Building an Effective Knowledge Base

The smart road to sustainable transport

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Urbanization Drives Mobility

In 2008, for the first time in history, more than half the world's population—3.3 billion people—lived in urban areas. Over the next twenty years, this number is expected to jump to an unprecedented 5 billion urban inhabitants, mostly in the developing world. This increasing urbanization will be most notable in Africa and Asia where the urban population is expected to double by 2030 (United Nations, 2007).

Although urbanization is frequently cited as a major cause of global emissions growth, it would be better understood as a crucial link between climate and development (Dodman 2009). Urbanization is a major driver of development (World Bank, 2008) and once in cities, people tend to increase their mobility dramatically, driving an increase in GHG emissions. On a global level, the transport sector currently generates nearly one-quarter of world-wide energy-related CO_2 emissions, accounts for about 19 percent of energy use, and is the sector most closely linked to fossil fuel consumption. From 1971–2006, global transport energy use rose steadily at between 2 and 2.5 percent per year, closely paralleling the increase in the world's economic activity (IEA, 2009). Of this global energy use, approximately three-quarters were consumed by on-road motorized transport (50 percent by passenger and 24 percent by freight). Based on urbanization trends, the urban share of transport-sector GHG emissions can be expected to grow rapidly: total passenger travel in developing countries is expected to double by 2050, going from 4,000 to 8,000 km per person per year.

Mobility Drives Infrastructure Needs

As incomes and urbanization increase, private vehicle ownership will increase as well, further increasing both GHG emissions and infrastructure demands. Over 80 percent of the 2.3 billion new cars that are expected to enter service over the 2005–2050 timeframe will be in developing countries (Chamon, et al., 2008). A World Bank study in 9 cities in 6 countries of the East Asia Pacific region forecast urban on-road motorized passenger-kms to increase to 1.9 times their 2007 values in the 13 years preceding 2020 (World Bank, 2009a). For India, a conservative forecast for the World Bank low carbon development study gave on-road motorized passenger-kms travelled in 2031 to be 8.7 times the 2005 figures. Not only does rising incomes promote higher car ownership, but they also increase vehicle use, energy demand, congestion, GHG emissions and local pollution from road transport.

Policies have been used to decouple car ownership and use from economic growth in a few shining cases (Schipper, 2007). European and Japanese drivers travel 30–60 percent fewer vehicle kilometers than drivers in the United States with comparable incomes and car ownership. Hong Kong, China, has one-third the car ownership of New York, the American city with the lowest ratio of cars per capita (Lam and Tam 2002). How? Through a combination of high urban density, high fuel taxes, road-pricing policies, and well-established public transport infrastructure. Europe has four times the public transport routes per 1,000 persons as the United States (Kenworthy, 2003).

For most developing countries, the rapid rise in urbanization will require both expansion and improvement of modern public transport infrastructure and services just to avoid deterioration in mobility. Existing infrastructure is simply insufficient for current populations even without the dramatic rise in private vehicle ownership and use. Unless infrastructure investments to improve public transport keep pace up with urban growth, urbanization and private car ownership trends will create chronic problems of congestion, pollution, road safety, health impacts and GHG emissions.

But for what type of Infrastructure?

The infrastructure design and development decisions which will be taken over the coming years will directly affect the long term sustainability of these cities. Infrastructure investments have a long life; design decisions made centuries ago are still evident in cities and towns around the world. If cities are developed to satisfy the needs of private motorization—as often demanded by a vocal minority of inhabitants—they will “lock-in” to a high energy-consuming development trajectory which will be difficult, if not impossible, to change at a later date.

