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INVESTING IN OUR PLANET

# Investing in Sustainable Urban Transport

THE GEF EXPERIENCE



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FUEL CELL CITY BUS

# Foreword

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**Monique Barbut**  
CEO and Chairperson  
Global Environment Facility

When the Global Environment Facility (GEF) began nearly two decades ago, our founders recognized that exhaust from cars and buses would be a major contributor to greenhouse gas emissions. To help meet this challenge we have spent the past decade building a program that addresses this trend, especially in developing countries. Today we can say that the GEF portfolio represents one of the largest sustainable urban transport programs in the world: this includes 37 projects worldwide, with \$201 million committed and an additional \$2.47 billion leveraged in cofinancing from the private sector and elsewhere. GEF projects can be found in 73 cities, positively affecting the lives of 244 million people each day.

Investing in sustainable transport reduces carbon dioxide emissions and helps mitigate the potential impacts of climate change. But making these investments also pays off at the local level: we work with stakeholders to expand clean public transportation choices that also have the added benefits of lowering air pollution and reducing traffic congestion.

We have made good inroads toward making a lasting impact: GEF money for sustainable urban transport projects has grown from \$31 million in 1998 to \$126 million today. Yet clearly there is a lot of work left to do: the global environment challenges in the transport sector remain daunting; with greenhouse gas emissions growing more than in other relevant sectors — a trend likely to continue and perhaps even accelerate unless we act now. Experts predict that unless there is a meaningful shift away from traditional transportation fuels in two decades nearly 45 percent of all carbon dioxide emissions from the developing world will come from transport.

This publication details our efforts in the field toward realizing sustainable urban transport all over the world. We look forward to remaining a catalytic force for change to meet global environmental challenges from climate change — through this document we hope readers gain a deeper understanding of what we do now and what we expect to accomplish with our partners in the developing world.



# Introduction



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Cars, trucks, buses, and trains — the world relies on transportation to fuel its economic growth and development. Without transportation, people cannot travel to jobs, materials are not delivered to manufacturing sites, and goods do not make it to market. Transportation, of both people and goods, is a necessary component of global development.

Increased global transportation has, until now, gone hand in hand with increases in greenhouse gas (GHG) emissions. Conventional technologies and transport modes emit substantial amounts of CO<sub>2</sub>, making the transportation sector a key contributor to human-induced global climate change. Indeed, over the past decade, GHG emissions from the transportation sector have increased faster than emissions from any other sector. To meaningfully address global climate change, there will need to be a transformation of transportation policies and practices worldwide.

Since 2000, the Global Environment Facility (GEF) has worked to address the nexus between transportation and climate change. The GEF's initial commitment to sustainable transportation, adopted as part of GEF 2, has grown into an emerging focus in the current GEF portfolio. As of April 2009, the GEF has funded 37 transportation projects in more than 73 cities worldwide. A review of the results to date shows that these projects have had a direct and cost-effective impact on reducing CO<sub>2</sub> emission levels.

Moving forward, the GEF's work in the transportation sector will reflect the successes and lessons learned from its experiences over the past nine years. Together with its partners in the international community, the GEF will continue to work toward ensuring that economic development and expanding transportation networks around the world do not lead to ever increasing GHG emissions.



## GROWING CONCERNS WITH Transport and Future Opportunities

### Trends in the transport sector

In 2006, the transport sector produced 6.4 Gigaton (Gt) CO<sub>2</sub> emissions, or 23 percent of world energy-related CO<sub>2</sub> emissions (IEA 2008). The growth of this sector's emissions is linked to the increased number of cars worldwide. The world auto fleet is swiftly growing, particularly in emerging economies. In China, for example, vehicle sales increased from 2.4 million in 2001 to 5.6 million in 2005 and 7.2 million in 2006 (IPCC 2007).

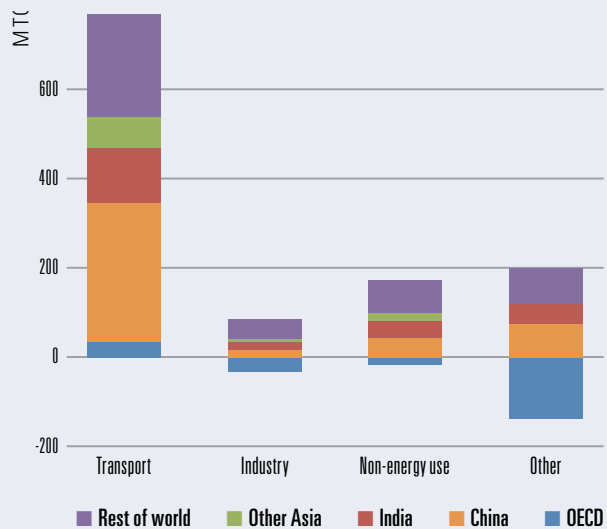
As for the future, the transport sector will account for an estimated three-fourths of the projected increase in worldwide oil demand by 2030 (figure 1).

