

**MINISTRY OF NATURAL RESOURCES
AND ENVIRONMENT**

MINISTRY OF TRANSPORT

**TOWARDS DEVELOPMENT OF STRATEGIC
DIRECTIONS FOR THE PROMOTION OF ENVIRONMENTALLY
SUSTAINABLE TRANSPORT IN VIET NAM BY 2020**



**UNITED NATIONS CENTER
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ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
CNG	Compressed Natural Gas
EST	Environmentally Sustainable Transport
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GSO	General Statistics Office
HCMC	Ho Chi Minh City
LPG	Liquefied Petroleum Gas
MOC	Ministry of Construction
MOD	Ministry of Defense
MOET	Ministry of Education and Training
MOF	Ministry of Finance
MOH	Ministry of Health
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MOPS	Ministry of Public Security
MOST	Ministry of Science and Technology
MOT	Ministry of Transport
MPI	Ministry of Planning and Investment
MRT	Mass Rapid Transit
NTSC	National Traffic Safety Committee
p.a.	per annum
PC	People's Committee
QCVN	Viet Nam Specifications
TCVN	Viet Nam Standards
TSP	Total Suspended Particulate
UNCRD	UN Center for Regional Development
VOC	Volatile Organic Compound
WHO	World Health Organization



FOREWORD

Viet Nam has recorded significant achievements in socio-economic development; economic growth has been continuously maintained throughout the past 25 years, poverty has greatly diminished, which has helped the country move out of the group of low-income countries. Along with the country's development, Viet Nam's transport sector has undergone major development and has made positive contributions to the national economy. However, the transport sector has also caused environmental pollution, GHG emissions with consequent impacts on climate change, traffic accidents, etc., and affected people's quality of life. It is therefore necessary to devise orientations for more sustainable transport development in the near future.

Strategies for Environmentally Sustainable Transport (EST) with the goal to develop an environmentally-sustainable and human-friendly transport system have been adopted in various countries. In 2005, the Asian Regional EST Forum was established, calling for member countries to incorporate and implement EST measures in their national sustainable development goals.

This report, "Towards Development of Strategic Directions for the Promotion of EST in Viet Nam" by 2020, was produced by the Viet Nam Ministry of Natural Resources and Environment (MONRE) in collaboration with the Viet Nam Ministry of Transport (MOT), with the support of the UN Center for Regional Development (UNCRD) and the Ministry of Environment of Japan. The report is a result of efforts and cooperation between the Institute of Strategy and Policy on Natural Resources and Environment (MONRE) and the Department of Environment (MOT). The report presents a review of the current situation, identification of challenges and proposals for strategic orientations for EST in Viet Nam in the near future, to work towards the objectives and goals laid out in the Bangkok 2020 Declaration on EST (2010).

This report was prepared through a participatory and consultative process involving government officials from line ministries and agencies, and experts and scientists in the areas of transport and environment protection.

We hope that this report will provide a meaningful basis for the government agencies and stakeholders concerned, at central and local levels, for policy-makers, and for researchers on environment and transport to work towards realizing EST in Viet Nam.

ON BEHALF OF UNCRD
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EXECUTIVE SUMMARY

INTRODUCTION

Over several decades, thanks to investment in infrastructure construction and overhaul of vehicles, Viet Nam's transport sector has gradually developed, making positive contributions to the national economy. However, transport has also been causing major environmental problems, GHG emissions, increasing rate of road accidents, etc., which have negative impacts on community life.

Meanwhile, strategies for Environmentally Sustainable Transport Development (EST) with the goal to develop an environmentally sustainable and human-friendly transport system have been adopted in various countries. The Asian Regional EST Forum was established in 2005 with the Aichi Statement, urging member countries to work for the incorporation and implementation of EST measures in their national sustainable development goals.

This study reviews the current situation, identifies challenges and proposes strategic orientations for EST in Viet Nam in the future, with a focus mostly on urban road transport.

I. THE CURRENT SITUATION AND CHALLENGES TO EST

1. Viet Nam development context

Viet Nam has recorded significant and recognizable achievements in socio-economic development; economic growth has been continuously maintained throughout the past 25 years, people's incomes have improved, poverty has greatly diminished, which has helped the country lift itself out of the category of low-income countries. However, economic growth patterns are not truly sustainable, relying largely on natural resource extraction with outdated technology, causing environmental pollution, and other problems, coupled with strong population growth and rapid urbanization processes, exerting pressure on urban transport systems that have not been proportionately developed.

2. Current situation and problems to EST in Viet Nam

Transport planning and transport demand management: The number of private vehicles, particularly motorcycles, has increased rapidly, reaching 34 million motorcycles and 1.8 million automobiles by 2011. Public transport still accounts for a small percentage of total traffic: 7-8% in Ha Noi and 5% in Ho Chi Minh City (HCMC), and many cities see no presence of public buses. Despite rigorous measures, the extremely high share of private means of transport has increasingly worsened urban traffic, as evident in increased traffic congestion, environmental pollution and traffic accidents.

Transport infrastructure development and road maintenance: The land set aside for urban transport is at too low a rate, merely 7% in Ha Noi and HCMC, compared to the average of 15-25% in developed countries in the world. Transport infrastructure is poor; there are too many at-level intersections, and a lack of parking and rest areas. Road maintenance and repair work encounter enormous difficulties in terms of organization and funding. Road planning is not aligned with land use planning, resulting in encroachments on traffic safety corridors by industrial use, service development and people's daily life.

Emission control, inspection and maintenance of vehicles: Currently in Viet Nam Euro 2 applies to new assembled/produced and imported motorized vehicles; by 2017 Euro 3 will apply to motorcycles and Euro 4 to automobiles; and by 2022 Euro 5 will apply to automobiles. For the current automobile fleet in use, a nation-wide emissions check was carried out in 2008. For motorcycles in current use, the Prime Minister's approval of the proposal for emission control was granted in Decision 909/QD-TTg dated 17 June 2011 but not yet implemented.

Fuel management: Viet Nam's annual fuel consumption has risen to approximately 16-18 million tons, around 55% of which is used for transport. 30% of this fuel is locally produced, and the remaining is imported. Leaded gasoline was officially eliminated in 2001. The Government's attention to biofuel was revealed in the promulgation of the Project for Biofuel Development, and currently four ethanol factories have been put into operation or are under construction, with the total capacity of 400,000 tons of ethanol p.a. E5 has been pilot-sold in the market. The use of other clean fuels such as CNG, LPG, and biodiesel still accounts for a tiny proportion of fuel usage and is restricted to pilot or research projects. In addition, the management of fuel quality contains several limitations, especially in recent times.

Urban air pollution: Major cities in Viet Nam suffer from particulate pollution, some with severe pollution. Total suspended particulates (TSP) measured in major cities have exceeded permissible standards by 1.5 to 2 times. Local SO₂, NO₂ and CO concentrations in some cities are also in excess, while those in most other towns fall within tolerable limits. Furthermore, noise pollution prevails in Viet Nam's cities; this can reach 70-80dBA, especially alongside roads. In addition, as a major fuel consumer, the transport sector emits greenhouse gases (GHGs) which contribute to climate change.

Impacts of air pollution on public health: Due to poor urban air quality, the prevalence rates of air-pollution-borne diseases in major cities like Ha Noi, HCMC, Hai Phong, Da Nang, etc., frequently surpass those in other towns or provinces. Estimated economic loss due to air pollution impacts on human health in the inner city of Ha Noi is about 67 million US dollars p.a., while that in the inner city of HCMC stays at about 71 million US dollars p.a.

Traffic safety: Viet Nam ranks among the countries with the highest accident rates in the world, including the number of accidents, the numbers of fatalities and injuries. Annual estimates are 11,000-12,000 deaths, 10,000 injuries, and damages accounting for 2.5-3.0% GDP, while traffic accidents continue to be the hottest problem in Viet Nam today.

3. Projections for 2020

A number of studies have provided projections of EST issues by 2020 in Viet Nam. Accordingly, motorized road vehicles may reach the numbers of 38-40 million motorcycles and 4 million automobiles nation-wide; fuel consumption continues to rise and may reach 29-35 million tons, and particulate and CO emission in Ha Noi is projected to double by 2010.

4. Challenges to EST

The report identifies several challenges to EST development in Viet Nam in the future, namely (i) rapid increase of private vehicles, causing environmental pollution traffic and accidents, while public transport is developing only slowly; (ii) poor transport infrastructure,

failing to satisfy needs or ensure social equity in transport; (iii) poor social awareness and consciousness of EST; (iv) weak environmental management solutions in the transport sector, including fuel management, emission monitoring and control, and poor inspection and maintenance; (v) high rates of traffic accidents, causing severe economic and social damages; (vi) transport planning and development which have given rise to several problems in environmental protection.

II. PROPOSED STRATEGIC ORIENTATIONS FOR EST DEVELOPMENT IN VIET NAM

1. Viewpoints

Six viewpoints have been proposed for EST development, mostly focusing on the development of environmentally-friendly road transport suitable to, and taking advantages of, the country's natural and geographical conditions. The transport sector is to be modernized with high technology in production and construction, ensuring close collaboration with other relevant sectoral planning in construction and implementation of the goals of transport development strategy. Adequate investments must be guaranteed for development of transport infrastructure, together with appropriate land reserves. Priority must be given to the development of urban public transport in tandem with the control of private vehicle growth, handling congestion and air pollution, ensuring traffic safety and social equity.

2. Objectives until 2020

Overall objectives include the implementation of EST strategic orientations, ensuring the sustainable development of road transport to satisfy the needs for socio-economic development while simultaneously achieving environmental protection goals, and contributing to the country's sustainable development and improvement of people's quality of life.

Specific objectives are to develop an EST system which meets people's travel demands in a safe manner, ensuring human health and social equity while restraining emissions within environmental carrying capacity, containing consumption of non-renewable natural resources, economizing land use and causing no impacts on ecological systems.

Proposed specific targets include:

- a) Development of public mass rapid transit systems in Ha Noi and HCMC, reaching a market share of 35-45%;
- b) Rational development of urban transport infrastructure and public transport system, ensuring 16-26% of land reserved for urban transport;
- c) Restraint of the growth of private motorized vehicles, ensuring that by 2020 there are no more than 4 million automobiles and 40 million motorcycles in the whole country.
- d) Reduction of TSP generated in Class I cities and above, ensuring national environmental technical specifications and standards as well as standards stipulated by WHO; reduction of SO₂, NO_x and VOC in Ha Noi and HCMC from the 2005 figures;
- e) Euro 3-equivalent emission standards to be applied to motorized two-wheelers and Euro 4 to new produced, assembled and new imported automobiles from 2017;
- f) Emission check on motorcycles in use in major cities and provinces pursuant to the Prime Minister's Decision 909/QD-TTg;

g) Clean and alternative fuels to be used accounting for 10% of the total fuel consumption, with quality equivalent to Euro 4. Intensify the conversion of buses and taxis, such that those using CNG and LPG reach 20% of the fleets in major cities;

h) Implementation of measures to improve fuel efficiency in transport;

i) Substantial reduction of traffic accidents both in numbers of accidents and in numbers of fatalities and injuries, with an annual reduction of 5-10% of traffic accident-related deaths;

j) Development and improvement of air environmental quality monitoring networks, particularly in major cities.

3. Strategic Orientations

Transport planning and transport demand management: It is imperative to develop public transport networks, to restrain and control the growth of private vehicles, to organize transport planning and for management to be environmentally friendly.

Vehicle emission control: Regulations on emission control must be developed and enacted; support should be provided for retiring and replacing old vehicles; intensify emission inspection and control on the road; encourage and promote the use of non-motorized transport.

Vehicle inspection and maintenance: Continue to improve policies and mechanism, with increased investment in infrastructure and human resources.

Fuel quality management: Improve policies and legislation, promote development of clean fuels, raise fuel standards according to the roadmap of emission standard application; implement technical measures; intensify check, inspection and control of fuel quality.

Transport infrastructure development and road maintenance: More investment is needed to develop road transport infrastructure; requirements for environmental protection in transport infrastructure construction must be strictly followed, and all possible resources for road maintenance should be mobilized.

Traffic safety: Improve State management effectiveness; improve the safety levels of transport infrastructure; intensify vehicle control; ensure strict management of driver training and licensing, management of vehicle operators; improve legislation enforcement; promote education and communication on traffic safety legislation, and reduce damages incurred by traffic accidents.

Ambient air quality monitoring: Invest in construction and improvement of air quality monitoring station systems in major cities; develop, manage and share databases of urban air quality.

Equity and gender issues in transport: Mainstream equity and gender factors in transport policies and institutions; promote transport infrastructure development in association with social equity and improve community awareness of equality in transport.

4. Solutions to the implementation

The report proposes 6 groups of solutions to foster the implementation of these strategic orientations, namely (i) improve the system of policies and legislation on environmental

protection in transport; (ii) intensify State management of environmental protection in transport; (iii) intensify investment in infrastructure and environmental protection in transport; (iv) capacity-building and awareness-raising on EST; (v) promote the application of new and modern technologies in transport; and (vi) intensify international cooperation in EST.

III. ORGANIZATION OF IMPLEMENTATION

1. Responsibility assignment

It is proposed that the Ministry of Transport (MOT) serve as the focal point to lead and coordinate with relevant ministries, sectors, localities, institutions and individuals in order to organize the effective implementation of the strategic orientations. It is also proposed that MOT directly organize the implementation of measures, mechanisms and policies on EST development in the fields of: transport demand planning and management; vehicle emission control; vehicle inspection and maintenance; construction and maintenance of road systems; promotion of science and technology application in transport; promotion of equity and gender equality in transport, and; information dissemination and communication for awareness-raising on EST in the society.

In addition, the Ministry of Natural Resources and Environment (MONRE) is responsible for the management of urban air quality; the Ministry of Industry and Trade (MOIT) is to implement policies and measures for managing fuel quality and developing clean fuels. The Ministry of Science and Technology (MOST) is responsible for technical specifications and standards of fuel quality, for science and technology related to transport. The Ministry of Construction (MOC) is responsible for urban planning. The Ministry of Planning and Investment (MPI) in collaboration with the Ministry of Finance (MOF) balances, arranges and provides guidelines on plans of capital use for the effective implementation of the EST strategic orientations. The National Traffic Safety Committee (NTSC) closely coordinates with ministries, sectors and localities in the development and implementation of plans, measures and policies to ensure traffic safety. People's Committees (PCs) of provinces and cities closely collaborate with ministries and sectors to organize the implementation of the goals, objectives and solutions of the EST strategy within their respective territories.

2. Proposed programs for EST implementation

A list of 22 priority programs and projects is also proposed for the implementation of EST strategic orientations.

INTRODUCTION

Stretching over a narrow strip of land, with over 3,200 km of coastline, Viet Nam possesses a multi-modal transport system, including railways, roads, waterways, seaways and airways. So far, thanks to focused investment in infrastructure construction and renovation of modes of transport, the sector has gradually developed to satisfy demands for passenger and freight transportation, socio-cultural interchanges among economic regions of the country and fulfilling the bridging role in international economic integration.

However, along with its development to meet socio-economic development demands, transport has led to negative social and environmental impact such as air pollution, noise, inefficient use of energy and land resources, GHG emissions which increase climate change and traffic accidents. This necessitates modifications to create new orientations for the transport sector in order to achieve sustainable development.

In the late 1990s, the concept of environmentally sustainable transport (EST) was formulated and developed internationally. Environmentally Sustainable Transport (EST) is a transport system which satisfies the demands for goods transportation and for human travel in a safe manner, ensuring human health without affecting ecosystems, ensuring equity to all social strata while restraining emission and waste within environmental carrying capacity, limiting consumption of non-renewable resources, reducing noise pollution and economizing on land use. Countries of the Organization for Economic Cooperation and Development (OECD) adopted Guidelines on EST in 2000 and many other countries subsequently have been applying these strategies.

In the Asian region, at the initiative of the United Nations Center for Regional Development (UNCRD) and the Ministry of Environment of Japan, the Asian Regional EST Forum was established in 2005 with the participation of 14 countries including the 10 ASEAN member countries, Mongolia, China, the Republic of Korea and Japan. Viet Nam has been an active participant in the Forum conferences and has adopted the Aichi Statement 2005 on EST.

EST can be achieved through the harmonized implementation of the 12 activities/solutions in management and planning of infrastructure, vehicles and fuel quality, etc., as specified in the Aichi Statement, namely

- a) Community health;
- b) Land use planning;
- c) Environmentally and human-friendly transport infrastructure;
- d) Public transport planning and transportation demand management (TDM)
- e) Non-motorized Transport (NMT)
- f) Social equity and gender equality

- g) Traffic safety and maintenance
- h) Intensified ambient air quality monitoring
- i) Noise management in transport
- j) Development of cleaner fuels
- k) Control of emission from road motorized vehicles, inspection and maintenance (I/M)
- l) Awareness raising and community participation.

In the context that Viet Nam is striving to become a fundamentally industrialized country by 2020, the transport sector will certainly undergo stronger development. To date, the Government has tried to carry out a multitude of solutions to address burning problems in transport; yet several problems remain. It is therefore highly necessary to study and develop strategic orientations for EST. These solutions and orientations will facilitate the achievement of sustainable development goals within the transport sector, satisfying socio-economic development demands and contributing to the country's sustainable development.