Extensively adding road space leads to urban sprawl and makes providing quality mass transit services. Just to maintain current mass transit shares in the face of exploding private vehicle ownership is almost an impossible task unless a paradigm shift occurs in the way we look at urban design and development. The spectacular rate of growth in auto ownership is likely to accelerate as disposable income increases, credit for vehicle purchase becomes more widely available, and lower cost cars (such as the TATA Nano in India) enter the market. Because more families in the developing world will own private vehicles, we are faced with the complex problem of convincing them not to use those vehicles for their routine daily travel. This can only be done by providing clean, modern, and effective alternatives.

Sustainable Transport: A Solution both Local and Global

Actions other than adding more roads need to be taken to focus cities' development along a more sustainable pathway. A paradigm shift is urgently needed to reshape and refocus the urban transport sector toward transport systems that not only give the urban inhabitants the mobility and access to the goods and services that they need, but do it sustainably, with little impact on the environment.

Sustainable transport should contribute to a higher quality of life in vibrant and livable cities; reducing environmental and social impacts (such as traffic congestion), through an enhanced mix of efficient public transport systems, walking and cycling, car-pooling, and other transport technologies using renewable and less contaminating energy sources. (See Box 1.)

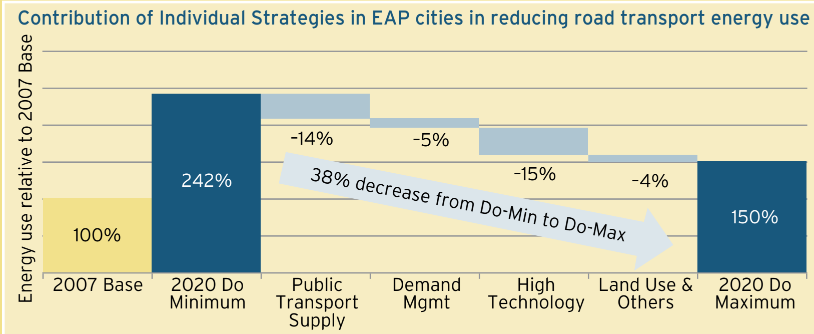
The biggest development challenge to shape a more sustainable future will be to provide the knowledge, assistance, and incentives that allow local stakeholders to purse this paradigm shift and make infrastructure decisions leading to long-term sustainability; improving access to goods and services, and improving their cities' livability while minimizing negative externalities, among them, GHG emissions.

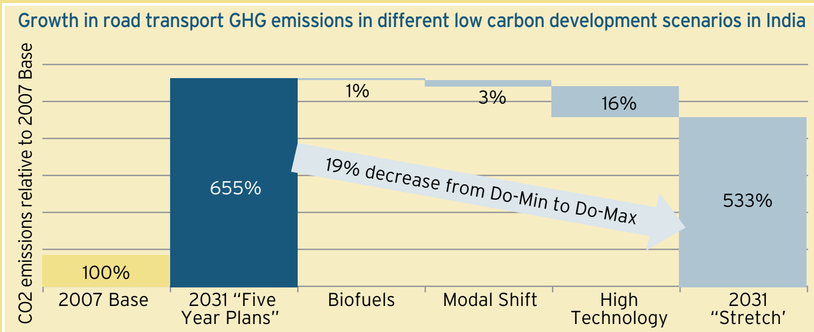
The Global Environment Facility-World Bank Partnership with Developing Countries for Sustainable Transport

Projects on sustainable transport generally pose greater challenges than energy mitigation projects in other sectors. They pose greater design and implementation complications, particularly because of the large number of individual decision-makers that are involved. Countries undertaking transport sector redesign have

BOX 1: How much can we reduce GHG emissions from road transport?

As part of its 2009 East-Asia-Pacific flagship energy study, the World Bank evaluated the impact of existing urban transport master plans on GHG emissions in nine cities in the region,[a] principally over the period of 2007 to 2020[b] (World Bank, 2009a). The analysis was performed using the cities' own data on expected growth and change in travel patterns and modal preferences.





