Chapter 5 Environmental Quality Targets and Basic Strategies

5.1 Environmental Quality Targets for the Future

5.1.1 Achievement of Environmental City

It is proposed that the ultimate environmental target or goal for Hanoi City should be to become an environmental city which should be declared to the Hanoi citizens and the country as a whole as well as to the outside world. To be an environmental city, Hanoi City should be:

- clean and quiet, namely free from the annoying public nuisance.
- living with nature to give comfort to the Hanoi citizens.
- preserving cultural and historical assets which the Hanoi citizens should be proud of, as well as keeping agreeable urban land scaping.

Namely, achieving CGC (Clean, Green, and Cultural) should be the slogan for Hanoi City to become an environmental city.

Considering the realistic schedule to achieve the above goal as well as the historical timing of 1000 year anniversary of the City of Hanoi which is to be celebrated in the year 2010, the following schedule of achieving the goal of becoming an environmental city is proposed.

(1) Year 2000: The First Year toward achieving the goal of environmental city

Declare the Year 2000 as the first year toward the goal of environmental city. Intention of the Government that Hanoi City shall be recognized as an environmental city is proposed to be announced in the year 2000, which is the 990 year anniversary of the city as well as when this JICA EMP will be completed and submitted to the Government.

(2) Year 2010: Declaration of Environmental City

Declare the achievement of the goal of Environmental City.

The first stage for becoming an environmental city should be completed by the Year 2010, with emphasis on the urban area lying on the right bank of the Red River. Intensive efforts should be put in to preserve and further enhance the agreeable environment as to improve the degraded environment between 2000 and 2010. All the projects recommended for early implementation, in particular the urgent solid waste management project as well as other priority projects should be fully implemented before 2010 and declaration of environmental city should be made.

(3) Year 2020: Further enhancement of the environment in the new capital area

Further enhancement of the environment should be continued from 2010 up to the year 2020, expanding the efforts to the new capital city area lying on the left bank of the Red River, in particular the new urban areas of Gia Lam and Don Anh which is in line with the approved Urban Master Plan of the Hanoi City for 2020.

5.1.2 Composition of the Targets

To attain these desirous prospects for each environmental zone, environmental quality targets are set for each environmental zone for the year of 2020. In addition to the environmental targets for the target year of 2020 for this JICA Study, targets are also set for the year 2010. Two kinds of environmental targets are set, one for indicating the overall comfort level of the citizens or the integrated quality target and the other as numerical indices showing the environmental conditions of each comfort target.

(1) Comfort Targets

1) Definition of the targets

Three categories of targets are selected to indicate the comfort and impression of the citizens for the environment as follows.

a) Clean and quiet

b) Living with nature

c) Cultural (Preserving cultural and historical assets)

For each category, three levels are set as follows.

a) Level A: Fully satisfied

b) Level B: Partially satisfied

c) Level C: Not satisfied

2) Selected comfort targets for the environmental zones

Targets are set for each environmental zone, considering the following points.

a) Desirous environmental prospects for each zone in the future

b) Current environmental conditions in each environmental zone

The selected comfort targets for each zone for the years of 2020 and 2010 together with the present level, are shown below.

Selected Comfort Targets for Environmental Zones

	Present Condition			2010			2020		
Zone	Clean	Nature	Cultural	Clean	Nature	Cultural	Clean	Nature	Cultural
1	C	C	B	A	A	A	A	A	A
2	C	B	-	B	B	-	A	B	-
3	C	B	-	B	B	-	A	B	-
4	B	B	-	B	B	-	B	A	-
5	B	B	-	B	B	-	B	B	-
6	B	A	-	B	A	-	B	A	-
7	B	B	B	A	A	A	A	A	A

5.1.3 Sectoral Targets for Clean and Quiet

(1) Sanitary Water-Related Environment

Management of a sanitary water-related environment requires measures to protect against flooding and to reduce environmental and health risks. The strategy with regard to structural measures for flood control and drainage improvement is to be flood-free with a return period of 10-years or less throughout the city.

For development of the drainage system, the following targets for each environmental zone are set as described below:

1) Environmental Zone 1: Old City Center

Since almost the whole area suffers great losses from flooding every year, the drainage system is to be improved and expanded urgently with the following protection levels:

- Storm-water collection sewer: 5-year return period
- City rivers and drainage channels: 10-year return period
- Conservation of city lakes/ponds to maintain existing function of retarding flooding
- Restriction of development to reduce peak flows

2) Environmental Zone 2: Red River Right Bank-North West

Protection levels for improvement and expansion are a 5-year return period for storm-water collection sewerage and a 10-year return period for drainage channels.