The World Business Council for Sustainable Development/Sustainable Mobility Project (WBCSD/SMP) reference case projection indicates that the number of light-duty vehicles worldwide will continue to grow to about 1.3 billion by 2030 and to just over 2 billion by 2050, which is almost three times higher than the present level. Nearly all of this increase will be in the developing world (Figure 2).

A critical component of this trend is rapid urbanization. According to the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, about 75 percent of people in the industrialized world and 40 percent in the developing world now live in urban areas (IPCC 2007). At the same time, cities have grown larger, with 19 cities now having populations over 10 million. A parallel trend is the decentralization of cities: cities have spread out faster than they have grown in population, with rapid growth in suburban areas and the rise of "edge cities" in the outer

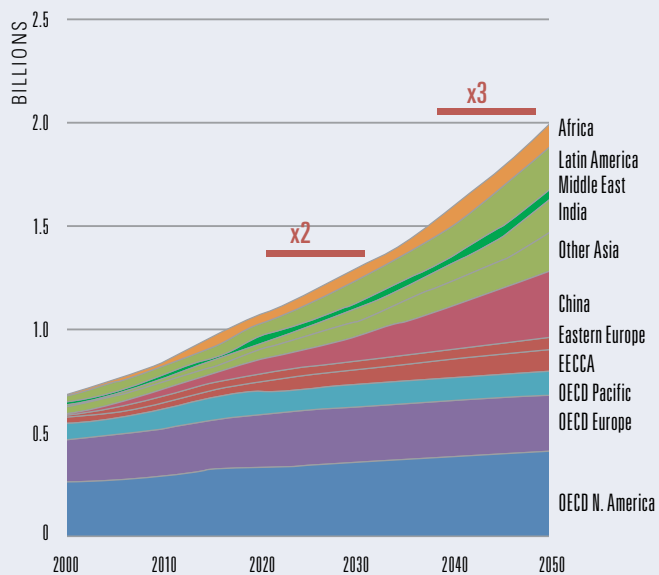


**FIGURE 1 PROJECTED INCREMENTAL OIL DEMAND BY SECTOR, 2006-30**



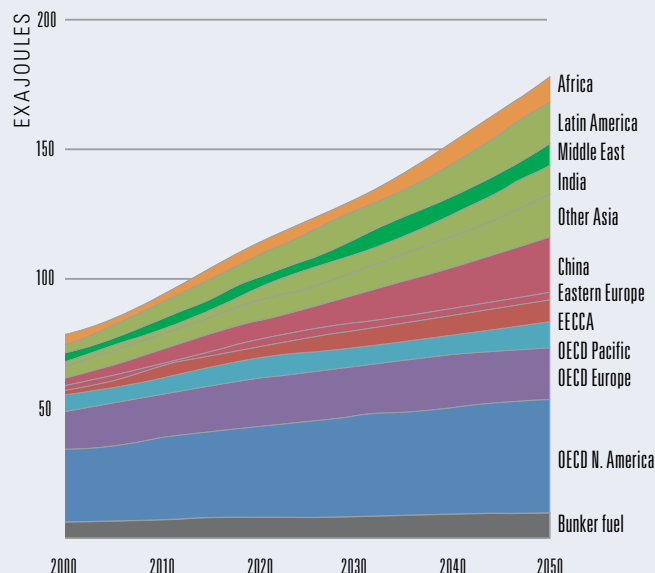
Source: IEA 2008.

**FIGURE 2 TOTAL STOCK OF LIGHT-DUTY VEHICLES BY REGION**



Source: WBCSD 2004.

**FIGURE 3 PROJECTION OF TRANSPORT ENERGY CONSUMPTION BY REGION**



Source: WBCSD 2004.



suburbs. This decentralization creates a growing demand for travel together with other factors. It is expected that in China and India alone, the urban population will grow by over 500 million people in the next 25 years.

As economic growth and urbanization increase demand, transport activities will multiply to meet those demands. Unless there is a major shift away from current patterns of energy use, the transport energy use in 2030 will be about 80 percent higher than in 2002 (Figure 3). A large part of the growth will be in developing countries, where transport energy use is projected to increase at about 3 percent per year, which is more than four times faster than the rate in developed countries (IEA 2008; EIA 2008). This implies a significant regional shift in transport CO<sub>2</sub> emission, with the emerging economies gaining significantly in share. The share of developing countries in CO<sub>2</sub> emission will increase from 30 percent in 2006 to 45 percent by 2030 (IEA 2008).

### Opportunities for the future

Decoupled growth in transport from increased GHG emissions presents a clear challenge to the international community. Dramatic new technologies and policies will be required. The International Energy Agency (IEA) estimates that an additional investment of \$1.5 trillion is needed to attain the 550 Policy Scenario<sup>1</sup> in the transport sector (IEA 2008). However, many promising technologies and strategies are available to reduce or even eventually reverse the growth of GHG emissions (IPCC 2007).

