

# Country Synthesis Report on Urban Air Quality Management



## »» Malaysia

Discussion Draft, December 2006



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Urban Air Quality Management

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The Study was led by the CAI-Asia Secretariat and the information contained in this report was developed by the CAI-Asia Secretariat with inputs by a range of organizations and air quality experts from across Asia and elsewhere.

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# Abbreviations

ADB	Asian Development Bank
API	Air Pollution Index
ASMA	Alam Sekitar Malaysia Sdn. Bhd.
CAQM	continuous air quality monitoring
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
DoE	Department of Environment
EDC	National Environmental Data Center
EQA	Environmental Quality Act
GTZ	German Agency for Technical Cooperation
LRT	light-rail transit
MAQM	manual air quality monitoring
NO <sub>x</sub>	Nitrogen oxides
NO <sub>2</sub>	Nitrogen dioxide
O <sub>3</sub>	Ozone
PM	particulate matter
PM <sub>10</sub>	particulate matter with a diameter less than 10 micrograms
RMG	Malaysian Ambient Air Quality Guideline
SO <sub>2</sub>	Sulfur dioxide
TSP	total suspended particulates
WHO	World Health Organization

Note: “\$” means “US dollar” in this publication.

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# General Information

## Geography and Climate

Malaysia is a coastal nation surrounded by Thailand in the northwestern part, Indonesia in the south, and Brunei and the South China Sea on the eastern part. It consists of a peninsula (West Malaysia) and approximately one third of the island of Borneo (East Malaysia). These two regions are separated by some 640 miles of the South China Sea. The country covers a total area of 330,252 square kilometers (km<sup>2</sup>), where the total land area is 328,550 km<sup>2</sup> and the water area, 1,200 km<sup>2</sup>. The country is composed of 11 states and the Federal Territory of Kuala Lumpur and Federal Territory of Labuan.

The country experiences relatively uniform temperature throughout the year, with the mean temperature in the lowlands ranging between 26 °C and 28°C. It has a tropical climate with annual southwest (from April to October) and northeast (from October to February) monsoons.

## Population and Urbanization

Malaysia's population in 2006 is estimated at 26,748,000, with an average population growth rate of 2.6% since 1999 (EPU 2006b). The urban population has reached 62.8% in 2004.

The Kuala Lumpur Metropolitan Area—also called *Wilayah Persekutuan*—is the major conurbation in the country. It comprises Kuala Lumpur and its suburbs and adjoining cities in the State of Selangor. It is also referred to as the Klang Valley. It is geographically delineated by Titiwangsa Mountains to the north and east and the Strait of Malacca to the west.

The urban area, which had a total population of more than 4 million as of 2004, is the heartland of Malaysia's industry and commerce. In 2006, the population in the Klang Valley is estimated at 6.5 million (Wikipedia, 2006).

## Economy and Industry

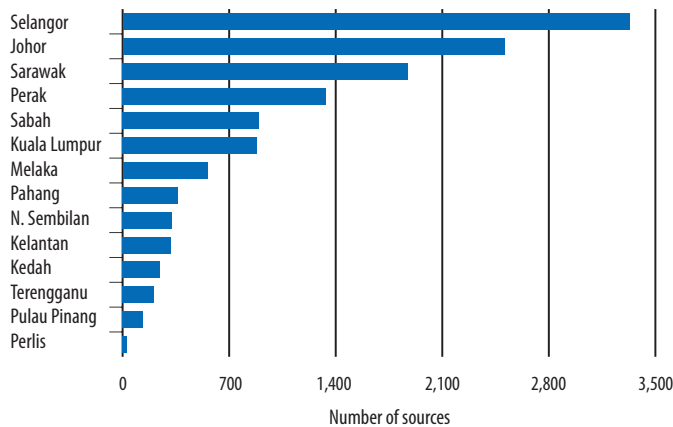
Malaysia is a middle-income country that has transformed itself—from 1971 through the late 1990s—from a producer of raw materials into an emerging multisector economy. Growth was almost exclusively driven by exports, particularly of electronics. As a result, Malaysia was hard hit by the global economic downturn and the slump in the information technology (IT) sector in 2001 and 2002. Although gross domestic product in 2001 grew only by 0.5% due to an estimated 11% contraction in exports, a substantial fiscal stimulus package equal to \$1.9 billion mitigated the worst of the recession and the economy rebounded in 2002 with a 4.1% increase. The economy grew by 4.9% in 2003, notwithstanding a difficult first half, when external pressures from the severe acute respiratory syndrome (SARS) epidemic and the Iraq War led to caution in the business community. Growth topped 7% in 2004 (EPU 2006).

The industries in Peninsular Malaysia are rubber and oil-palm processing and manufacturing, light manufacturing industry, electronics, tin mining and smelting, and logging and processing timber; Sabah has logging and petroleum production; and Sarawak has agriculture processing, petroleum production and refining, and logging.