According to EST concepts, and the proceedings and documentation of the Asian Regional EST Forum, focal EST issues center around urban road transport where transport exerts the greatest impact on environmental sustainability in comparison with inland waterways, marine transport or airways. This study is therefore confined solely to issues of road transport in urban areas.



PART I

CURRENT SITUATION AND CHALLENGES OF ENVIRONMENTALLY SUSTAINABLE TRANSPORT

1. Viet Nam's socio-economic development context

After 25 years of doi moi (renovation), Viet Nam has recorded praise-worthy achievements in socio-economic development. Several key objectives of the 2001-2010 socio-economic development strategy have been achieved. The economy is growing quickly at an average rate of 7.2% p.a. In 2010, average GDP per capita reached 1,168 US\$. A positive shift is evident in economic structure. The poverty rate continues to decline, and Viet Nam has moved out of the group of low-income countries.

Nevertheless, economic growth is mostly in width rather than in depth, largely relying on capital, raw materials, energy and cheap labor. Labor productivity is low, and the rate of natural resources and energy consumption per unit of production is high, resulting in environmental pollution, resource degradation, and GHG emission, with further impact on climate change.

Table 1. Some targets for socio-economic development between 2006-2010 and achievements over the years

Targets	National Assembly's Resolution	Achievements over the years				
		2006	2007	2008	2009	2010
GDP growth (%)	7.5-8.0	8.23	8.46	6.31	5.32	6.78
Average GDP per capita (USD)	1,050-1,100	730	843	1,052	1,064	1,168
Agriculture/industry/service shares in GDP (%)	15-16/ 43-44/ 40-41	20.4/41.5/ 38.1	20.3/41.5/ 38.2	22.2/39.8/ 38.0	20.9/40.2/ 38.9	20.6/41.1/ 38.3
Export turnover increase (%)	16	22.4	31.4	28.8	- 11.4	25.6
Total annual social investment capital (% GDP)	40	36.8	43.1	41.3	42.8	41.9
Population growth rate (%)	1.14	1.12	1.09	1.07	1.06	1.05
Agricultural labor (% of social labor)	< 50	54.4	56.3	57.0	51.9	48.2
Employment creation (million)	> 8	-	1.68	-	-	-
Urban unemployment rate (%)	< 5	4.82	4.64	4.65	4.60	4.43
Poor household rate (%)	10-11	18.1	14.8	12.1	12.3	10.6

Source: National Environment Report 2010

Along with the economic development process, the past years have witnessed strong population growth and urbanization. Viet Nam has a large population, ranking third in Southeast Asia, and fourteenth in the world; additionally, it is one of the countries with the highest population densities in the world. Despite certain achievements in family planning policies, in 2005-2010, the population increased at an average rate of 1.09%, reaching 86.9 million by the end of 2010¹.

In addition, urbanization has been vigorously taking place; while there were only 649 cities in 2000, the number rose to 727 in 2006, and by September 2009 there were 754 cities, large and small. The number of urban residents soared from around 18.7 million in 2000 to 25.4 million in 2009, an increase of 6.7 million within 10 years, i.e. an annual average of 0.67 million migrants to cities. The urban population percentage, which was 29.9% in 2010, is projected to reach about 43-45% by 2020.

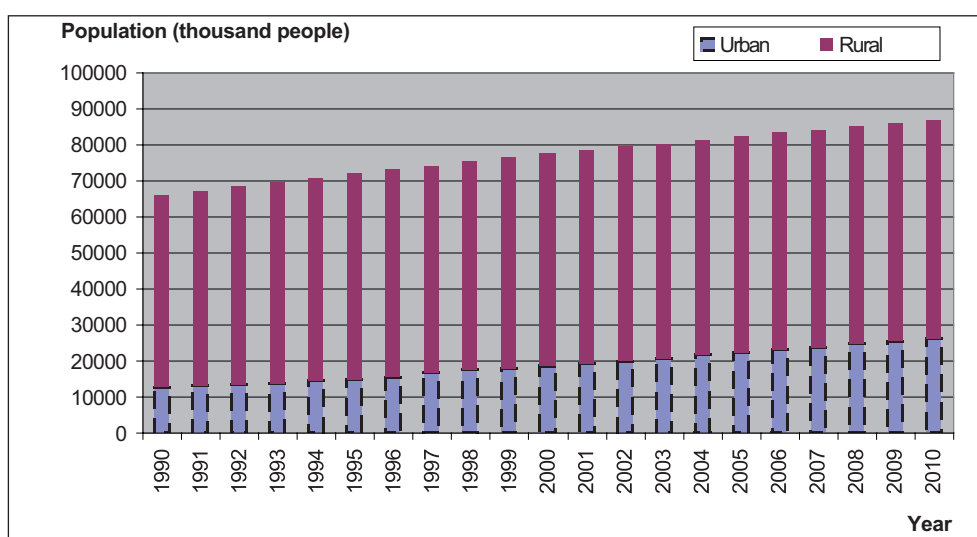


Chart 1. Urban - Rural Population between 1990-2010

(Source: GSO, Statistics Yearbook 1990-2010)

2. Current problems of road transport

2.1. Transport planning and transportation demand management

Over the years, the number of motorized road vehicles in the whole country has increased rapidly, mostly in major cities, the Red River Delta and the Southeastern region. Taking into account only vehicles for civilian use, from 1995 to the end of December 2011, registered motorized vehicles have increased at an annual average rate of 15.2%, with 15.56% and 10.9% for motorcycles and automobiles respectively. By the end of 2011, the total vehicles being managed include 1,882,972 automobiles and 33,925,839 motorcycles. At present, most travel in cities is by private transport. In Ha Noi, public passenger transport can only meet about 7.4% of travel demand, while the figure in HCMC is only 5%. Motorized two-wheelers remain the principal mode of transport, the number of motorbike in HCMC and Ha Noi accounts for as high as 15% and 8.45% respectively of the total number of registered motorbike nationwide.

¹ MPI, GSO, Statistics Yearbook 2010

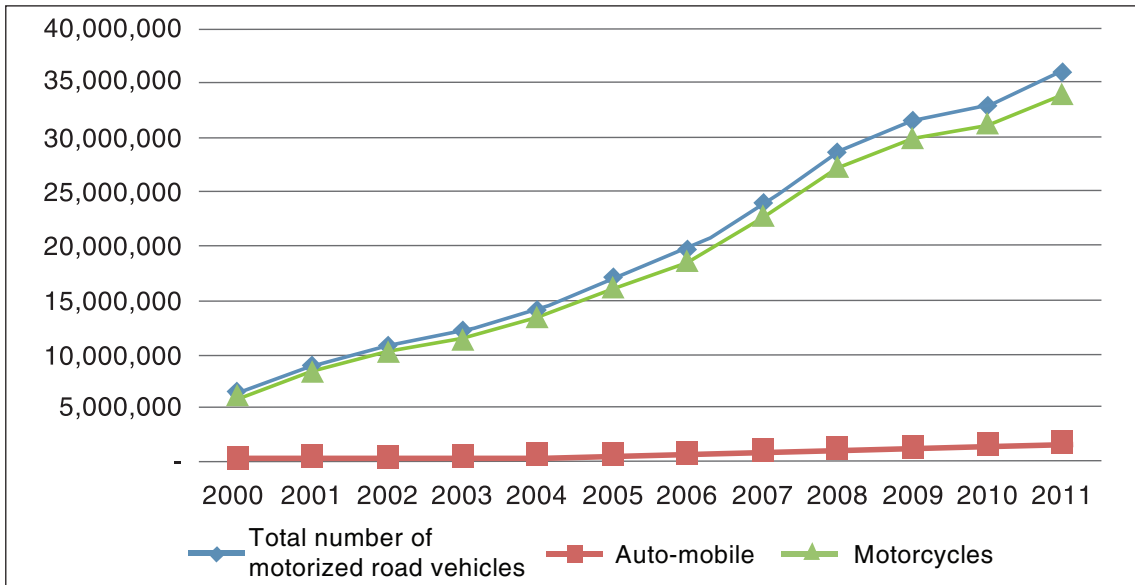


Chart 2. Vehicle Growth Over Time

(Source: Department of Road-Railway Traffic Police, National Committee for Traffic Safety)

Despite active implementation of several measures, due to the high share of private means of transport, urban transport situations in cities are increasingly worsening, as evident in increased congestion, environmental pollution and traffic accidents. In Ha Noi frequent congestion occurs at 69 hotspots in the rush hours, including 15 intersections and 8 arterial roads, with some experiencing severe congestion. The case in HCMC is even worse with 92 regular congestion spots, including 12 intersections and 21 arterial roads, mostly with severe congestion. Other cities like Hai Phong and Da Nang where congestion used to be occasional are now similarly faced with regular and widespread jams due to high growth of private vehicle ownership.

2.2. Transport infrastructure development and road maintenance

MOT statistics report that the road length in Viet Nam totals 279,924km, including 16,758km (5.98%) national highways, 25,449km (9.1%) inter-provincial roads, and the remainder made up of inter-district roads, inter-communal roads, urban roads and roads for special use. The road density stands at 0.78km/km², and 3.09km/1000 population, with varied quality and discrepancies across the systems². Asphalted roads nation-wide account for 92.12% of the total, while in provinces the figure is 65.54%. Two-lane national highways account for over 60%, while roads reaching high technical standards only account for 41%.

The national highway system comprises 93 routes, with 56% of the length assigned to 4 regional management authorities, and 44% delegated to 48 provincial Departments of Transport (DOTs) for management. All local road systems fall into the responsibility of provincial People's Committees for maintenance and repair.

The maintenance of road systems in Viet Nam still encounters numerous difficulties in terms of organization and investment capital. Maintenance responsibility for road transport

² MOT, Project for Road Maintenance Fund, 2010

infrastructure remains unclearly defined. Facilities and equipment are poor and outdated; regulations on post-maintenance quality checks are not yet in place. Procedures for fund transfer are unsuitable while funding is small, barely enough for 40% of demands for national highways and around 20-30% of demands for local roads; such funding is largely provided by the State Budget and not yet covered by direct revenues from users' tolls. The consequence is low quality of road maintenance, repair and upgrading.

Road transport system planning is not integrated with land use planning, resulting in: encroachment of traffic safety corridors by industrial development, services, and community use; delay and difficulties in site clearance and resettlement, and; limited land reserve for both stationary and mobile traffic. The lack of rest areas, service stations and fuel storage along the routes also causes difficulties to environmental protection and traffic safety work.

With respect to urban transport infrastructure, although the State has earmarked significant budgets for new investments, upgrading and improvement, urban transport remains poor. Land reserves for urban transport still account for low proportion of land use: just approximately 7% in both Ha Noi and HCMC; and the road densities in these two cities are 1.2 and 1.8km/km² respectively, while the figures are 15-25% and 5-6 km/km² internationally³. Road systems are unevenly distributed; urban roads are normally short and narrow, crossed by numerous at-level side lanes, which substantially limits traffic flow. Urban ring roads are incomplete and not in close circuits, so transit vehicles for both freight and passengers still have to go through the inner cities of Ha Noi and HCMC, exerting huge pressure on the inner-city transport systems. Bridges and roads are of poor and deteriorating quality. There remains a great shortage of stationary traffic provision, such as stations, parking lots, rest areas; the existing provision can only meet about 10% of demand, and is of poor quality, especially public parking areas in the inner cities and nodular large-scale station systems. Intersections are mostly at-level, with many being highly overloaded hotspots of traffic congestion. Serious particulate pollution also occurs at these spots during rush hours.

2.3. Emission control, vehicle inspection and maintenance

The Government of Viet Nam has promulgated emission standards for vehicles in the country, which stipulated that from 1st July 2008 all motorized road vehicles, locally manufactured or imported, must reach Euro 2-equivalent emission standards. The roadmap for application of emission standards recently enacted also requires that from 1st January 2017 all automobiles must reach Euro 4, motorcycles locally produced or imported must reach Euro 3, and from 1st January 2022, all automobiles shall reach Euro 5.

In Viet Nam, a relatively high proportion of motorcycles and part of automobiles in use are locally manufactured or assembled. For old vehicles (excluding motorcycles) imported from overseas, the Government has also issued controls allowing only the importation of vehicles produced less than 5 years prior to the date of importation.

This notwithstanding, old, polluting vehicles account for a large proportion of on-road vehicles in Viet Nam. A MOT survey in 2007 revealed that 59% vehicles in Ha Noi and 52% in HCMC did not reach the limits of 4.5% CO and 1,200ppm HC, which is much higher than the average of 15.91% in Taiwan and under 10% in Thailand (with the limits

³ MONRE, National Environment Report, 2010

were almost equivalent). Over 60% of vehicles that have been in use for more than 3 years in Viet Nam do not achieve these emission standards.

Inspection and maintenance (I/M) help calibrate mechanical deviation or malfunctioning problems in vehicles, and reduce fuel consumption and emissions. Experience shows high quality I/M can help reduce CO and HC emissions from exhaust pipes by 20-30%. Experimental and survey results demonstrate that after good I/M, motorcycles can reduce CO and HC concentrations in their emissions by 38% and 43% respectively; the amounts of CO and HC can be cut down by 50%, and 15-30% of fuel can be saved. Also, I/M programs can be a source of potential budgets for the Government to invest in and provide support to air environmental protection.

At present, in Viet Nam, automobile care to keep vehicles in good technical condition between regular I/M cycles is conducted by the owners themselves, so they pay attention to environmental and safety criteria only when they bring their vehicles in for I/M. Motorcycles, the main vehicles involved in traffic accidents and a source of huge emissions, have not been subject to compulsory periodical I/M so far, despite the Government's intention to introduce it.

2.4. Fuel management in transport

Fuels for motorized vehicles in Viet Nam mostly comprise gasoline and diesel. Annual consumption in the whole country comes up to 16-18 million tons, 55% of which is used for transport. Currently, the control of fuel quality in the market is assigned by the Government to the Ministry of Science and Technology (MOST) while fuel importation and distribution is overseen and carried out by the Ministry of Industry and Trade (MOIT).

Prior to 2009, when Dung Quat Oil Refinery had not been put into operation, all fuels locally consumed had to be imported, mostly from Singapore, China, Taiwan, Korea, Malaysia, and Thailand; Singapore was then the biggest supplier to Viet Nam. Viet Nam fuel consumption has increased over time, especially between 2001-2008 at an average growth rate of about 10-11% p.a.

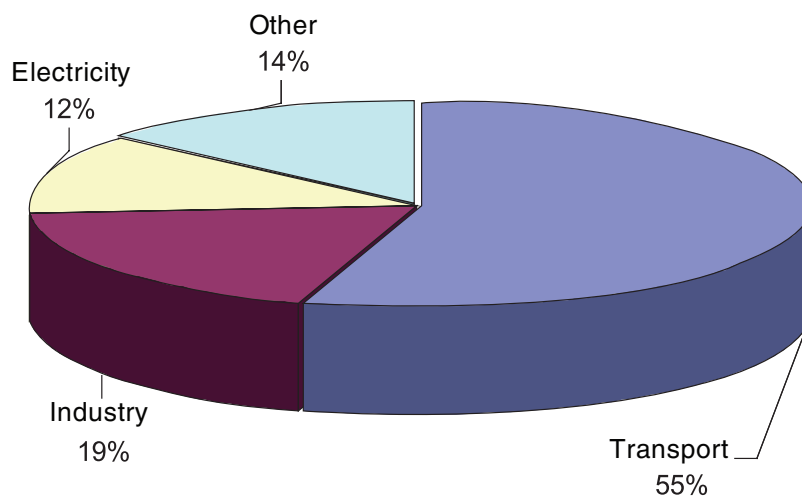


Chart 3. Fuel Consumption by sector in Viet Nam

(Source: Viet Nam Oil and Gas Development Planning 2006-2015, Orientations towards 2025, Ministry of Industry, July 2007)

From February 2009, Dung Quat Oil Refinery was officially put into operation with an annual capacity of 6.5 million tons of crude oil, i.e. 148,000 barrels a day, supplying about 30% of national fuel demands. The Refinery produces LPG, propylene, polypropylene, A92 and A95 gasoline, kerosene, jet fuel, diesel and fuel oil (FO). At present, Dung Quat Oil Refinery is carrying out an expansion project to improve capacity to 10 million tons p.a. Also, two other major refinery projects are being studied and developed, one of which is Nghi Son Refinery and Petro-chemical Complex in Thanh Hoa with a capacity of 10 million tons of crude oil p.a., and the other is Long Son Refinery in Ba Ria - Vung Tau.

As for fuel quality, Viet Nam removed leaded gas in 2001 and issued TCVN 6776:2005 standard for unleaded gas quality and TCVN 5689:2005 standard for diesel quality. Permissible benzene content (2.5% of volume) in TCVN 6776-2005 standard equals that of other countries in the region. At present, there are Mogas 90, 92 and 95 unleaded gasolines in the market with maximum sulphur content of 500ppm, and diesel with 500ppm sulphur content (equiv. 0.05%S). Fuel quality management still suffers from limitations as seen in several recent incidents of motorcycles and cars suddenly bursting out in flames due to unidentified causes.