The pre-existing master plans had been formulated to resolve real-life transport issues in each city (not to reduce GHG emissions). All the selected plans involved different levels of action and investment going from a business-as-usual (BAU) "do-minimal" scenario to a more complete implementation of the master plan with additional complementary measures to further integrate public transport (with a focus on coordination and minimizing the time and cost penalty of transferring between modes) and to discourage private car use (the "do-maximum" scenarios),

On average, the studies showed that in the BAU case, the energy used by urban transport could be expected to be, in 2020, almost two and a half times that of the base year, with fastest growth seen in the medium size cities. With the complete "do-maximum" implementation of the master plans, the energy used by urban transport grew only by 50 percent in 2020. This represented a reduction of 38 percent against the dynamic BAU baseline.

[a] Bangkok, Beijing, Chengdu, Guangzhou, Hanoi, Ho Chi Minh City, Jakarta, Manila, and Ulaanbaatar.
[b] Beijing and Guangzhou had base years of 2005; Beijing and Bangkok had master plan years of 2021, and the HCMC MVA study had a master plan year of 2025

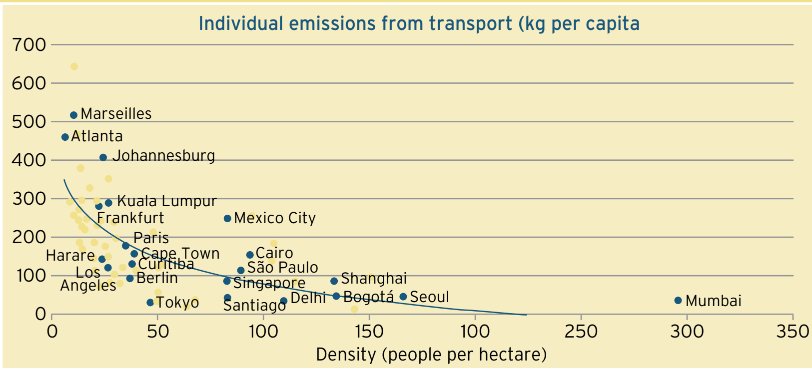
(*continued on next page*)

BOX 1: How much can we reduce GHG emissions from road… (*cont*)

India has a lower motorization index and thus is expected to exhibit greater growth. Nationwide, road transport GHG emissions can be reduced 19 percent against the dynamic BAU baseline by 2032 by improving public transport and light-duty-vehicle technology (World Bank, 2009b).

Improved (high density) urban design, strengthened public transport and a greater commitment to charge private transport externalities will be needed to further reduce energy consumption and GHG emissions (World Bank, 2009c).

Developing countries will install at least half the long-lived energy capital stocks built between now and 2020(McKinsey, 2009). The scale and rate of urbanization present an unrivaled opportunity to make major decisions today about building low-carbon cities with compact urban designs, good public transport, efficient buildings, and clean vehicles.



begun to seek global support for this work, which is central to their sustainable development plans.

In 2000, to help countries to reshape their transport sectors—not only to provide local municipal sustainability but to contribute to increased global environmental benefits—the governing Council of the Global Environment Facility (GEF) approved the GEF Operational Program for Sustainable Transport (OP11), calling for a focus on six areas:

- Modal shifts to more efficient and less polluting forms of public and freight transport through measures such as traffic management and avoidance and increased use of cleaner fuels
- Non-motorized transport
- Fuel-cell or battery operated 2- and 3-wheelers designed to carry more than one person

- Hydrogen-powered fuel cell or battery-operated vehicles for public transport and goods delivery
- Internal combustion engine-electric hybrid buses
- Advanced technologies for converting biomass feedstock to liquid fuels

Consistent with the GEF principle of funding incremental cost, GEF support to transport projects typically constitutes a small share of the project's total expenditure. Nevertheless, the GEF's contribution plays a positive, strategic role by bringing attention to the sustainable aspects of urban transport programs and stimulating interest in innovative approaches and low-carbon development.

