

Goa, 3-5 April 2008

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## **Background note on the session on ENERGY EFFICIENCY IN URBAN TRANSPORTATION**

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Road transport currently represents 16 percent of global energy demand and 46 percent of global demand for petroleum products. The issues relating to climate change and the local air quality in some cities present a unique set of challenges for the growth and development of the automotive industry and the transportation sector.

An added dimension is that a significant portion of growth in future is seen to be in the developing economies such as China, Brazil, Russia and India. In India too, a largely young population going forward with their aspirations will drive the growth of the automobile sector in India. The automobile will primarily be a means for commuting either to office and back or used as a means to earn livelihood or for carrying out essential activities related to daily life. Given the large population the demand for efficient, economical and equitable public transportation will also increase. The challenge of modern mobility is to be able to meet these aspirations, satisfy the quest and need for mobility and yet do it in a manner that is inclusive, in harmony with nature, has minimal impact on the environment and does not accelerate climate change.

An efficient transportation sector is a major factor in increasing production capability, enabling employment, creating opportunity, facilitating economic growth, developing backward areas and improving socio economic conditions. Efficient mobility is the key to tourism development and in bridging the gap between production and consumption.

Yet, the availability of various forms of transport in India is far below what is required for an economy of its size. In addition, the growth in the infrastructure required to enable transportation is not able to keep pace with the demand. The transport sector is a major consumer of fossil fuel and vehicular emissions also impact air quality.

India is a hugely under motorized economy so are Indian cities. In Delhi the penetration is only 85 cars per thousand persons, in Chennai 51, Bangalore 41, Kolkata 23 and Mumbai 23 cars per thousand persons. Malaysia 253, Mexico 135, Brazil 96, Thailand 51, Indonesia 15 and Philippines 9. Even Pakistan and Sri Lanka have a greater penetration.. Similarly two wheeler penetration in India is 43 per thousand compared to Thailand 286, Malaysia 258, Italy 166 and Indonesia 90. The penetration of two wheelers in the cities is lower compared to the National averages of other countries. Bus penetration in India is also low 0.7 buses per 1000 persons, compared to Korea 26, China 6, Indonesia 3.5 and Japan 1.8. What is an optimum level of penetration?

Even with the low levels of penetration, it had been perceived that there was a need for regulation in the transport sector to minimize the impact of vehicular emissions on air quality and also improve performance of the vehicles in terms of safety and fuel and energy efficiency.

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To address sustainability issues in urban cities, the Jawaharlal Nehru National Urban Renewal Mission had been introduced to enable cities to access funds to improve urban transport.

Yet this is a segmented approach to the problem, whereas an integrated approach is required. The solution has to encompass fuel and fuel quality including alternate fuels and infrastructure to distribute such fuels, road infrastructure, traffic management, which would include urban planning, integration of different transport modes and consumer behaviour. In the current context, the challenge is to address three key issues; air quality; global warming; and energy security.

The enablers are vehicle technology, fuel and fuel quality including alternate fuels, traffic management including infrastructure and enforcement of rules, in use vehicle and air quality monitoring. A holistic view and a comprehensive strategy is needed. Focusing on only one aspect, for example vehicle technology will not yield the desired results.

### **Vehicle technology**

Technologies to reduce green house gas emission, as well as local pollutants for engines are currently available off-the-shelf. Currently only about 20% of the chemical energy contained in the fuel converts into mechanical energy that is used to propel the vehicle. What efforts are required to increase this?

### **Fuel Quality and Alternate Fuels**

98% of the commercial energy consumed in the transport sector was in the form of high speed diesel and gasoline. There has been a significant increase in petrol and diesel consumption from 58 MMT, in 2002-03 to 69 MMT in 2006 -07. There is clearly no single answer to the alternate fuel issue. In the short term Compressed Natural Gas, (CNG) Liquefied Petroleum Gas and (LPG) would be the alternate as is being seen in India. In the medium term, hybrid vehicles and electric vehicles would be a possibility and in the long term, hydrogen fueled vehicle fuel cells or hydrogen based internal combustion engines would emerge. There is a global debate on the use of agricultural land and water resources to produce fuel for automotive use, is there the possibility of finding a sustainable way to address this?