3) Environmental Zone 3: Red River Right Bank-South

Protection levels for improvement and expansion are a 5-year return period for storm-water collection sewers and a 10-year return period for drainage channels. Lakes/ponds, such as Dinh Cong and Linh Dam, will be conserved in order to maintain their flood retarding function.

4) Environmental Zone 4: Dong Anh Urban Area

The drainage system with a 5-year return period protection level of is to be expanded by sewers and channels according to the city plan.

5) Environmental Zone 5: Gia Lam Urban Area

Protection levels for improvement and expansion are a 5-year return period for storm-water collection sewers and a 10-year return period for drainage channels.

6) Environmental Zone 6: Suburban Area

The target is to maintain the existing land use pattern and maintain the existing water management function of farmland and lakes/ponds, since natural drainage systems are effective in this zone.

7) Environmental Zone 7: Ho Tay Area

The target is to conserve the existing surface area and capacity of the West Lake. A drainage system with a 5-year return period protection level will be expanded, mainly by means of a sewer system.

8) Environmental Zone 8: Red River Quasi Zone

The target protection level is more than a 100-year return period. Final goals are for MOARD to improve and maintain the dyke system and to establish flood forecasting and warning systems.

(2) Clean Water Environment

Surface water quality standards for the protection of human health should be maintained at all times.

This section focuses on organic pollution. Basically, all water bodies are expected to achieve the level of "Unpolluted" as a final target by the year 2020.

1) Zone 1

Environmental Zone 1 is the most seriously polluted part of the Study Area. At the same time, pollution control in Zone 1 has highest need for improvement of water quality, because of the large number of residents and tourists who would benefit from recreational use of the water bodies in this area. The water quality target in Zone 1 is to become "Unpolluted" before 2010.

2) Zone 2

Zone 2 is adjacent to Zone1. The targeted water quality level in Zone 2 is same as Zone 1, namely, to achieve "Unpolluted" , but before 2020.

3) Zone 3

Zone 3 is located downstream of Zone 1. Therefore, water bodies in Zone 3 are affected by the pollution load generated in Zone 1. Due to the completion of sewerage system to cover Zone 1 before 2010, the water bodies in Zone 3 are also expected to be improved. The achievement of an "Unpolluted" condition seems to be difficult, because of high pollution density and limited budget for the sewerage system. Target water quality in Zone 3 is to maintain a level of "Slightly Polluted" until 2020.

4) Zone 4 and Zone 5

Development in Zone 4 and 5 is expected to be extremely high. Targets for water quality in Zones 4 and 5 are to maintain a level of "Slightly polluted" until 2020.

5) Zone 6

Development of Zone 6 is expected to take place gradually. Even if no countermeasures are taken, the pollution level will still be "slightly polluted". No countermeasures are planned until 2020. The water quality target for Zone 2 is to maintain the "Slightly Polluted" condition.

6) Zone 7

As a matter of priority, Zone 7 should maintain the level of "Unpolluted", because of the large number of residents and tourists expect to benefit from use of the water bodies in this area. Therefore, the target in Zone 7 for water quality is to achieve an "Unpolluted" condition before 2010.

7) Major Rivers

Major rivers, Cau River, Ca Lo River, Red River and Duong River (but not Nhue River) are "Unpolluted" and to should be maintained within this level in future. Targeted water quality for all major rivers should be to keep the "Unpolluted" condition.

8) Overall Target

Targets for water pollution control in each environmental zone are as shown below:

Target for Water Pollution Control

	1997	2010	2020
Zone 1 Old City Center	P	U	U
Zone 2 Red River Right Bank – North West	S	S	U
Zone 3 Red River Right Bank – South	P	S	S
Zone 4 Dong Anh Urban Area	U	S	S
Zone 5 Gia Lam Urban Area	S	S	S
Zone 6 Suburban Area	U	S	S
Zone 7 Ho Tay Area	S	U	U
Major River	U	U	U

