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**ENVIRONMENTALLY SUSTAINABLE TRANSPORT (EST) AS THE BASIS
FOR NAMAS**

(EST Session 3A of the Provisional Programme)

Final Draft

This background paper has been prepared by Akshima T Ghate, Director, Fellow and Area Convenor, Centre for Research on Sustainable Urban Development and Transport Systems, The Energy and Resources Institute (TERI) and Sanjivi Sundar, Distinguished Fellow, TERI, for the Sixth Regional EST Forum in Asia. The views expressed herein are those of the authors only and do not necessarily reflect the views of the United Nations.

EST as the Basis for NAMAs

Background paper for Sixth Regional EST Forum in Asia

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1. Current trends in urban transport sector not sustainable

An urban transport system can be considered sustainable if it promotes equity, fosters clean and healthy environment, and promotes economic growth and a balanced system in which private vehicles, public transportation, bicycling, and walking are all viable mobility options for the citizens. Unfortunately, the transport systems in most cities of developing countries are not sustainable. The growing urbanization, increasing per capita incomes and rising aspirations have led to an exponential increase in personal transport in these cities with reduction in public transport and non-motorized transport. This in turn has resulted in inequity, traffic congestion, road accidents, pollution and increasing dependence on fossil energy.

Congestion levels in many larger cities have become unmanageable with average vehicle speeds dropping significantly during peak hours; average vehicle speed in central area in many Indian cities is as low as 10 kmph. This results in higher fuel consumption due to low speeds and vehicle idling. It is estimated that idling at intersections in Delhi leads to fuel loss of about 0.13 million litres of diesel, 0.41 million litres of petrol and 0.37 million kg of CNG every day, which translates into monetary loss of about 200 million USD annually (Parida and Gangopadhyay, 2008)¹. These losses are increasing daily as more than 1300 new vehicles get added to Delhi's roads daily.² Similar energy losses are likely to be occurring in other large urban centres in developing countries facing rapid motorization and increasing congestion levels

Another key impact of rising motorization, congestion and idling is the increasing vehicular pollution. Studies on air pollution in a few cities indicate the significant contribution of transport sector to air pollution, for e.g. it is estimated that about 42 % of air pollution in Bangalore city is caused by vehicular emissions³. Countries are spending huge sums of money to treat the health problems caused by air pollution. To add to the health impacts of urban transport, traffic accidents further make things worse. Fatalities due to road accidents have been on the rise in many developing countries; India alone witnessed more than 126 thousand fatalities in 2009, of which about 40% occurred in urban roads.