In initial national communications to the United Nations Framework Convention on Climate Change (UNFCCC), nearly two-thirds of the non-Annex I Parties to the Convention identified mitigation measures in the transport sector, such as the introduction of electric and hybrid vehicles, implementation of vehicle emission standards, and measures focused on mode switching and other behaviors affecting transport. Thirty-four of the 50 mitigation projects proposed by the non-Annex I Parties include the promotion of public transport and use of bicycles (UNFCCC 2007).

In general, there are three ways to address the growing GHG emissions in the transport sector: reduce the demand to travel by car, shift travel to a more efficient mode, and improve the energy efficiency of car travel. Examples of each approach follow.

<sup>1</sup> The 550 Policy Scenario seeks to stabilize GHG concentration at 550 ppm CO<sub>2</sub>eq.



### REDUCE THE DEMAND TO TRAVEL BY CAR

From a long-term perspective, GHG emissions can be reduced by shaping the design of cities and restraining motorization. Planning and policy to restrain light vehicles and increase land-use density lead not only to reduced GHG emissions, but also reduced pollution, traffic congestion, oil use, and infrastructure expenditures, and are generally consistent with social equity goals as well (IPCC 2007).

### SHIFT TRAVEL TO A MORE EFFICIENT MODE

GHG emissions can be considerably reduced by offering strong and optimized public transport, integrating transit with efficient land use, enhancing walking and cycling, and encouraging mini-cars and electric two-wheelers. Around the world, bus rapid transit (BRT) is gaining attention as a substitute for light rail transit (LRT) and as an improvement over conventional bus service. In addition to reducing transport emissions, public transport like BRT carries the social benefit of increasing the mobility of people without access to cars.

Traffic Demand Management (TDM) is a traffic management system that improves road performance by controlling and reducing traffic volumes. TDM is particularly appropriate in developing country cities because of its low costs, multiple benefits, and potential to redirect the motorization process (IPCC 2007). In many cases, effective TDM during the early stages of development can avoid the problems that result when communities become too automobile dependent. Early avoidance of these problems can help support a developing country's economic, social, and environmental objectives (Gwilliam et al. 2004).

### IMPROVE ENERGY EFFICIENCY OF TRAVEL

Improving vehicle energy efficiency offers an excellent opportunity for GHG mitigation. IPCC has determined that carbon emissions from 'new' light-duty road vehicles could be reduced by up to 50 percent by 2030 compared to currently produced models (IPCC 2007). How the significant increase in vehicle demand in developing countries will be met in the coming decades is crucial. Total GHG emissions will differ significantly depending on whether these demands are met by energy-efficient

transport modes and vehicles or, for example, by old used cars. In the medium and longer term, electric, hybrid, and fuel-cell vehicles could play important roles<sup>2</sup> in those efforts, though their market penetration is currently small.

From a policy perspective, fuel economy regulations, taxes, and subsidies can be effective in promoting vehicle efficiency improvements. According to the IPCC Fourth Assessment Report, road vehicle efficiency could be improved by 5–20 percent through strategies such as eco-driving styles, increased load factors, improved maintenance, in-vehicle technological aids, more efficient replacement tires, reduced idling, and better traffic management and route choice.

These three general approaches to controlling GHG emissions—reducing the demand for car travel, shifting to more efficient travel modes, and improving the energy efficiency of travel—encompass a large range of possible cost-effective mitigation options for the transport sector. The best choice of options will vary depending on regions and countries. The local economy, geography, population, and culture all influence the feasibility and effectiveness of each option. Policies and measures must be tailored to local conditions by carefully assessing the existing situations and consulting with relevant stakeholders. It is also important to support new measures with appropriate legal frameworks, trainings, capacity build-ings, and public awareness campaigns.

Cobenefits also play an important role reducing GHG emissions. Local air pollutants and GHGs have a common source in motorized traffic, which may also create congestion, noise, and accidents. By addressing these issues simultaneously through climate change mitigation efforts, the development and climate agendas can be integrated, potentially offering large cost reductions, as well as reductions of health and ecosystems risks.<sup>3</sup> For example, estimates suggest that in China, the costs of a 5–10 percent CO<sub>2</sub> reduction would be compensated by increased health benefits from the accompanying reduction in particulate matter (Aunan et al. 1998). Actions addressing GHG emissions from transport could also benefit economic and energy security efforts.

2 In some cases, Life Cycle Analysis aspects need to be taken into account in introducing cleaner vehicles. For example, if electricity for electric cars will be supplied through old coal plants, the environmental benefit of the introduction of those vehicles might be limited.

3 Emissions of black carbon (BC), which refers to light-absorbing carbonaceous particles formed through incomplete combustion of fuels, could be reduced through those efforts as well. BC is not covered under UNFCCC but arguably contributes significantly to global warming.



## GEF's Strategy on Transport

As an operational entity of the financial mechanism of the UNFCCC, the GEF and its partners have supported a variety of mitigation efforts in developing countries during the past 18 years in close cooperation with recipient countries and the 10 GEF Agencies.