Note:U: Unpolluted, S: Slightly Polluted, P: Polluted

(3) Clean Air Environment

At present, only air qualities for TSP and PM10 have exceeded the standard. Countermeasures on CO, NO_2, SO_2, and lead should be planned as preventive measures. Even if the countermeasures on TSP and PM10 are carried out, air quality for TSP in Zone 1, which is most crowded area is not expected to the standard, which is very strict in densely populated areas. However, the target for the whole study area, except for Environmental Zone 1, is to achieve an "Un-polluted" condition within 10 years. Targets for air pollution control in each environmental zone are as shown below

Target of Air Pollution Level in each Environmental Zone

	1997	2010	2020
Zone 1 Old City Center	P	SP	SP
Zone 2 Red River Right Bank – North West	U-P-SP	U	U
Zone 3 Red River Right Bank – South	P-U-SP	U	U
Zone 4 Dong Anh Urban Area	U	U	U
Zone 5 Gia Lam Urban Area	U-SP	U	U
Zone 6 Suburban Area	U-SP-P	U	U
Zone 7 Ho Tay Area	U-P	U	U

Unpolluted, S: Slightly Polluted, P: Polluted

(4) Freedom from Scattered Soil Waste and Scattered Septage

Targets for improvement of solid waste management in terms of, for example, rate of collection should be set for organizations responsible for solid waste management. It is proposed that each district should have ultimate responsibility

for solid waste management. Target waste collection amount for each district is shown in Tables 6.5.2 and 6.5.3 in Part 3. This section shows the targets for the urban districts as a whole and suburban district as a whole respectively.

1) Urban Districts

Targets

- Collection Coverage in terms of Population
  HPC will provide 100 % of population living in the urban districts by 2007.
- Collection Coverage in terms of Waste Amount
  Rate of waste collection relative to generation should reaches 95% by 2007 and the rate will remain constant at 95 % thereafter.
- Street cleanliness
  All main streets and major public spaces should be free from scattered waste.

As of s. Inform the beginning of 1999, it is estimated that URENCO collects about 1,300 ton per day including demolition waste and soil waste, 77% of the estimated generation amount of 1,700 ton/day.

- In terms of the collection service coverage by population, URENCO should provide 100% of the urban population with waste collection service. However, technically, 100% of service coverage is unlikely in terms of waste quantity.
- It is proposed that URENCO will increase collection amount at rate of 8% until the collection rate reaches 95% in 2007. Thereafter, URENCO's collection rate will remain at 95% by increasing waste collection at same rates as generation increase rateation for selected years is shown below.

Target Waste Collection and Projection of Waste Generation Amount in the 7 Urban Districts of Hanoi

Year	Target Collection (ton/day) (a)	Projected Generation (ton/day) (b)	Collection Rate (a)/(b) = (c)
1999	1,317	1,708	77%
2005	1,935	2,184	91%
2007	2,396	2,522	95%
2010	2,763	2,908	95%
2020	3,954	4,162	95%

1) Sub Urban District

Targets
- Collection Coverage in terms of Population
- Within town areas (urbanized area in sub urban districts), waste collection service coverage should reach 100% in terms of population.
- Collection Coverage in terms of Waste Amount
  1) Rate of waste collection relative to generation should reach 95% within the town areas by 2007 and the rate will remain at 95 % thereafter.
  2) For the whole area of sub urban districts, the waste collection rate should reach 65% by 2020.
- Street cleanliness
  All main streets and major public spaces should be free from scattered waste.

At present, each Urenco of suburban districts provides collection service for town (district center) and few communes surrounding communes (out of about 25 communes) in each district. Except for Gia Lam suburban district that established its Urenco in 1989, the other four suburban districts of Hanoi established Urenco in each district in recent years during 1994 – 1998.

The longer the history of Urenco, the more waste it collects. As of the beginning of 1999, Gia Lam district collects 48 ton/day, and the other four suburban districts collect about 20 ton/day of waste each. Rates of collection relative to generation are estimated to be 37% in Gia Lam, and 20 – 30% in the other 4 districts.

- It is projected that waste generation amount in suburban districts will increase at rates from 2 – 4%/year. Target waste collection amount must increase 6 – 10%/year.
- Because each suburban district is responsible for solid waste management within each district area, target collection amounts and resulting collection rates are set for each suburban districts as shown in Part 3 Table 6.5.3. Summary is shown below.