The use of clean fuels such as biofuel (E5 gasoline), CNG, LPG, etc., in substitution for traditional fuels is still on a small scale, accounting for only a tiny proportion of use, and is largely confined to research and experimental applications. The Government of Viet Nam has approved the Project for Biofuel Development until 2015 and Vision 2025. Presently, PetroViet Nam has started the construction of 03 bio-ethanol factories in Phu Tho, Binh Phuoc and Quang Ngai, while Dai Tan bio-ethanol factory of Dong Xanh Company started its production in 2010. The total capacity of these 4 factories is 400,000 tons of ethanol p.a., and E5 gasoline has been put on trial sale in the market. The production of biodiesel is, however, confined to a scattering of small-scale study projects, mostly from jatropha and fish fat.

2.5. Air pollution by urban transport

Most major cities in Viet Nam suffer from particulate pollution, some at an alarming level, especially at intersections and areas with high traffic concentration, and TSP far exceeds permissible standards, particularly in the dry season. The main causes are construction activities, poor road quality, and vehicles releasing dust to roads and air when operating. The concentrations of other pollutants like SO₂, CO, NO₂ are still within permissible limits in most cities, although in some others the line has been crossed. Another "air pollution" problem in Viet Nam cities is noise pollution.

At some monitoring points in some roads in Ha Noi, Hai Phong, Hue, Da Nang, Dak Lak, Dong Nai, HCMC, etc., TSP amounts have far exceeded the daily and annual average limits (Chart 4).

Part I. Current situation and challenges of environmentally sustainable transport

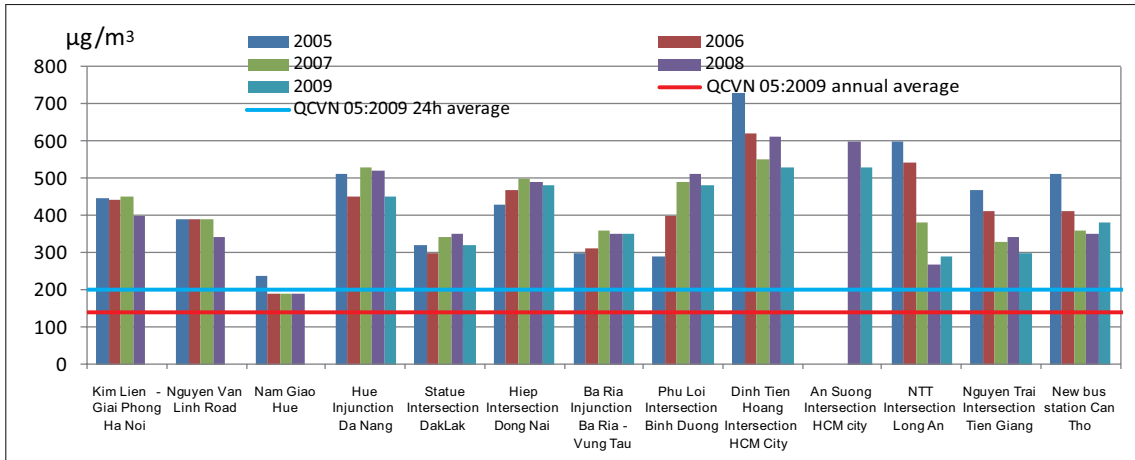


Chart 4. TSP concentration variation in some urban road systems between 2005-2009

(Source: National Environment Report 2010)

With regards to SO₂ pollution, in several arterial roads in Ha Noi, Ha Long, Bac Ninh, Hai Phong, Hai Duong, SO₂ concentration in ambient air has tended to decline over the years and falls within permissible limits (Chart 5).

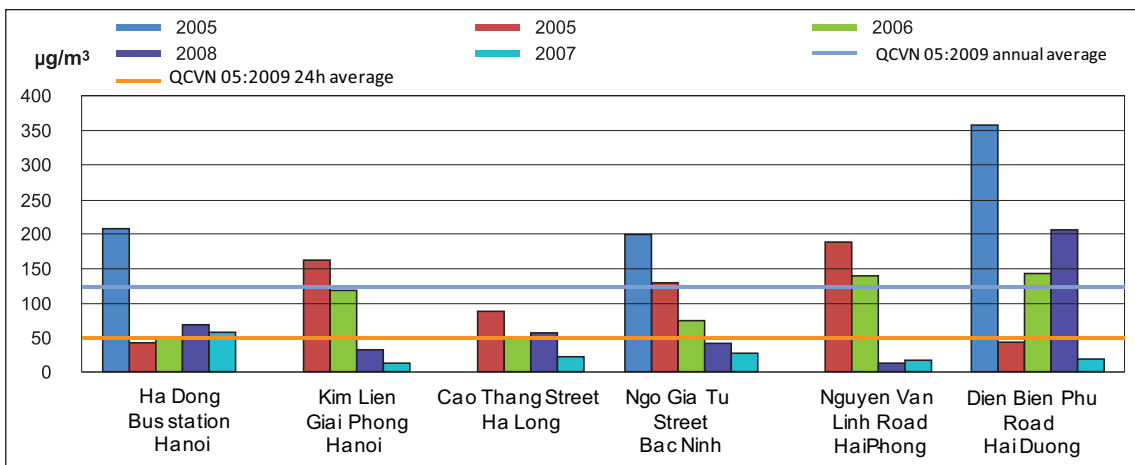


Chart 5. SO₂ concentration variation in some urban arterial roads

(Source: National Environment Report 2010)

Part I. Current situation and challenges of environmentally sustainable transport

In terms of CO and NO₂ pollution, their concentrations in major cities are higher in the South and lower in the North, and exceed the average 24h limit of NO₂ in Southern cities, yet CO concentrations largely satisfy standards except in HCMC and Long An (Charts 6 and 7).

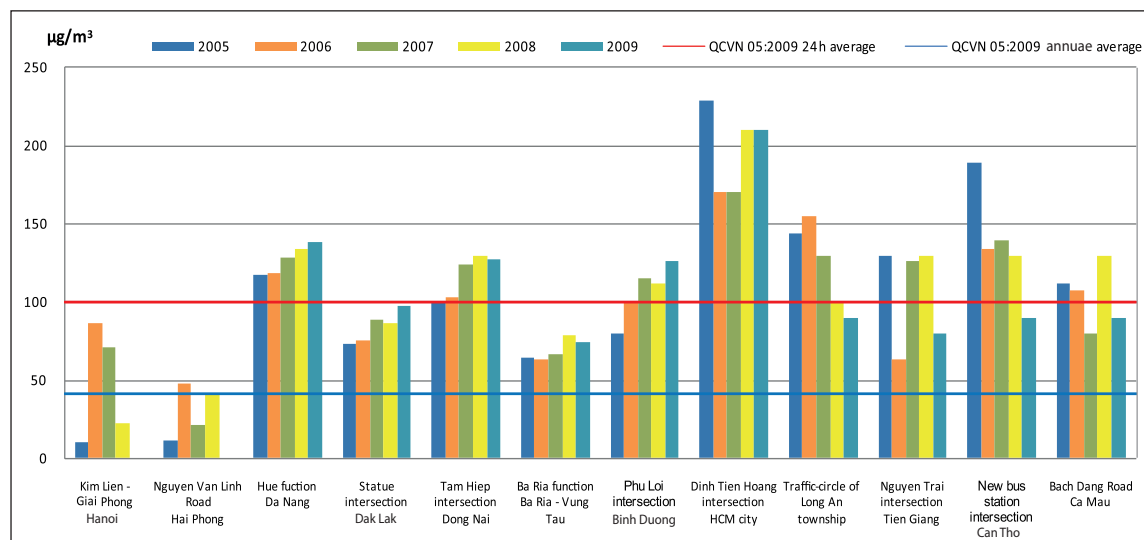


Chart 6. NO₂ concentration variation along arterial roads in some cities in the whole country

(Source: National Environment Report 2010)

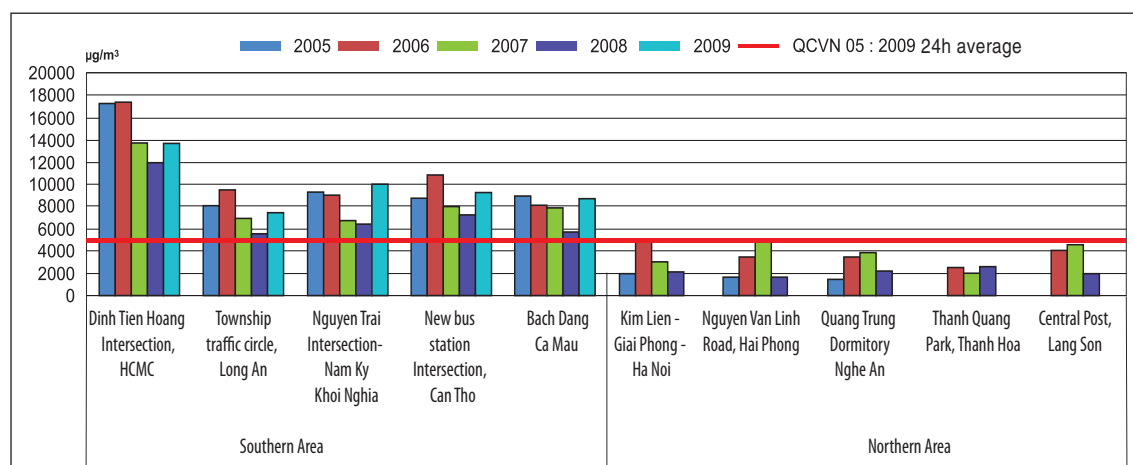


Chart 7. CO concentration variation in areas of some Northern and Southern cities

(Source: National Environment Report 2010)

With respect to lead pollution, Viet Nam officially removed leaded gas in July 2001, so the lead content in the air has tended to decrease. However, in the last 5 years, monitoring statistics show that although lead concentration is within acceptable limits, it tends to increase at some junctures with high traffic flow in HCMC (Chart 8), which has caused concern about fuel quality in recent times.

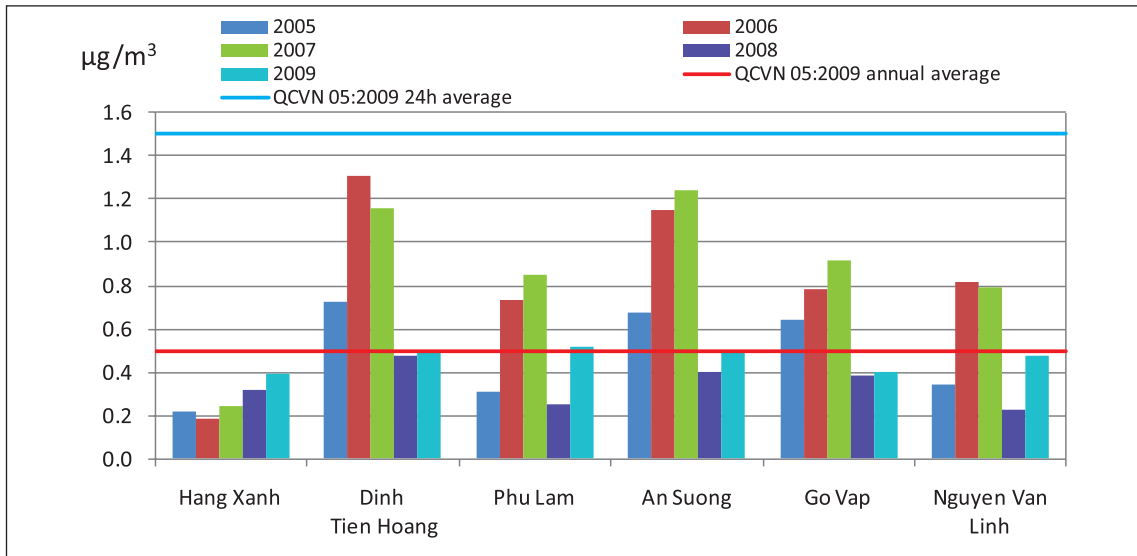


Chart 8. Average lead concentration variation in ambient air along HCMC roads between 2005-2009

(Source: National Environment Report 2010)

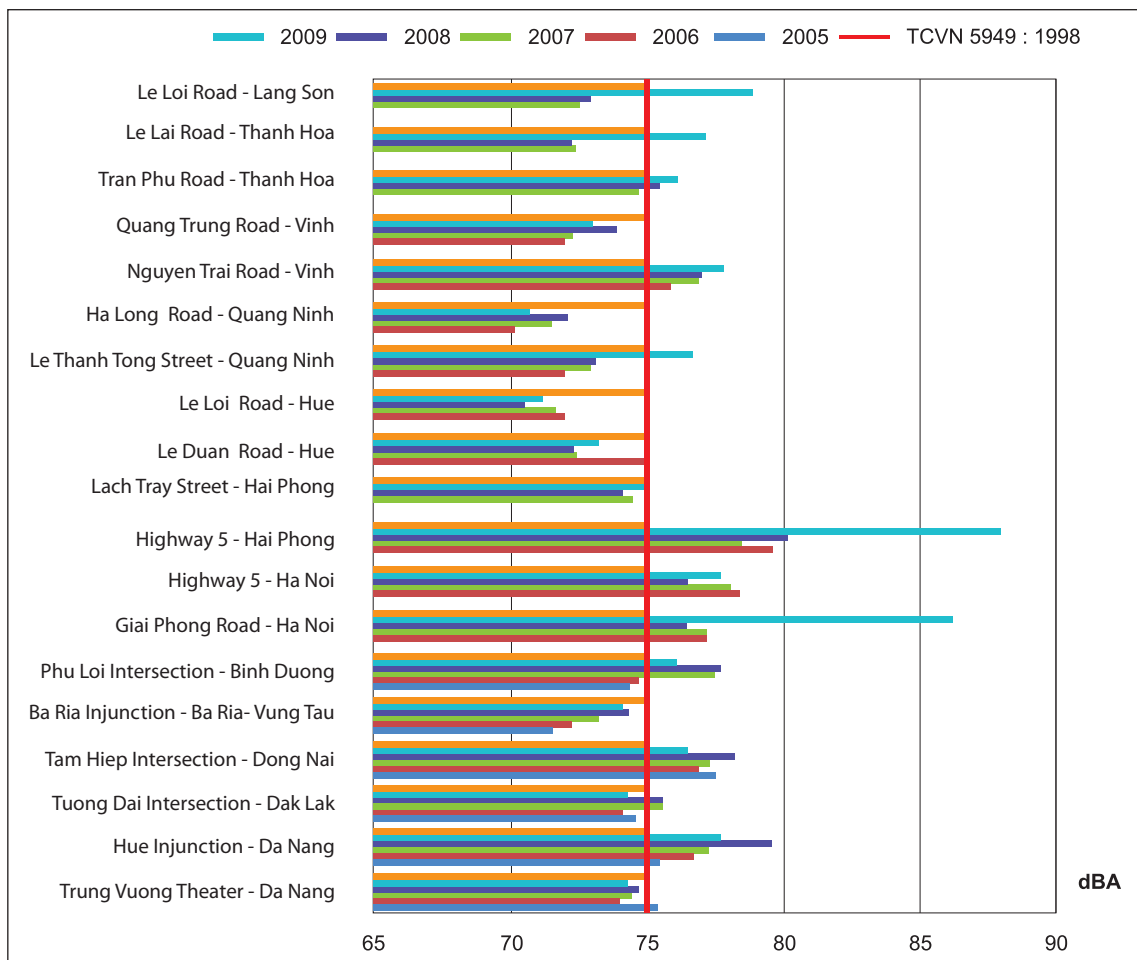


Chart 9. Road noise level variation in Northern and Central cities over time

(Source: National Environment Report 2010)

Apart from pollution by dust and emission gases, the urban air environment in Viet Nam is polluted by noise. Noise generated by traffic in Viet Nam cities normally reaches 70-75dBA, even 80-85dBA at places (Chart 9). The main cause is the limited behaviour and awareness of most road users.

Table 2. Viet Nam GHG inventory in 2000 and projections for 2010, 2020 and 2030

Unit: thousand tons CO₂ equivalent

No	Sectors	2000		2010	2020	2030
		Emission amount	Percentage (%)	Emission amount	Emission amount	Emission amount
1	Energy	52,773.46	35.0	113.1	251.0	470.8
	- Power generation	11,205.20				
	- Industry and Construction	15,113.23				
	- Transport	11,946.61	7.9			
					
2	Industrial processes	10,005.72	6.6			
3	Agriculture	65,090.65	43.1	65.8	69.5	72.9
4	LULUCF	15,104.72	10.0	-9.7	-20.1	-27.9
5	Waste	7,925.18	5.3			
	Total*	150,899.73	100.0	169,2	300,4	515,8

Note: * The total figures of 2010, 2020 and 2030 is estimated only for 3 areas energy, agriculture and LULUCF

Source: Viet Nam 2nd National Communication to UNFCCC, 2010

In Viet Nam, transport generates relatively large amounts of GHG emission, which stood at 11,946,610 tons of CO₂ equivalent in 2000, accounting for approximately 7.9% of the total GHG emission by all sectors. Projections show that GHG emission from energy and transport will increase faster than from other sectors.