The GEF has supported sustainable urban transport projects since 1999. In 2000, the GEF Council approved Operational Program #11 (OP 11 – “Promoting Environmentally Sustainable Transport”), a program aimed at enhancing efforts in the transport sector. Recognizing that resources were limited, the GEF adopted a selective and catalytic approach. The scope of activities covered by the “Promoting Environmentally Sustainable Transport” program was limited to measures that provide a significant opportunity to reduce GHG emissions and technologies with costs that will drop significantly with economies of scale in manufacturing.

The program initially emphasized the following ground transport measures:

- 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
- Nonmotorized 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.

In 2004, with the benefit of several years of implementation and monitoring, the GEF's operational strategies were evaluated and judged generally successful (OME/GEF 2005).

As part of the GEF-4 replenishment process, the climate change strategy for mitigation was revised to focus primarily on six strategic programs, including one program on "sustainable innovative systems for urban transport."

Initially, GEF support to the transport sector focused on technological solutions. However GEF-4 (2006–10)

emphasizes "nontechnology" options, such as planning, modal shift to low-GHG-intensive transport modes, and promotion of better managed public transit systems. The new strategic program on "sustainable innovative systems for urban transport" prioritizes countries with rapidly growing small and medium-size cities. Although greater overall emissions reductions are liable to result from countries with larger total GHG emissions, smaller countries might also find reducing transport CO<sub>2</sub> emissions a priority for the potential cobenefits of development and environment. Projects under the new program include a mixture of technical assistance and limited investment support.





# The GEF's Investment in Transport

## Portfolio overview

From 1999 to the present, the GEF has supported 37 projects (including the ones under preparation) focused on actions to reduce GHGs from the transport sector. Latin America and Asia have the largest number of these 37 projects (Table 1, Figure 4)

During this period, the GEF has allocated approximately \$201 million to sustainable urban transport projects, with an average of \$5.4 million per project. This funding has been supplemented by more than \$2.47 billion in cofinancing. This cofinancing ratio of 1 to 12.3 is the highest in all GEF programs as it often requires large-scale investments to develop infrastructures.

Funding for transport activities has continuously increased since GEF-2 (Table 2, Figure 5). Funding has multiplied by 1.5 from GEF-2 to GEF-3, and by 2.8 from GEF-3 to GEF-4.

Although estimating these projects' impact on CO<sub>2</sub> reduction is difficult, project documents indicate an expected direct CO<sub>2</sub> reduction of 31.5 Megaton (Mt) CO<sub>2</sub>, and an expected indirect CO<sub>2</sub> reduction of 34.5 Mt CO<sub>2</sub>.

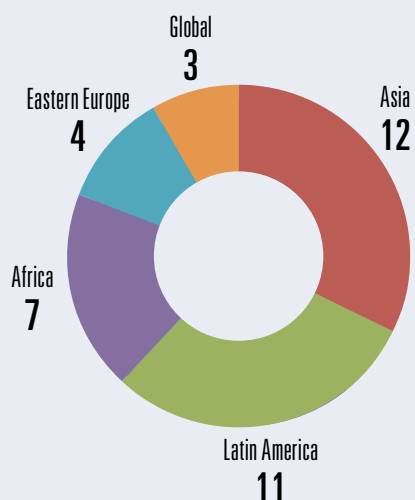
The average cost-effectiveness of GEF funding, for projects with estimated CO<sub>2</sub> emissions reductions, is around \$4.3/t CO<sub>2</sub> (direct reductions only).

To date, only the World Bank, the United Nations Development Programme (UNDP), and the United Nations Environment Programme (UNEP) have implemented GEF-funded sustainable urban transport projects (Table 3). The UNDP has implemented 19

**TABLE 1 REGIONAL DISTRIBUTION OF THE GEF SUSTAINABLE URBAN TRANSPORT PORTFOLIO**

Region	Number of projects as of May 2009
Asia	12
Latin America	11
Africa	7
Eastern Europe	4
Global	3
<b>Total</b>	<b>37</b>

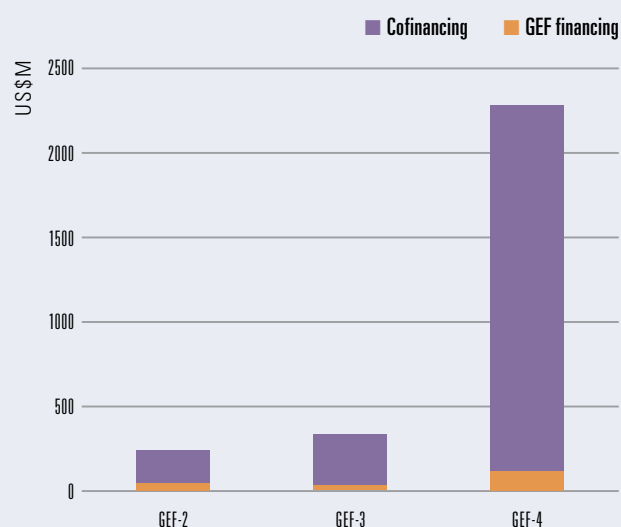
**FIGURE 4 REGIONAL DISTRIBUTION OF THE GEF PORTFOLIO IN SUSTAINABLE URBAN TRANSPORT**



