traffic crashes. That's why Lahore needs to develop a sustainable transport system not only to reduce the externalities of transport but also due to achieving sustainable development for the 21<sup>st</sup> century. In order to help, achieve this goal, the purpose of this paper is to review the adequacy and deficiency of transport planning in Lahore and to investigate a strategy for developing a sustainable urban transport system in the city.

## **2. METHODOLOGICAL APPROACH**

The research is based on a case study, Lahore, Pakistan. Lahore, being a second largest city will represent a true picture of Pakistani cities. Although each major city of Pakistan has a particular character, Lahore offers more opportunities to implement new policies because it is the social, cultural and political hub of the country. That is why; sustainable transport guiding principles and indicators are established for Lahore, as a methodological approach for the analysis of existing data. These indicators of sustainable transport will assist in assessing and evaluating the sustainability of current and future transport development.

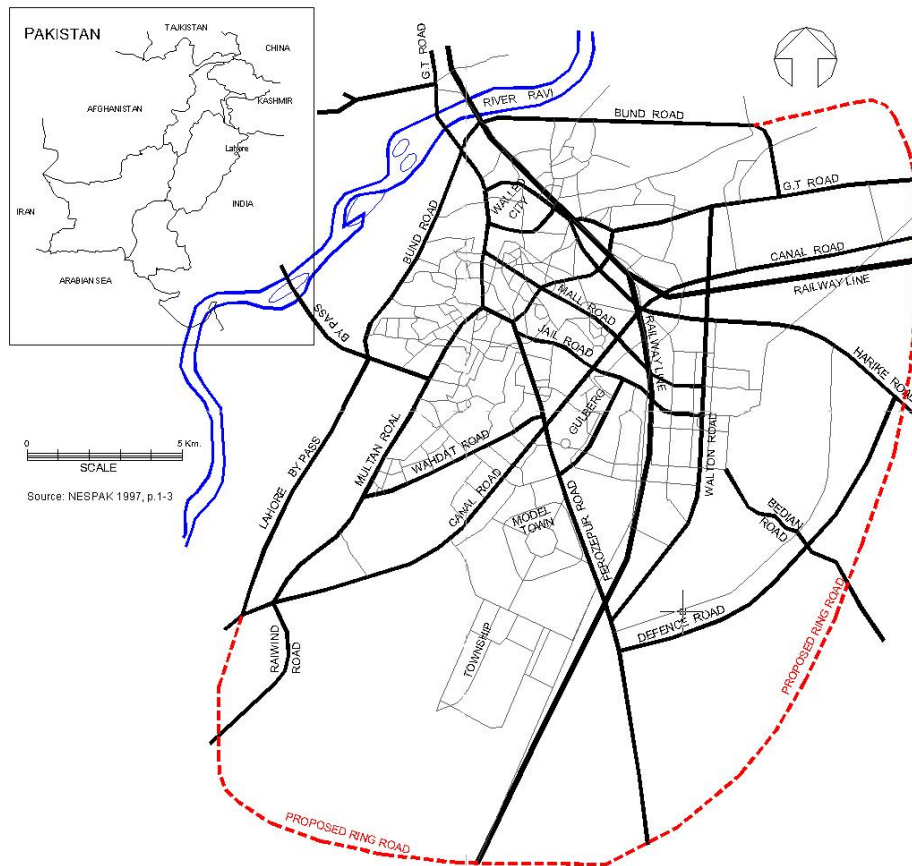
### **a) The Current Situation of Lahore**

Lahore is located on the left bank of the River Ravi near the Indian border (Fig. 1). The land use of the city can be divided into central, intermediate and outer zones. The central area has generally poor and middle class residential uses and a concentration of commercial and business land uses. The intermediate area (largely planned) is an uncontrolled mixture of housing (middle and upper income groups) and related activities and services (i.e. education, health, recreation, utilities etc.) while there is considerable dependence on the central zone due to job opportunities. The outer area presents typical characteristics of urban sprawl where the city has grown through low density housing for the rich (NESPAK 1997, p.3-1).