2.6. Air pollution and community health

Air pollution causes harm primarily to community health, terrestrial ecosystems, and household appliances, especially electric-electronic devices, materials, and also leads to climate change.

In terms of community health, air pollution is one of the main causes of respiratory diseases (rhinitis, sinusitis, pharyngitis, bronchitis, coughs, pneumonia, asbestosis or silicosis, and lung cancer, amongst others), skin diseases (dermatitis, rash, allergy), eye diseases (sore eyes, conjunctivitis, amongst others) and worsens nervous and cardiovascular diseases. Noise pollution disturbs sleep and the tranquility necessary for rest and relaxation, which consequently causes or increases nervous breakdown, fatigue, cardiovascular diseases, physical weakness and hearing reduction.

The Ministry of Health's statistics show about 20-26% of respiratory incidents, 6-7% eye patients, 2-4% dermatological cases and 0.1-0.5% of tuberculosis incidents in Viet Nam are due to air pollution. Results of epidemiological investigations of several research projects reveal the comparison of the prevalence rates of respiratory diseases out of the total sample populations between precincts with serious air pollution and precincts with less air pollution: chronic bronchitis 4-6 times higher in the seriously polluted precincts, allergic rhinitis 2-3 times higher, and frequent cough 7-11 times higher.

The research project "Comprehensive evaluation of health and economic damages caused by air pollution" under Program 23 "Improving urban air quality" of the Transport Health Administration (MOT) in 2010 shows a much higher prevalence of respiratory diseases in Ha Noi than in HCMC. One of the main reasons identified is higher air pollution in Ha Noi, worsened by stronger impacts of weather changes in Ha Noi, especially in winter time. The study also presents figures of 1,538 VND/person/day as damages related to air pollution in Ha Noi, and 739VND/person/day in HCMC⁴. These make up a loss of 66.83 million of USD per annum for the 10 urban districts of Ha Noi (around 2.5 million people), while the 19 urban districts of HCMC (5.6 million people) amount up to roughly 70.96 million USD p.a⁵.

2.7. Traffic accidents

a) General situation

In Viet Nam, the average daily number of fatalities is estimated to be 30-35 due to traffic accidents, mostly road accidents. Estimated damages due to road accidents in 2007 were about 2.89% of GDP, i.e. 32,600 billion VND⁶.

The numbers of accidents, fatalities and injuries continuously increased over the years and only started to decline in 2003. However, the reduction was not steady and sustainable. In 2011, there were 30,583 collisions on the roads and 13,203 accidents, depriving 10,979 persons of their lives and injuring 10,049 others nationally. In comparison with 2010, these were reductions of 1,335 accidents (-9.18%), 457 deaths (-3.8%) and 800 injuries (-7.37%). Road accidents account for the largest percentage of the total (94.22%), followed by railroad accidents (4.04%), inland waterway and marine transport accidents.

b) Road accidents

Between 2000 and 2002, all three statistics for road accidents (accidents, fatalities and injuries) increased sharply and steadily. Within 3 years, the number of accidents and injuries rose by 1.2 times and the number of deaths by 1.66 times. In the period 2002-2010, road accidents declined; the number in 2010 went down by 49.5% against the 2002 figure; similarly, the numbers of injuries and fatalities diminished by 66.5% and 13.6% respectively (Chart 10).

4 Transport Health Administration, MOT, "Comprehensive evaluation of health and economic damages caused by air pollution", 2010

5 MONRE, National Environment Report 2010

6 MOT and JICA, Viet Nam Road Safety Masterplan to 2020, 2010

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In 2011, there were 12,441 road accidents, a reduction of 9.28% compared to 2010, which caused 10,543 deaths (a reduction of 4.76%), 9,671 injuries (a reduction of 6.16%) against 2010 figures. Despite such reduction, the fatality rate remained high. On the other hand, there occurred 85 extremely serious accidents, costing 281 lives and injuring 301 other persons. By comparison with the same period in 2010, there were 26 fewer accidents and 89 fewer deaths.

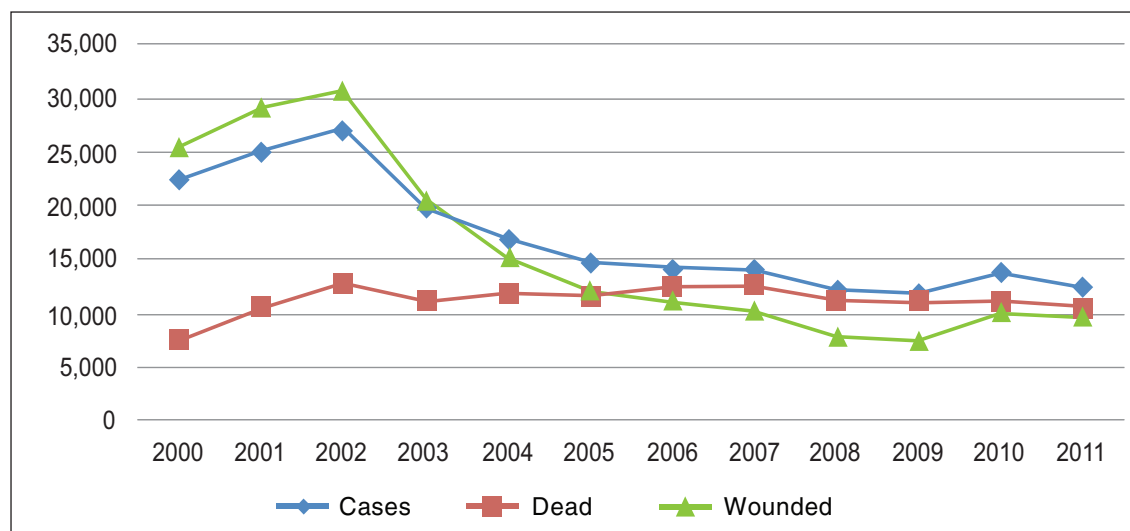


Chart 10. Casualties related to road accidents in Viet Nam 2000-2010

(Source: National Traffic Safety Committee)

3. Implemented measures in road transport

3.1. Legal documents related to EST development orientations

So far, the Government of Viet Nam has developed and promulgated a number of development orientations in relation to EST, namely:

- Decision 153/2004/QĐ-TTg on the promulgation of orientations for sustainable development strategy in Viet Nam (Viet Nam Agenda 21).
- Decision 206/2004/QĐ-TTg on the approval of the Viet Nam Transport Development Strategy until 2020.
- Decision 256/2003/QĐ-TTg on the approval of the National Environmental Protection Strategy until 2010 and Orientations towards 2020.
- Decision 35/2009/QĐ-TTg on the modification of the Viet Nam Transport Development Strategy until 2020.
- Decision 2139/QĐ-TTg dated 05 December 2011 on the approval of the National Strategy on Climate Change.

3.2. EST solutions implemented

Addressing increasing problems in transport, the Government of Viet Nam and authorities of major cities have carried out a number of EST solutions, namely:

a) Transport and demand management

- Restrain registration of motorcycles and automobiles in Ha Noi and HCMC via increased registration fees and number licensing fees.
- Regulate operating hours of some types of vehicles; restrict heavy trucks from entering the inner cities during the day; others can only operate on ring roads and centripetal, or radial, roads, etc.
- Develop public transport networks: more buses, more routes; improve quality of services; renovation of vehicles; pilot mass rapid transits; issue policies and provide price subsidies to public passenger transport by buses. On 8th March 2012, Prime Minister approved the Decision 280/QD-TTg on Program of development of public transport by bus from 2012 to 2020.
- Organize and intensify traffic management; apply lane division and traffic flow directions; intensify steering, guiding and inspecting of traffic during rush hours at hotspots of congestion.
- Change school and work hours at agencies, institutions and schools based in the 10 urban districts of Ha Noi.

b) Infrastructure development and road maintenance

- Build new, upgrade and improve transport infrastructure; upgrade and improve external link axes and centripetal road arteries; build and complete ring road systems; construct grade separation at hotspot intersections.

c) Vehicle control

- Regulations on trading and conditions for commercial use of vehicles pursuant to the Government Decree 91/2001/ND-CP.
- Regulations on expiration of trucks and passenger vehicles pursuant to the Government Decree 95/2009/ND-CP.
- Restrict importation of used vehicles pursuant to the Prime Minister's Decree 12/2006/ND-CP which specifies the implementation of the Commercial Law on international purchases and sales, on activities of agents for purchase, sale, manufacture and transit of goods with foreign countries. Following this directive, only vehicles produced less than 5 years earlier and meeting technical safety and environmental protection requirements are allowed to be imported and put into use on Viet Nam roads.

d) Vehicle emission control

- Stipulate the roadmap for application of emission standards on road motorized vehicles pursuant to the Prime Minister's Decision 249/2005/QG-TTg dated 10th October 2005, which rules that from 1st July 2008, emission from all motorized new vehicles produced, assembled and imported must reach Euro-2 equivalent standards.
- Develop and approve the Project for control of emission from motorcycles in use in provinces and major cities pursuant to the Prime Minister's Decision 909/QD-TTg.

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- Determine the roadmap for application of Euro 3, 4 and 5 emission standards for motorized two-wheelers and new automobiles produced, assembled or imported, pursuant to the Prime Minister's Decision 49/2011/QĐ-TTg, according to this, by 2017 Euro 4 will be applied for motorbikes and automobiles and from 2022, Euro 5 will be applied for automobiles.

- Implementing Program of pollution control in transportation activities approved by the Decision 855/QĐ-TTg dated 6th June 2011.

- Promulgate regulations on quality, technical safety and environmental protection inspection on motorized vehicles, whether imported, or locally produced or assembled; standards and periodic inspection of technical safety and environmental protection requirements on special-use vehicles.

- Enact regulations on control of dust diffusion from construction machines and vehicles in service of city development projects.

e) Fuel quality management

- Regulations on removal of leaded gas since 2001.

- Promulgate National Technical Specifications on gasoline and diesel fuels and biofuels (QCVN 01:2009/BKHCN) pursuant to MOST's Circular 20/2009/TT-BKHCN dated 30th September 2009.

- Promulgate "Project for Biofuel Development until 2015, Vision 2025" pursuant to the Prime Minister's Decision 177/2007/QĐ-TTg.

f) Traffic safety and order

- Intensify urban traffic safety and order; education and communication on awareness and compliance with traffic regulations and urban order; handle congestion spots at schools during rush hours.

- Establish the National Traffic Safety Committee chaired by one Deputy Prime Minister, with Minister of Transport as Permanent Vice Chair of the Committee. Directive 22-CT/TW dated 24th February 2003 of the Party Central Committee on the intensification of the Party's leadership in traffic safety assurance, the National Assembly's resolution 14/2002/QH11, the Government's resolutions 13/2002/NQ-CP, 32/2007/NQ-CP, 16/2008/NQ-CP and 88/NQ-CP on solutions to reduce and reverse the increase of traffic accidents and congestion have been enacted as well.

- Compulsory helmet wearing by all motorbike riders on all roads from 15th December 2007.

4. Projections of the growth of vehicles, fuels and environmental pollution in road transport

4.1. Projections on the growth of vehicles

a) Motorcycles

According to the 2007 Masterplan for the development of the motorcycle industry of the Ministry of Industry, it is projected that by 2020 the number of motorcycles in Viet Nam

will reach 33 million. Yet, in fact, by the end of 2011, there were already nearly 34 million of these in the whole country.

Studies reflected in the National Strategy for Assuring Road Safety and Order until 2020 and Vision 2030 assert that by 2020, motorcycles will continue to be instrumental means of transport. Therefore, in the long run, public transport needs to become the major means in big cities like Ha Noi and HCMC. However, the completion of the infrastructure projects necessary to allow this requires enormous resources, both in time and finance. Even in the medium term, Viet Nam can construct only part rather than all of such public transport systems in its major cities.

Thus, according to projections, by 2020, the use of motorcycles will continue to account for 30% and 35% of traffic in Ha Noi and HCMC respectively, and the total number of motorcycles in the country will reach 38.8-40.5 million⁷.

b) Automobiles

It is projected in Viet Nam Road Transport Development Planning until 2020 and Orientations towards 2030 (pursuant to Decision 1327/QĐ-TTg dated 24th August 2009) that by 2020 there will be 2.8-3.0 million automobiles, including 50% cars, 17% buses and 33% trucks.

Nevertheless, based on current socio-economic development and projections on automobile consumption demands in the country, the Automobile Industry Development Planning between 2010-2020 and Vision 2030 (Draft 4) being prepared by MOIT present options for automobile growth in Viet Nam in Table 3, which forecasts total numbers of 2.5 million automobiles in use in 2015 and over 4 million in 2020 (Table 3).

Table 3. Estimated growth of automobiles in Viet Nam by 2025

Targets	2010	2015	2020	2025
Number of automobiles in use	1,624,406	2,495,990	4,060,126	6,632,597
Demands of vehicles p.a.	167,740	306,977	512,518	829,315
- Up to 9-seat cars	94,592	174,280	293,671	494,853
- Over 10-seat cars	6,826	16,985	34,163	52,565
- Trucks	61,094	107,669	173,401	266,799
- Special-use vehicles	5,228	8,044	11,282	15,098

Source: Draft Automobile Industry Development Planning and Statistics, MOIT, 2012

Thus, by 2020, it is projected that Viet Nam will have 38.8-40.5 million motorcycles, and 4 million automobiles of all kinds, and that motorcycles will remain the principal means of transport among the population.

⁷ MOT, Report of the National Strategy for Assuring Road Safety and Order until 2020 and Vision 2030, 2011

4.2. Projections on the growth of fuel demands for transport

According to Viet Nam Oil and Gas Development Planning, the total fuel demands in the country by 2020 will reach approximately 32 million tons, 29 million and 35 million in the medium-, low- and high-growth scenarios respectively.

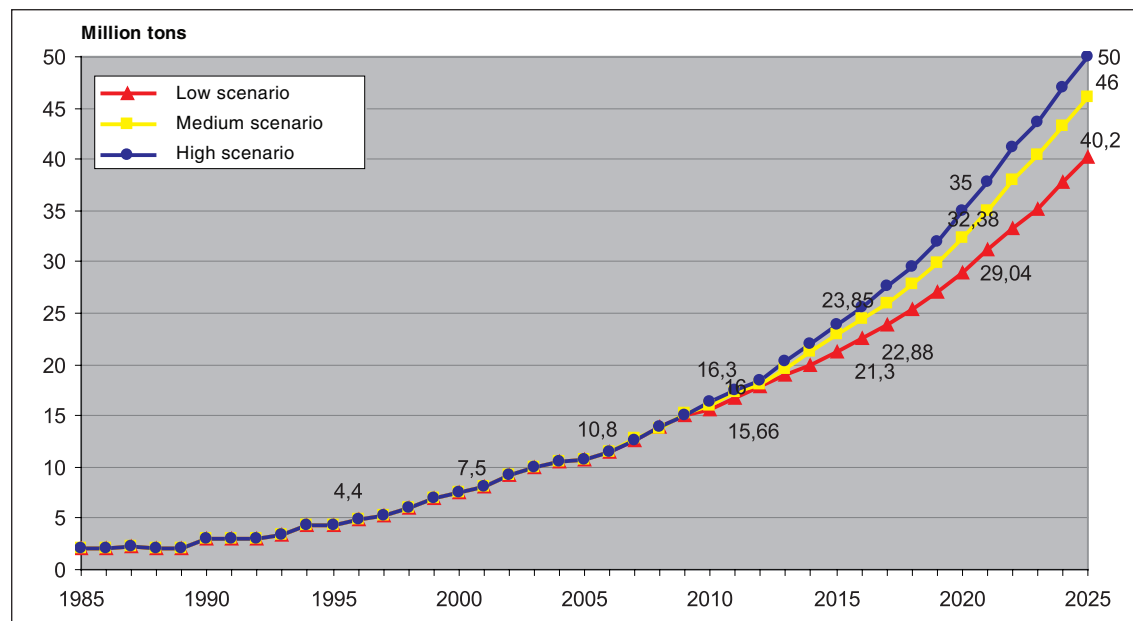


Chart 11. Past fuel demands in Viet Nam and projections

(Source: Draft Oil and Gas Development Planning 2006-2015 Orientations towards 2025, Ministry of Industry, July 2007)

Of those projected fuel demands, the transport sector accounts for about 55%, i.e. around 17 million tons. If the goals of the Project for Biofuel Development until 2015 and Vision 2025 approved by the Prime Minister are achieved, clean alternative fuels produced will reach only 250,000 tons of ethanol and vegetable oil, and 5 million tons of E5 and B5.

4.3. Projection on the growth of air pollution due to transport activities

If projections on the high increases of the number of vehicles and fuel demands by 2020 prove to be accurate, increased air pollution in Viet Nam major cities will be inevitable unless environmental protection measures are applied. The National State of the Environment Report 2007 estimates that the amounts of air pollutants generated by transport activities in Ha Noi will reach around 170,000 tons of CO and 1,050,000 tons of TSP by 2020, doubling the figures in 2010 (Charts 12 and 13).