**TABLE 2 LEVEL OF FINANCING IN SUSTAINABLE URBAN TRANSPORT (MILLION \$)**

\$M	GEF financing	Cofinancing	Total
GEF 2 (1998.7 – 2002.6)	30.6	30.4	61.0
GEF 3 (2002.7–2006.6)	45.0	293.4	338.5
GEF 4 (2006.7–present) as of May, 2009	125.9	2149.8	2275.7
<b>Total</b>	<b>201.5</b>	<b>2473.6</b>	<b>2675.1</b>

**FIGURE 5: LEVEL OF FINANCING IN SUSTAINABLE URBAN TRANSPORT SECTOR**



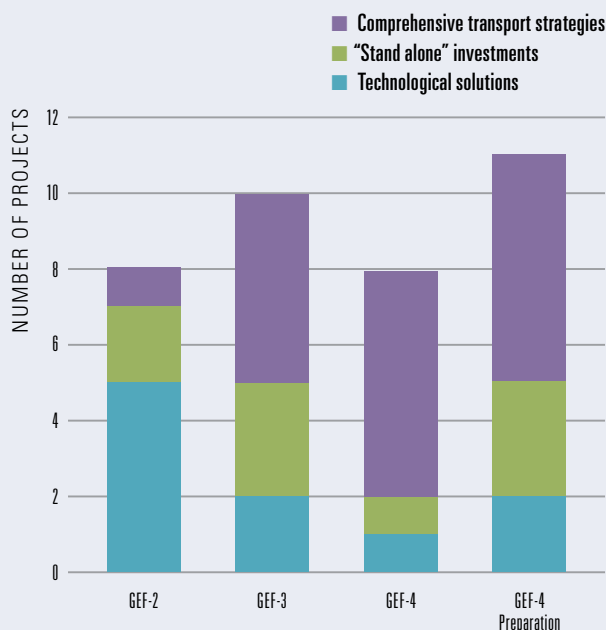
**TABLE 3 APPROVED PROJECTS BY THE GEF AGENCIES**

	Number of projects	GEF financing \$M	Cofinancing \$M
UNDP	19	68.4	563.0
World Bank/ UNDP	1	22.9	352.7
World Bank	11	100.6	1361.8
UNEP	6	9.6	196.1
<b>Total</b>	<b>37</b>	<b>201.5</b>	<b>2473.6</b>

**TABLE 4 PROJECTS FOR IMPROVEMENTS IN URBAN TRANSPORT SYSTEMS BY REGION**

	Number of projects	Number of cities covered	Population of the cities (million)
Asia	7	32	121
Latin America	10	22	80
Africa	7	15	40
Eastern Europe	4	4	3
<b>Total</b>	<b>28</b>	<b>73</b>	<b>244</b>

**FIGURE 6 TRENDS IN GEF INTERVENTIONS**



projects, the World Bank has implemented 10, and the UNEP has implemented 7. One project is implemented jointly by the World Bank and the UNDP. The Inter-American Development Bank and Asian Development Bank are in the process of developing projects but they are not yet approved.

**Types of interventions**

The GEF funds projects that fall within two general categories:

- Projects focusing on technological solutions, like fuel-cell buses and electric 3-wheelers
- Projects that improve the transport system on an urban scale, either by “stand-alone” investments (public transport infrastructures, nonmotorized transport infrastructures), or comprehensive urban strategies such as urban and transport planning, traffic demand management, public transport infrastructures and fleet improvement, and nonmotorized transport infrastructure.

During GEF-2, the GEF’s portfolio focused on technological solutions. During GEF-3, the focus shifted to comprehensive strategy options (Figure 6). Today, GEF’s portfolio focuses on comprehensive transport strategies developed at the city-wide level, including the complementary components that contribute to a modal shift to low-GHG-intensive transport modes.

In addition to these types of projects, the GEF is taking further steps to expand the scope of its assistance to be more comprehensive in its approach. One of the examples is the Global Fuel Economy Initiative (GFEI) Project, which tries to improve fuel economy of light-duty vehicles at the national level in developing countries worldwide.

**Technological solutions**

In China and Brazil, the GEF partnered with UNDP to develop a portfolio of fuel-cell bus (FCB) projects. The Chinese experience to date has been positive, as described in Box 1. The experiences of China’s FCB project will be disseminated in other places as well. In Brazil, the FCB project will be launched in July 2009. Elsewhere, Egypt and India are testing hybrid buses and electric 3-wheelers respectively. UNEP has developed global projects on FCBs, sustainable liquid biofuel production, as well as the Global Fuel Economy Initiative.