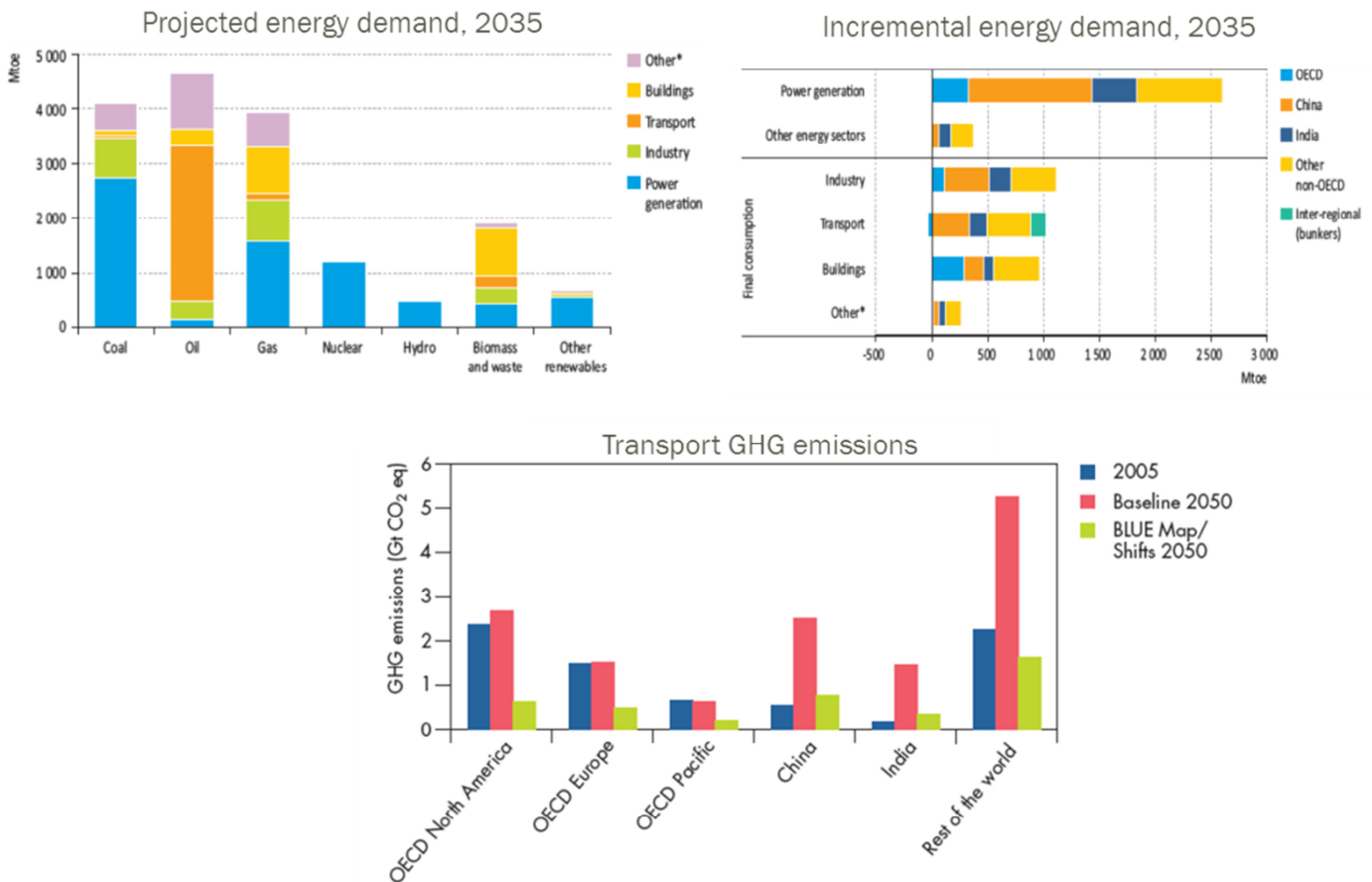
In addition to the negative impacts due to congestion, pollution, etc., the increasing fossil energy consumption in urban transport sector has become a major cause of concern. According to IEA (2009)⁴, transport sector accounts for 19% of global energy use; 95% of the total energy used in the sector comes from a single fossil resource, petroleum (IPCC, 2007)⁵. According to the World Energy Outlook 2011⁶, global energy demand in transport sector is expected to increase by 43% in 2035 and will be met primarily by oil. The non-OECD countries will account for all of the net growth in energy demand.