In 1998, 5.5 million people resided in the city, 80 percent within a radius of 7 km. The greatest concentration of population is within and around the central area and there is a gradual diffusion in the outer areas of overall average density of 120 people per acre (NESPAK 1997, p.6-1).

By revealing the existing urban transport situation of Lahore, the overall picture shows that 60% of trips are non-motorized mainly pedestrian (51%). While more than half of all trips are the pedestrian, there is no serious effort to plan for people on foot in Lahore. Provision of narrow footpaths along major roads is considered sufficient pedestrian planning in Lahore. Among motorized transport the share of road based public transport is just 14%. The overall situation of

Fig. 1 LAHORE



public transport is very poor and does not cover service for all members of society including women, the disabled and variety of disadvantaged groups. One of the major issues is the 6.3 percent growth rate of vehicles in which 84% consist of motorcycles and cars (NESPAK, 1997, p.6-4, 6-13).

In air pollution, suspended particulate matter (dust and smoke); carbon monoxide (CO) and nitrogen dioxide are most prominent and already exceed the WHO standard. The noise level of vehicles is also more than 85 dBA standard. All transport vehicles in Lahore used non-renewable energy resources as well. Another aspect of these vehicles is the fatalities rate of which grew to 11.4% between 1990 and 1996. Moreover, in Lahore, at least seven government organizations each with their own agenda are directly or indirectly responsible for transport and related environmental issues (NESPAK, 1997, p.13-13).

SUSTRAN (2000) has made an effort to guide sustainable transport activities by providing good and bad examples of transport in Asian cities. Considering the above figures, the best way to perceive the current city image is:

*“A city, where roads and haphazard vehicles seem to be everywhere, a city where shops, schools and parks are far apart and require a vehicle to reach them, where roads act as barriers between communities, where traffic dominates the streets making them difficult to cross, where walking and cycling are unsafe and unpleasant, where public transport is infrequent and hard to get, where air pollution is visible, pungent health*

*hazard and where honking and road rage are the main forms of social exchange.” (SUSTRAN, 2000, p.4)*

In spite of these results of existing policies the government is continuously investing significantly in road building. They are still searching for transport and environmental solution in future road building projects such as Lahore ring road and elevated expressway.

The other reason behind traffic and pollution disasters is rapid urbanization during the last three decades. In spite of the high natural birth rate, being a center of employment, education and medical facilities, people are continuing to migrate to Lahore. These are the reasons behind its fast growing population at the annual rate of 4.23 % (NESPAC, 1997, p.2-2). This growth has brought new demand to travel from the periphery to the central area.

#### **b) Sustainable Transport Guiding Principles and Indicators**

Sustainable transport guiding principles have been developed to streamline the research. These principles can be subdivided into the following categories: economic viability, accessibility for all, ecological sustainability, social equity, health and safety, integrated planning, land and resource use, education and public participation, consensus building through networking, individual and community responsibility. The purpose of these principles is to establish approaches that are holistic, long term and community oriented.

With the help of these guiding principles, short lists of indicators have been designed to provide a basis for monitoring progress in Lahore towards or away from sustainable transportation and to provide a better understanding of the dynamics of Lahore’s transportation systems in relation to sustainability (Appendix –I). These indicators are also suitable for providing meaningful cross-jurisdictional comparisons in order to contribute a better understanding of the consequences and to help provide a basis for policy development as well as monitoring of results. These indicators have been developed in three main categories, each with several sub-categories. The three main categories used correspond to the main domains of sustainability: environmental, economic, and social. The environmental domain is the most extensive in terms of the number of indicators. Emissions and concentrations and resource use are the sub-categories in this domain. The economic domain has been categorized into pricing and taxation, and expenditures and subsidies. The social domain represents indicators related to health and safety and accessibility. Some of the indicators related to transport have been established under transport activity indicators.

### **3. EVALUATION**

To evaluate how far is the existing transport system of Lahore from sustainable transport system three broad analyses have been done in this research. These include transport policy analysis, indicators analysis and current project analysis.