The major industries in the country affecting air quality are the iron and steel industry, nonferrous metal industry, nonmetallic (mineral) industry, oil and gas industry, petrochemical industry, pulp and paper, power plants, and waste incineration sector. The industrial production growth rate was 10.2% (2004 estimate). Figure 1.1 shows the number of industries that contribute to air pollution in Malaysia.

FIGURE 1.1

### Distribution by State of Industries with the Potential to Affect Air Quality, 2004



## Energy

The primary energy source for Malaysia is crude oil followed by natural gas. The country's crude oil and condensate reserves amounted to 5.3 billion barrels in 2005. The average production of domestic crude oil and condensate increased from 681,000 barrels per day (bpd) in 2000 to 727,000 bpd in 2005. Based on this production level, which is in line with the National Depletion Policy, the reserves are projected to last for 19 years. In terms of export, crude oil and condensate exports increased to 369,000 bpd, with a value of Malaysian ringgit (RM)28.5 billion (US\$ 7.52 billion<sup>1</sup>) in 2005. As for natural gas, Malaysia has proven reserves of 85.2 trillion cubic feet as of 2005 (EPU 2006). The country does not import oil from other countries and is able to meet its domestic demand.

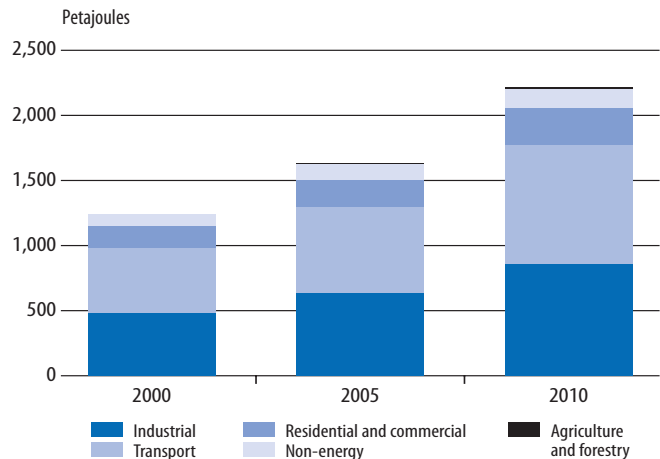
The energy demand by sector and the primary energy demand by source in Malaysia for 2000, 2005, and 2010 are shown in Figures 1.2 and 1.3. The transport sector has accounted for the largest energy demand in 2005; demand from this sector is expected to increase by 2010. Crude oil and petroleum products will remain as the major sources of energy in the country (see Figure 1.2).

Natural gas is mostly used in the power-generating sector. In the Eighth Year Plan of Malaysia, efforts were undertaken to reduce this high dependency on natural gas in the fuel mix for electricity generation. As a result, the share of coal to the total

generation mix increased from 8.8% in 2000 to 21.8% in 2005, while that of natural gas decreased from 77% to 70% in 2005 and is further expected to be reduced to 56% in 2010.

FIGURE 1.2

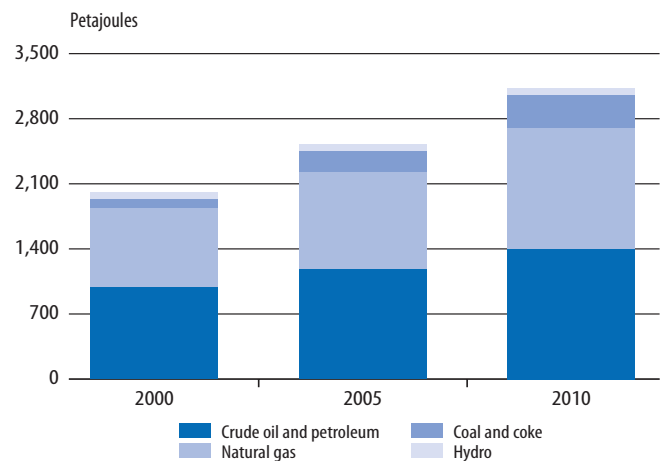
### Commercial Energy Demand by Sector, 2000–2010



Source: EPU (2006).

FIGURE 1.3

### Commercial Energy Demand by Source, 2000–2010



Source: EPU (2006).