The World Bank, as one of the GEF's implementing agencies, recognized that the road to sustainable transport involves implementing good transport projects that simultaneously reduce GHG emissions and enhance multiple co-benefits, and undertook to work with developing countries to build an effective sustainable transport portfolio through the GEF. In particular, the Bank focused its efforts on two of the six areas targeted by the GEF: modal shift to more efficient, less-polluting forms of public passenger transport; and non-motorized transport.

To date, more than 10 developing countries have partnered with the Bank through the GEF to undertake sustainable transport projects. The impact of this work at the municipal level is enormous: more than 30 cities have begun to operationalize projects funded by the GEF/Bank to redesign their transport systems, including through installation or upgrade of urban transit systems.

The GEF/World Bank Portfolio

By 2006, the Bank had helped countries design a first cohort of 14 GEF-sponsored sustainable transport projects, of which four were under implementation at the time of the Third GEF Assembly (World Bank 2006). These four projects and their current status are listed in Table 1 below.

Of the two completed projects, the Marikina project has exceeded its target for increasing the safe use of non-motorized transport safely in metropolitan Manila, and the Mexico City project (see box 2) has contributed dramatically to Mexico's pursuit of sustainable transport throughout all of its urban areas.

Since then, the portfolio has grown to include projects in Asia, Latin America and Africa, with potential positive impacts on the transport sector in 30 cities and accounting for a vast potential projected reduction in GHG emissions by 2030.

TABLE 1 **Initial Cohort of GEF-sponsored World Bank Sustainable Transport Projects**

Country (City)	Project Title	GEF Funding ($m)	Total Funding ($m)	Estimated CO_2 Emission Reduction Target (t CO_2e)	Current Status
Chile (Santiago)	Sustainable Transport and Air Quality for Santiago	$7.0	$14.0	31,000	Closed late 2009
Mexico (Mexico City)	Climate Friendly Measures in Transport	$5.8	$12.2	None	Completed (see Box)
Peru (Lima)	Lima Urban Transport	$7.9	$142.3	1,916,000	Closes June 2010
Philippines (Manila)	Marikina Bicycle Network	$1.3m	$97.6	None	Completed

Box 2: Mexico City: Actions leading to replication[a]

Transport is the sector that showed the greatest participation in energy consumption and the second largest contributor of GHG emissions in Mexico, accounting for 18 percent of the 643 million tons of carbon dioxide equivalent emitted by the country in 2002 (INE, 2007). Road transport is also associated with issues of ambient air quality. The World Bank's partnership with Mexico City represents a comprehensive approach to tackling urban local and global pollution caused by the transport sector[2b] (Johnson *et al*, 2009).

With a $5.8 million GEF contribution, the $12.2 million *Introduction of Climate Friendly Measures in Transport* project has contributed to Mexico's development of policies and measures to support a modal shift toward lower carbon-intensive transport in the Mexico City Metropolitan Area. The project was instrumental in reform of the city's transport policy framework and development of the first Bus Rapid Transit (BRT) System. This project supported the city's first BRT corridor, creation of the METROBUS agency to manage the system, testing of alternative technologies, development of monitoring methodologies for CDM, and development of the first Latin American city-wide Climate Change Action Plan.

The city replaced an aging fleet of 350 polluting buses and microbuses with a modern fleet of 97 high-capacity articulated buses that run in dedicated lanes, resulting in time savings for passengers, increased capacity and quality of service, and the reduction of local and global pollutants. The operation was credited with having changed the momentum for the city's transport system, transporting 10 million passengers and resulting in GHG emission reductions of over 107 kilo-tons of CO_2 equivalent during the first three years of operation. A cost-benefit study done by Mexico's Instituto Nacional de Ecología found total transport benefits of at least $15 million/year from the operation (Schipper *et al*, 2009).