#### **i) Transport Policy Analysis**

First, comprehensive urban transport policies across all sectors were analyzed under sustainable transport principles. Ideally transport policy documents guide the development of transport at national level. However, Pakistan has no clear policy document on urban transport. In the late 90’s some efforts have been made to formulate a National Transport Policy. But still no such policy has been approved. Until now three drafts transport policies have been proposed. These were prepared by three separate agencies: Chartered Institute of Transport, Pakistan (CITP), The Planning Commission and National Transport Research Center (NTRC) (Imran 2002, p.121).

In Table-1 we have tried to evaluate these policies under broad categories of sustainable transport principles, which show the overall picture of all three-transport policies.

**Table-1 Evaluations of Proposed Transport Policies**

Sustainable Transport Principles	CITP, 1998	Planning Commission, 2000	NTRC, 2001
<b><i>Economic Principles</i></b>			
Economic Viability	★	★★	★★
No road building policies	×	×	×
Road Pricing	×	×	×
<b><i>Social Principles</i></b>			
Accessibility for all	★★	×	★★
Social Equity	×	×	★★★
Education and public participation	×	×	★★
<b><i>Environmental Principles</i></b>			
Pollution reduction measures	★	★★	★★★
Mitigating noise	★	×	★
Health and Safety	★★	★★	★★
Renewable energy consumption	×	×	×
Clean fuel technological advancement (R & D)	×	★★	★★★
Investment to environmental protection	×	×	★
Land and resource use	★	×	×
<b><i>Town Planning Principles</i></b>			
Mixed Land use / compact cities	×	×	×
High density	×	×	×
Integrated planning	×	×	×
Public transport encouragement	★★★★★	★★★	★
Car reduction strategy	★	×	×
Promotion of non-motorized traffic	×	×	×
Pedestrian environment policy	×	×	×
Realistic Institutional changes	★★	×	★★

Source: (Imran, 2002, p.121)

★ Shows the intensity of emphasis of proposal ranges from ★ to ★★★★★★

The above table clearly shows that all three-transport policies have tried to solve the transport problems in a piecemeal manner. Rather than holistic approach of transport system, only specific principles relating to part of the system have been developed. If these policies will be adopted than it will not be helpful as a long term commitment to achieving sustainability.

If we want to find sustainable solutions to problem of mobility, then we have to give priority to all issues at the same time. This is because transport is a complex web and without integration of

environmental, social and town planning principles within an economic framework, a sustainable transport system will remain as a dream.

## ii) Indicators Analysis

Secondly, sustainable urban transport indicators developed have been applied with the help of existing data and assessment criteria (Appendix- II). The summary evaluation given below is based on different degree of shading according to the availability of data and how it fulfills those criteria (Table-2). The benefit of this evaluation methodology is that a broad picture of the existing transport system of Lahore will clearly be seen. Although comprehensive data is lacking, efforts have been made to analyze the existing transport system of Lahore under the established criteria.

**Table-2 Indicators Analysis**

Environmental Indicators		Economic Indicators		Social Indicators		Transport Activity Indicators	
Green house gas		Fuel price		Urban density		Non motor. trans.	
CO <sub>2</sub> & CH <sub>4</sub> emission		GDP per capita		Mixed land use		Car ownership/1000	
Ecological footprint		Transport land use		Compte. cost/time		Avg. trip length	
NO <sub>2</sub> , Lead & SPM		An. new rd. const. <sup>1</sup>		Public T for poor		Traffic vol.	
Noise		Rd expend. /cap		Death and injuries		Vehicle condition	

\*. The more black intensity the worse the situation

1. Annual new road construction

Source: Authors

Analysis shows that the overall performance of city transport in moving towards sustainability is very poor. Especially in the environment sector the figures are approaching dangerous limits. But some potential opportunities offered by the city also came into picture. These are related to the mixed land use characteristics of the city in certain areas, the high density population in the core, the high level of non motorized and pedestrian trips, relatively low level of automobile ownership and comparatively small emissions of green house gases. If policies were adopted to encourage these opportunities in future then they would help to establish a sustainable urban transport system. However, most of the indicators need serious attention to reduce the effect of negative factors on the city.