Target Waste Collection and Projection of Waste Generation Amount in the 5 Suburban Districts of Hanoi

Year	Target Collection (ton/day) (a)	Projected Generation (ton/day) (b)	Collection Rate (a)/(b) = (c)
1999	133	470	28%
2005	204	570	36%
2010	294	671	44%
2020	586	908	65%

(5) Quiet Environment

Noise and vibration have two aspects. One aspect is emotional, such as unpleasant or uncomfortable feelings, disturbed sleep and so on. The other, which is related, is the effect on human health. The JICA Study Team has identified separate targets for noise and vibration to provide people with a comfortable and healthy life as shown in Table 5.1.1 and Table 5.1.2. By 2010, noise and vibration pollution problems should be solved in both urban and rural areas of the city throughout the day. To maintain a quiet environment up to the year of 2020 is also one of the targets. To attain this target, various countermeasures should be practiced.

5.1.4 Sectoral Targets for Co-existing with the Nature and Enjoying Amenity

(1) Green and Watery Area

Though about 3.5 million people are planned to live in the Hanoi city in 2020, adequate area of land remain not urbanized at present and can be reserved as nature and for green- oriented land use including agriculture, forest and water surface especially in the urbanized area, not to mention the suburban area. In order to provide comfort and relaxation to the residents, "Co-existing with the nature" should be one of the principles for environmental improvement and management for the city.

It is estimated that the population will be about double in the year of 2020 in the urban area. At present, the area of park per person is 1.8 m^2/capita. This number should not be smaller even if population will grow rapidly. In urbanized city, they are trying to secure the park at least 20 m^2/capita. Green area such as roadsides trees and agricultural area also should be kept as far as possible. The number and kinds of trees in Hanoi at roadsides still have the room to be increased.

Concerning the watery area, the number of lakes should be kept or increased. Ho Tay and other 14 lakes have been admitted by HPC to be improved. To make the access to the water surface of these lakes easier is also important.

(2) Enjoying Amenity

There are some projects to construct the buildings with recreational facilities such as bowling and amusement parks with foreign capital. These facilities are considered to be developed gradually according to the rise of income of citizens and inflow of foreign capital.

(3) Sectoral Targets by Environmental Zones for 2010 and 2020

Sectoral targets for co-existing with the nature and enjoying amenity for the year of 2010 and 2020 are set in the table below. Nature and amenity should be preserved considering the characteristics of each zone. To secure the adequate area of parks in parallel with the economic development in the urban area such as Old City Center and Ho Tay is the most important subject.

For the Environmental Zone lying in the existing urban area, target for the park area is set so that the about half of the existing park area per capita of 1.8 m^2/capita, i.e., 1 m^2/capita should be created every year until the year 2020. Namely, targets are 10 m^2/capita for 2010 and 20 m^2 capita for 2020.

5.1.5 Sectoral Targets for Co-existing with the Historical and Cultural Assets

The year of 2010 is the memorial year, the 1000th anniversary of capital transfer to Hanoi, called "Thang Long 1000". It is a good chance to preserve relics in Hanoi City. Actually there are 38 project to preserve cultural and historical assets such as temples, pagodas and Ancient Quarters for the year. To carry out these significant projects certainly and start the campaign of Thang Long 1000 internationally will lead not only to the increase of tourists but to the increase of the interest of Vietnamese themselves.

The JICA Study Team set the targets for 2020 for two environmental zones, namely Old City Center and Ho Tay Area, which have many valuable temples and buildings as shown below. The historical and cultural temples, pagodas, buildings in other environmental zones should be preserved carefully also.

Sectoral Targets for Co-existing with the historical and cultural assets by Environmental Zones for 2020

Environmental Zones	Targets for 2020
Old City Center	• Preservation of Ancient Quarters and old markets • Preservation of Long Bien Bridge • Preservation of museums, pagodas and temples
Ho Tay Area	• Repair of Ho Chi Minh Mausoleum (Improvement of the equipment to keep the remains of Uncle Ho) • Preservation of museums, pagodas and temples

Table 5.1.1 Noise Pollution for the Present, 2010 and 2020 as Targets

Environmental Zones		Present	2010	2020
1, Old City Center	Morning	P	U	U
	Daytime	P		
	Nighttime	P		
2, Red River Right Bank North- West	Morning	P	U	U
	Daytime	P		
	Nighttime	P		
3, Red River Right Bank South	Morning	P	U	U
	Daytime	P		
	Nighttime	P		
4, Dong Anh urban area	Morning	U	U	U
	Daytime	P		
	Nighttime	U		
5, Gia Lam urban area	Morning	P	U	U
	Daytime	P		
	Nighttime	U		
6, Suburban Area	Morning	P	U	U
	Daytime	P		
	Nighttime	U		
7, Ho Tay Area	Morning	P	U	U
	Daytime	P		
	Nighttime	P		