Using the lessons and experiences of the *Climate-Friendly Transport Project*, the Mexico Urban Transport Transformation Program (UTTP) was designed to transform urban transport in eight Mexican cities to a lower carbon growth path. The project will blend together resources from IBRD ($200m); the Clean Technology Fund ($200m); National Trust for Infrastructure ($900m); the private sector ($300m) and participating municipalities ($150m). Anticipated carbon revenue payments are initially estimated at being no less than $50 million. In addition, four of the participating municipalities (Ciudad Juarez; Puebla, Leon, and Monterrey) have also received funding under the GEF-funded Sustainable Transport and Air Quality Project (STAQ), which will provide assistance to them in the preparation of their transport plans.

[a] World Bank, 2007
[b] In the Mexico City metropolitan area, the transport sector accounts for about 40% of total GHG emissions

TABLE 2 Current Cohort of WB-GEF transport projects

Project	Content	Funding (million USD)		Ex Ante Mitigation Target (CO_2)
China: GEF Urban Transport Partnership	Including at least 14 high-profile city sustainable urban transport demonstration sub-projects(4 WB co-financed)	GEF Total	21 857.13	439,700,000 tons over lifetime of investment
Ghana: Urban Transport Project	Improve mobility and increase use of dedicated bus lanes and BRT systems in urban Ghana	GEF Total	7 90	100,000 tonnes over 5 year project life
India: GEF Sustainable Urban Transport Project	Including demonstration projects in 6 cities	GEF Total	22.5 353.5	12,828 tons
Latin America: GEF Sustainable Transport and Air Quality Program	Including pilot investments in 11 cities in Argentina, Brazil and Mexico	GEF Total	20.8 79.3	423,000 to 717,000 tons
Nigeria: GEF Lagos Urban Transport Project	Enhance public transport service and expand BRT	GEF Total	4.5 329.5	2,400 to 5,200 tons

Measuring Project Effectiveness: Bridging the Critical Information Gap

From its inception, the GEF has played a key role in helping developing countries test, innovate, and learn from activities intended to improve the delivery of global environmental benefits. Its focus on "learning by doing" has paved the way for much of the growth in investments in renewable energy and energy efficiency worldwide.

In the sustainable transport sector, however, results so far have neither confirmed nor contradicted the assumptions embodied in OP11 about what actions will lead to good transport systems that improve mobility and at the same time reduce GHG emissions, or at least reduce their rate of growth.

They have, however, highlighted the need to adopt a more methodical approach to measuring results, and a more systematic means for sharing knowledge and data. Low-carbon sustainable transport development is feasible only when relevant stakeholders have the information and knowledge that they need to evaluate the impacts of different policy options.

In developing countries, the information they need often cannot be easily obtained. Because local level transport data is usually generated on an *ad-hoc* basis, it is frequently incomplete or insufficient for following projects. Aggregating local level information to national and regional levels often compounds these inconsistencies. Although people's travel preferences vary widely from city to city, trip-based data is usually available only on a very limited basis, is often outdated and almost never is available as a time-series (IEA, 2009).

Because project developers usually have difficulty justifying the expense and effort involved in generating information beyond that which is strictly essential for their immediate project implementation requirements, little knowledge is disseminated for the benefit of other projects.

This is one of the main reasons why transport is largely missing in climate change mitigation policies and actions worldwide despite being one of the largest, and fastest growing, sources of GHG emissions. This situation has been identified by over 40 organizations;[1] it was further confirmed in a range of presentations at the December 2009 UN Framework Convention on Climate Change (UNFCCC) 15th Conference of the Parties meeting.

GEF funding has been shown to have the biggest impact when it helps create an enabling environment that reduces the risk to local decision makers of promoting those innovative and transformational choices that favor long-term sustainable low-carbon outcomes. GEF support and funding are particularly advantageous in bridging this information gap through:

- **Knowledge creation and sharing:** GEF is ideally positioned to promote development of knowledge useful to others for subsequent projects; this may

[1] See the SloCaT partnership at www.slocat.net

initially require greater effort at the project level but creates needed synergy between projects.