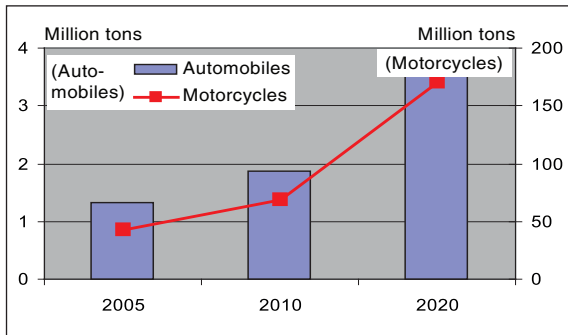


Chart 12. Projection of CO emission from traffic in Ha Noi by 2020

(Source: National Environment Report 2007)

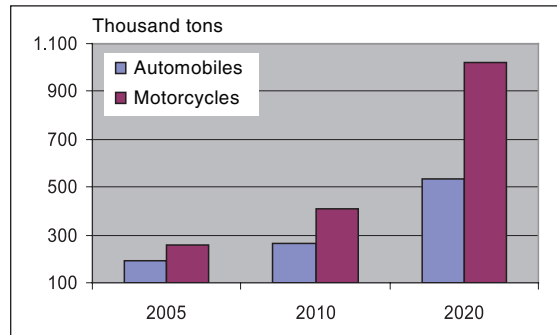


Chart 13. Projection of TSP emission from traffic in Ha Noi by 2020

(Source: National Environment Report 2007)

5. Challenges to EST development

5.1. Rapid increase of private vehicles causes environmental pollution and traffic accidents while public transport develops slowly

In recent years, the number of motorized vehicles in Viet Nam cities rose sharply at an annual average rate of 15.2%; most of these are motorbikes and cars. A large proportion of these are old vehicles, having been used for many years and failing to meet environmental standards. Public transport in cities is developing too slowly compared to the increasing demand for people’s travel. In HCMC, public transport can only satisfy 5% of demands, and over 70% of the population use private motorized means, mostly motorcycles.

These rapid increases of vehicles, particularly motorcycles, have posed huge challenges to the efforts to address congestion, environmental pollution and accident problems.

5.2. Poor transport infrastructure fails to satisfy demands and ensure social equity in transport

The system of urban transport technical infrastructure in Viet Nam is still poor and undeveloped in terms of surface quality, width, km/km² of urban area, the ratio between land reserved for transport and total urban area, and other indicators; none of these equal the average in cities of advanced countries in the region, especially given the present process of strong urbanization, urban spatial and population sprawl, happening at a far greater speed than investments in urban technical infrastructure development and improvement.

Infrastructure and urban transport planning have not paid sufficient attention to the development of environmentally friendly modes of travel such as walking and non-motorized transport. Technical facilities reserved for vulnerable social groups have also not received attention. There is a common lack of purpose-built facilities and devices for the elderly, children, people with disabilities and pregnant women at railroad stations, bus stations or on vehicles.

5.3. Weak social awareness and consciousness of EST

EST is still a new concept in Viet Nam, so the awareness at all levels of leadership about how urban planning and transport development can be environmentally friendly, safe and socially equitable is limited.

Low awareness on the part of road users has led to increased congestion in big cities and increased accidents in the whole country. Vehicle users' awareness of environmental protection is equally poor and they do not show proactive compliance with environmental standards. Fuels with poor quality are still imported and distributed. Community awareness of the environment benefits from the use of non-motorized transport is not high. Awareness of gender equality and consciousness of the transport needs of the socially vulnerable groups also remain low.

5.4. Weak solutions for fuel management, emission monitoring and control, and weak I/M in transport

Fuels: mostly traditional with unsatisfactory quality which does not meet environmental standards; diesels still contain high sulphur (S) content; the concentrations of benzene and polycyclic aromatic solvents in gasoline remain high; cleaner fuels or technologies, such as CNG, LPG, biofuels, solar energy, electric cars, etc., have not been developed. There are several difficulties in the application of fuel standards for motorized vehicles, especially in the weak inspection, checking and supervision of the quality of fuels imported and sold in the market.

Air quality monitoring: The systems of monitoring stations have poor infrastructure due to lack of funding (the minimum investment for each ambient air quality monitoring station is estimated to be about 200,000USD, and funding for operation and maintenance of each station is about 30,000USD p.a.). There are also difficulties in selecting sites for such stations in old towns so as to ensure both technical requirements for monitoring, safety and security. Another challenge is the lack of qualified experts for operating, maintaining and repairing monitoring stations.

Emission control: It is difficult to control emissions from motorized vehicles in Viet Nam due to various complexities and huge differences in the fleet's numbers, origins, types, years in operation, etc. Discrepancies exist in the statistics and data archived in MOT, MOPS and MOD; collaboration and linkages among ministries and sectors, especially among MOT, MOPS, MOIT, etc., so as to synchronously control emission from sources, control during production as well as the whole life of vehicles, are weak. Facilities for inspection are incompatible and outdated throughout the country. Mobile spot checks on the road to detect vehicles with excessive emissions cannot be executed regularly due to the lack of facilities and logistics. There are insufficient human resources and facilities both in quantity and technical expertise for the management and performance of control on pollution sources from motorized vehicles.

I/M of motorized vehicles: There have not been sufficient legal instruments to accredit and recognize private institutions with sufficient conditions for servicing and maintenance. There is lack of policies and mechanisms for priority, preferential treatment, partial tax reduction, insurance, or economic support to encourage the use of less polluting motorized transport. Environmental protection fees charged on emissions from transport have not

been issued. Emission checks have not been conducted on motorcycles, the most popular private means of transport.

There are insufficient public education programs on the benefits of environmentally-friendly driving techniques, or the benefits of I/M programs for prolongation of vehicle life and improved community health. No requirements have been imposed upon manufacturers so that they deliver skill training to maintenance companies on how to service emission control systems. Human resources and facilities of the system of centers for inspecting and registering motorized vehicles are inconsistent throughout the country.

5.5. High accident rates with huge social and economic damages

Traffic accidents in Viet Nam have been depriving many of their lives, causing huge losses to the economy and leaving enormous social consequences.

Statistics from the NTSC show that the number of accidents related to motorcycles normally accounts for over 75% of the total road accidents, while automobile- and bicycle-related ones merely come up to 17% and 4% respectively.

Statistics from the Transport Development and Strategy Institute reveal that the number of traffic accidents and the number of injuries per 100,000 population have been declining (Chart 14). However, the fatality rate per 100,000 population remains high (11.99 in 2011). The number of accidents per 10,000 vehicles has shown a downward trend because of the rapid growth of vehicles (Chart 15). Yet, the fatality rate per 10,000 vehicles is still high (2.94 in 2011).

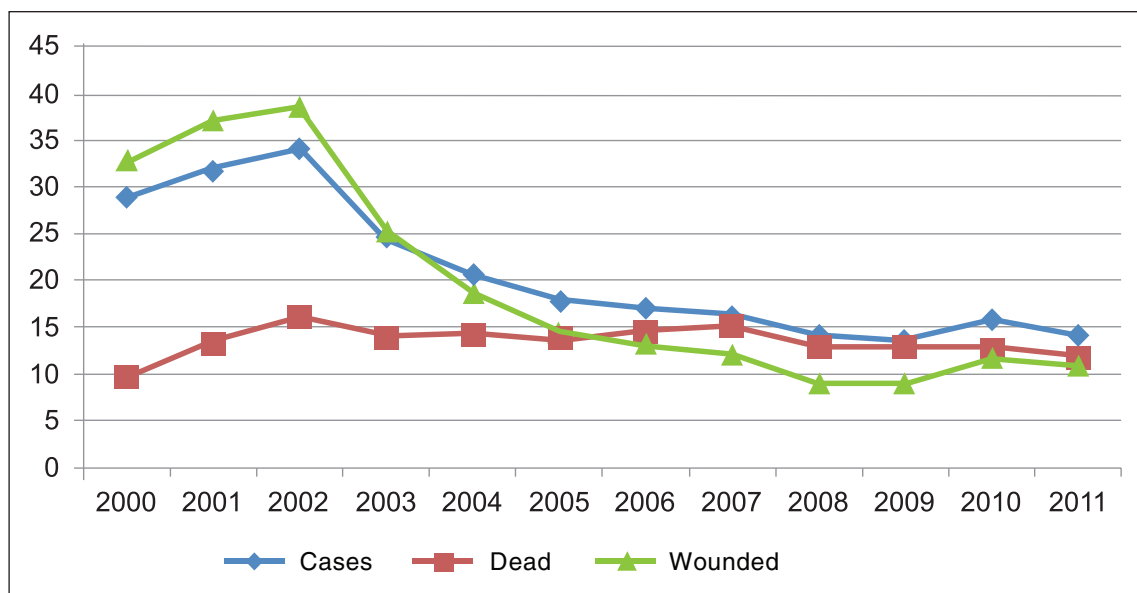


Chart 14. Traffic accidents per 100,000 populations in Viet Nam

(Source: Transport Development and Strategy Institute)

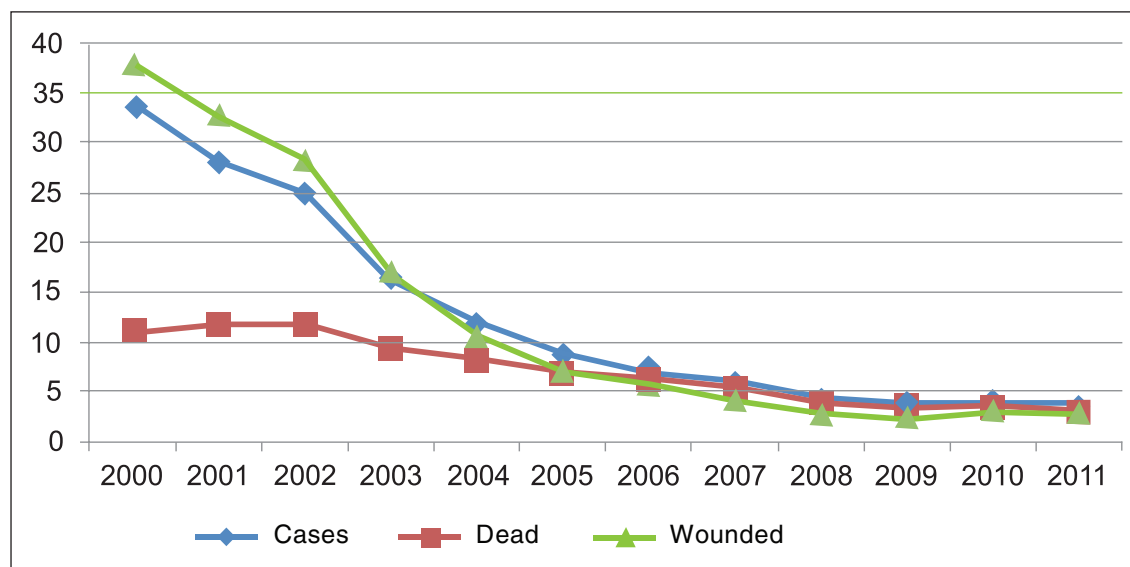


Chart 15. Traffic accidents per 10,000 vehicles in Viet Nam

(Source: Transport Development and Strategy Institute)

Estimates show road accidents in 2007 caused a loss of 2.89% of GDP, i.e. 32,600 billion VND⁸. This is a huge challenge to EST development in Viet Nam.

5.6. Transport planning and development are giving rise to several issues in environmental protection

The construction of new roads, and upgrading and repair of roads exploits land resources and encroaches on sensitive ecosystems, forests, natural reserves, and national parks, and is a major cause of biodiversity degradation. The time taken for road construction is prolonged and sometimes projects are abandoned unfinished because many projects are undertaken simultaneously, despite a lack of funds, non-modern equipment, illogical arrangement of manpower, insufficient performance of minimization measures; all of this results in environmental pollution and negative impacts on community health.

The rate of road network development fails to satisfy travel needs, which leads to high traffic density in major cities and focal national arterial roads, and severe congestion. MRT network planning is slow to be implemented, again resulting in increased traffic density and pressure on the road network.

Road maintenance work encounters several challenges, such as drainage, inundation, flood handling on national North-South arterial roads and highway systems, and road embankment erosion and collapse, which makes it difficult to ensure smooth traffic flow. Exploitation of construction materials for road building is undertaken without proper planning, which causes environmental pollution and soil erosion. Road maintenance and repair is slow and often delayed, giving rise to particulate pollution, waste gases, and loud and prolonged noise, all of which affect the health of the population in the vicinity and roadside areas, increase accidents, and cause a rise in fuel consumption and vehicle damage. Inadequate care is given to restoring the site and the environment upon completion of road construction.

⁸ MOT, JICA, Viet Nam Road Safety Planning to 2020, 2010

PART II

STRATEGIC ORIENTATIONS FOR ENVIRONMENTALLY SUSTAINABLE TRANSPORT DEVELOPMENT IN VIET NAM

1. Viewpoints

a) Transport development must facilitate socio-economic development while achieving environmental goals, with a focus on road transport development in an environmentally-friendly manner.

b) Development must maximise the advantages of the geographic location and natural conditions of the country for the development of modern, rational, smooth and well-connected transport networks to allow for convenient transfer among different modes of transport, among different regions, among urban and rural areas, with priority given to the North-South axes, external links, major cities and regions of strategic importance to the poverty reduction strategy and to the service of national security, defense and international integration.

c) The transport sector should be gradually modernized with the use of high technology in production and construction, rational use of transport modes in transport demand management so as to minimize costs, economize energy use and be environmentally friendly.

d) Close collaboration must apply throughout relevant sectoral planning in the development and implementation of the goals of transport development strategy, such as socio-economic development planning, land use planning, energy development planning and urban development planning;

e) Adequate investment must be made in environmental infrastructure in transport; adequate land reserves must be made for the development of environmentally friendly transport infrastructure and to ensure traffic safety corridors. EST implementation is the responsibility of all levels of authorities, sectors, society and each citizen.

f) EST implementation must give priority to the development of a public transport system which is modern, safe and convenient; this must be combined with control on the growth of private vehicles, emissions control, resolving congestion, ensuring urban traffic safety and order, and increased access for people with disabilities.

2. Objectives until 2020

Overall Objectives

Ensure sustainable development of road transport to meet socio-economic development demands while simultaneously achieving environmental protection goals, contributing to the country's sustainable development and improving the quality of people's life.

Specific Objectives

Develop an EST system which meets people's travel demands in a safe manner, ensuring human health and social equity while restricting emissions within environmental carrying

capacity, containing consumption of non-renewable natural resources, economizing land use and causing no impacts to ecological systems.

The following targets are to be achieved by 2020:

a) Quick investments in the construction of MRT lines such as elevated railroads and subways in Ha Noi and HCMC so that they reach the shares of 35-45% in passenger transportation.

b) Rational development of urban and public transport infrastructure systems, ensuring 16-26% land reserved for urban transport.

c) Restrict the growth of private motorized vehicle ownership, especially in Ha Noi and HCMC, ensuring that by 2020 there are no more than 4 million cars and 40 million motorcycles in the whole country.

d) Reduction of TSP generated in Class I cities and above, ensuring national environmental technical specifications and standards as well as standards stipulated by WHO; reduction of SO₂, NO_x and VOC in Ha Noi and HCMC from the 2005 figures;

e) Euro 3-equivalent emission standards to be applied to motorized two-wheelers and Euro 4 to automobiles from 1st January 2017;

f) Emission check on motorcycles in use in major cities and provinces pursuant to the Prime Minister's Decision 909/QD-TTg;

g) Clean and alternative fuels to be used accounting for 10% of the total fuel consumption, with quality equivalent to Euro 4. Intensify the conversion of buses and taxis to those using CNG and LPG to reach 20% of the fleets in major cities;

h) Implementation of solutions to improve fuel efficiency in transport;

i) Reduce traffic accidents to reach substantial reduction in terms of the numbers of accidents, fatalities and injuries, with an annual reduction of 5-10% of traffic accident-related deaths;

j) Development and improvement of air environmental quality monitoring networks, particularly in major cities.

3. Strategy to promote EST development

3.1. Transport planning and transport demand management

a) Development of public transport networks

Public passenger transport network planning must be aligned with urban development planning, taking into account connections to socio-cultural and commercial destinations. Priority is to be given to the development of public transport in cities. This includes: investing in increasing the number of buses; expediting studies for the construction of MRT lines, rail cars, etc; improving the quality of services to attract passengers to public transport; increasing coverage of the route networks and frequency of service; intensifying security and safety for passengers; encouraging all economic sectors to invest in vehicles and public passenger

transportation by bus through supportive policies; implementing social mobilization measures in public transport; and ensuring that urban public transport satisfies 35-45% of people's travel demands.

b) Organization of transport planning and management

Transport and urban planning must take into account the integrated planning and construction of parking areas and transfer points to facilitate people's gradual shift from private means to public transport in a convenient manner. This includes: exercising lane division and traffic flow direction; regulating operating hours of some types of vehicles, areas or pedestrian streets; implementing synergetic solutions in improving and managing streets, intersections and sidewalks in cities; and handling congestion hotspots with heavy traffic during rush hours, such as schools, hospitals or factories.