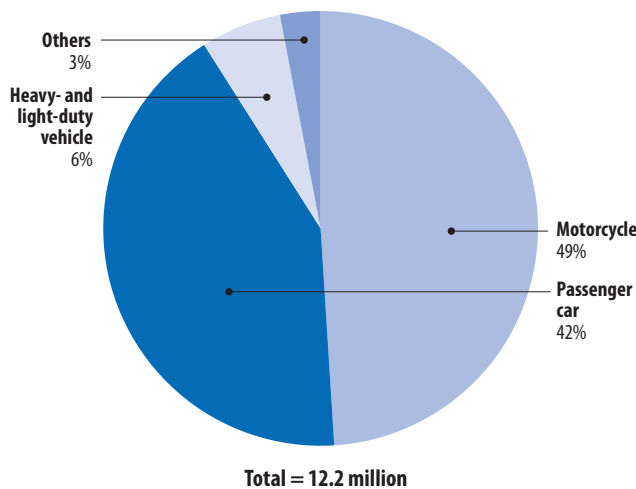
<sup>1</sup> Average exchange rate 1 US\$ to RM is 3.78860 in 2005 (www.oanda.com).

## Transportation

According to the *Annual Report* of the Road Transport Department of Malaysia, the number of registered road vehicles had increased from more than 6.8 million in 1995 to more than 12.2 million in March 2003. Motorcycles accounted for the largest share of the motor vehicle fleet in the country, closely followed by cars. Figure 1.4 shows the share of motor vehicle types in Malaysia as of March 2003. Private passenger cars and motorcycles have been increasing at an average rate of 10% and 4.5%, respectively, since 2000.

FIGURE 1.4

### Percentage Share of Motor Vehicle Types in Malaysia in 2003



Source: Ministry of Transport (cited in Yahaya 2006).

Malaysia's high-quality transportation infrastructure and its relatively high economic status have encouraged private motorized transportation to be regarded as the primary mode of transportation in most cities in Malaysia.

Malaysia has substantial rail and public transportation infrastructure compared with other Asian countries. However, the shares of the ridership of these modes are very small compared with those of private motorized trips.

Kuala Lumpur's rail-based transit system consists of three light-rail transit (LRT) lines, one monorail, one commuter rail system consisting of two lines, and two high-speed airport rail links. There are several bus operators operating in Kuala Lumpur, linking the city center with the suburbs of the Klang Valley and to other major cities in the peninsula.

However, different companies operate the various systems and developed them separately at different times. As a result, many of the lines do not integrate well, making transferring from system to system inconvenient for passengers (Wikipedia, 2006).

There is also no common ticket for all systems, forcing commuters to buy new tickets when transferring. However, the LRT, monorail, and commuter rail systems now accept the Touch 'n Go stored value fare card. Also, Rapid KL, the operator of the three LRT lines, as well as Rapid KL buses (which cover about 70% of the Klang Valley's bus network), has come up with a daily ticket that can be used on both its LRT and bus services (Wikipedia 2006).

## » Part Two

# Sources of Air Pollution

Emissions from mobile sources have been the major source of air pollution, contributing to at least 70%–75% of the total air pollution. Emissions from stationary sources generally contribute 20%–25%, while open burning and forest fires have contributed approximately 3%–5% (DoE 1996 cited in Yahaya 2006). The estimates from forest fires exclude episodes when haze from neighboring countries affects the country.

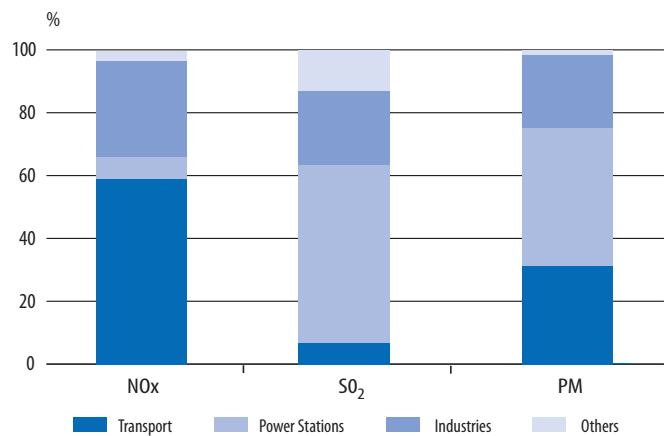
A study from the Department of Environment (DoE) in 1996 showed that motor vehicles contributed 82% to air pollution. Other sources contributing to air pollution were power stations, 9%; industrial fuel burning, 5%; industrial production processes, 3%; domestic and commercial furnaces, 0.2%; and open burning at solid-waste disposal sites, 0.8% (DoE 1996 cited in Yahaya 2006).

Recent estimates of emissions in Malaysia are shown in Figure 2.1. The transport sector accounted for the majority of Nitrogen oxide ( $\text{NO}_x$ ) emissions and about 35% of the total particulate matter (PM) emissions in the country. The power sector and industries accounted for the majority of Sulfur

dioxide ( $\text{SO}_2$ ) and PM emissions; the power sector accounted for about 60% of the total  $\text{SO}_2$  emissions and almost 50% of the total PM emissions, while the industries accounted for about 20% of the total  $\text{SO}_2$  and PM emissions.