**Improvements in urban transport systems**

Starting with GEF-3, GEF’s sustainable urban transport portfolio focused on comprehensive strategy solutions and, to a lesser extent, on “stand-alone” investment at the city-wide level. Local authorities (municipalities, metropolitan authorities) are heavily involved in these projects, as they are often in charge of local urban planning and transport investments. Most of the recently approved projects include the following components:

- A comprehensive strategy that integrates sustainable transport policy into overall urban planning policies. This includes planning for investments in public transport and nonmotorized transport infrastructure and reorganizing transport networks.
- A TDM plan to control the use of private vehicles. This often includes parking policies, definition of pedestrian areas, traffic management systems, car sharing, and nonmotorized transports campaigns. Congestion pricing policies may also be included in a TDM plan.
- Large investments in public transport infrastructures (mainly for bus rapid transit systems or dedicated bus lanes, but also for rail-based public transport) and nonmotorized transport infrastructures. These investments partially account for the high cost of transport projects. They also lead to the largest direct CO<sub>2</sub> reductions. Projects emphasize the connection between the public transport network and the nonmotorized transport network, with the latter feeding the public transport system.
- Many projects include improvements to the public transport fleet by employing technology that improves energy efficiency and reduces CO<sub>2</sub> emissions. Public transport fleets are also improved through the use of hybrid or electric buses.
- Design of a national policy framework to disseminate and scale up the lessons and solutions tested in these cities, and build the capacities of local institutions through training, information sharing, and engagement of relevant stakeholders.

The GEF supports projects based on these solutions (“comprehensive strategy projects” and “stand-alone investments”) in 73 cities with a combined population of 244 million (Table 4). Together, these projects constitute the largest sustainable urban transport program in the world. Although these projects are always executed at the city level, their lessons are disseminated country-wide through capacity building activities, development of information centers, and other activities.

## ASIA

In Asia, seven projects have been developed and/or implemented. These projects cover 32 cities with a combined 121 million inhabitants (figure 7). This is the largest sustainable urban transport portfolio in the GEF. It includes two large projects in China and India.

The Chinese Urban Transport Partnership Program covers 14 large cities and 5 small cities throughout the country. The Sustainable Transport Project in India will cover six cities. The Pakistan Sustainable Transport Project involves the cities of Islamabad, Rawalpindi, and Lahore. In

## BOX 1 DEMONSTRATION OF FCB COMMERCIALIZATION IN CHINA

**GEF Agency – UNDP**  
**GEF: \$ 11.6 million**  
**Cofinancing: \$ 23 million**

### BACKGROUND

China’s rapid economic growth has been accompanied by accelerated urbanization. The average annual rate of population growth in urban areas during the 1990s (2.9 percent per year) was over seven times the rate in rural areas. Today, slightly over 30 percent of Chinese live in cities. The demand for public transport services is growing at an estimated rate of 4 percent per year. Buses today account for an estimated 75 percent of urban public transport passenger volume.

The demand for buses in China is expected to grow at an average rate of 5 percent per year between 2000 and 2030, which would result in a Chinese bus population of about 0.72 million in 2030. The demand for new buses (counting replacement and new markets) in 2030 under this scenario would be some 108,000 buses per year. This creates a sizeable potential market for FCBs.

### PROJECT OVERVIEW

The project aims to catalyze the cost reduction of FCBs for public transit in Chinese cities and stimulate technology transfer activities by supporting significant parallel pilots of FCBs and their fuelling infrastructures in Beijing and Shanghai. The public transport companies of these two cities will each obtain and operate six FCBs. The first stage of the project included gathering up-to-date information on FCB technologies, selecting FCB systems, and purchasing the first three buses. These buses were launched during the 4th International Clean Vehicle Technology Conference Exhibition, in November 2005. The second stage of the project is intended to support FCB commercial viability and replicability, and will focus on FCB hybrid technology. Hybrid FCBs will introduce lower costs, as engine power requirements for bus operation will be lower, and improved performance through reduced fuel consumption. The results of the pilot will be used to promote and replicate FCBs as a commercially viable transportation alternative for cities sharing similar environmental characteristics and conditions. In complement to the GEF project, Beijing had at least 15 FCBs in demonstration for the 2008 Olympic Games. By 2010, the planned production volume of FCBs is 30 per year. For Shanghai, the government of China has committed to demonstrate more than 10 FCBs by 2008 and to further expand the demonstration for the World Expo in 2010.

FIGURE 7 CITIES WITH COMPREHENSIVE STRATEGY PROJECTS - MAP







## BOX 2 BUS RAPID TRANSIT AND PEDESTRIAN IMPROVEMENTS IN JAKARTA

**GEF Agency – UNEP**

**GEF : \$ 6.16 million**

**Cofinancing : \$ 188 million**

### BACKGROUND

Jakarta, the capital of Indonesia, has a population over 8.3 million, and the greater Jakarta region is roughly double that. The number of private cars in Jakarta has doubled about every 10 years, reaching more than 4 million private vehicles in 2001. Motorcycle registrations have grown even more rapidly, doubling in Jakarta in the past two years. While bus mode share is currently at around 50 percent of total trips, it is declining rapidly. Jakarta's traffic congestion is estimated to cost as much as \$330 million in vehicle operating costs and \$280 million in travel time every year. Unless current trends are altered, congestion costs could reach \$ 7.8 billion annually by 2020.