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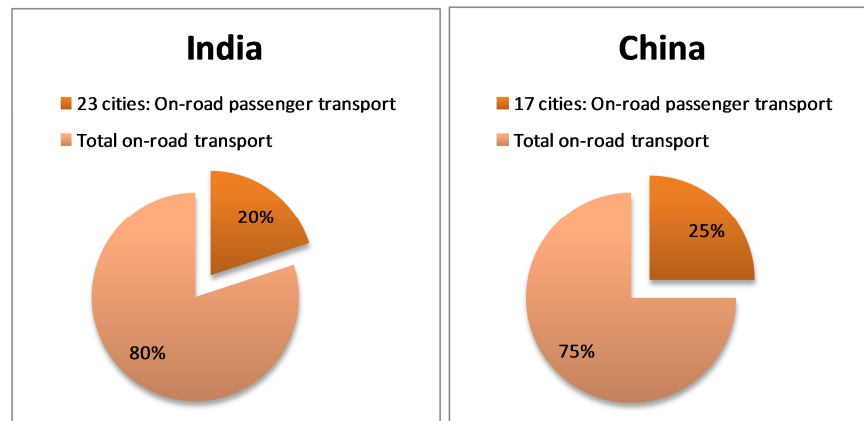
Transport sector also has a significant share (23%) in the total energy-related CO₂ emissions globally. The share of non-OECD countries in the total CO₂ emissions from transport sector in 2004 was 36%. The CO₂ emissions from transport sector are projected to increase by 50% by 2030 and 80% by 2050 (14 Gt) (figure 1). Cities represent a significant proportion of transport sector emissions due to concentration of transportation activities within their administrative boundaries (figure 2). It is estimated that the on-road passenger transport activities in 23 million plus cities in India have a significant share in energy consumption (about 40%) and CO₂ emissions (about 20%) from road transport (Ghate and Sundar, 2011)⁷. Passenger mobility in 17 largest cities in China represents about 25% of the national estimate for road transport sector's CO₂ (Darido et al, 2009).⁸ GHGs from transport sector in these 17 cities are growing at a very fast rate of about 4 to 6% a year. These trends indicate the significant contribution of large cities to the transport sector's emissions, which is expected to further increase in future as we witness rapid urbanization. Urbanization in India has reached a level of about 32%, while in China more than 45% population lives in cities. It is projected that by 2025, China and India will account for 45% of the total world increase in oil use (ADB, 2006)⁹; the contribution of urban transport sector to the same is expected to be substantial.

Figure 1: Transport sector- energy demand and GHG emissions



Source: IEA (2009) and IEA (2011)

Figure 2: CO₂ emissions from urban transport sector in larger cities in India and China



Source: Ghate and Sundar (2011), Darido et al (2009)

With rapid urbanization and the impact of ill-planned and poorly managed urban transport on the environment, society and economy, there is now a compelling need to address local concerns like congestion, safety, equity, etc. Strategies to address local concerns and make urban transport sustainable would in turn result in reduction in CO₂ emissions. In other words, a reduction in CO₂ emissions would be a co-benefit of policies and programs that combat congestion, vehicular emissions, road accidents, etc. in cities.

It is equally imperative to bring down CO₂ emissions from the transport sector in view of the impact that CO₂ has on the climate. Strategies to effect a reduction in CO₂ emissions from the urban transport sector will again in turn lead to a reduction in the other negative externalities of urban transport. In other words, improvement in urban air quality, road safety, reduction in energy consumption, etc. will be co-benefits of strategies aimed at reducing CO₂ emissions in the transport sector. It is therefore important to understand that in drawing up policies and programs to make urban transport sustainable, we should be looking at all the benefits that will flow from sustainable transport projects both in terms of addressing local concerns and reducing GHG emissions.

2. Need to abandon the BAU and promote sustainable and low carbon growth

Cities need to arrest their current pattern of transportation growth in order to promote sustainable mobility and bring down their CO₂ emissions and derive other local benefits. This can be done by adopting the 'Avoid, Shift, and Improve' approach in transport planning as advocated by the Asian Development Bank and reiterated by the Bellagio Declaration¹⁰ in May 2009. The approach is based on the need to avoid travel, shift travel to more sustainable modes, and improve the sustainability of modes (ADB, 2009). In line with such a strategy, following are the key action areas that cities need to follow:

- Practice integrated transport and land use planning
- Use information technology as substitute to physical mobility
- Improve and augment public transport and non-motorized transport systems (both in terms of capacity and quality)
- Discourage use of personal vehicles by using appropriate policy and planning instruments

- Ensure efficient movement of traffic by implementing relevant traffic demand management measures and technologies
- Encourage use of clean fuels and technologies
- Adopt stringent standards for fuel economy and emissions
- Ensure proper monitoring of the performance of in-use vehicular fleets

