Kitakyushu Initiative Seminar on Urban Air Quality Management[1]
Feb. 20-21, 2003, Bangkok, Thailand

1. General Introduction of the City

(1) City characteristics

(a) Geography. Located in the central part of the Philippines, the city of Cebu is an island in the south inhabited by 718,821 people. It has a total land area of 326.10 sq. km. It is accessible from all places by air and sea transportation. It only takes an hour or less by plane from Cebu to reach Manila and just a few hours more to reach most of the cities in the Asia Pacific region.

(b) Demography. The city of Cebu has a population density of 2,468 and a total number of 147,600 households. From 1995 to 2000, the city is growing at an annual average growth rate of 1.65%.

© ***Topography.*** The topography of the city is rugged and mountainous with elevation ranging up to 900 meters above mean sea level. Flat lands are found only on the shorelines that extend a few kilometers inland. The flat land of the city occupies about 23 sq. km., representing 8% of its total land area and containing 2/3 of its population.

(d) Weather and Climate. Like the rest of the country, the city of Cebu is within the tropical climate zone. Its mean annual temperature is 26.5^0C with a relative humidity of 75%. The annual average rainfall is 1,636.7 mm. Generally, rainfall decreases from February to April and then gradually increases from May to July.

(e) Employment. Census data in 2002 showed that 73.2% of the employed labor force of the city were found in trade and other related service activities such as banking, real estate and insurance, community and personal services and others. Some 18.8% were employed in the industry, while only 7.8% were engaged in agriculture and other related services.

(f) Family Income and Expenditures. The average family income of the city of Cebu in 1997 was P 163,196.00. The average family expenditure was P 114,326.00, in the same year. This represented a savings rate of 29.9%. Most of the families in the city still spent their income on food, accounting for 44.8% of the total family expenditure.

More than half of the households in the city received their income from salaries and wages. Only 27.7% received their income from entrepreneurial activities, mostly from non-agricultural business. The remaining 72.3%

[1] Mr. Nigel Paul Villarete, Project Manager, Cebu South Reclamation Project, City Government of Cebu

received their income from shares of crops, receipts from abroad, interest on deposits, dividends, gifts and others.

(g) Economic Activity. The city of Cebu is the second biggest growth center next to Manila. There is a dominance of trade and service activities due to its strategic location in the Visayas region and also because of its good seaport. The service sector constitutes 73% of the economy of the city, far greater than the industry (20%) and agriculture (7%) sectors.

The direct foreign trade of the city comprised 30% of the entire Visayas figures and is equivalent to 52% of the entire foreign trade of the Mindanao region. The city also controlled 70% of ship calls and 90% of the passenger traffic made in the province of Cebu.

Majority of the establishments in Cebu city are considered micro or small enterprises with an average capitalization of P 1.5 million or less. 67% of these business establishments are situated in the central part of the city, which controlled about 77% of the economy of the city.

In 1995-1998, investments in the central area of the city were getting to be capital-intensive compared to the average investments of the city. This happened during the economic crisis that hit the city in 1998.

(2) Main Features of the City

(a) Organizational Structure. Cebu city is classified as a highly urbanized city, independent of the Cebu province. Under the new local government code, the city has the power and authority to establish an organization that shall be responsible for the efficient and effective implementation of its development plans, programs and priorities.

The structure of organization and management of the city follows what has been prescribed in the new local government code. At the head of the city is the City Mayor. Under him are all the departments and offices required to be established under the local government code and all the other offices created by the city council to implement its plans or priority programs and projects.

The city government of Cebu has no office responsible for air quality management and control programs of the city. It is dependent on the activities and air quality management programs undertaken by the Environmental Management Bureau of the Department of Environment and Natural Resources and the Land Transportation Office.

(b) Financial Structure. The actual income of the city of Cebu in 2001 was P 1.25655 billion. The four income generators of the city are identified as follows: a) the Internal Revenue Allotment, IRA (41%), b) local taxes (28%), operating and miscellaneous revenue (16%), and real property taxes (14%).

The IRA, the largest source of income, grows at annual average growth rate of 3.9%.

The total expenditure of the city in 2001 increased to P 1.6938 billion. The annual average growth rate of expenditure of the city for the 1997-2001 period was 2.3%. The top three expenditure items for the last five-year period are: economic services (40.7%), general public services (31.7%) and social services (19.7%).