In conclusion, the overall picture shows that Lahore is not only far from developing a sustainable transport system but also in some respects going in the opposite direction. The past approach of road building and road expansion is still continuing as the favoured remedy for traffic congestion and environmental improvement. Road building and road expansion will be needed from time to time in all urban areas as part of a balanced transport strategy but this should never be regarded as the solution to all congestion or access problems. Massive expansion of road capacity may in fact make the underlying imbalances and trends worse.

## iii) Current Project Analysis

Finally, on-going projects have been reviewed in order to analyse government efforts towards improving the sustainability of the transport sector. These projects include the Fuel Efficiency in Road Transport Sector project, the National Environmental Action Plan (NEAP), the Environmental Awareness Program, the Facilitating Women's Mobility Project and the Lahore Urban Transport Project. Some efforts are also being made to reduce the use of pressure horns and to improve the ambient air quality. These on-going projects are mostly funded by the

international donor agencies related to transport and environment but none of them have the aim of establishing a sustainable transport system in any city of Pakistan. All the projects are implemented only for their specific goals in a scattered way rather than an integrated approach. The projects related to clean vehicles and clean fuels have come to be seen as panaceas to solve pollution problems from transport in cities. But Lahore needs to do much more to clean up their fuels and vehicles if its air to become healthy again.

### SUSTAINABLE TRANSPORT STRATEGY

Using the SUSTRAN (2000) framework, the main aim behind this proposed strategy is to achieve a city:

*“Where it is pleasant and safe to walk to shops, parks and schools. Where streets are safe too cycle on, cross or even children to play on. Where work is not far away or is easily reached by bus. Where it is safe to take bicycle to the nearest rail station or bus interchange. Where buses move quickly in bus lanes and get priority at traffic lights. Where you don’t need to go away for fresh air and do not have to shout over traffic noise. Where city is quiet but fully alive” (SUSTRAN, 2000, p.4)*

In earlier work Imran (2001) has proposed a comprehensive future strategy that suits particular city according to its social, economic and environmental needs. Policies are also formulated related to town planning and to improve different stakeholders, considered important for sustainable urban transport in Lahore. This strategy can only be summarized here. It includes the following categories:

- ❖ For ***environmentally sustainable transport***, a strategy has been proposed to address the health-threatening impact of transport in terms of improving road safety and reducing air pollution. An environmentally sensitive strategic framework has been developed to make policies for congestion, pollution and road user charges, public transport fares, integration of urban structure and transport planning, changing the balance of modes and to make environmental and economic policies complement each other.
- ❖ Policies of ***socially sustainable transport*** are formulated to provide the poor and other disadvantaged groups with better physical access to employment, education and health services. Meeting the transport needs of these disadvantaged groups, recommendations emphasize the role of the informal sector and non-motorized transport. Transport equity and justice is given priority in a socially sustainable transport policy.
- ❖ The overall objective of an ***economically sustainable transport*** strategy is to increase the responsiveness of transport supply to user needs by creating competition and by enhancing user participation. True charges for the use of infrastructure and services, commercialization of public sector firms and proper public transport pricing are other principles of this policy.
- ❖ Finally, ***town-planning measures*** provide some of the most promising transport planning policies in the growing “tool kit” of ways to bring us closer to sustainable urban transport in Lahore. There is a strong emphasis on approaches that are integrated, long term, pro-poor, holistic, focused on accessibility, aiming to enhance urban quality of life and economic thrift and prosperity by providing town friendly transport modes. Strategy have been proposed for replacing old policies regarding parking, car growth, road buildings, vehicle speeds and formulating new policies for good governance, telecommuting, and community transport.

There is tried to keep away to false solution. As we can't achieve sustainable transport system without empowering all stakeholders, strategies have been formulated to incorporate these elements as integrated way.