- **Facilitation of lessons learned in other projects:** Once a project has been fully implemented, funding is rarely assigned to conduct an ex-post evaluation of the outcomes, but this analysis is critical to scaling up knowledge.
- **Sharing practical examples of best practices through GEF Agencies and beyond:** Helping local developers learn from best practices in other cities is important for project implementation. Sharing successful, innovative, and transformational projects with decision-makers can help them decide to implement low carbon development pathways for their cities and helps reduce their perceived risk of doing so.
- **Building on convening power:** For many cities and projects, becoming part of GEF's sustainable transport portfolio is a rallying-flag that gets stakeholders on board. The political importance of this leadership cannot be underestimated.

Defining an Effective Methodology for Measuring Sustainable Transport Effectiveness

Since the first cohort of projects was approved, GEF has required that GHG avoidance be used as a standard target and indicator across the entire climate change mitigation portfolio. However, the only methodology that has been agreed upon by GEF has been for renewable energy, energy efficiency, and advanced energy technology projects. Transport projects have been proposed and approved with some form of GHG reduction estimate, but the methodologies used for these *ex ante* estimations remain inconsistent.

The World Bank has committed itself to ensure comparability and consistency from this and future cohorts of sustainable transport projects. To do so, it has begun to work with the GEF Secretariat, Scientific and Technical Advisory Panel (STAP) and other agencies to develop a consistent methodology for both *ex ante* and *ex post* estimation of GHG emission reductions.

To this end, the GEF Secretariat and the STAP organized a workshop at the Asian Development Bank (ADB) headquarters in Manila in October 2009, to move toward development of a consistent methodology for assessment of GHG benefits from urban transport interventions sponsored by GEF. The World Bank and the ADB worked together with STAP's experts to propose a new approach to evaluating GHG emissions from GEF transport projects. This proposal involves using a simplified methodology for undertaking *ex ante* GHG reduction estimates at the beginning of a project. But at the same time, it requires the use of a more complex methodology to evaluate emissions from the project activities under implementation. This more complex *ex post* evaluation methodology is similar to that used worldwide in mobile source emissions inventory work to evaluate transport sector emissions between a project case and those of a dynamic baseline scenario.

The proposed methodology will employ an activity-based measurement protocol that uses low-cost global positioning systems (GPS) together with vehicle counts to define the initial, *ex ante* baseline travel data. Project proponents must then assume an obligation to measure *ex-post* travel activity patterns using a similar protocol on at least two occasions after completion of the project. These measurements would allow the true GHG mitigation from the project to be evaluated. This data is essential to: refine the initial default values for use in later projects; evaluate and report the emissions reductions resultant from this project; and re-evaluate the ex-ante assumptions used and the uncertainty associated with the initial estimation.

More broadly, the contribution of knowledge and information about what has worked from this program of similar projects in 30 medium-size developing country cities will be invaluable in determining what works (and what does not) in reducing GHG emissions in the urban transport sector worldwide.

■ Building a Sustainable Transport Toolkit

To support this approach, the Bank is working with its second cohort of GEF projects to develop a practical toolkit (*Annex 1*) to facilitate collection and reporting of vehicle population and activity data in a standardized and consistent manner. As twenty-nine of the cities included in this second cohort of projects are medium-sized cities, the tool-kit and experiences are expected to provide tremendous insight and learning for the management of these cities of less than 10 million inhabitants. The toolkit will help project practitioners:

- Improve the quality and consistency of data used to evaluate impacts of specific interventions
- Proportion a unified framework to facilitate cross-country and region assessment
- Involve different experts and institutions in data collection and modelling activities

The outcomes of these activities are being combined with the Bank's recently formed Development Grant Facility (DGF) knowledge management partnership[2] to provide project developers and decision makers in Asia (and in a second phase, Latin America) with credible air quality and climate change data and information for energy and transport sectors, and highlighting the co-benefits of jointly addressing both. With these activities, the Bank faces a unique opportunity to use GEF resources to contribute to global knowledge and understanding about what works in sustainable transport.