© ***Air Quality Situation.*** The air pollutants affecting Cebu city, as well as with the other two neighboring cities (Mandaue and Lapu-lapu cities), came from both stationary and mobile sources. Mobile sources are basically fuel burning such as motor vehicles (land-based, sea-based and air crafts). Stationary sources are classified as fuel burning and non-fuel burning. Non-fuel burning sources include woodcrafts, stone crafts, shell crafts and similar industries. Other sources of air pollutants include road construction/ improvement projects, and the south reclamation project.

i. Sulfur Dioxide and Nitrogen Dioxide. In August – December 2002, the Metro Cebu Air Quality Monitoring Project was conducted with coverage area comprising the city of Cebu and its neighboring cities, Mandaue City and Lapu-lapu City. The project focused only on two air pollutants, sulfur dioxide and nitrogen dioxide. The monitoring activity lasted for five months. A total of 102 stations were established, 50 of which were placed in the government buildings of the city of the Cebu, while the rest were located in the cities of Mandaue and Lapu-lapu.

Monitoring results revealed the following information:

1. Monthly average sulfur dioxide levels range from 0.00173 ppm to 0.00558 ppm, which is well within the standard of 0.07 ppm as prescribed in the Clean Air Act. *See fig. 1.*

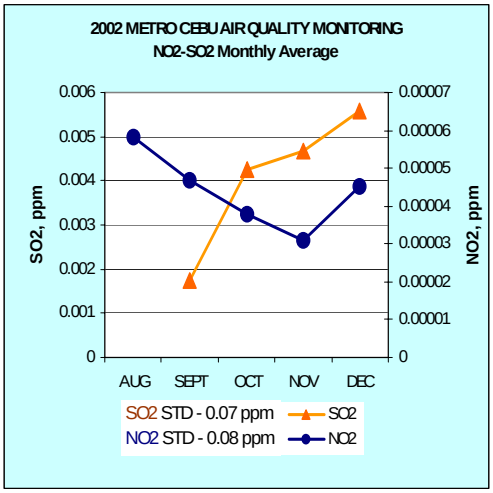

Figure 1

2. Monthly average nitrogen dioxide levels range from 0.000031 ppm to 0.000058 ppm, also conforming to the standard of 0.08 ppm. *See fig. 1.*

3. Cebu City registered the highest level for nitrogen dioxide. *See fig. 2.*

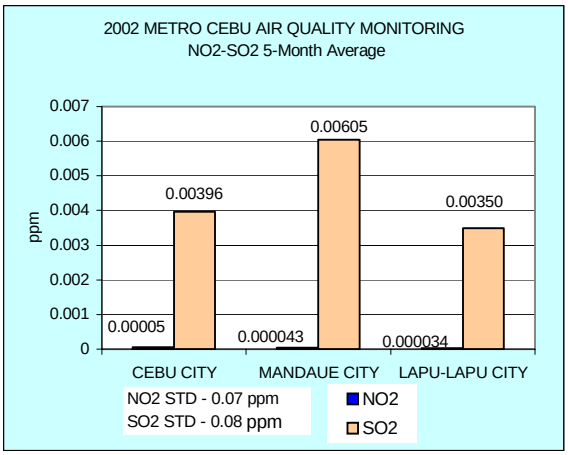

Figure 2

4. Results obtained from the air quality monitoring activity can be explained by analyzing the vehicle traffic profile, topography and meteorology of the area of Cebu City and the other two cities. *See fig. 3.*

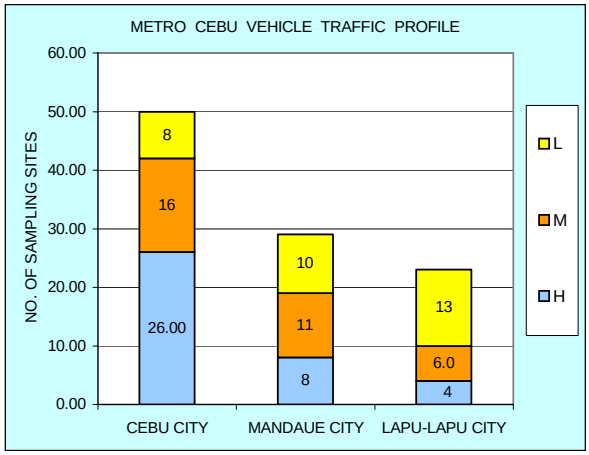

Figure 3

Pollutant levels in Cebu City were expected to be high because of its high and medium traffic densities. Also, because of the meteorological condition of the area of the city. The city of Cebu is the immediate impact area of the air pollutants from the industrialized cities of Mandaue and Lapu-lapu. Wind rose pattern reveals that most of the

time, wind coming from the northeast (where Mandaue and Lapu-lapu cities are situated) is blown towards the city of Cebu carrying with it all pollutants from the two cities.