Investment is also needed to improve and develop urban transport infrastructure by focusing on underground and elevated structures. For new cities, attention must be paid to transport infrastructure planning so that it reaches average values of advanced countries in the region in terms of surface quality, road width, km/km² of urban area, the ratio between land for transport and total urban land of about 16-26%; construction of grade separations, and other relevant indicators.

3.2. Vehicle emission control

a) Develop and promulgate regulations on emission control

This will be undertaken by: developing and applying technical specifications and emission standards according to European Standards (Euro 3, 4, 5), standards on fuel consumption by motorized new vehicles, whether locally produced or assembled or imported; focusing on gradual improvement of emission standards on all motorized vehicles in use; and developing and implementing the roadmap for application of emission standards in a flexible manner to ensure achieving the goals within a reasonable span of time.

In step with the foregoing: develop compatible systems of legal documents with reasonable roadmaps as well as supportive financial mechanisms for technologies and vehicles which satisfy emission standards and vehicles which use clean fuels; encourage the use of alternative fuels; and exercise emission checks on motorcycles in use.

b) Retirement and replacement of old vehicles

Establish supportive funds to accelerate the retirement of old vehicles and produce appropriate policy instruments to regulate the importation of used vehicles.

c) Intensify spot check and mobile emissions control on the road

Implement programs of mobile on-road emissions control; improve facilities and apply on-site immediate sanctions against polluting vehicles. Implement the retrofit program to install catalyst converters and particulate filters in the exhaust pipes of motorized vehicles in use. Establish emissions check points in Ha Noi, HCMC and some other cities as well as mobile inspection teams. Request all motorized vehicles in use to undergo compulsory periodical inspection and satisfy emissions standards; impose proper penalties on unsatisfactory vehicles.

Promulgate regulations on minimization of particulate discharge from trucks; carry out zoning and restrictions of heavy trucks in certain areas.

Publicly announce air pollution levels in sensitive areas on billboards and report on air quality to encourage pollution-free roads. Share information via nation-wide internet links.

d) Encourage and foster the use of non-motorized transport

Encourage all the community to use non-motorized transport such as bicycles, electric bicycles or walking, for short-distance travels especially in places of high population density, as an environmentally friendly mode of transport. Encourage planning and construction of infrastructure that boosts non-motorized transport while improving safety for those engaged in such transport modes.

3.3. Vehicle inspection and maintenance (I/M)

a) Improve policies and institutions

Develop new regulations, supplement and amend mandatory regulations on periodical maintenance of motorized vehicles, and especially implement the I/M program to control pollution from motorcycles; develop and implement regulations on the management and licensing of motorized vehicle maintenance services. Complete and improve capacity and facilities of laboratories for motorized vehicle emission testing; develop a system of inspection and registration centers throughout the country for motorized vehicles, including vehicles in use and new ones, whether locally produced, assembled or imported.

Update and systematize procedures and processes for vehicle testing and registration, with particular attention paid to periodical inspection and registering. Promulgate technical specifications and standards for motorized vehicle maintenance services.

Study, develop, promulgate and implement the retrofit program with filters for exhaust from gasoline engines and particulate filters from diesel ones where possible.

b) Intensify investment in infrastructure and human resources

Invest in building a system of maintenance centers of international quality. Control quality, inspect and periodically evaluate so as to improve capacity of motorized vehicle maintenance services.

Deliver mandatory training as required by the I/M program for registered officials, technicians and mechanics. Encourage manufacturers to join in skill training for maintenance services on how to technically service the emission control system on vehicles.

3.4. Fuel quality management

a) Perfecting policies and institutions

Develop the National Fuel Strategy until 2025 in line with EST development, in which active collaboration with relevant ministries and sectors in fuel management is intensified.

Implement solutions for fuel quality management in parallel with addressing issues of emission standards, engine manufacturing technology and I/M of motorized vehicles.

Policies to develop clean fuels must closely link with the roadmap for application of new technological standards on vehicles. Fuel management plans in each period must be developed in a way that the automobile industries as well as relevant stakeholders have time to adapt to new regulations and policies.

Develop and apply new tax and fee policies to encourage the use of clean fuels. Alternative fuels such as CNG and LPG need to be encouraged as well, especially those used for public transport (taxi and bus) via priority in prices and appropriate distribution systems, and inter-sectoral collaboration, particularly among MOT, MOF and MOIT. Improve capacity and State apparatus on fuel quality control. Control fuel quality at ports where fuels are imported; also conduct regular checks and inspection of fuel businesses. Promote cooperation among MOF, MOST, MOT, MONRE and MOIT in relation to tax policies and fuel quality control.

b) Implement technical solutions

Implement the “Project for Biofuel Development” pursuant to the Prime Minister’s Decision 177/2007/QĐ-TTg so as to partially replace fossil fuels being used while diversifying and taking authoritative hold of fuel supplies. Develop infrastructure for studying, receiving and distributing clean fuels like LPG, CNG, etc.

Improve technical specifications and standards for traditional fuels like gasoline and oil via the control of the contents of toxic substances such as heavy metals, benzene, aromatic compounds and sulphur. Maintain the use of unleaded gasoline, reduce the sulphur content in gasoline to 500ppm, 300ppm, 150ppm and 50 ppm in tandem with the roadmap for application of Euro 3, 4 and 5 standards.

3.5. Transport infrastructure development and road maintenance

a) Invest in the development of road transport infrastructure, integrated with responses to climate change and efficient and economical use of energy

Develop road transport infrastructure through the construction of centripetal axes, ring roads, urban arterial roads, and grade separations with overpasses. Build the system of urban public transport such as MRT, tramways, elevated railroads, or subways in big cities, with attention paid to connectivity among various modes of transport for fuel saving.

Implement solutions to construct noise-absorption walls to reduce noise for roadside residents in the city. Effectively implement resettlement programs for people who have to be relocated for project construction.

Mainstream responses to climate change and energy efficiency in road infrastructure planning and construction.

b) Strict implementation of environmental protection requirements in transport infrastructure construction

Strictly carry out SEA (strategic environmental assessment) of inter-regional, inter-provincial land use planning, and EIA (environmental impact assessment) of transport infrastructure construction projects as required by environmental protection legislation. Conduct post-EIA inspection in order to control the implementation of environmental protection measures already agreed.

Reduce planning of projects which cut through sensitive ecosystems, natural reserves, protected areas and national parks to conserve biodiversity. Study to adjust and complete standards for design and construction of road works to ensure environmental friendliness.

c) Mobilize resources for road maintenance

Set aside stable funding from the State budget for maintenance and restoration work after environmental calamities on the road system, and to invest in facilities and equipment in service of environmental checks, monitoring and supervision. Promote inter-ministerial and inter-sectoral cooperation in infrastructure construction planning so as to produce the optimal and most economical options for the country, such as transport network, power grid, telecommunication network, and sewerage systems.

Implement social mobilization of all sectors in the management, maintenance and repair of roads; execute Decree 18/2012/ND-CP on Road Maintenance Fund. Encourage all economic sectors and private businesses to take part in these activities in various forms, such as assignment of rights to fee collection, bidding for road maintenance and repair, in order to reduce costs and improve quality.

Intensify resources for road network maintenance; study and apply advanced techniques and technologies in the management and maintenance of road transport infrastructure.

3.6. Traffic safety

a) Improve the effectiveness of State management

Gradually complete the system of legislation and legal documents on traffic safety and order. Develop National Strategy on Traffic Safety. Improve NTSC and local traffic safety boards by increasing responsibility and authority in organization and collaboration as well as the professionalism of their staffs. Complete organization of work and improve State management capacity in traffic safety at MOT and provincial Departments of Transport (DOTs). Establish the National Research Center for Traffic Safety; establish the department of Traffic Safety at transport training institutions. City and provincial authorities develop resolutions and action plans to implement the goals of traffic safety and order.

Develop databases of traffic accidents and mechanisms for data sharing. Intensify the roles and responsibilities of the transport, public security, military sectors, local authorities and State agencies in ensuring traffic safety and order.

b) Improve safety levels of transport infrastructure

Restore order to the traffic safety corridors. Intensify management and protection of corridors from land encroachment and re-encroachment, and increase responsibility of the chief of local authorities. Develop, approve, implement and supervise the implementation of planning for crossing roads, access roads, intersection nodes and merging traffic points between residences, industrial parks, commercial and service centers and national highways in line with local socio-economic development planning, terminating all illegitimate mergers with national highways.

Continue to detect and address in a timely manner 'black spots' on road systems, supplement accessory structures to prevent accidents on dangerous mountain passes and slopes on national

highways. Priority is given to the construction of structures to maintain traffic safety and order on main national highways with high rates and frequencies of accidents.

Apply new, modern technologies, intensify the upgrading and improvement of at-level intersections to turn them into grade separations; build new grade separations. Conduct planning for and construction of long-haul rest areas along national highways.

Issue the Guidebook for Traffic Safety Appraisal soon. Appraise safety criteria in projects from design to operation. Ensure no approval of design documents without safety appraisal. Safety appraisal must be regularly and continuously performed; new roads or roads to be upgraded or improved must consider incorporating specific lanes for each type of vehicle right from the beginning of design preparation. Establish safety areas around spots of heavy traffic.

c) Intensify vehicle control

Conduct general inspection of all vehicles; cancel the use of all vehicles which do not meet technical safety and environmental protection requirements. Develop policies to support and prioritize public transport development; restrain the growth of private vehicle ownership, especially of motorcycles in big cities via economic and administrative measures. Reclaim license numbers of expired vehicles as stipulated by law.

d) Strict management of driver training and licensing, and management of vehicle operators

Intensify management and oversight of vehicle operators. Review and modify training curricula, ensure that training institutions satisfy requirements and keep updated with actual situations; modify and issue standards for trainers. Upgrade technical facilities in service of training. Establish databases of driver tests; invest in upgrading driver training and testing centers and institutions; study to develop and deliver eco-driver training programs at training centers; implement the project to overhaul driver licensing systems; better manage drivers of motorcycles and buses. Regularly inspect the quality of on-road motorized vehicle drivers. Temporarily or permanently reclaim the licenses of driver training institutions which fail to meet standards or commit wrongdoings or deliver incomplete training programs. Apply strict sanctions for wrongdoing by officials, staff and leaders of such institutions.

Develop and issue skill standards for professional drivers; require transport businesses to strictly manage their drivers; deliver skill and compliance training with regards to Road Transport Law. Apply strict penalties on drivers with violation of law, traffic safety and order.

e) Intensify law enforcement

Improve the effectiveness of enforcement forces, increase manpower and facilities for traffic police and inspectors. Enact mechanisms and legal documents for the assurance of traffic safety and order, and address violations of traffic safety and order. Increase penalty levels and strictly apply sanctions on vehicle operators without driving licenses; gradually apply new technologies in patrol, control, violation handling and supervision; intensify prevention of wrongdoings among enforcement agents and security guards; strictly adhere to cancellation of expired vehicles which fail to ensure safety.

g) Intensify education and communication on traffic safety legislations

Continue to improve the quality of traffic safety education at school. Provide teaching aids, improve the capacity of managers and teachers of traffic safety at school. Adjust the traffic safety education program at school as needed, increase curricular time for this program while organizing more extra-curricular activities on traffic safety and order. Carefully manage pupils and students; incorporate their traffic law compliance as a criterion for assessing their moral and personal profile.

Intensify communication on traffic safety at community level to vehicle operators in diverse modalities. Mobilize the participation of State agencies, authorities at all levels, socio-political organizations, unions, and media agencies in traffic safety communication activities. Intensify education and communication to increase drivers' awareness of responsibility and professional ethics; highlight good examples in traffic safety assurance.

h) Minimize damage from traffic accidents

Improve the capacity of emergency and intensive care units at hospitals and emergency centers. Conduct planning and construction of first-aid venues and emergency information systems along important national roads and highways at appropriate intervals. Deliver paramedic training for health officials, and consolidate existing Emergency Centers 115 in cities and provinces.

Deliver regular training to disseminate paramedic knowledge and skills related to traffic accidents to relevant stakeholders in rescue work and handling of road accidents. Study to modify and supplement regulations on levels of mandatory premium for 'civil liability' insurance paid by motorized vehicle owners; stipulate the collaborative scheme between the police and insurance agencies to conduct inspection and supervision of motorized vehicle owners.

Strict penalties shall be imposed upon insurance businesses and vehicle owners for violation of such mandatory 'civil liability' insurance scheme. Strictly implement the Prime Minister's Decision on mandatory helmet use by motorbike riders on all roads.

3.7. Ambient air quality monitoring

Invest in, construct and gradually perfect the air environment monitoring system in particular, and environment monitoring system in general, pursuant to the Prime Minister's Decision 16/2007/QD-TTg.

Improve, maintain, service, and upgrade the facilities of existing air monitoring stations in Ha Noi and HCMC in a well-integrated manner. Develop plans and construct the system of automatic ambient air monitoring stations, starting with Class I cities (Hai Phong, Da Nang, Hue and Can Tho), and expanding to Class II cities. Supplement the ambient air quality monitoring system with portable devices for mobile stations. Increase monitoring frequencies in the year, and monitoring hours in the day (both day and night), and the measuring points in each city.

Develop, update and consistently manage databases of air quality in Viet Nam's cities.

3.8. Equity and gender issues in transport

a) Mainstream equity and gender issues in policies and institutions

Mainstream equity, gender and poverty reduction issues in transport policies to ensure convenient access to transport infrastructure and services by the poor, the elderly, people with disabilities, children and women. Complete and promulgate new legislative regulations on assistance and enablement of convenient access to and use of public transport by vulnerable groups. Mandate the implementation of equity and gender equality in planning and public transport development plans, ensuring the participation of all beneficiaries in such planning processes.

b) Promote the development of equitable transport infrastructure

Invest in improvement, design and construction of new infrastructure (roads, stations, parking areas, etc.) and public transport with consideration of requirements and demands of vulnerable groups who need assistance when traveling. Design and construct special facilities for people with disabilities, pregnant women, the elderly and children in transport infrastructure projects, such as roads, stations, terminals, public facilities, vehicles, etc.

c) Raise community awareness

Conduct public awareness programs supporting a socially equitable transport system, enhancing community responsibility and obligation to assist the vulnerable when traveling.

4. Solutions for implementing the strategic orientations

4.1. Complete policy and legislation systems on environmental protection in transport

Develop and promulgate legal documents on transport development to be environmentally friendly; clearly identify the responsibilities, obligations and authority of relevant stakeholders. Intensify the effectiveness of law enforcement, focusing on the synergy of all three management instruments (economic, educational and administrative).

Supplement and complete the system of legal documents on environmental protection in road transport. Study to incorporate Land Law, Construction Law, Road Transport Law and other relevant by-laws so that transport planning can be mainstreamed in land use planning, ensuring effective and safe use of roads. Develop and complete policies to maximally mobilize all social resources for EST development.

Standardize technical norms; issue standards of advanced technology for new vehicles and limits on vehicles in use; issue appropriate fuel standards and encourage the use of alternative fuels.

4.2. Intensify State management of environmental protection in transport

Improve capacity in State management of environmental protection in the transport sector at the central level. Decentralize, delegate and improve capacity of transport management agencies; clearly designate responsibility and ensure collaborative mechanisms among relevant agencies, including MOT, MONRE, MOPS, MOC, among others.

Build capacity for authorities of big cities and districts in the implementation of EST development, particularly in critical fields like transport development planning and transport demand management. Intensify urban transport safety and order, improve enforcement capacity of traffic police, security forces and traffic inspectors.

4.3. Intensify investment in transport infrastructure

Maximally build upon pre-existing internal resources, implement solutions to generate domestic capital appropriately based on actual context while carrying out investment promotion activities and partnership in order to take the most advantage of foreign investment capital through official development assistance (ODA), foreign direct investment (FDI), Build-Operate-Transfer (BOT) contracts and private-public-partnership (PPP) for transport infrastructure development.

Conduct social mobilization in investment in transport infrastructure development based on the “user pays” principle for maintenance and re-investment in transport infrastructure construction. Collect fees from institutions and individuals who directly or indirectly use road infrastructure to recover the capital invested in construction and maintenance, and environmental protection in transport.

Intensify and diversify investment sources for education and communication on awareness and consciousness of EST, especially traffic safety, emission control and transport demand management.

4.4. EST capacity building and awareness raising

Develop qualified human resources for EST development. Improve capacity of human resources both in quantity and skills, and in management of EST. Deliver training and re-training for capacity improvement among management staff and highly-skilled workers in all fields of EST. Diversify training modes: short-term, long-term training, local and overseas training, official training at schools and self-training. Increase the number of environmental professionals in the organizational apparatus of MOT.

Intensify communication for raising awareness of EST, diversify measures and forms of communication in the community relating to awareness, consciousness, and compliance to traffic safety regulations in general and rules related to environmental sustainability of road transport in particular.

Intensify and diversify measures and forms of education and communication, especially in the school system from kindergarten to university, focusing on integrative measures and combination of environmental friendliness in transport and environmental protection pursuant to the Politbureau’s Resolution 41/NQ-TW on intensification of environmental protection in the industrialization and modernization process, and the Prime Minister’s Decision on the integration of environmental protection in the curricula of the national education and training system.

