

MANAGEMENT OF AIR QUALITY IN BANGKOK METROPOLITAN

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Air Pollution Situation in Bangkok Metropolitan

Bangkok is the center of economic growth of Thailand and therefore has long suffered from industrial expansion and rapid increase in number of population. As the result, the number of motor vehicles has significantly increased and led to traffic congestion and deterioration of environmental qualities. The most severe is the air pollution where its impacts to quality of life of over 10 millions inhabitants of the metropolitan, including their working productivity, has been particularly appearance. Environmental deterioration brought about by the air pollution has also adversely affected tourism and national images, and thus resulted in both direct and indirect economic loss.

Current air pollution problems in Bangkok are mostly the result of heavy traffic congestion and rapid raise in number of motor vehicles. The problems have also been aggravated by the lack of sufficient and effective maintenance service for the vehicles. It has been estimated that number of motor vehicles in Bangkok accounts for roughly one-third of the total number of the vehicles in the country. In 1999, approximately 4 millions cars were registered in Bangkok, in addition to 1.5 millions motorcycles. Roughly 95% of the registered motorcycles are with two strokes engines and thus are the main contributors of white smoke and particulate. The air pollution has become a serious health problem in Bangkok for over a decade, especially among the poor who expose to the pollution than other citizens. Concentration of particulate of less than 10 micron (PM₁₀) and carbon monoxide (CO) in the atmosphere have been found to exceed the acceptable standard, while the concentration NO_x hydrocarbon (HC) and ozone have been increasing. It has been found that over 1 million citizens of the Bangkok Metropolitan have been suffered from air pollution related illness.

Thailand has been well aware of the need to tackle the air pollution for several years. Such need include the efforts to reduce mitigation of the particulate of less than 10 micron (PM₁₀) from motor vehicle sources as well as particulate from roads and other sources such as factories, power plants, building construction, open burning of solid waste, crematoriums sand incinerators.

Result of the Implementation on Management of Air Quality In Bangkok

The Bangkok Metropolitan Administration has long recognized the need for continuous reduction of air pollution in the metropolitan, in order to mitigate its impacts to public health. The

improvement of air quality in Bangkok has been included, by the national government, in the policy on protection of public health formulated in accordance to the 7th National Economic and Social Development Plan (1992-1996). The policy recommended clear measures for management and improvement of the air quality including the increase in number of roads, traffic improvement, development of public transport systems, reduction of lead in Gasoline and improvement of fuel quality. Although some measures, such as the use of un-lead gasoline nation wide in 1999, have been very successful, some measures under responsibilities of several agencies have not been effective due to the lack of harmonization, independence and sufficient coordination. In the 8th National Economic and Social Development Plan, supports were provided for continuous implementation on capacity building for environmental improvement. However, such supports were neither sufficient nor effective due to economic crisis facing the country at the time. The 5th Bangkok Development Plan (1997-2001) shares the same objectives to those of the 8th Plan regarding regulation of urban growth and development, improvement of quality of life and the environment, and provision of sufficient social service for the less fortunate

Thirteen Measures for Reduction of Air Pollution Problem

The Bangkok Metropolitan Administration has declared the year 1999 as the year for mitigation of air pollution through implementation of 13 measures for reduction of air pollution problem. Several public and private agencies participated in the implementation. These include the Traffic Police Division of Royal Thai Police, Pollution Control Department, the Department of Land Transport, Bangkok Mass Transit Authority, Fuel Authority of Thailand. The campaigning for the implementation of the measures focuses on building of awareness and public participation through all forms of public relation activities between January 1-February 28, 1999. Following implementation of the campaigning measures, initiated on March 1, 1999, have been assigned to the Environmental Quality Control and management Division, under coordination with agencies of the Bangkok Metropolitan Administration and other relevant agencies.

1. Setting Up Check Points

Check Points for vehicles that emitted black smoke have been set up in 50 areas in Bangkok. Officers assigned to each check point comprise of officers from the Traffic Police Division of Royal Thai Police and Environmental and Sanitation Section and Law Enforcement Section of District Office. The officers have been carry out their tasks at the check points as indicated in the monthly operational plans.

Emission inspection at the checkpoints by the Bangkok Metropolitan Administration has been successful at certain level. Between March 1, 1999 and December 2000, 247,435 vehicles were inspected and 130,572 were found to violate the legally emission level, accounted for 52.7%.

2. Mobile Inspection Units

- Between March 1, 1999 and December 2000, 6 mobile inspection units, organized with cooperation with the Traffic Police Division of Royal Thai Police, inspected 128,135 vehicles and 70,504 were found to violate the permitted emission level.

- Mobile inspection units, organized with the Department of Land Transport, inspected 10,055 vehicles and issue bans for 525 vehicles.

3. Motorcycle Units

Motorcycle units have been assigned to 50 checkpoints, to arrest the spotted violators.

4. Pollution Free Road

Campaigning for cooperation from motorist, especially those without additional passengers, to avoid heavily congested route during the peak hours. The first phase of the campaign was implemented for Silom, Rachapralop and Paholyothin Roads. The campaign was later extended to Arjanarong, Ramkumhang, Rama 9, Si Paya and Phetburi Road.