FIGURE 2.1

**Emissions Inventories of PM,  $\text{SO}_2$ , and  $\text{NO}_x$  by Sources in 2004 (Tons)**



## » Part Three

# Status of Air Quality

## Air Quality Monitoring

Malaysia's air quality monitoring network is operated and maintained by a private company, Alam Sekitar Malaysia Sdn Bhd (ASMA). ASMA operates, manages, and maintains 51 continuous air quality monitoring (CAQM) stations and 19 manual air quality monitoring (MAQM) stations nationwide (ASMA 2006). In 1995, DoE awarded a 20-year concession to ASMA, which included the establishment and management of the National Environmental Data Center (EDC), as well as the collection, processing, interpretation, analysis, and dissemination of environmental data (ASMA 2006).

The air quality monitoring network has 51 monitoring stations that are linked via public telephone lines to EDC. The network has become one of the most successful air quality monitoring programs in the developing world. The \$6 million system includes 51 CAQM stations, of which 44 are designed to measure Carbon dioxide (CO), SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, and Ozone (O<sub>3</sub>) and 7 are designed to measure PM<sub>10</sub> only. In addition, there are 25 MAQM stations for measuring total suspended particulates (TSP), PM<sub>10</sub>, and heavy metals, which are checked every 6 days. The continuous monitors provide real-time updates every hour. The average data capture rate has been more than 95%, and the project passed an audit by the United States Environmental Protection Agency (Hight and Kirkpatrick 2006).

EDC is equipped with a sophisticated computer system that automatically dials up the 51 CAQM stations every hour for an immediate update of air quality data collected at the stations. The system has a QA/QC in place to ensure collection of good quality data (ASMA 2006).

In the Federal Territory (Wilayah Persekutuan) of Kuala Lumpur, there are only two CAQM stations and two MAQM stations. This number may be insufficient to provide an adequate air quality profile for the metropolis, where 3

million people live and own more than 1.8 million vehicles (GTZ 2004).

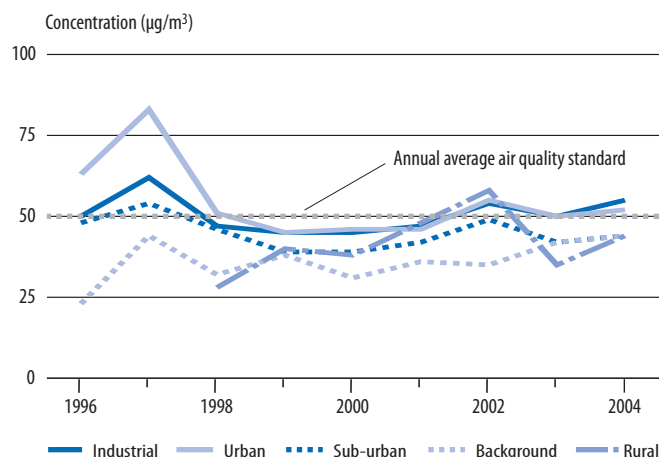
## Air Quality Data

Compared with that in other cities in Asia, air quality in Malaysian cities is fairly good, except during periods of severe haze from forest fires. The following analyses are based on annual averages. Possible exceedances of standards can occur, for example, on a daily basis, but these short-term excursions can be hidden by the annual averaging of daily values.

**Particulate Matter.** The annual average concentration levels of ambient PM<sub>10</sub> from 1998 to 2004 were generally within the Malaysian Ambient Air Quality Guideline (RMG) for PM<sub>10</sub>. In 1997, there were severe haze episodes. In 2002, the annual average concentration levels of ambient PM<sub>10</sub> at some sites exceeded the limit in RMG.

FIGURE 3.1

### Annual Average Concentration of Particulate Matter (PM<sub>10</sub>) by Land Use, 1996–2004



**Sulfur Dioxide.** The annual average ambient concentration levels of SO<sub>2</sub> in Malaysia between 1996 and 2004 were well below the World Health Organization (WHO) annual average guideline value of 50 µg/m<sup>3</sup>, or 0.019 parts per million (ppm) as shown in Figure 3.2. SO<sub>2</sub> concentrations have continued to decrease over this period.