Intensify the operation of institutions, socio-political and professional organizations and unions with a strong focus on education and communication about the significance and importance of EST, citizens’ awareness, responsibility, rights and obligations in compliance to regulations for EST promotion.

4.5. Intensify the application of new, modern technologies in transport

Intensify the application of scientific and technological advances, new materials and new technologies in design, construction and exploitation of road transport in an environmentally friendly way. Intensify the application of public transport, ensuring modernity, safety, convenience and environmental protection in such transport modes as MRT (railroad), and control the growth of private vehicles. Encourage, produce and use environmentally friendly means of transport and vehicles which consume alternative fuels instead of fossil ones. Priority is to be given to improvement and in-depth investment in upgrading to increase the effectiveness of existing transport industries; rapidly renovate and apply modern technologies, gradually increase localization rate and eventually locally manufacture vehicles.

Gradually modernize vehicles, applying advanced transport technologies and means, especially multi-modal means. Encourage the purchase of up-to-date construction machinery and equipment together with transfer of advanced technology. Restrict the importation of used vehicles and facilities, and prohibit the importation of obsolete technologies, vehicles or equipment. Apply information technology (IT) in the operation and management of EST development.

4.6. Intensify international cooperation in EST

Promote international cooperation in the Asian region and around the world in EST; promote the implementation of programs and projects in public transport development, in environmentally friendly transport infrastructure design and construction; bring in advanced technologies in transport from overseas; take maximal advantage of and make effective use of financial assistance, experience and funding from overseas for EST development projects.



PART III

ORGANIZATION OF IMPLEMENTATION

1. Responsibilities for the implementation of strategic orientations for EST

Responsibilities for the implementation of the content and solutions of the strategic orientations for EST are proposed as follows:

1.1. Ministry of Transport

a) Be the Focal Agency in coordination with relevant ministries, localities and stakeholders to implement the strategic orientations;

b) Leads and coordinates with ministries, sectors, localities and relevant institutions and individuals to develop and implement measures, mechanisms and policies for EST development in the fields of planning and transport demand management; controls emission from vehicles; inspects and maintains vehicles; constructs and maintains the road systems; promotes the application of science and technology in transport; promotes equity and gender equality in transport, and information and communication to raise EST awareness in the society;

c) Proactively develops long-term and annual plans for the use of capital from the State budget to implement the orientations to be sent to MOF and MPI for submitting to the Prime Minister for approval;

d) Leads and coordinates with MONRE and MOFA to organize the implementation of international cooperation in EST development.

1.2. Ministry of Natural Resources and Environment (MONRE)

Leads and coordinates with People's Committees in provinces and cities to develop and manage the system of ambient air quality monitoring in residences in cities in the whole country; develops and promulgates technical specifications and standards on air environment quality.

1.3. Ministry of Industry and Trade (MOIT)

Leads and coordinates with MOST and other ministries to develop and implement policies and solutions for fuel quality management, and development of clean fuels and biofuel; import and manufacturing of vehicles.

1.4. Ministry of Science and Technology (MOST)

Leads and coordinates with relevant ministries and sectors to develop and promulgate technical specifications and standards on fuel quality; organizes and promotes scientific and technological research in all spheres of transport.

1.5. Ministry of Construction (MOC)

Leads and coordinates with MOT, MONRE and People's Committees of provinces and cities to formulate urban development planning, ensuring EST goals.

1.6. Ministry of Planning and Investment (MPI)

Coordinates with MOF and People's Committees of provinces and cities to allocate funds and provide instructions on how to use long-term and annual plans for the use of capital from the State budget and other sources so as to effectively implement the strategic orientations for EST development.

1.7. Ministry of Finance (MOF)

Leads and coordinates with MOT and MONRE to develop and submit to the Government for promulgation of environmental protection levies on emission; instructs People's Committees of provinces and cities to issue fees and levies in transport.

1.8. Ministry of Education and Training (MOET)

Coordinates with MOT in education, communication and dissemination of traffic laws and safety regulations to minimize traffic accidents.

1.9. National Traffic Safety Committee (NTSC)

Leads and closely coordinates with MOT, other ministries, sectors and localities to develop and implement plans, measures and policies for ensuring traffic safety throughout the country; raises awareness of traffic safety and order.

1.10. People's Committees of provinces and cities

Closely coordinate with MOT, MONRE and others to organize the implementation of the goals, contents and solutions for EST development within their respective territories.

2. Proposed programs to implement EST

In order to realize the contents and solutions of the strategic orientations for EST, 22 specific programs and projects have been proposed as listed in Table 4.

3. Monitoring and evaluation of the implementation of the strategic orientations

MOT leads and coordinates with MONRE, other ministries, sectors, and localities to conduct periodic reviews and evaluations of the progress of the strategic orientations so as to draw lessons and experiences for subsequent implementation.

Table 4. Priority programs and projects for the implementation of the Strategy until 2020

No	Titles	Lead agencies	Coordinating agencies
1	Transport planning and transport demand management		
1.1	Construction of MRT systems (elevated railroad, subway) in Ha Noi and HCMC	MOT, PCs of Ha Noi and HCMC	Relevant ministries and sectors
1.2	Improve quality and capacity of urban bus transport	PCs of Ha Noi, HCMC, Hai Phong, Da Nang and Can Tho	Relevant ministries and sectors
1.3	Research and apply solutions to prevent and minimize the growth of motorbike ownership	PCs of Ha Noi, HCMC, Hai Phong, Da Nang and Can Tho	Relevant ministries and sectors
1.4	Project for encouragement of non-motorized transport	PCs of Ha Noi, HCMC, Hai Phong, Da Nang and Can Tho	Relevant ministries and sectors
1.5	Mainstreaming EST in urban planning	MOC	Relevant ministries, sectors and provincial PCs
1.6	Study to ensure connectivity of public transport modes in Ha Noi and HCMC	PCs of Ha Noi and HCMC	Relevant ministries and sectors
2	Urban air quality management		
2.1	Development of air quality monitoring networks in cities	MONRE	Relevant ministries, sectors and provincial PCs
2.2	Implementation of the roadmap for application of Euro 3, Euro 4 and Euro 5 emission standards on motorized vehicles	MOT	Relevant ministries, sectors and provincial PCs
2.3	Control emission from motorcycles in use in provinces and major cities	MOT	Relevant ministries, sectors and provincial PCs

No	Titles	Lead agencies	Coordinating agencies
2.4	Research and apply technological solutions to minimize emission from vehicles and save fuels	MOT	Relevant ministries and sectors
2.5	Research and apply clean fuels in transport	MOT	Relevant ministries, sectors and provincial PCs
2.6	Apply comprehensive solutions to reduce particulate in Ha Noi and HCMC	PCs of Ha Noi and HCMC	Relevant ministries and sectors
2.7	Develop and apply national technical specifications and standards on fuel consumption by new motorized vehicles locally produced, assembled or imported	MOT	Relevant ministries, sectors and provincial PCs
2.8	Implement the regulation on energy labeling on cars up to 7-seats pursuant to the Prime Minister's Decision 51/2001/QĐ-TTg	MOT	Relevant ministries, sectors and provincial PCs
2.9	Research and apply solutions to reduce noise from transport	MOT	Relevant ministries, sectors and provincial PCs
2.10	Communication and training program on environmentally friendly driving	MOT	Relevant ministries, sectors and provincial PCs
3	Traffic safety and social equity		
3.1	Promote the implementation of national goals in minimization of traffic accidents	NTSC	Relevant ministries, sectors and provincial PCs
3.2	Upgrade transport infrastructure to meet the needs of the vulnerable	MOT	Relevant ministries, sectors and provincial PCs

No	Titles	Lead agencies	Coordinating agencies
4	Implementation of the Strategy's solutions		
4.1	Develop and complete the system of legal documents and standards to promote EST	MOT	Relevant ministries, sectors and provincial PCs
4.2	Education to raise community awareness of EST	MOT	Relevant ministries, sectors and provincial PCs
4.3	Capacity building for transport officials (inspection, control, monitoring and assessment of emission and noise; transport management)	MOT	Relevant ministries and sectors
4.4	Project for Road Maintenance Fund	MOT	Relevant ministries and sectors



CONCLUSION AND RECOMMENDATION

The transport sector plays a critical role in every country's socio-economic development. Transport development so far has frequently exerted negative impacts on the environment and on quality of life. EST incorporates strategic solutions aiming at the development of a transport system which satisfies developmental demands while achieving human and environmental friendliness.

In Viet Nam, despite the Government's numerous measures, urban transport in general still presents a number of deficiencies. The control of vehicles and management of fuel quality is not strict. Traffic and transport demand management has not been performed in a modern manner and transport is largely relying on private vehicle ownership. Transport infrastructure is poor and incompatible. Air pollution is common in big cities. Road accidents occur at high rates, causing one of the greatest concerns in society. Gender equality and social equity with regards to the vulnerable in transport have not been properly addressed.

The report proposes approaches, goals, contents and specific measures to facilitate the implementation of EST in Viet Nam. It also proposes 22 programs and projects for their implementation.

As a member in the Asian Regional EST Forum, a participant in the Aichi Statement and Bangkok Declaration, Viet Nam's ministries, sectors, localities, socio-political organizations, community and each Viet Nameese citizen must all demonstrate the highest responsibility to successfully implement EST solutions for the country's sustainable development.



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25. Bangkok Declaration 2020

Appendix 1

AICHI STATEMENT

Towards establishment of the Regional Forum for the promotion of environmentally sustainable transport (EST) in Asia

The participants, having met in Nagoya City, Aichi Prefecture, Japan from 1-2 August 2005, for the International Conference on Environment and Transport, to draw up and adopt a statement on the establishment of a Regional EST Forum for the promotion of environmentally sustainable transport in Asia,

Reaffirming and building upon the 'Manila Statement' agreed upon by the participants at the intergovernmental Manila Policy Dialogue on Environment and Transport in the Asian Region, held in Manila, the Philippines, from 16-17 January 2004,

Reaffirming and building upon the 'Framework for Environmentally Sustainable Cities in ASEAN', agreed upon by the ASEAN Working Group on Environmentally Sustainable Cities (AWGESC) and officially endorsed by the ASEAN Environment Ministers in December 2003,

Reaffirming and building upon the Johannesburg Plan of Implementation (JPOI) adopted in the 2002 World Summit on Sustainable Development (WSSD) which underlines the importance of environmentally sustainable transport and the required actions to be taken at national and international level,

Noting the important contribution sustainable transport systems can make towards realizing the Millennium Development Goals (MDG) set by the United Nations, through improving access to education, employment opportunities, and health care,

Noting the importance of achieving greater synergies among the various efforts to promote environmentally sustainable transport in Asia, at the regional, national and local level,

Acknowledging that continued economic growth in Asian countries will result in significant further growth in transport demand, which will require a wide range of effective measures at the national and local level to prevent or minimize negative environmental and social impacts associated with the rapid growth in motorization,

Considering that efforts to promote environmentally sustainable transport will result not only in the improvement of human health through the reduction of urban air pollution but will also have important complimentary benefits, including the reduction of greenhouse gas (GHG) emissions, the reduction of deaths and injuries from road accidents, the reduction of harmful noise levels, and the reduction of traffic congestion levels,

Recognizing the need for both national and local level governments to develop and adopt integrated policies, strategies, and programmes incorporating key elements of environmentally sustainable transport such as:

a. Public health

- *Promoting integrated transport policies that mitigate the negative human health impacts of motorized transport*
- *Recognizing the high costs incurred to the national health system due to non-sustainable transport modes*
- *Strengthening the coordination and cooperation among health and transport agencies*

b. Land-use planning

- *Accepting a vision of cities for people rather than for cars, with a focus on the movement of people and goods rather than vehicles*
- *Supporting urban planning with a particular emphasis on public transport, non-motorized transport, traffic safety and environmental control*
- *Encouraging the integration of both land-use and transport planning to reduce the unplanned, low-density expansion of urban areas*
- *Promoting urban revitalization through mixed-use development, favouring concentrated development around public transport nodes*

c. Environment and people friendly urban transport infrastructures

- *Providing affordable and socially acceptable transport infrastructure and facilities in urban areas*
- *Recognizing that overprovision of infrastructure can induce additional travel by private motorized vehicles and result in increased pollution and congestion, unless appropriate consideration is made*
- *Acknowledging the importance of mass transit systems in meeting the needs for increased mobility in an environment friendly manner*

d. Public transport planning and transport demand management (TDM)

- *Maintaining or increasing the share of public transport by improving the quality of such services*
- *Controlling the demand for private motorized travel through a combination of policies, such as regulatory measures (manage demand for road space), fiscal policies (such as parking fees, vehicle taxes, road or congestion charging, and fuel taxes, etc.), and infrastructure design measures*
- *Recognizing Bus Rapid Transit (BRT) as a low-cost mass transit option which can be implemented quickly to meet the growing demand for mobility*
- *Recognizing Mass Rapid Transit (MRT) as a mass transit option which can be implemented to meet the growing demand for mobility, where appropriate*

e. Non-motorized transport (NMT)

- Acknowledging the dependence of all-income groups on non-motorized transport and its importance as an environmentally sustainable mode of transport
- Aiming to maintain or enhance the existing role of non-motorized transport, especially in dense urban areas, especially for short trips
- Encouraging the provision of higher-quality infrastructure and the development of city-level master plans for footpaths and cycle ways
- Increasing safety for non-motorized transport

f. Social equity and gender perspectives

- Acknowledging the need for, and contribution of, safe and affordable urban transport systems to the alleviation of poverty and the promotion of social development
- Recognizing that public transport has to address the conditions of women and the need to build the institutional capacity to better include gender aspects in urban transport planning
- Providing infrastructure that particularly caters to the needs of the most vulnerable users, including children, the elderly, and the physically disabled

g. Road safety and maintenance

- Creating appropriate inter-agency coordination and management mechanism to address the road safety in transport policies and programmes
- Acknowledging road safety as a primary guiding principle for transport planning
- Mobilizing resources for formulation and implementation of multi-stakeholder integrated road safety action plans

h. Strengthening road side air quality monitoring and assessment

- Improving road side air quality monitoring in urban city centres to better understand the impacts of road side pollution on people travelling on the roads and people working or living close to the roads
- Improving and harmonizing road side monitoring methodologies in line with the internationally standardized methodologies for ambient air quality monitoring

i. Traffic noise management

- Improving traffic noise monitoring in urban city centres to better understand the impacts of road side noise on people travelling on the roads and people working or living close to the roads
- Acknowledging the need for standards on noise levels and the enforcement of such standards by establishing management mechanisms

- Promoting the prevention of excessive noise through the promotion of non-motorized modes and high-quality public transport

j. Cleaner fuel

- Phasing out leaded gasoline as rapidly as possible, and phasing down sulphur levels in gasoline and diesel as required to achieve advanced vehicle emission standards

- Acknowledging the contribution of alternative fuels such as Compressed Natural Gas (CNG) and biomass-derived ethanol and biodiesel as a means to reduce vehicle emissions

- Planning for an eventual transition to renewable fuels

k. Vehicle emission control, standards, and inspection and maintenance (I/M)

- Rapidly phasing-in strict emission standards for new vehicles, with due regard to manufacturing lead times and to the provision of compatible fuels

- Adopting and enforcing vehicle inspection and maintenance programmes for vehicle emissions and safety, based on high-volume, test-only inspection centres with stringent quality control

- Reducing emissions from in-use vehicles by retro-fitting of emission control devices and/or the conversion to lower-emitting fuels

l. Strengthening knowledge base, awareness, and public participation

- Promoting coordination and cooperation among groups collecting or managing information on EST through a decentralized network of knowledge providers

- Developing and disseminating best practice on EST

- Increasing the understanding and awareness of the civil society and decision-makers on the beneficial aspects of EST with the aim to accomplish changes in policies, investment decisions, and personal behaviour

Noting the best practice principles presented in this document, the participants are thus called upon to:

1. Unanimously endorse the Regional EST Forum and welcome the contribution by its expert members to conduct periodic high-level policy dialogues and expert consultations to share opinions, ideas, and information on best practices and effective policy instruments among the participating countries on environment and transport related issues in the Asian Region;

2. Welcome the initiatives of UNCRD in extending assistance to the countries of the region, especially the developing countries, in preparing national EST strategies, and request the expert members of the Forum to play a catalytic role by providing substantial input and strategic feedback towards the formulation of such strategies;

3. Welcome the involvement of all groups including international organizations, bilateral organizations, nongovernmental organizations and civil society, academic

institutions, foundations, private enterprises, and others, in developing and promoting a decentralized cooperation network to contribute to activities undertaken in support of the Forum such as knowledge management, capacity-building, and the formulation of integrated action plans;

4. Request UNCRD to cooperate with other related organizations and initiatives both at the national and international levels in identifying and exploring sources of potential assistance and collaboration for capacity-building activities, including demonstration and pilot projects, as well as for the implementation of policies, strategies, and action plans developed by the participants of the Forum; such efforts may include providing assistance to the Forum participants in utilizing the Global Environment Facility (GEF), the Clean Development Mechanism (CDM), and financing from the bilateral and international organizations to implement EST measures.