The key to increasing use of such bio fuels would be sustained availability, national standards to ensure uniform quality and attractive pricing along with incentives to producers and creation of adequate infrastructure for distribution in cities. What are some of the challenges and issues?

Research by McKinsey Global Institute emphasizes the fact that “the removal of fuel subsidies is a large opportunity to improve the transport sector’s energy productivity. Cutting subsidy by 80% would reduce demand for transport fuel by 5%. Fuel pricing in India needs to be reviewed. What needs to be done to bring about change in India? Are there lessons from Europe?

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Fuel and Vehicles are an integrated system and low emission vehicles require good quality ultra low sulphur fuels. A comprehensive approach, including information and awareness programmes, labeling, mandatory minimum energy performance standards and voluntary efficiency agreements need to be considered. . What has been the European experience in this?

### **Traffic Management & Public Transport**

Despite there being a lower density of vehicles on most Indian roads, there is congestion. The problem on Indian roads is not the number of vehicles but the large number of different types of vehicles and issues related to discipline while driving. Peak Hour Traffic congestion will always exist. However, lack of commensurate increase in road space including in cities such as Delhi, where per capita availability of road space has declined over the last decade, coupled with inadequate public transport, inefficient use of land resources and inappropriate fuel pricing has led to congestion, increased fuel consumption and emissions. At the 2007 European Ministerial meeting on mitigating congestion it was recognized that congestion was a widespread and serious impediment to the movement of people and goods. It harms the economy, raises industry costs, increases pollution and CO<sub>2</sub> emissions and wastes a lot of time. In many countries the most conservative estimates put the costs in time losses alone at many billions of Euros. It was also recognized that as trade and mobility grow, congestion will continue to get worse, given that increases in traffic are likely to be greater than increase in expansion in capacity. Without concerted action, the impact could triple in the next 20 years. An integrated approach to traffic management is required. This includes setting the policy and institutional framework for land use, planning and transport demand management, including a framework for public transport. Land use planning will not only cut the average length of trips but also in actual fact reduce the total number of trips thus reducing both use of fuels and emissions. How do extant cities address the issue of land use planning?

In most cities in India there are multiple organizations that are in charge of various aspects of transport. There are no common tickets across different types of transport, no coordination in financing of infrastructure projects that cut across jurisdictions and ensure land acquisition. There is also need to cooperate across states. The data collection, assimilation and analysis process needs to be developed and institutionalized.

Public transportation requires reform in India. There should be uniform taxation across the country and cities, no entry taxes, off-vehicle ticketing, use of ITS to inform people of time of arrival of bus, mix of modes of transport rather than a standard large bus of 50 plus seats. An efficient public transport system will enable reduction of use of private vehicles for daily commutes only if reliability, access, and comfort improve. Bus Rapid Transit is one promising possibility. It is possible for public transport services to be profitable and they should be encouraged to become so. Attempts to integrate this non formal sector in to intra city systems must be made. Good efficient public transport would ensure that there is no need to curb ownership of private vehicles. Some good models are emerging in India such as in Indore and this needs to be replicated and multiplied.

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**In Use Vehicle & Air Quality Monitoring.**

Till date, over 101 million vehicles have been registered in India. A majority of them are used in the cities. For want of better data, it is presumed that all of these vehicles continue to ply on the road. Many of these vehicles were developed and manufactured at a time when there were no emission legislations. There is a need to promote the concept of fleet modernisation.

To help take decisions regarding emission norms, air quality monitoring and source apportionment studies are important. This data has to be supported by vehicle registration and traffic flow data. What are lessons from Europe? Is there scope for cooperation? The Ministry of Environment is currently carrying out a study under the Indian Clean Air Programme. An action plan for periodic source apportionment studies needs to be developed with adequate budgets.

Better management of the transport system along with a stable and predictive regulatory framework that address the multiple issues of Automotive Technology, fuel quality, traffic management and in use vehicle management would greatly enhance the development of a sustainable transport network in India and reduce energy consumption thereby increasing energy efficiency.

Stakeholders need to work together and this could become a reality. One of the gifts that we could give the next generation is the ability to choose their own means of transport personal or public, so that they may experience the joys of mobility and freedom in a sustainable manner.

(Views are personal)