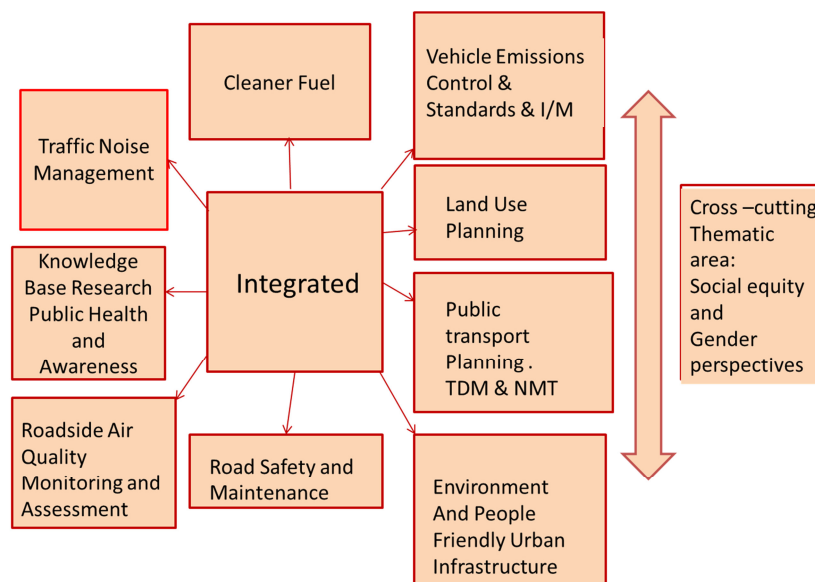
The above measures reinforce the Environmentally Sustainable Transport (EST) framework suggested by the UNCRD and the Ministry of Environment, Japan. The EST initiative is discussed in the next section.

3. EST initiative

Environmentally Sustainable Transport (EST) Initiative, a joint initiative of UNCRD and the Ministry of Environment, Japan targets *building common understanding across Asia on the essential elements of EST and the need for an integrated approach at the local and national levels to deal with multi-sectoral environment and transport issues, including GHG reduction*. It focuses on 12 key thematic areas related to EST (figure 3).

The sustainable mobility measures promoted by EST through its several declarations, especially the Bangkok 2020 Declaration will help in achieving the low-carbon growth pathways for transport sector as most of these measures will help reduce energy consumption. The key strategy of the Bangkok Declaration - Avoid, Shift and Improve along with cross-cutting strategies related to climate change and energy security will promote sustainable low carbon transport.

Figure 3: Key thematic areas of EST



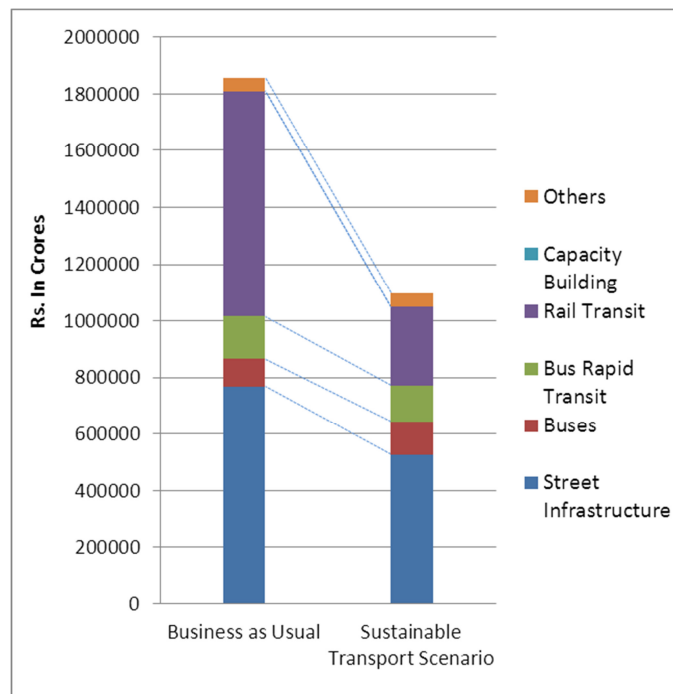
Source: UNCRD¹¹

The implementation of a comprehensive EST strategy would be a daunting task for cities; it will require:

- National/state level policies and support
- City level- actions
 - Preparation of sustainable city mobility plans
 - Implementation of sustainable transport projects
- Capacity building of urban local bodies and parastatal agencies to plan and implement sustainable mobility plans
- Establishment of appropriate institutional and regulatory frameworks
- Massive investments for project implementation
- Effective monitoring mechanisms

Among the above requirements, meeting investment needs to implement sustainable transport initiatives at the city-level is a key challenge. Though the investment needs for EST measures may appear high, these are usually less as compared to investments required for the conventional transport interventions or the business as usual (BAU) scenario. As an example, the level of investments required for urban transport sector in Indian cities is much higher in a BAU scenario as compared to the sustainable transport scenario (figure 4).

Figure 4: Urban transport investment requirements by 2030, India



Source – NTPC Working Group on UT (2011)¹²

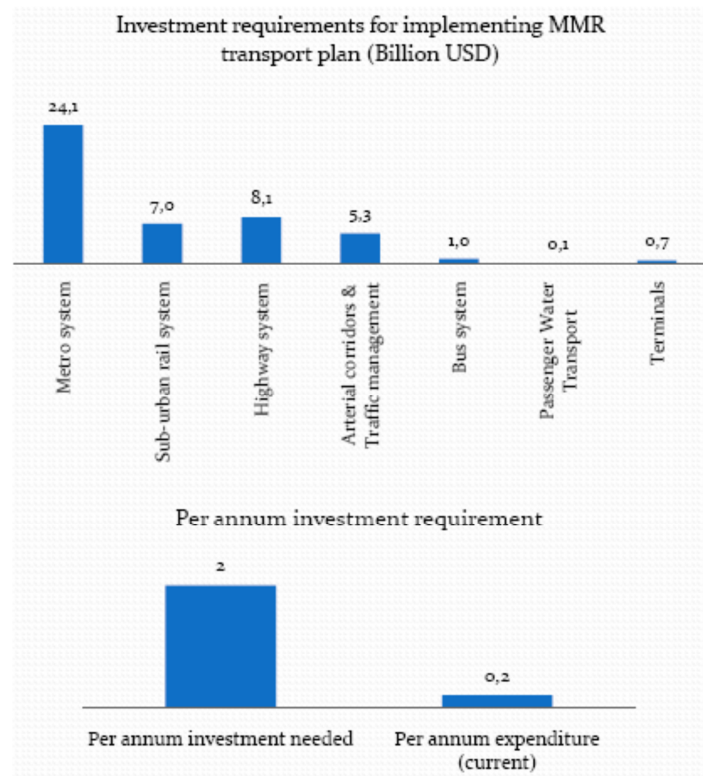
4. Meeting investment requirements

The main sources for financing urban transport include the following:

- Direct funds
 - Income generated from fare box collections/user charges/taxes
- Land monetization/revenues from non-transport commercial activities
- Government support/subsidies
- Debt and PPP

The above listed sources typically are not able to meet the level of investments required for urban transport. As an example, an investment requirement of above 45 billion USD is estimated for the Mumbai Metropolitan region (MMR) by 2031 or 2 billion USD per annum. 65% of the investments are needed in the short-term. The current level of annual investments in MMR (0.2 billion USD per annum) amount to only 7.6% of what is required, indicating inadequate funds for implementation (figure 5).

Figure 5: Gap in investment required for transport sector in Mumbai Metropolitan region



Source: MMRDA, 2010¹³

Additionally global climate funds have been available for low-carbon initiatives in different sectors and one of the key mechanisms to tap these funds has been the Clean Development Mechanism (CDM). Unfortunately CDM has failed to provide the much-needed funds for sustainable transport programs and projects due to a variety of technical and other factors. Out of 3641 registered CDM projects, only 10 are in transport sector. The new climate instruments and policy initiatives like the GEF that are now emerging are more imaginative and pragmatic in their approach to financing sustainable transport projects. It is in the context of these new initiatives that NAMAs (Nationally Appropriate Mitigation Actions) are emerging as a mechanism to source climate funds.