5. Generally, the highest concentration of pollutants are in the downtown area of Cebu city followed by that in the uptown area.

ii. Total Suspended Particulates (TSP). One station for TSP was at the DENR Regional Office, located in Banilad, northeast of the city of Cebu. Monitoring of this station was done during the period 1995-2003. On a year by year average basis, the result was within the standard of 230 ug/Ncm, except in 1999 when the result obtained was slightly above the standard (average of 238.5 ug/Ncm).

The other station was situated at the barangay hall in Pardo, Cebu City. It was monitored in 1999. The result obtained was 261.50 ug/Ncm, which is slightly beyond the standard.

Another station for TSP monitoring was at the office of the DENR-CENRO, located at the main highway towards the south (N. Bacalso Avenue), in Cebu City. It was monitored in 1995. The average TSP was 125.3 ug/Ncm which was just within the standard . However, in 1996, the result obtained was 786.05 ug/Ncm, which was well above the standard.

iii. Particulate Matter less than ten microns(PM-10). The station for PM was located at the Camp Forestal in Lahug, Cebu City. The period of monitoring was done from 1996-2000. On a year by year basis, results were within the standard of 150 ug/Ncm.

(d) Existing Legislation, Regulations, Standards for Pollutants

i. *Presidential Decree (P. D.) 1151*, otherwise known as the Philippine Environmental Policy. It defines the general state policies on the pursuit of a better quality of life for this generation and the future generations, without degrading the environment. Specifically, it mandates the undertaking of an EIA for all projects which may significantly affect the environment.

ii. *P. D. 1152*, establishes specific environmental management policies and prescribes environmental quality standards to provide the structure to pursue a comprehensive program on environmental management.

iii. *P. D. 1586,* otherwise known as the Environmental Impact Statement Law. The objective is the pursuit of a comprehensive and integrated environmental protection program whereby the exigencies of socio-economic undertakings can be reconciled with the recruitment of environmental quality.

iv. *Republic Act (R. A.)No. 8749,* otherwise known as the Clean Air Act, revises the air quality management of PD 984 (National Pollution Control Decree of 1976). It declares that the state shall promote and protect the global environment to attain sustainable development. It recognizes that the responsibility of cleaning the habitat and environment is primarily area-based. It also recognizes the principle that the polluters must pay and that clean and healthy environment is for the good of all and should be the concern of all.

v. *P.D. No. 984*, otherwise known as the National Pollution Control Decree of 1976. It contains the policy statement to prevent, abate and control pollution of air, water and land for the more effective utilization of the resources of the country. The major thrust of this policy is the prevention and control of industrial pollution.

vi. *R. A. 7160 (Local Government Code of 1991)*. The code devolves certain powers and responsibilities to the local government units, including the preparation and enforcement of their respective waste management programs.

(e) Management Capacity. In the past, the city government of Cebu as well as the other local government units of the province and of the country, had been relying at the monitoring systems of the national government's environmental agency, the DENR especially the Environmental Management Bureau. For the past few years, however, local governments have started to formulate their waste management programs including enforcement of these programs, through the Local Environmental Code, and also with the assistance of the DENR. However, local efforts were focused mostly on solid waste management programs. Programs on air quality management and control are mostly the responsibility of the DENR, the EMB, Land Transportation Office, and the Cebu City Traffic Operations Management (CITOM).

Starting August 2002, the local governments of the cities of Cebu, Mandaue and Lapu-lapu, have started to involve themselves through the Metro Cebu Air Quality Monitoring Project conducted by the city of Kitakyushu, KITA, and PCAPI, a Cebu-based NGO.

2. Sectoral Perspectives: Transportation Sector

(a). Major sources of air pollution in the transportation sector. As of 2000, data from the Land transportation Office showed that vehicle registration in the city of Cebu increased tremendously, from 69,824 vehicles in 1994 to 95,861 in 1999, a total increase of 26,000 vehicles. This translates to an average annual growth rate of 7.5%. Car registration by type revealed that private cars dominate at 87.4% followed by utility public vehicles at 10.4% and government-registered vehicles at 2.2%.

In general, the type of important air pollutants in Cebu City are the total suspended particulates, photochemical smog, and heavy metal pollutants like lead. These pollutants are emitted from the exhaust tail pipes of the motor vehicles. Highly toxic pollutants coming out from vehicle exhausts include lead particulates, carbon monoxide, sulfur dioxide, and nitrogen oxides.

(b) Information on the efforts of the local and national governments in combating air pollution from the transportation sector.

The Land Transportation Office in coordination with the Cebu City Traffic Operations Management has been undertaking an anti-smoke belching campaign since 1995. Pursuant to Department Order No. 2000-11 dated January 17, 2000, all motor vehicles in the city are required to undergo a smoke emission test. From 1995 until 1999, the number of public vehicle units that were apprehended by CITOM totaled 10,670. Of the total, about 9,418 units were tested and 5,948 were issued compliance.