FIGURE 3.2

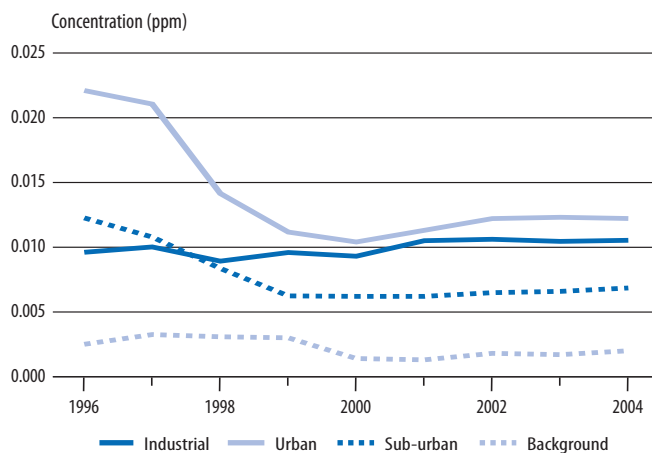
### Annual Average Concentration of Sulfur Dioxide (SO<sub>2</sub>) by Land Use, 1996–2004



**Nitrogen Dioxide.** The annual averages of 24-hour ambient concentrations of NO<sub>2</sub> are relatively low and generally stable.

FIGURE 3.3

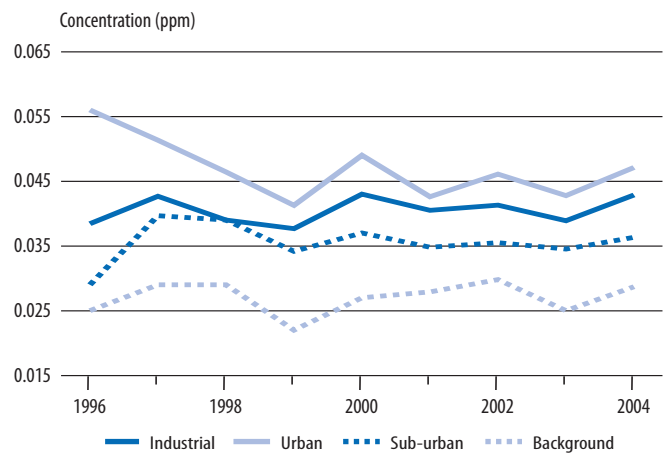
### Annual Average Concentration of Nitrogen dioxide (NO<sub>2</sub>) by Land Use, 1996–2004



**Ozone.** Figure 3.4 shows the annual average daily maximum 1-hour concentrations in ambient air for the years 1996–2004. There were fluctuations in the trend observed throughout this period. A high level recorded in 1997 can possibly be explained by the meteorological conditions during that year when the whole region experienced prolonged dry and hot weather as a result of the El Niño phenomenon. The annual average of daily maximum 1-hour concentrations is relatively stable, showing small annual variations but no consistent trend in recent years.

FIGURE 3.4

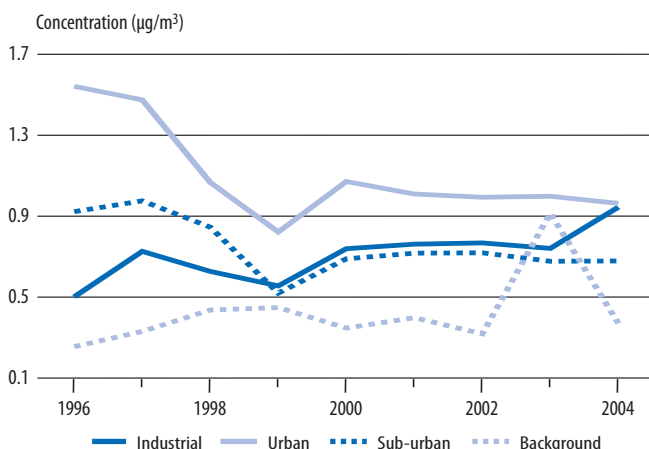
### Annual Average Concentration Daily Maximum 1-Hr Concentration of Ozone (O<sub>3</sub>), 1996–2004



**Carbon monoxide.** Similar to the other air pollutants, the annual 8-hourly average concentrations of CO from 1996 to 2004 were consistently higher in urban areas where the main sources of emissions were motor vehicles, than other land uses, although concentrations in industrial areas appear to be increasing. The annual average concentrations are relatively stable and show no clear directional trend.

FIGURE 3.5

### Annual Average Concentration of Carbon monoxide (CO), 1996–2004



## Reporting of AQ Information (Air Pollution Index Trends)

The air quality status for Malaysia is determined and disseminated according to the Air Pollution Index (API). There is no real-time air quality data made available to the public. To determine API for a given time period, the subindex values (sub-API) for five air pollutants included in the API system are first calculated for the air quality data collected from the CAQM stations. The corresponding air quality data are subjected to the necessary quality control processes and quality assurance procedures, prior to the subindex calculations. The API value

reported for a given time period represents the highest API value among all the sub-APIs calculated during that particular time period. Table 3.1 shows the API values and the level of pollution and the health measure.