Jakarta's nascent BRT system has begun to reallocate scarce road space in the center of the city to efficient public transport and has already resulted in a shift of trips from private motor vehicles. Jakarta and other Indonesia cities also have begun to improve pedestrian facilities to increase the number of walking trips, important to the development of public transport.

### PROJECT OVERVIEW

The project aims to maximize the effectiveness of the Jakarta BRT and use it as a catalyst for urban transport reform in Jakarta and other key Indonesian cities. The project includes the following activities:

- TDM measures to reduce private vehicle use
- Development of the current BRT network into a full system of 14 corridors covering most of the city over the next five years (design of the corridors, improvement of intersections, optimization of bus ways, operation improvement of public information on BRT, and public transport)
- Rationalization of non-BRT bus routes
- Improvement of pedestrian and nonmotorized transport facilities
- Dissemination of the results to other cities.

The project is expected to result in a direct reduction of 7.7 Mt CO<sub>2</sub> during the timeframe of the project.

addition, the cities of Teheran (Iran), Hanoi (Vietnam), Vientiane (Lao PDR), Marikina (Philippines) and Jakarta (Indonesia) (Box 3) will participate in GEF-funded projects.

### LATIN AMERICA

In Latin America, 10 projects have been developed and/or implemented. These projects cover 22 cities with a combined 80 million inhabitants (Figure 7). This is the second largest sustainable urban transport portfolio in the GEF.

There are two regional projects in Latin America.

"Promoting Sustainable Transport in Latin America" involves three cities in Chile, Guatemala, and Panama.

"Latin America Regional Sustainable Transport and Air Quality Project" involves 11 cities in Argentina, Brazil, and Mexico (Box 3). In addition, Lima (Peru), Santiago (Chile), São Paulo (Brazil), Quito (Ecuador), Mexico and Managua (Nicaragua), Cartagena (Colombia), and Valencia (Venezuela) have benefited from GEF funding of their transport projects.

### AFRICA

In Africa, seven projects have been developed and/or implemented. These projects cover 15 cities with a combined 40 million inhabitants (Figure 7). The portfolio of Africa is expected to grow in the coming years.

The South African project addresses seven host cities of the 2010 World Cup. In West Africa, the cities of Accra and Kumasi (Ghana) (Box 4), Ouagadougou (Burkina-Faso), and Lagos and Kano (Nigeria), will implement transport projects. In addition, Dar El Salaam (Tanzania), Cairo (Egypt), and Gaborone (Botswana) will also benefit from GEF funding.

### EASTERN EUROPE

In Eastern Europe, four projects cover one city each. These four cities represent 3.3 million inhabitants (Figure 7). There are comprehensive strategy projects in Gdansk (Poland), Bratislava (Slovak Republic), Belgrade (Serbia), and Dushanbe (Tajikistan).



## BOX 3 LATIN AMERICA REGIONAL SUSTAINABLE TRANSPORT AND AIR QUALITY PROJECT

**GEF Agency – World Bank**  
**GEF : \$ 21.05 million**  
**Cofinancing : \$ 58.5 million**

### BACKGROUND

The transport sector is responsible for more than one-third of CO<sub>2</sub> emissions in Latin America, and because of increased motorization and vehicle use, it is the fastest growing CO<sub>2</sub>-emitting sector in the region. At the same time, Latin American cities are rapidly growing. About 75 percent of Latin Americans currently live in urban areas, where the most kilometers of vehicle travel occur. Urban transport, therefore, represents a key sector for long-term GHG mitigation efforts in the region.

Despite the rapid growth in vehicle numbers, most Latin American cities are not yet locked into absolute automobile dependence. The current car ownership level of 100 vehicles per 1,000 inhabitants is still low compared to international standards and thus provides a great opportunity for maintaining the current modal split. Moreover, population density is still low near city centers, which represents an opportunity for land-use planning orientated toward public transport.

### PROJECT OVERVIEW

The project is divided into a regional project and three country projects in Argentina, Brazil, and Mexico. The regional project focuses on capacity building (knowledge sharing, regional cooperation, and fostering of policies and guidelines). The country projects include technical assistance and pilot investments aimed at introducing and developing sustainable transport initiatives in 11 cities in these 3 countries. These actions will provide valuable lessons to inform and help develop appropriate policies at the national level.

The project includes the following activities:

- Integration of land-use planning, transport, and environmental management
- Design and implementation of TDM measures to rationalize the use of private cars, and create incentives for more widespread use of public transport and nonmotorized modes (car-free zones, car-free days, parking management plans, road-pricing schemes)
- Management of freight transport
- Improving public transport: pilot investments in public transport systems and/or improvement of the effectiveness and interconnectivity of those systems with other complementary modes of transport
- Developing nonmotorized transport: pilot investments to better integrate walking and biking with current mass and public transport systems.

The project is expected to result in a direct reduction of 2.4 Mt CO<sub>2</sub> during the timeframe of the project.