Note: P: Polluted U: Unpolluted

Table 5.1.2 Vibration Pollution for the Present, 2010 and 2020 as Targets

Environmental Zones		Present	2010	2020
1, Old City Center	Daytime	P	U	U
	Nighttime	P		
2, Red River Right Bank North- West	Daytime	P	U	U
	Nighttime	P		
3, Red River Right Bank South	Daytime	P	U	U
	Nighttime	P		
4, Dong Anh urban area	Daytime	U	U	U
	Nighttime	U		
5, Gia Lam urban area	Daytime	U	U	U
	Nighttime	U		
6, Suburban Area	Daytime	U	U	U
	Nighttime	U		
7, Ho Tay Area	Daytime	P	U	U
	Nighttime	P		

Note: P: Polluted U: Unpolluted
SP: Slightly Polluted (Not being polluted whole day)

Table 5.1.3 Sectoral Targets for Co-existing with the Nature and Enjoying Amenity by Environmental Zones for 2010 and 2020 (1/2)

1. Old City Center	
2010:	• Increase the park area per capita from the current level of 1.8 m^2 to 10 m^2 • Not reduce the total area of the green and increase the number and kinds of street trees • Maintain the number and area of the lakes as at 1999 • Increase the waterfront with easy access by people for the 14 urban lakes • Construct buildings with recreational facility
2020:	• Increase the park area per capita to 20 m^2 • Not reduce the total area of the green and increase the number and kinds of street trees • Maintain the number and area of the lakes as at 1999 • Increase the waterfront with easy access for the other urban lakes • Construct buildings with recreational facility
2. Red River Right Bank North- West 3. Red River Right Bank South 5. Gia Lam urban area	
2010:	• Not reduce the total area of the green and increase the number and kinds of street trees • Maintain the number and area of the lakes as at 1999 • Limit the conversion of agriculture land to urban area within the range specified in the Hanoi Urban Master Plan for 2020
2020:	• Not reduce the total area of the green and increase the number and kinds of street trees • Maintain the number and area of the lakes as at 1999 • Limit the conversion of agriculture land to urban area within the range specified in the Hanoi Urban Master Plan for 2020
4. Dong Anh	
2010:	• Limit the conversion of agriculture land to urban area within the range specified in the Hanoi Urban Master Plan • Construct recreational lake
2020:	• Limit the conversion of agriculture land to urban area within the range specified in the Hanoi Urban Master Plan • Develop recreational facilities for the recreational reservoir

Table 5.1.3 Sectoral Targets for Co-existing with the Nature and Enjoying Amenity by Environmental Zones for 2010 and 2020 (2/2)

6. Suburban area	
2010:	• Minimize the conversion of agriculture and forest land to urban area
2020:	• Minimize the conversion of agriculture and forest land to urban area
7. Ho Tay Area	
2010:	• Increase the park area per capita from the current level of to 10 m^2 • Not reduce the total area of the green and increase the number and kinds of street trees • Maintain the current lake area as at 1999 and improve the water quality • Increase the waterfront with easy access by people with promenade • Develop recreational facilities
2020:	• Increase the park area per capita to 20 m^2 • Not reduce the total area of the green and increase the number and kinds of street trees • Maintain the current lake area as at 1999 and improve the water quality • Increase the waterfront with easy access by people with promenade • Develop further recreational facilities

5.2 Basic Strategies for Environmental Preservation

5.2.1 Basic Strategies

As industry grows and population increases and traffic volume increase, volume of pollutants generated and discharged are destined to increase. The most effective and less costly way of environmental management is to reduce the generation and discharge/emission of the pollutants, rather than treating them after being discharged. To decrease the concentration of discharged pollutants in an area is also important to reduce the environmental impact on the residents. Changing the distribution of the pollutants would also contribute to mitigating the impacts on the people to be affected.

Treatment or disposal of discharged pollutants are, however, necessary until zero emission society is realized. Also the improvement of the polluted environment is necessary where it already took place.

To achieve the clean environment, all the people and entities of the society, who might be wrongdoers and sufferers at the same time, should be involved for environment protection activities besides the Government administration.