The overall air quality for Malaysia in 2004 deteriorated slightly compared with that in previous year. Several unhealthy air quality days were recorded at various locations in Wilayah Persekutuan, Kuala Lumpur, Selangor, Penang, Perak, Negeri Sembilan, and Melaka. The unhealthy days recorded in the Klang Valley (Wilayah Persekutuan, Kuala Lumpur, and Selangor) and Negeri Sembilan were mainly caused by high concentrations of ground-level O<sub>3</sub> (DoE 2005).

The unhealthy air quality recorded in other parts of the country was mainly due to high levels of PM<sub>10</sub>. In 2004, Malaysia experienced short periods of slight-to-moderate air pollution in the months of June, August, and September. This was mainly due to south westerly winds that caused the deterioration of air quality in the west coast of Peninsular Malaysia. The fires in Kalimantan also contributed to the slight haze in the southern part of Sarawak. Apart from these haze episodes, there were no other serious incidences of air pollution in 2004. PM and ground-level O<sub>3</sub> remained the prevailing pollutants in the country (DoE 2005).

The air quality status, based on APIs, in major Malaysian cities for 2004 are shown in Figures 3.6 through 3.8. As can be seen in these figures, most cities in Malaysia have mostly “Good” and “Moderate” APIs for throughout the year.

TABLE 3.1

### API Status Indicator

API	Status	Level of Pollution	Health Measure
0–50	Good	Low, no ill effects on health	No restriction of activities for all groups
51–100	Moderate	Moderate pollution, no ill effects on health	No restriction of activities for all groups
101–200	Unhealthy	Mild aggravation of symptoms among high risk groups, e.g. those with heart or lung disease	Restriction of outdoor activities for high-risk persons General population should reduce vigorous outdoor activity
201–300	Very unhealthy	Significant aggravation of symptoms and decreased exercise tolerance in persons with heart or lung disease	Elderly and persons with known heart or lung disease should stay indoors and reduce physical activity General population should avoid vigorous outdoor activity Those with any health problems to consult doctor
301–500	Hazardous	Severe aggravation of symptoms and a danger to health	Elderly and persons with existing heart or lung disease should stay indoors and reduce physical activity General population should avoid vigorous outdoor activity
Above 500	Emergency	Severe aggravation of symptoms and a danger to health	General population advised to follow the orders of the National Security Council and always follow announcements through the mass media

Source: Yahaya et al. (2006).

FIGURE 3.6  
Air Quality Status in West Coast Peninsular Malaysia, 2004

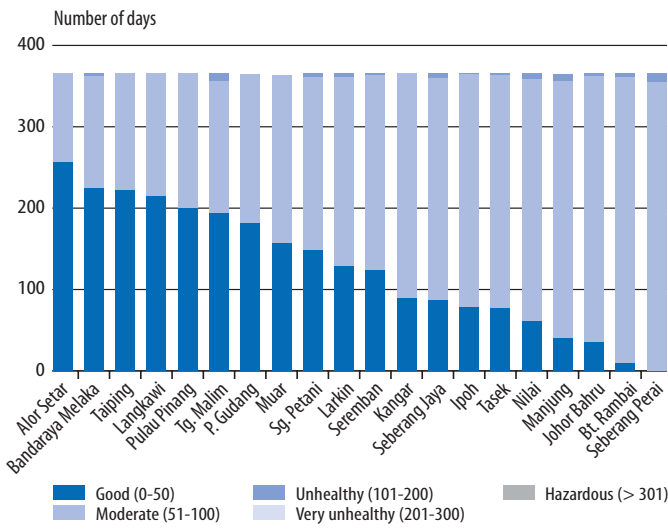


FIGURE 3.8  
Air Quality Status in Sabah and Sarawak, 2004

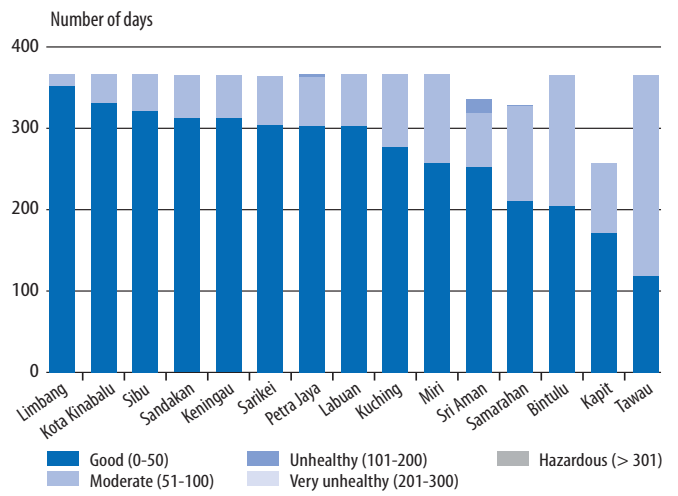
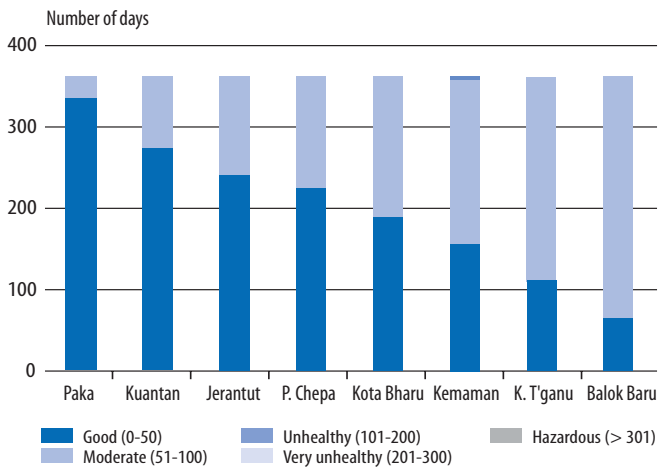