Appendix 2

BANGKOK DECLARATION FOR 2020

Sustainable Transport Goals for 2010-2020

We, the participants, who are representatives of Asian countries (Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, People's Republic of China, Indonesia, India, Japan, Republic of Korea, Lao PDR, Malaysia, Maldives, Mongolia, Myanmar, Nepal, the Philippines, Pakistan, Singapore, Sri Lanka, Thailand, and Viet Nam), international organizations, bilateral and multilateral agencies, nongovernmental organizations (NGOs), research organizations, and expert sustainable transport professionals, having met at the Fifth Regional Environmentally Sustainable Transport (EST) Forum in Asia, held in Bangkok, Kingdom of Thailand, from 23 to 25 August 2010, to draft and adopt a declaration, the Bangkok 2020 Declaration, in order to demonstrate our renewed interest in, and commitment to, realizing a promising decade (2010-2020) of sustainable actions and measures for achieving safe, secure, quick, reliable, affordable, efficient and people-centric and environment friendly transport in rapidly urbanizing Asia,

Noting the identification of transport as a theme under Agenda 21 on sustainable development and the outcome of the high-level meeting of the 9th session of the Commission on Sustainable Development (CSD-9) in 2001 which reached important decisions on transport sector issues concluding that improving transport systems to promote sustainable development, including improving accessibility, can foster economic and social development, help integrate developing countries into the world economy, and contribute to the eradication of poverty,

Reaffirming and building upon the Aichi Statement agreed upon by the participants at the First Regional EST Forum, held in Nagoya, Aichi Prefecture, Japan, on 1-2 August 2005, and its integrated approach to promoting environmentally sustainable transport will result not only in the improvement of human health through the reduction of urban air pollution, but also the reduction of greenhouse gas (GHG) emissions, deaths and injuries from road accidents, harmful noise levels, and traffic congestion,

Reaffirming and building upon the Seoul Statement, agreed upon by the participants at the Fourth Regional EST Forum, held in Seoul, Republic of Korea, from 24 to 26 February 2009, that urged the need to address transport issues within the context of the broader environmental aims of Green Growth to encompass the transport-energy-carbon emission nexus, to develop strategies for low-carbon transport that include a shift to energy-efficient and low carbon modes to enhance energy security, and mitigate the effects of transport on climate as well as of climate change on transport services and other socioeconomic sectors,

Noting the findings of the 18th Session of the Commission on Sustainable Development (CSD-18) held in May 2010, that basic transport infrastructure and services are still lacking or inadequate in many developing countries (both in urban and rural areas), making it difficult for the poor, including women, youth, and children, to access basic services,

including those related to health and education, and for workers to have access to jobs, and that in the case of rural areas lack of adequate rural transport infrastructure perpetuates poverty, poses constraints on the marketing of agricultural produce and other income-generating opportunities, and thus hampers efforts to achieve the internationally agreed Millennium Development Goals (MDGs),

Noting that transport-related carbon dioxide emissions are projected by international bodies to increase approximately 57 per cent worldwide in the period 2005-2030, whereby the largest part of this increase would come from the increase in private motorized vehicles in Asia,

Noting the UN General Assembly Resolution (64/255) of 2 March 2010 on improving global road safety, proclaimed 2011-2020 as a decade of action for road safety, and deeply concerned that about half of all road traffic fatalities and injuries occur in the Asian and Pacific region, most of which are related to vulnerable road users such as pedestrians, children, and cyclists, due to streets that lack the necessary safety infrastructure such as exclusive pedestrian and bicycle lanes, safe street crossings, kerb ramps for the disabled, and lack of post-accident care,

Recognizing the specific mobility needs of low-income groups, as well as women, children, the elderly, and persons with disabilities which must be addressed to achieve socially-equitable communities and a better quality of life for all,

Acknowledging the importance of an EST strategy based upon the concept of Avoiding unnecessary motorised transport - Shifting to more sustainable transport modes and - Improving transport practices and technologies,

We, the participants of the Fifth Regional Environmentally Sustainable Transport (EST) Forum in Asia express our intent to voluntarily develop and realize integrated and sustainable transport policy options, programmes, and projects that will help realize the following EST goals and objectives by the year 2020 in the Asian region (EST 20):

I. Strategies to Avoid unnecessary travel and reduce trip distances

Goal 1: Formally integrate **land-use and transport planning** processes and related institutional arrangements at the local, regional, and national levels

Goal 2: Achieve **mixed-use development** and medium-to-high densities along key corridors within cities through appropriate land-use policies and provide people-oriented local access, and actively promote transit-oriented development (TOD) when introducing new public transport infrastructure

Goal 3: Institute policies, programmes, and projects supporting **Information and Communications Technologies** (ICT), such as internet access, teleconferencing, and telecommuting, as a means to reduce unneeded travel

II. Strategies to Shift towards more sustainable modes

Goal 4: Require **Non-Motorized Transport** (NMT) components in transport master plans in all major cities and prioritize transport infrastructure investments to NMT, including wide-scale improvements to pedestrian and bicycle facilities, development of facilities

for intermodal connectivity, and adoption of complete street design standards, wherever feasible

Goal 5: Improve **public transport** services including high quality and affordable services on dedicated infrastructure along major arterial corridors in the city and connect with feeder services into residential communities

Goal 6: Reduce the urban transport mode share of private motorized vehicles through **Transportation Demand Management** (TDM) measures, including pricing measures that integrate congestion, safety, and pollution costs, aimed at gradually reducing price distortions that directly or indirectly encourage driving, motorization, and sprawl

Goal 7: Achieve significant shifts to more sustainable modes of **inter-city passenger and goods transport**, including priority for high-quality long distance bus, inland water transport, high-speed rail over car and air passenger travel, and priority for train and barge freight over truck and air freight by building supporting infrastructure such as dry inland ports

III. Strategies to Improve transport practices and technologies

Goal 8: Diversify towards more sustainable **transport fuels and technologies**, including greater market penetration of options such as vehicles operating on electricity generated from renewable sources, hybrid technology, and natural gas

Goal 9: Set progressive, appropriate, and affordable **standards** for fuel quality, fuel efficiency, and tailpipe emissions for all vehicle types, including new and in-use vehicles

Goal 10: Establish effective vehicle testing and compliance regimes, including formal vehicle registration systems and appropriate periodic vehicle **inspection and maintenance** (I/M) requirements, with particular emphasis on commercial vehicles, to enforce progressive emission and safety standards, resulting in older polluting commercial vehicles being gradually phased-out from the vehicle fleet, as well as testing and compliance regimes for vessels

Goal 11: Adopt **Intelligent Transportation Systems** (ITS), such as electronic fare and road user charging systems, transport control centres, and real-time user information, when applicable

Goal 12: Achieve improved **freight transport** efficiency, including road, rail, air, and water, through policies, programmes, and projects that modernize the freight vehicle technology, implement fleet control and management systems, and support better logistics and supply chain management

IV. Cross-cutting strategies

Goal 13: Adopt a zero-fatality policy with respect to road, rail, and waterway **safety** and implement appropriate speed control, traffic calming strategies, strict driver licensing, motor vehicle registration, insurance requirements, and better post-accident care oriented to significant reductions in accidents and injuries

Goal 14: Promote monitoring of the **health** impacts from transport emissions and noise, especially with regard to incidences of asthma, other pulmonary diseases, and heart

disease in major cities, assess the economic impacts of air pollution and noise, and devise mitigation strategies, especially aiding sensitive populations near high traffic concentrations

Goal 15: Establish country-specific, progressive, health-based, cost-effective, and enforceable **air quality and noise** standards, also taking into account the WHO guidelines, and mandate monitoring and reporting in order to reduce the occurrence of days in which pollutant levels of particulate matter, nitrogen oxides, sulphur oxides, carbon monoxide, and ground-level ozone exceed the national standards or zones where noise levels exceed the national standards, especially with regard to environments near high traffic concentrations

Goal 16: Implement sustainable low-carbon transport initiatives to mitigate the causes of **global climate change** and to fortify national **energy security**, and to report the inventory of all greenhouse gases emitted from the transport sector in the National Communication to the UNFCCC

Goal 17: Adopt **social equity** as a planning and design criteria in the development and implementation of transport initiatives, leading to improved quality, safety and security for all and especially for women, universal accessibility of streets and public transport systems for persons with disabilities and elderly, affordability of transport systems for low-income groups, and up-gradation, modernization and integration of intermediate public transport

Goal 18: Encourage innovative **financing** mechanisms for sustainable transport infrastructure and operations through measures, such as parking levies, fuel pricing, time-of-day automated road user charging, and public-private partnerships such as land value capture, including consideration of carbon markets, wherever feasible

Goal 19: Encourage widespread distribution of **information and awareness** on sustainable transport to all levels of government and to the public through outreach, promotional campaigns, timely reporting of monitored indicators, and participatory processes

Goal 20: Develop dedicated and funded **institutions** that address sustainable transport-land use policies and implementation, including research and development on environmentally-sustainable transport, and promote good **governance** through implementation of environmental impact assessments for major transport projects

Inviting countries to voluntarily report progress by utilizing the EST Forum.

Annex 1

MEASURING PROGRESS ON THE BANGKOK DECLARATION FOR 2020

This annex outlines the type of performance indicators that countries may consider in achieving a successful EST strategy. The Bangkok Declaration for 2020 is a voluntary document, and thus countries may opt for developing a number of additional / alternative indicators and measures to monitor progress domestically.

The objective of such comprehensive list of indicators is to provide guidelines for objective measurement of the efficiency and effectiveness of the transport system to achieve the desired goals.

Strategy	Indicator
“Avoid” Strategies	Meta Indicator: Change in vehicle kilometres travel per person over time at the metropolitan and national levels
Integrated Land Use-Transport Planning	Number of cities in the country having formally developed integrated land use-transport plans
	Requirements for local compliance with regional integrated land use-transport plans
Mixed-Use Development	Reduction in average passenger trip length in the city
	Reduction in average freight trip distance regionally and nationally
	Number of units developed in purpose-built mixed-use projects
	Number of public transport projects achieving transit-oriented development (TOD) around stations
	Population and employment per square kilometre along major public transport corridors
	Number of public transport corridors achieving an increase in development and population density
	Amount of increase in property value along corridors of quality public transport projects
Information and Communications Technologies (ICT)	Number of policies developed encouraging ICT as a substitute for travel
	Average broadband speed of internet services
	Penetration of broadband among different income groups

	Penetration rate of mobile telephones in the country
	Increase in the amount of teleconferencing over business travel
	Number of policies and/or programs that promote telecommuting
	Estimated number of trips avoided through telecommuting
“Shift” Strategies	Meta Measure: Mode share of all major transport modes at the metropolitan and national levels, including passenger transport (walking, bicycles, car driver, car passenger, motorcycle driver, motorcycle passenger, motorized three-wheelers, non-motorized three-wheelers, buses, minibuses, and urban rail), inter-city transport (private motorized vehicles, bus, rail, and boat), and freight transport (truck, rail, barge, minivan, and non-motorized)
Non-Motorized Transport	Number of cities with NMT specifically highlighted in the city’s integrated transport master plans
	Note the existence of national and local policies requiring drop curbs at interface between footpaths and intersections
	Note the existence of national and local policies mandating minimum footpath widths, and note the minimum width
	Note the existence of national and local policies mandating dedicated pedestrian signals at major intersections
	Promote the monitoring and measurement of the quality of pedestrian facilities and the number of cities surveyed or audited for a “walkability” score
	Number of cities with dedicated cycleways
	Number of kilometres of cycleways
	Number of secure bicycle parking spaces
	Number of cities with shared bicycle programmes and number of shared bikes per programme
	Number of cities with pedicabs (cycle rickshaw) improvement programmes
	Number of public transport systems with formal integration of pedicabs (cycle rickshaws)
	Number of cities participating in a Car-Free Day programme
Public Transport	Number of cities with trunk bus corridors operating on dedicated busway lanes in the median of the roadway (Bus Rapid Transit)
	Number of kilometres of dedicated, median busways (Bus Rapid Transit)
	Number of cities with bus systems using pre-board fare verification and stations designed for at-level fast boarding

	Number of cities utilizing electronic fare cards on their public transport system
	Number of cities with a fully integrated fare structure across public transport modes
	Number of cities with elevated or underground metro systems (MRT)
	Number of kilometres of MRT
Transportation Demand Management	Number of cities or areas utilising congestion charging
	Number of cities or areas utilizing road tolls
	Number of cities employing a formal parking levy system, in which a parking levy is defined as a set land tax charged to each non-residential parking space, and is assessed regardless of whether or not the parking space is utilized
	Number of cities with active parking management programmes
	Amount of any increase in fuel levies
	Number of cities or regions which have adopted measures to discourage ownership and/or operations of private vehicles
	Amount of vehicle duties or taxes
Inter-City Passenger and Goods Transport	Increase of mode share of high-quality inter-city bus services
	Increase of mode share of inter-city conventional rail services
	Increase of mode share of high-speed inter-city rail services
	Number of kilometres of high-speed inter-city rail
	Number of kilometres of freight rail lines
	Number of inland dry ports
“Improve” Strategies	Meta Measure: Fuel efficiency levels of passenger and freight fleets
Cleaner Fuels and Technologies	Market share of alternative fuels for road transport, including renewably-generated electricity, natural gas, and sustainably managed and cultivated biofuels that do not compete with food crops
	Market share of electric vehicles, hybrid vehicles, and fuel cell vehicles
Standards	Note current fuel quality standards and the time line for attainment of EURO IV (or equivalent) fuel quality standard
	Note current vehicle emission standards for each vehicle class
	Note current fuel economy standards for each vehicle class

Inspection and Maintenance	Note the nature of commercial vehicle testing requirements, including frequency of tests, emission levels required, safety features examined, and number of vehicles retired
	Number of cities that conduct roadway spot checks on vehicle emissions
	Note the type of vehicle insurance mandated by national and local laws
	Number of persons taking driver licensing testing and provision of the pass/fail rate
Intelligent Transportation Systems	Number of public transport vehicles per city with Automatic Vehicle Location tracking technology
	Number of public transport stations and vehicles using real-time information displays
	Number of cities with a control centre to manage traffic incidents and manage public transport fleets
Freight Transport	Quantify improvements in freight vehicle fuel efficiency
	Quantify changes in freight vehicle types
	Quantify network efficiency gains
“Cross-Cutting” Strategies	
Safety	Reductions in number of traffic accidents
	Reductions in number of transport-related injuries and deaths
	Adoption of a zero-accident policy framework
Health	Incidence levels of disease and illnesses related to transport emissions including asthma, other pulmonary diseases, heart disease, stroke, and flu
	Reduction in number of days with restricted outdoor activity due to health concerns of air quality
	Number of cities with policies in place to prohibit smoking in public places, including public transport systems
Air Pollution and Noise	Number of cities with ambient air quality monitoring, including monitors for particulate matter (PM10 and PM2.5, nitrogen oxides (NOx), sulphur oxides (SOx), carbon monoxide (CO), and ground-level ozone, especially with monitors in high traffic areas and ports
	Air quality levels for particulate matter (PM10 and PM2.5), nitrogen oxides (NOx), sulphur oxides (SOx), carbon monoxide (CO), and ground-level ozone for each major city
	Number of days air quality is within local standards and WHO guidelines for all major pollutants in each major city
	Number of cities with formal noise monitoring programme

	Number of cities that spot check noise levels on vehicles
	Number of cities with time-of-day noise restrictions and noise reduction programmes
Climate Change and Energy Security	Note whether the transport sector is included as part of the Nationally Appropriate Mitigation Actions (NAMA), and note the specific transport sub-sectors in the NAMA
	Note the number of transport GEF projects approved for the country
	Amount of oil imported by the country
Social Equity	Amount and type of security measures provided on public transport systems
	Off-peak frequency of public transport systems
	Number of public transport vehicles and stations permitting full universal access for users in wheelchairs and parents with prams
	Number of public transport stations and kilometres of footpaths with tactile paving tiles for the sight impaired
	Number of kilometres of footpaths that have been upgraded to be fully accessible to persons in wheelchairs
	Relative affordability levels of public transport services for low-income groups
	Employment generated from EST projects and availability of related job training opportunities
Finance and Economics	Number of applications for greenhouse gas emission reduction credits
	Total amount of revenues generated from greenhouse gas emission reduction credits
	Total amount of revenues generated from congestion charging schemes
	Total amount of revenues generated from roadway tolls
	Total amount of revenues generated from parking levies
	Number of Public-Private Partnerships (PPPs) implemented
	Total amount of revenues generated from land value capture initiatives
	Number of Benefit-Cost analyses conducted on transport projects, considering, direct, indirect, and cumulative impacts
	Note the results of Benefit-Cost analyses conducted on transport projects

Information and Awareness	Number of EST-related publications
	Number of outreach and promotional efforts on EST
Institutions and Governance	Number of staff at Transport, Environment, and Health Ministries dedicated to EST
	Amount of financial resources of the national government dedicated to EST
	Human and financial resources devoted to EST at the regional and local levels
	Existence of unit at National Government level dedicated to non-motorized transport and number of cities with local government units dedicated to non-motorized transport to promote walking
	Structure and relationship of national, regional, and local actors involved in EST, including engagement with civic and business sectors
	Note environmental impact assessments (EIAs) for evaluating the impact of transport infrastructure initiatives prior to environmental clearance

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