As a concept, NAMAs were first introduced under the Bali Action Plan of 2007 to provide a framework for developing countries to reduce their greenhouse gas emissions through a mechanism that provides funding support, technical assistance, global recognition for their efforts and changes in investment priorities and policies.¹⁴ After Bali, the Copenhagen Accord that followed invited the developing countries to submit Nationally Appropriate Mitigation Actions.¹⁵ The precise manner, in which NAMAs are to be prepared, supported and implemented, however was not clarified. Several countries, since then have submitted their NAMAs to UNFCCC for different sectors including urban transport.

Box 1: Three types of NAMAs

- Unilateral NAMAs are autonomous actions taken by developing countries to achieve emissions reductions without outside support or financing.
- Supported NAMAs are developing-country actions undertaken with financial or other support from developed-country Parties in a measurable, reportable and verifiable (MRV) manner.
- Credit-generating NAMAs are actions that reduce emissions below a predetermined and negotiated sector-wide or policy-wide crediting baseline. Beating that baseline will produce offset that developing countries can sell to developed countries to reduce the cost of their compliance.

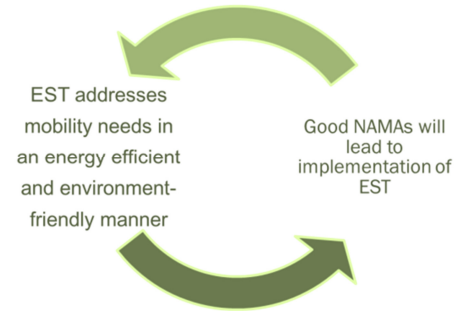
5. NAMAs for urban transport

Keeping in view the larger financial support expected for mitigation in the coming years, NAMAs hold a significant potential to draw climate funds for sustainable transport projects. These can be voluntary measures reported by the national government to UNFCCC or used by government to seek support or claim credit. Expected to be tailored to the local context with an aim to promote sustainable development, NAMAs as per Bali Action Plan, are to be, “supported and enabled by technology, financing and capacity building, in a measurable, reportable and verifiable (MRV) manner.” As a general understanding, it is accepted that NAMAs need not be restricted to direct GHG reduction measures; they could also include indirect actions that facilitate GHG reduction. Transportation NAMAs could be unilateral NAMAs, supported/cooperative NAMAs or credit-generating NAMAs. A NAMA in transport sector could be a:

- **Programme, policy or standard**– sustainable urban transport policy, vehicle efficiency norms, etc.
- City sustainable mobility **plan**
- **Project** like bus rapid transit system, cycle paths, etc.

6. EST and NAMAs – mutually reinforcing concepts

EST and NAMAs mutually reinforce each other. While mobility interventions suggested in the EST framework help reduce carbon emissions, which can then be converted into NAMAs to access international funding, good NAMAs will help in implementation of EST. Comprehensive city strategies or mobility plans could be a good way to imbibe the key EST principles and translate them into city-specific actions that also help reduce GHGs. These plans can be pitched as NAMAs to access climate finance. As an example, the Comprehensive Mobility Plans being formulated for Indian cities could provide a good beginning towards NAMA preparation. These Plans, however, would need to be improved to address the current gaps and align them with EST strategies. A recent TERI study has highlighted the gaps in a few CMPs with regard to sustainable mobility elements and planning framework advocated in several national and international sustainable mobility frameworks including EST (box 2).