Above sustainable urban transport strategy have been developed for Lahore bearing in mind the need to right balance between ability of transport to serve economic development, ability of the environment to sustain future quality of life and ability of society to fulfill there needs of accessibility freely. This strategy emphasizes approaches that are holistic, long-term and community oriented.

## **DISCUSSION AND FUTURE RESEARCH**

For commitment to sustainable development principles, urban areas of Pakistan need to revise their transport policies and programs. This will only be possible when there are standard criteria for evaluating existing policies. The best approach will be to develop national sustainable urban transport indicators which will provide a better measure of the dynamics of the country's transportation systems in relation to sustainability. Although urban transport policies are local in nature and must be tailored to fit the "profile" and context of the particular urban area, the long-term impact and effectiveness of local policies and measures can be compromised, if at national level, the policy framework for spatial planning, financing, investment and pricing schemes does not accommodate and support these local policy initiatives. That's why these national level sustainable transport indicators will have to establish links between national objectives for transport, environment and health and those in local areas. These indicators will help to reshape urban transport programs to make transport more cost effective, to ensure environmental protection, and to increase the social sustainability in Pakistan.

However, the development, application and implementation of these indicators are really a challenge due to the absence of clear operational definitions and the ad-hoc polices of government toward transport and environmental issues. One of the biggest challenges to implementing sustainable urban transport strategies is to identify and overcome institutional and organizational barriers. Co-ordination and co-operation among different branches and levels of government, as well as efficient consultation and communication between government and the public can determine if policies are implemented or not. This co-operation is essential to ensure that packages of complementary policies designed to promote sustainability, rather than "isolated measures" are implemented. These implementation problems are not the same, nor are they experienced in the same way in all countries. Particular economic and political structures, as well as social and cultural factors, can engender particular implementation problems

From the above review of project analysis, it is clear that Lahore is making progress in developing policy schemes to confront congestion, and in tackling environmental problems. However, serious difficulties persist in putting these policy plans to work in integrated way. The main hurdles to surmount are the institutional barriers to implementing sustainable transport policies and programs. Identification of these institutional barriers is very important otherwise a well thought-out strategy does not guarantee that the goal of sustainable transport in the city will be achieved. In most cases, these institutional problems are often not adequately considered when the strategies are defined. In this way, implementation problems are really a reflection of inadequate policy-making.

These challenges draw attention not only to the need to rethink urban transport programs and policies but also the reshaping of institutions responsible for implementing these indicators and policies. That is why, in depth research is required to identify and overcome institutional barrier



for implementing sustainable urban transport policies in Lahore. To research these barriers we have to identify the power structure in Pakistan society and come to know how it influences urban transport policies and programs. After that we will be able to know the real intention of current policies in Lahore that are making the city unsustainable. This will help to determine the right track for transport institutions which will facilitate and exhibit sustainable urban transport.

## CONCLUSION

In conclusion, research has revealed that there is no single solution to achieving sustainable urban transport in Lahore. Lahore urban transport cannot be considered in isolation because it has intimate interactions with the whole pattern of urban development. These interactions take place over both the short and long term. Therefore, only those solutions should be adopted which are long terms; otherwise current short-term results will lead to a disaster in the long term. A program package is expected to be more effective if coordinated with other short, medium and long term measures. Moreover, there is a need to combine the development, application and implementation of national level sustainable transport indicators with in depth institutional analysis.

## Note

The research described in this paper was part of initial PhD work in Faculty of Architecture, Building and Planning, University of Melbourne, Australia and M.Sc dissertation “Cities for citizens not for cars: Planning for sustainable urban transport system, Case Study: Lahore, Pakistan” in Centre of Urban Planning and Environmental Management, University of Hong Kong.