■ Conclusion: Toward Sustainable Mobility

The global transport sector currently generates nearly one-quarter of energy-related CO_2 emissions and is the sector most closely linked to fossil fuel consumption. Worldwide transport energy use has risen steadily—closely paralleling the increase in the world's economic activity—and under a business as usual scenario will grow much faster in many developing countries. A paradigm shift is needed in this historic trend for the world to successfully face its climate change challenges. However, transport is the sector that has least benefited from global assistance in towards achieving this emission mitigation.

The biggest development challenge in shaping a future involving sustainable passenger and freight transport will be to provide the knowledge, assistance, and

[2] The partner organizations are: Asian Development Bank (ADB), Clean Air Initiative for Asian Cities (CAI-Asia) Center, Clean Air Initiative for Latin American Cities (CAI-LAC), German Agency for Technical Cooperation (GTZ), Global Air Pollution Forum (GAPF), United States Agency for International Development (USAID) and the World Bank.

incentives that are needed by local stakeholders for them to implement infrastructure decisions in the short-term that lead to sustainability in the long-term.

The lack of a consistent methodology for measuring the impacts of transport projects has become a serious hindrance to the world's needs to reduce the trajectory of GHG emissions from the transport sector. The GEF's commitment to "learning by doing" is playing an important role in helping resolve this problem. Several of the first cohort of GEF-approved transport projects have demonstrated impressive results. But the challenge lies in working to ensure that the much larger second and subsequent third cohort of projects provide a more systematic basis for learning by doing as a way to achieve even greater results.

The Bank has worked closely with the GEF Secretariat, STAP and ADB to develop and adopt a methodology that overcomes this impasse both in terms of *ex ante* (proposal stage) estimates and *ex post* (results stage) assessments. The Bank is especially committed to following through on the application of this consistent methodology in its current cohort of projects of over 30 medium size cities in developing countries.

These tools and experiences are expected to provide tremendous insight and learning on what works to improve mobility and reduce GHG emissions through these GEF-sponsored projects in those cities that are undergoing unprecedented urban growth. In a world with such rapidly changing parameters, investing in knowledge and learning about how the challenges in the transport sector can be met is the shrewdest long-term investment that GEF can continue to make.

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Annex 1

Building a Transport Activity Measurement Toolkit

The toolkit will offer a practical and simplified means to collect and report vehicle population and activity data in a standardized and consistent manner. It is designed to be easy to use for project staff, city personnel and other stakeholders to assess fuel efficiency, greenhouse gas (GHG) and air pollutant emissions, based on vehicle characteristics and measured activity. It will use modern tools, such as low cost global positioning system (GPS) loggers to generate precise data with a minimum of effort. The toolkit will be formed of the following modules.