Comparison of 24 Hour Average Concentration of PM – 10 on 8 Pollution Free Roads before the Campaign 1998) and after the Campaign (May 2000)

Roads	24 Hour Average Concentration of PM – 10		% Difference
	Before the Campaign (1999)	May 2000	
1. Rachapralop*	242	182	-24.8
2. Phetburi	283	213	-24.7
3. Silom*	195	112	-42.6
4. Si Paya	225	112	-50.2
5. Ramkumhang	332	182	-45.2
6. Ram 9	304	120	-60.5
7. Arjanarong	205	146	-28.8
8. Paholyothin*	395	207	-47.6

Note *Initiated the campaign on March 1, 1999

The rest were commenced on August 2, 1999

- Legal standard of the **24 hour average concentration of PM – 10** is not exceeding 120 ug/ m³

5. Air Quality Reporting

Air quality from 17 air quality measuring stations has been reported to the public on the display boards of the Pollution Control Department at 4 locations, which are

- Wireless Intersection (Lumpini Park)
- Lum Sumlee Intersection
- Lard Prod Intersection
- Taksin Intersection (under construction)

6. Engine Inspection and Tune-Up Services

Free Vehicle inspection and tune-up services have been provided at 6 service stations. These include 3 service stations of the Mechanic Division, 2 stations established jointly by the Bangkok Metropolitan Administration and Petroleum Thai Authority as well as a station of the Pollution Control Department. Since the initiation, services have been provided to 28,970 vehicles,

comprised on 8,705 gasoline vehicles and 20,265 vehicles with diesel engine. Seventy six private service stations were later joint the project and have provided tune-up serviced to 721 vehicle since march 2, 1999.

7. Campaigning and Public Relation Boards

Boards have been placed to request for public cooperation to avoid the 8 pollution free roads during peak hours as well as to report air pollution information to the public.

8. Strictly Enforcing the Use of Covering Sheets at Construction Sites

Inspection of the use of covering sheet by the Working Group on Inspection of Building and Infrastructure Construction, between July and September 1999, found 54 complying construction sites and 38 sites that were not satisfactory complied to the regulation.

9. Strictly Enforcing the Use of Covering Sheets by trucks

Inspection of the use of covering sheets by trucks since April 1999 has been conducted on 33,168 vehicles at checkpoints where 29,930 have been found to comply with the regulation and 3,238 were prosecuted.

10. Improvement of Road Shoulders

Improvement of road shoulders has been completed for 173 roads in 26 districts, with total funding of 45.28 million baht.

11. Inspection of White smoke from Motorcycles

Implemented since August 2, 1999, the inspection has experienced considerable difficulty due to the measuring methodology that required at least 15 consecutive acceleration. The Pollution Control Department therefore made adjustment to the inspection methodology and opted for measuring of carbon monoxide and hydrocarbon emission.

Since initiation, 14,095 motorcycles have been inspected. One Hundred and forty three motorcycles have been found to emit carbon monoxide exceeding the standard while 411 have been found to exceed hydrocarbon emission standard.

12. Car Free Road

Appropriate methodologies for applying the car free concept are currently under review.

13. Improvement of fuel Quality

The Office of National Energy Policy has formulated a 10 years policy on improvement of fuel quality. Commenced in 1993, implementation of the policy includes study on collection of used engine oil for disposal and eradication of counterfeit fuel.

Inspection of fuel quality has been regularly conducted or carried out upon request by Fuel Division, Department of Trade Registration.

- Motorcycle Fleet Upgrade to Reduce Air Pollution in Bangkok
Bangkok Metropolitan Administration with the World Bank, Motorcycle Manufacturers, Fuel Product Producers, Thailand Motor Vehicle Industry Association and relevant agencies signed a memorandum of understanding (MOU) for cooperation on rectification of air pollution from

motorcycles, on April 21, 2000. Under the MOU, activities have been organized to improve environmentally sound performance of motorcycles including reduction of emission, fuel efficiency and effective combustion. These activities were first set up at Bangkok Waste Re-use Center on May 15-17, 2000 and later at the Military Academy on July 10-12, 2000.

At both events, the totals of 2,849 motorcycles were inspected. Two thousands two hundreds and seventy two were found to be environmentally sound while 577 has failed the test. Owners of 260 motorcycles expressed their interest to participate in the motorcycle exchange program. Sixty motorcycles have now been available for the program

Problems in managing Air Quality in Bangkok

The problems in implementing the management of air quality in Bangkok are mostly due to worsen air pollution problems and economic crisis, which limits allocation of public funding. These problems and obstructions can be listed as follow;

1. Problems in Public Sector

- 1) Local agencies, especially the Bangkok Metropolitan Administration, do not have full authority in managing air quality.
- 2) Limited public funding which adverse affects improvement of public buses and capacity building of the officials.
- 3) Implementation of policies especially promotion of natural gas consumption while insufficient service station still is a problem.
- 4) Public relation of governmental agencies lack independence and continuity.
- 5) Inefficient public transport systems. Incapable of achieving public need.

2. Problems in Private Sector and General Public

- 1) Limited funding for improvement of private buses.
- 2) Private Inspection stations are unable to meet acceptable standards due to limited funding and labor force and ineffective inspection
- 3) Lack of awareness on participation in solving air pollution problems.