Box 2: Gaps in CMPs for Indian cities with regard to sustainable mobility elements and planning framework advocated in several national and international sustainable mobility frameworks, including EST

Planning process/Plan

- Inadequate stakeholder engagement in plan preparation process
- Gaps in translation of plan recommendations into specific projects
- Lack of clarity on formal linkages of CMP with other city plans like Master Plan and City Development Plan (CDP)

NMT

- Lack of recommendations on provision of supporting facilities for NMT users
- Lack of recommendations on integration of hawkers/informal sector

Security

- None of the plans suggest any measures to improve security of transport system users, especially that of the vulnerable traveller categories

Access

- Most of the Plans ignore promotion of universal accessibility
- Lack of proposals on running differential transit services in cities

Public transport

- Lack of proposals to improve quality of public transit services
- Lack of projects to improve accessibility of public transit terminals
- Lack of measures to promote integration of Intermediate Para Transit (IPT) with public transport

ITS

- Lack of measures to promote use of ICT in mobility solutions

Environment

- Lack of recommendations specific to environment quality improvement

Land use transport integration

- Most of the plans lack clear strategy to implement proposed transit oriented designs

Freight

- Freight proposals limited to construction of bypasses and shifting of economic activities to city peripheries

Traffic demand management

- Only a few plans give detailed parking policy/management plan
- Lack of innovative solutions to restrain transport demand by private vehicles

Implementation

- Lack of clear implementation strategy in many plans
- Lack of a well-defined framework of targets and performance indicators
- Lack of identification of capacity building requirements
- Lack of recommendations to establish a mechanism for periodic revision and updating Plan
- No proper communication strategy to build public support for projects to be implemented

Measurement of expected impacts

- Very few plans measure expected CO₂ savings or expected local benefits
- Inconsistency in methodologies to estimate impacts
- Lack of mechanisms to verify and validate quantification (if carried out)

Source: TERI (2011)¹⁶

7. Preparing transport NAMAs - key requirements and challenges faced

A key requirement for preparing NAMAs is to quantify GHG reductions expected from the proposed interventions. There are several challenges while carrying out GHG estimation:

- Availability, consistency, authenticity of data
- Cost of data collection
- Availability of a commonly accepted methodology to estimate GHG savings
- Capacity of city-level agencies to estimate mitigation potential of proposed measures
- Availability of monitoring frameworks at city-level for measurement and monitoring

Successful preparation of NAMAs would require addressing these challenges. Data issues specifically need to be resolved at city-level and the design of GHG estimation methodology should take into account the difficulties in collating high quality data. While data generation and analysis should be improved, data requirements should not require extensive and expensive surveys. Additionally, the potential for creating a central database in each city should be explored. This would also help in long-term monitoring of the impacts. These interventions would require creation of institutional mechanisms at city/state/central level to facilitate data collection and maintenance and creating linkages between different stakeholders.

Box 3: Data challenges for GHG estimation, Example of Mumbai

In a recent exercise of trying to estimate GHGs from Mumbai Metropolitan Region's transport sector, TERI face the following data challenges

- Estimating on-road fleet
 - Inconsistency in motor vehicle statistics in reporting:
 - Vehicles that go off the roads due to age factor/vehicles that may be scrapped
 - Vehicles that are registered in the city but are plying in other cities and vice versa
- Estimating utilization of vehicles
 - Actual utilization of vehicles cannot be captured by motor vehicle statistics; primary surveys are needed
 - Data on age of fleets, technology/models not available
 - Mileage and occupancy data requires primary surveys - inconsistency in surveys conducted by different agencies
- Estimating fuel consumption
 - Fuel efficiency numbers from secondary sources do not capture city-specific conditions
 - Fuel sales data does not disaggregate sales for transport sector

8. Conclusion

It is for the countries to decide whether to proceed with unilateral NAMAs. Preparing and implementing NAMAs will contribute towards reducing GHGs and obtaining local benefits. In any event, cities should be encouraged to prepare good and comprehensive mobility plans based on EST principles, which are capable of being converted into NAMAs; it will also be in the interest of the cities to set-up MRV arrangements in order to monitor the impact of their interventions. The government should facilitate and assist cities in developing NAMAs or at least sustainable mobility plans and implement them.

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