FIGURE 3.7  
Air Quality Status in East Coast Peninsular Malaysia, 2004



» Part Four

# Impacts of Air Pollution

Few studies of the effects of air pollution on health have been conducted in Malaysia. Studies focusing on the effects of transboundary air pollution or haze, nevertheless, have been conducted.

A study conducted in 2005 looked into hospitalization for all causes (respiratory, cardio-respiratory, circulatory, cardio-obstructive pulmonary disease [COPD], and asthma). Findings showed that from 1995 to 1998 in Kuching, the number of haze-related hospitalizations significantly increased, especially

for COPD and asthma patients. Survival analyses indicated that persons more than 65 years of age with previous hospital admissions were significantly more likely to be re-hospitalized for any cause (HEI 2006).

Another study conducted in 2002, which looked into the number of deaths in 1997 from various cities in Malaysia, also found significant correlations in the observed sample (HEI 2006).

# Air Quality Management

## Legislation and Mandate

The Environmental Quality Act (EQA), the basic framework for environmental management in Malaysia, was enacted in 1974. The Act was officially endorsed by the Government of Malaysia in its Third Malaysia Plan (1981–1985). The main environmental regulatory agency in Malaysia at the federal level is DoE, which is currently part of the Ministry of Natural Resources and the Environment. It was established to administer and enforce EQA of 1974 (Heng 2002).

Environmental management is conducted at the federal level by DoE and headed by the Director-General of Environmental Quality, who is appointed by the Minister from among members of the public service. Within each state, the state governments have corresponding authorities and officials in charge of environmental matters. The Director-General has, as one of his major functions, the establishment and maintenance of liaison and cooperation with the state authorities in relation to issues of environmental protection, pollution control, and waste management. Corresponding authorities at the state level exist independently within the various state governments to enforce EQA (EPU 2006).

The National Policy on the Environment, which integrates the three elements of sustainable development—economic, social and cultural development, and environmental conservation—was formulated and approved in 2002. The Policy aims to promote continued economic, social, and cultural progress and the enhancement of the quality of life of Malaysians through environmental and sustainable development. Malaysia adopts both the prevention and pollution control approach in order to protect the environment, as well as to ensure the environment is clean, safe, healthy, and productive.

## Ambient Air Quality Standards

In 1989, DoE formulated a set of air quality guidelines called the Recommended Malaysian Air Quality Guidelines (RMG) (see Table 5.1). Based on RMG, DoE subsequently developed the Malaysian Air Quality Index (MAQI) in 1993.

TABLE 5.1

**Malaysia and WHO 2005 Ambient Air Quality Guidelines**

Pollutant	Averaging Time	Malaysian Air Quality Guidelines		WHO (2005) <sup>(1)</sup>
		ppm	µg/m <sup>3</sup>	
Sulfur dioxide (SO <sub>2</sub> )	1 hr	0.13	350	
	24 hrs	0.04	105	20
PM <sub>10</sub>	24 hrs		150	50
	1 year		50	20
TSP	24 hrs		260	—
Nitrogen dioxide (NO <sub>2</sub> )	1 hr	0.17	320	200
	24 hrs			—
	1 year	0.04	90	40
Carbon monoxide (CO)	1 hr	30.00	35 mg/m <sup>3</sup>	
	8 hrs	9.00	10 mg/m <sup>3</sup>	
Ozone (O <sub>3</sub> )	1 hr	0.10	200	—
	8 hrs	0.06	120	100
Lead (Pb)	3 months		1.5	1.5

Note: The limits given are the basis for assessing atmospheric load in Malaysia. The figures all in all correspond to international guidelines for assessment.

Source: Department of Environment (1989, cited in Yahaya 2006).