Basic strategies for the environmental preservation and management should, therefore, be as follows:

a) Achievement of recycle society and cleaner production
b) Proper land use and transport planning
c) Establishment appropriate system for the disposal of the discharged pollutants
d) Participation of all the players concerned with environment

Viewed sector-wise, manufacturing industry is the biggest contributor among all the industries to the pollution of the environment, considering the volume and quality of the waste in various forms as well as the most rapid growth expected in the coming years. In the subsequent section, basic direction of the reduction of the industrial pollution will be discussed.

It should be noted that the subjects discussed hereunder are all substantial and need laborious effort for working out a concrete program. It is recommended, therefore, that detailed studies should carried out for each subject.

5.2.2 Strategy for Reducing Industrial Pollution

Efforts to control pollution in Hanoi City are increasing in priority as Hanoi plans for the twenty-first Century. Industrial pollution is a serious problem in a number of areas of the city. Past practices of discharging effluents to the water and releasing emissions to the air are no longer acceptable. Inappropriate disposal of

industrial solid waste is no longer tolerable. Clear policy directions to reduce industrial pollution have been given at the highest levels in the Hanoi City and Vietnamese Governments. There are about 318 major industrial facilities in Hanoi City. According to the Hanoi DOSTE there are about 100 enterprises that create serious pollution.

However, those faced with task of reducing pollution encounter a number of challenges. The policy directions set the stage for efforts in industrial pollution control. The NEA and the DOSTEs have major responsibilities for state environmental management as it relates to pollution. And the industrial enterprises themselves are ultimately responsible for reducing or eliminating pollution associated with their activities. Efforts by these enterprises will be ultimately responsible for environmental improvement.

(1) Economic and Industrial Planning

The overall strategy for pollution reduction in Hanoi combines:

- Setting targets and proposing countermeasures gradually over time to limit and reduce pollution levels in the 9 existing industrial areas. This includes the preparations of schedules and plans to upgrade existing facilities.
- Ensuring the new industrial areas (5 currently) have proper environmental management systems and waste treatment facilities from the start of operations
- For medium and large scale facilities that are major polluters: 1) install new pollution control equipment to reduce pollution loadings at source; or 2) relocate facilities to new industrial zones outside of the urban areas
- For small production facilities located within residential areas: 1) serious polluters are to be closed down; and 2) other facilities will be relocated and concentrated in small industrial zones (subject to availability of land at the district level) with proper waste treatment facilities

1) Discouraging Polluting Industries

Implementation of the overall strategy for pollution reductions will require specific program directed at both:

- controlling pollution in small medium enterprise, and
- enterprise level environmental management in larger SOEs.

Programs for controlling polluting in SMEs will rely on increasing awareness in both the enterprises and the public in the surrounding communities.

Because of the large number of SMEs, effective pollution control will require the implementation of district level environmental management.

Pollution cannot be controlled without cooperation and significant investment by industrial enterprises. The EIA provisions of the EP Law provide the necessary legal mandate to require existing and new enterprises to put in place pollution abatement programs. New regulations will require that plans for pollution abatement be developed and new measures implemented within five years. The Hanoi DOSTE must establish and industrial pollution control unit to give advice on how to implement these plans. At the Hanoi City level the Department of Industry must direct and provide technical guidance to enterprises under its control. At the Central level the Ministry of Industry must direct and provide technical guidance to enterprises under its control.

(a) Controlling Pollution of Small and Medium Sized Enterprises

The Hanoi DOSTE estimates that there are over 17,000 small or medium sized enterprises (SME) within Hanoi City. While each one is a small source of pollution, taken together they represent a significant source of pollution. An enterprise is considered to be an SME if has less than 200 employees or capital of less than VND 5 billion. SMEs contributed 24% of industrial GDP and 31% of industrial output in 1996 and represent 89% of jobs. The number of SMEs is increasing in the private sector while the number of state-owned SMEs and co-operatives is decreasing. While the size of SMEs varies greatly, 49% of SME are very small enterprises; and 43% of SMEs employ less than 5 persons. These SMEs have virtually no capital, operate relatively low levels of technology, and are inefficient in terms of water, energy, and material usage. It is difficult if not impossible to control the establishment and operation of small enterprises. These industries can not be relocated to industrial zones because of the small scale of production. The Hanoi DOSTE can not possible control and manage pollution from the SMEs.