## BOX 4 GHANA URBAN TRANSPORT

**GEF Agency – World Bank**

**GEF : \$ 7.35 million**

**Cofinancing : \$ 83 million**

### BACKGROUND

The population of Ghana is over 20 million, with more than 40 percent living in urban areas. Approximately 3 million people (representing more than 14 percent of the national population) live in the Accra metropolitan area, which is growing at 4 percent per year. Another 1 million (about 5 percent of the national population) live in the Kumasi metropolitan area, which is growing at 5.6 percent per year.

In the last 15 years, Accra's population has doubled and its area has expanded almost threefold. Traffic in Accra is characterized by heavy congestion (particularly during the peak periods), low vehicle utilization, heavy dependence on informal private bus services, weak implementation of traffic management measures, inadequate facilities for pedestrians and bicyclists, poor road safety arrangements, and high accident rates. Almost 70 percent of motorized person trips in the city depend on some form of bus transport, which is the dominant mode and uses about a third of the road space. In contrast, private cars and taxis provide only a quarter of the person trips but occupy over half of the road space.

### PROJECT OVERVIEW

The project addresses institutional, management, and regulatory issues to improve personal mobility in cities in Ghana, with an initial focus on Accra and Kumasi metropolitan areas. Project activities are designed to

- Strengthen the capacity of ministries, local authorities, agencies, and operators concerned with urban transport
- Update the integrated urban and transport development plans for the greater Accra Metropolitan Area, resulting in a better integration of urban development and transport planning, and supporting urban growth that is more compatible with the development of transport infrastructure and services
- Manage the traffic in Accra and Kumasi and enforce traffic rules and education
- Implement a BRT infrastructure in Accra (including segregated bus-ways, interchange facilities, and terminals and facilities for pedestrians and nonmotorized transport).

The project is expected to result in a direct reduction of 240 kt CO<sub>2</sub> during the timeframe of the project.



## Looking to the Future

Transport is key for the future. It is a driver of economic and social development of developing countries. Thus it is also critical to global efforts to reduce GHG emissions. Without attending to this sector, the world society cannot win the battle against climate change.

To address this global challenge, the GEF has invested considerable resources in sustainable urban transport in developing countries. To date, the GEF has allocated \$201 million to transport projects and leveraged an additional \$2.47 billion. GEF efforts currently reach 73 cities around the world with a combined population of 244 million. The GEF's transport-related financing has grown more than four times, from \$30 million in GEF-2 to \$126 million in GEF-4, constituting the world largest sustainable urban transport program.

Through this program, the GEF has made significant achievements, not only for reducing GHG emissions but

also for contributing to sustainable urban transport in developing countries through addressing issues such as local air pollution, traffic congestion, and accessibility to affordable public transport simultaneously. It is truly remarkable for the GEF, because achievements of such magnitude could not be made without true cooperation of partners, in particular the local as well as the national governments of developing countries.

The challenges in front of us are enormous. GHG emissions from the transport sector are growing rapidly. The GEF commits itself to scale up its efforts in sustainable urban transport to meet this growing challenge in the coming years by focusing more on comprehensive and integrated intervention, especially in urban systems. Together with its partners, particularly recipient countries and the 10 GEF Agencies, the GEF will continue to move toward investing in sustainable urban transport all over the world.

# About the GE







EF

The Global Environment Facility (GEF) unites 178 member governments — in partnership with international institutions, nongovernmental organizations, and the private sector — to address global environmental issues. An independent financial organization, the GEF provides grants to developing countries and countries with economies in transition for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. These projects benefit the global environment, linking local, national, and global environmental challenges, and promoting sustainable livelihoods.

Established in 1991, the GEF is today the largest funder of projects to improve the global environment. The GEF has allocated \$8.6 billion, supplemented by more than \$36 billion in cofinancing, for more than 2,400 projects in more than 165 developing countries and countries with economies in transition. Through its Small Grants Programme (SGP), the GEF has also made more than 10,000 small grants directly to nongovernmental and community organizations.

The GEF partnership includes 10 agencies: the UN Development Programme; the UN Environment Programme; the World Bank; the UN Food and Agriculture Organization; the UN Industrial Development Organization; the African Development Bank; the Asian Development Bank; the European Bank for Reconstruction and Development; the Inter-American Development Bank; and the International Fund for Agricultural Development. The Scientific and Technical Advisory Panel provides technical and scientific advice on the GEF's policies and projects.

## ABBREVIATIONS AND ACRONYMS

BRT	Bus Rapid Transit
EIA	Energy Information Administration
FCB	Fuel-Cell Bus
GEF	Global Environment Facility
GHG	Greenhouse Gas
Gt	Giga (10 <sup>9</sup> ) ton
IADB	Inter-American Development Bank
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPCC AR4	Intergovernmental Panel on Climate Change Fourth Assessment Report
LRT	Light Rail Transit
Mt	Mega (10 <sup>6</sup> ) ton
OP 11	Operational Program 11
TDM	Traffic Demand Management
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD/SMP	World Business Council for Sustainable Development / Sustainable Mobility Project

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