## Management of Mobile Sources

Malaysia is one of the few countries in Asia to have started early in addressing emissions from mobile sources. As such, it is also one of the countries that have a fairly advanced system in managing emissions from mobile sources. In 1977, the Government enacted The Motor Vehicle (Control of Smoke and Gas Emissions) Rules as part of the Road Traffic Ordinance of 1958. This enabled the control of excessive black smoke emitted from diesel vehicles (Heng 2002).

Regulations have since been in place for both petrol and diesel vehicles under Acts that came into force: the Environmental Quality (Control of Emission from Diesel Engines) Regulation on 1 September 1996 and the Environmental Quality (Control of Emission from Petrol Engines) Regulation on 1 November 1996 (Heng 2002). Malaysia has adopted Euro 1 emissions standards for new light-duty vehicles in 1997 and has adopted Euro 2 standards for gasoline vehicles in 2000. It now has plans to introduce Euro 2 standards for diesel vehicles and Euro 3 standards for gasoline vehicles in the 1<sup>st</sup> quarter of 2007. The Government also has plans of adopting Euro 4 standards by 2009 (JAMA 2006).

Though the Government has actively pursued stricter vehicle emissions standards, the move toward the use of higher-quality fuels has not been similarly aggressive. The current fuel quality for diesel and gasoline are still at Euro 1 levels. Current government plans to move to higher-quality fuels both for gasoline and diesel in two stages are underway. The last stage is equivalent to fuel required for Euro 4 emissions standards (Idris 2004).

Malaysia has one of the advanced inspections and maintenance systems in place among Asian countries. Its inspection and maintenance system, which has been outsourced to a private entity, is still regularly monitored by the authorities. It started imposing roadside inspections and surprise checks of excessive black smoke emission in 1 September 1996. The Area Watch and Sanction Inspection (AWASI) Programme was first introduced in Kuala Lumpur so that enforcement could be “seen and heard”.

Malaysians’ preference for private motorized transportation has undermined and, sometimes, overlooked public transportation in Malaysian cities. The Ninth Malaysia Plan

(2006–2010) includes urban transportation strategies focusing on the development of an integrated, efficient, and reliable public transport system to encourage a modal shift from using private vehicles to public transport, particularly in the Klang Valley (EPU 2006).

## Management of Stationary Sources

The primary regulation for controlling emissions from stationary sources is the Environmental Quality (Clean Air) Regulations of 1978, which is currently being revised.

## Management of Area Sources

Pollution from forest fires and waste burning is one of the major concerns of Malaysia. The Government has enacted an Environmental Quality (Declared Activities) (Open Burning) in 2003 to reduce the occurrence of haze from domestic sources.

## Public and Nongovernment Participation

Information on the activities of nongovernment organizations for environmental protection and/or for cleaner urban air in Malaysia is limited.

Other nongovernment participation for improving air quality in Malaysia is the involvement of the Government of Germany through the German Agency for Technical Cooperation (GTZ). For more than 10 years, GTZ has been assisting Malaysia in fields directly or indirectly related with air quality. By the end of 1999, preparatory steps were taken to explicitly assist Malaysia in air pollution control. Various short-term experts’ missions on legislation, vehicle, data quality, and fuel followed. The 4-year project “Air Pollution Control for Malaysian Cities” commenced in early 2002.

# Conclusion

Malaysia's air quality is fairly good except during periods of haze as indicated by its Air Pollution Index. However, there were some instances of air quality deterioration in the Klang Valley; Selangor; and Seberang Perai, Pulau Pinang caused by increased concentrations of ambient PM from motor vehicles, industries, and open burning activities, and of SO<sub>2</sub> from industrial activities. The most important pollutants are PM and ozone. Although SO<sub>2</sub> concentrations are decreasing, PM<sub>10</sub> and ozone do not show clear directional trends.

The air quality monitoring network has greatly increased the national government's capacity to control air pollution. During extreme haze episodes, available data has been used to identify local burning and to enforce regulations. Haze monitoring and the cooperation of the local governments in the affected areas have improved (Hight and Kirkpatrick 2006).

Few studies of impacts of air pollution have been conducted in Malaysia and most have focused on health effects of transboundary haze. They show significant increases in the number of hospitalizations, especially for COPD and asthma patients.

The occurrences of haze from transboundary sources have become an annual phenomenon in parts of west coast of peninsular Malaysia and Sarawak. International cooperation, especially among the Southeast Asian nations, has to be sought and strengthened in order to develop policies and strategies in controlling forest fires and open burning.

Malaysia's capacity to manage air quality, compared with that of other Asian countries, is above-average. It has a well-developed air quality monitoring system while policies for controlling sources of air pollution are also in place.

One of the problems faced by Malaysia is the growing vehicle fleet and the urban society's dependence and preference for private motorized travel. The growth in the number of private vehicles has resulted in increased emissions. However, the Ninth Malaysia Plan has recognized the importance of public transportation and the need to reduce private motorized travel and to encourage a shift toward public transportation.

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