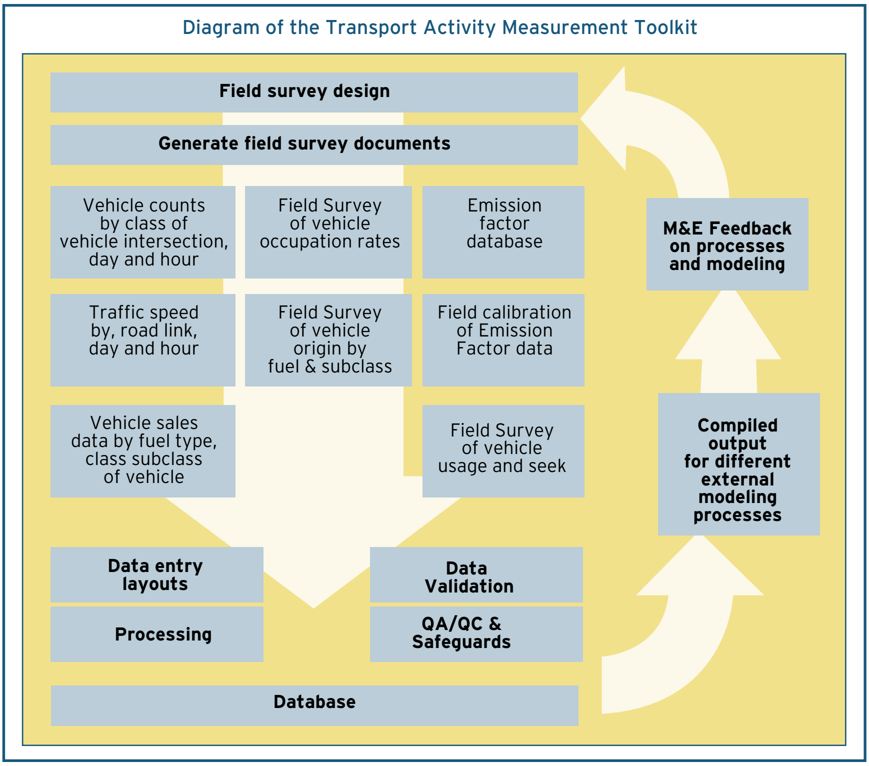
Practitioners guide

The practitioners guide will describe:

- Selection of the accounting framework (model): Options include the World Bank ESMAP/WBI and IVEM models. The document structure must facilitate others being added at a later stage
- How to determine an adequate sampling size according to the selected model and size of city/region and/or area of intervention (such as a BRT corridor)
- The sampling and measurement process: methodology, equipment, personnel, costs, management, logistics, and quality control and assurance (QA/QC) processes and safeguards
- Criteria for choosing the appropriate locations and times to carry out the measurements
- Process and criteria for assigning road category or hierarchy to road segments (arcs)

Data collection documentation

An Excel-based application to generate the data collection documents needed using a standardized format, in the local language, and providing guidance on their use. Initially this will be developed in English, Spanish, and Portuguese and will provide a structure for adding other languages. On selecting the desired language, the application will print all the necessary data collection documents and supporting instructions to field personnel in that language.



Data collection documents will include the following data sets:

- Vehicle counts and fleet composition
- Vehicle occupation levels
- Vehicle usage surveys
- Vehicle technology distribution
- Vehicle speed and duty cycle
- Road hierarchy distribution
- Vehicle fuel consumption calibration surveys
- Passenger modal choice surveys
- Route-based O-D surveys

The document set and associated instructions shall also include those needed for the quality assurance and control processes and safeguards.

Road hierarchy assignment

An open source and freely distributable application that:

- Facilitates assigning road category or hierarchy to up to 10 types of road segments (arcs) within the study area. This application needs to work using Google Earth and/or Openstreetmap.com
- Is able to automatically read all valid GPS data collected and to assign the road category or hierarchy that corresponds to each segment of road (arcs)
- Adds all valid GPS data collected together with the assigned the road category or hierarchy to a relational database for further analysis

Database

An open source and freely distributable relational database to house and validate the collected activity data. This database will be designed to:

- Facilitate data entry from the field survey documents
- Eliminate errors among data using verification filters
- Provide QA/QC validation and traceability
- Convert data as necessary to ensure consistency between the different data sets and interpolate missing data
- Generate output files that can be used as input to the included emissions models (initially ESMAP/WBI, IVEM)
- Generate relational database output files that facilitate combining (replicating) all the collected data into a common depositary

Front end

A front end that facilitates access to, and use of, the different modules when all are assembled on a CD for delivery to the local institution (such as a university) or company that is tasked with performing the selected measurements. The front end will supply information to the user on:

- The contents of the CD
- How to access/install the different modules for their use
- Where to find additional information
- Steps involved in the process

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