In addition to the anti-smoke belching campaign of the city government, air pollution control programs proposed to be undertaken by the city shall include the following:

1. The city shall establish a system of planning and coordination with the DENR, in the designation of airsheds in the city and its neighboring areas, in the formulation of an Action Plan for the airshed, and in the constitution of a Governing Board. The board shall be responsible for the actualization of the formulated action plans.
2. Develop an Action Plan for the control and management of air pollution from motor vehicles consistent with the Integrated Air Quality Framework.
3. Promote a continuous program of monitoring air quality, airsheds and air emissions.
4. Prepare and implement a program and other measures to protect the health and welfare of the residents in the city, in coordination with the DENR and other appropriate government agencies.
5. Implement section 24 of the Clean Air act, which prohibits smoking inside a public building or an enclose public place including vehicles and other means of transport, or in any enclosed area outside of one's private residence, private place of work or any duly designated smoking area.

   In connection with items 4 and 5 above, the city government of Cebu has approved an ordinance in 2001, regulating cigarette, cigar and pipe smoking within the confines of private or public places or establishments in the city of Cebu.

3. **Improving the capacity of local governments in urban air quality management: Successful experiences, problems/constraints, and future directions.**

The anti-smoke belching campaign is based on city ordinance 1491 of the city of Cebu. The campaign is designed to promote a continuous program of monitoring air emissions from mobile sources, which are the motor vehicles. It is carried out to ensure that motor vehicles plying the city's thoroughfares daily conform to emission standards or standards of performance set forth by the DENR. The anti-smoke belching activity is conducted by the Cebu City Traffic Operations Management in coordination with the office of the DENR.

A testing operation is conducted daily from Monday to Friday, starting at 8:00 in the morning until 5:00 in the afternoon. A team of 9 people goes out to the field, in one specific location, with each member of the team performing different responsibilities. A hard ridge smoke meter machine is used by the team for testing purposes. All types of vehicles are apprehended – public, private or government-owned.

The operation starts once the "spotter" spots at a distance, a jeepney for instance, spewing dark smokes. A team member stops the driver of the jeepney, about 3 to 5 people conducts the testing, another member issues the citation ticket while another writes the apprehension report. If the jeepney fails in the testing, a citation ticket is issued to the driver. But it is not the driver who is apprehended, it is the operator of the jeepney. The operator is given 3 days to go to the office to comply with the requirements. Once he has complied, a certificate of compliance is issued. CITOM gives tips to the drivers and operators on the proper maintenance of their jeepneys. The operator may be penalized on the following grounds: if he is apprehended more than two times, if he refuses to comply with the requirements, and if he does not want his vehicle to be tested.

Accomplishment reports on a weekly, monthly and annual basis, are given to the Chairman of the CITOM who in turn forwards it to the Mayor for appropriate action.

The apprehension team, faced several difficulties during the conduct of the operation. Almost always, they get the ire of the driver as well as the passengers of the vehicles because of the time lost during the conduct of the operation. Others, especially drivers of privately-owned vehicles, question their authority to conduct the operation. The team complains of the lack of the testing machine. The city purchased the machine in October last year. Previously, the city rented the machine from a private company. Because of the problem of the renewal of the contract between the city and the private owner of the machine, the operation was temporarily suspended from January until September of 2002. Another problem is the lack of personnel to conduct the operation. A CITOM staff said that they need about 10 to 12 people to compose an apprehension team.

4. General Conclusions

(1). Learning from the experiences of the city of Cebu, other cities may replicate the anti-smoke belching campaign of the city. But they have to take note of the difficulties encountered by the city of Cebu during the process, to avoid repeating their mistakes. And they should constantly seek to look for other ways to improve the system.

(2). While the city is serious in its effort to maintain clean air through the operation of the anti-smoke belching campaign, however, the city is faced with the problem of seeking funds for the sustenance of the project. Buying more testing machines and employing more staff to put into the apprehension team involves money. The city has to strengthen its financial capability to ensure that this campaign will continue for the years to come.

(3) One of the important lessons that the city learned from its experiences is the importance of the information and education campaign to the public. Those who are questioning the authority of the team to conduct the testing operation do not really understand the objective of the campaign. The city needs to educate the people on what the campaign is all about and what are its goals and objectives.

(4) The following could be the major areas of cooperation between the Kitakyushu Network cities on urban air quality management:

a). use of clean/alternative fuel especially for diesel-fed public utility vehicles such as jeepneys and motorcycles;
b). long-term solutions on traffic congestion in highly-urbanized areas such as Cebu city;
c) use of appropriate technology to reduce emission of pollutants from vehicles.