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<http://www.pakroadusers.com/tsdi/cittp.htm#preamble>
- ❖ Ministry of Environment, Local Government and Rural Development, Government of Pakistan (<http://www.environment.gov.pk/NCS>)
- ❖ NTRC and Transport Sector Development Initiative TSDI - Consolidate transport policy for all modes, A collective efforts by citizens and Government’s of Pakistan  
<http://www.pakroadusers.com/tsdi/tsdidraft.htm>

## MAJOR INDICATORS OF SUSTAINABLE TRANSPORT IN LAHORE

<i>Environmental Indicators</i>	<i>Social Indicators</i>	<i>Economic Indicators</i>	<i>Transport Activity Indicators</i>
<p><b>a) Emissions and Concentration:</b></p> <ol style="list-style-type: none"> <li>Greenhouse gas emissions from transportation</li> <li>Carbon emission per capita</li> <li>NO<sub>2</sub> emission</li> <li>Lead emission</li> <li>Methane (CH<sub>4</sub>) emission; emissions of ozone depleting substance</li> <li>Suspended Particular Matter</li> <li>Air pollution</li> <li>Final energy consumption</li> <li>Day and night time noise level</li> </ol>	<p><b>a) Health and Safety:</b></p> <ol style="list-style-type: none"> <li>Death and injuries</li> <li>Medical cost of disease due to pollution</li> </ol>	<ol style="list-style-type: none"> <li>GDP per capita</li> </ol> <p><b>a) Pricing and Taxation:</b></p> <ol style="list-style-type: none"> <li>Gas and diesel fuel price at the pump</li> <li>Transport Cost index</li> <li>Pricing and Taxation</li> </ol>	<ol style="list-style-type: none"> <li>Percentage of urban trip not by automobile</li> <li>Automobile ownership per 1000 population</li> <li>Road Utilization Index</li> <li>Traffic volumes of road</li> <li>Modal Split (portion of trips made by each mode), assuming that more diversity is better</li> <li>Average trip length</li> <li>Public transport route length</li> <li>Vehicles conditions</li> <li>Road traffic density</li> <li>Length of railway and main roads</li> </ol>
<p><b>b) Resource Use</b></p> <ol style="list-style-type: none"> <li>Petrol quality</li> <li>Fossil fuel consumption per capita</li> <li>Non-fossil fuel use per capita</li> <li>Ecological footprint</li> <li>Transport waste</li> </ol>	<p><b>b) Accessibility:</b></p> <ol style="list-style-type: none"> <li>Commute cost</li> <li>Average commute time, lower is better</li> <li>Quality of pedestrian and bicycle environment</li> <li>Quality of public transit service particularly non-drivers</li> <li>Affordability of public transit</li> </ol>	<p><b>c) Expenditure and Subsidies:</b></p> <ol style="list-style-type: none"> <li>Total area of land under transport use per capita</li> <li>Annual new road construction</li> <li>Total road expenditure per capita</li> <li>Average portion of household expenditure devoted to transportation (including vehicle expenses, fares, parking cost and taxes) lower is better</li> </ol>	

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service by lower income residents  
8. Transport for women, elderly,  
disable and children  
9. Parking supply in CBD  
10. Mixed Land use  
11. Overall urban density  
12. Residents participation in  
transportation and land use decision  
making

9. Investment dedicated to  
environmental protection

*c) Others:*

10. Employment density  
11. Medical cost attributed to  
transportation

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Source: (Imran, 2002, pp.62-64)

**CRITERIA FOR ASSESSMENT OF INDICATORS**

- 1) Limits Emissions within the Planet's Ability to Absorb Them
- 2) Limits Wastes within the Planet's Ability to Absorb Them
- 3) Minimizes Consumption of Non-renewable Resources
- 4) Reuses and Recycles Components
- 5) Minimizes the Use of Land
- 6) Minimizes Production of Noise
- 7) Meets the Basic Access Needs of Individuals
- 8) Meets the Basic Access Needs of Society
- 9) Consistent with Human Health
- 10) Consistent with Ecosystem Health
- 11) Access Needs are Met Safely
- 12) Access Needs are Met Consistent with Equity within the Present Generation
- 13) Access Needs is Met Consistent with Equity Across Generations
- 14) Is Affordable?
- 15) Operates Efficiently
- 16) Offers a Choice of Transport Modes
- 17) Supports a Vibrant Economy (Gilbert 2000, pp.33-40 quoted by Imran, 2002, p.64-75)