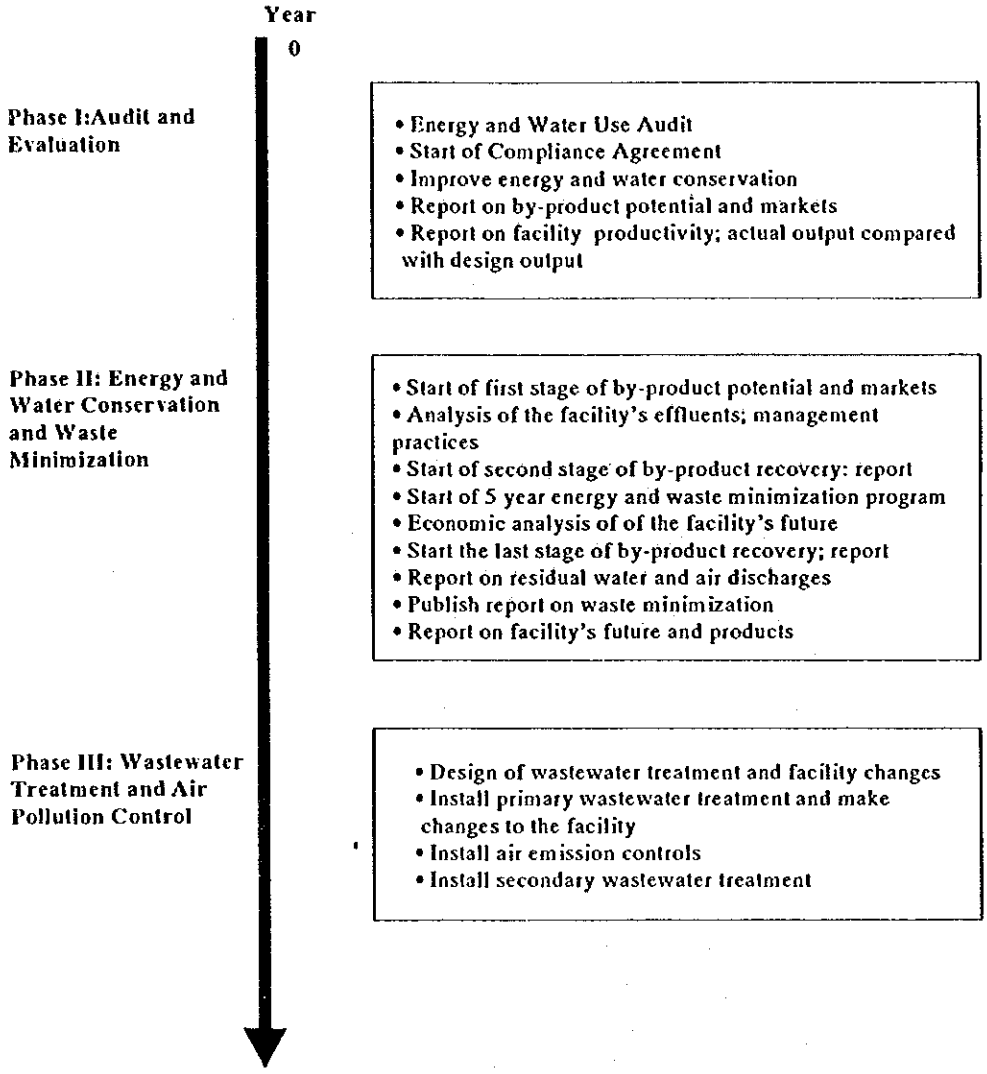
Efforts at controlling pollution from small and medium enterprises need effective implementation of:

- grass roots education and awareness programs for both the public and individual enterprises
- extending state environmental management to the district and sub-district level.

(b) Enterprise Level Management

In general, the implementation of a pollution control program within an

enterprise has three major phases. The basic steps in a three phase program are shown in the figure below.



a) Phase I: Audit and Evaluation

To be consistent with Articles 1 and 11 of EP Law, the program may start with the energy, water use and waste materials audit. Most industrial facilities have wasteful practices that have become part of the basic operations. To identify and stop as many sources of economic loss due to wastefulness, it usually necessary to conduct careful audits or the use of energy, water, and raw materials. The audits may find problems that can be easily rectified. These can be done immediately.

b) Phase II: Energy and Water Conservation and Waste Minimization

The second phase is the implementation of the energy and conservation programs as well as the focus on waste minimization. During this phase detailed reports on residual air emissions and water discharges should be prepared. A study should be undertaken on the economic viability of the enterprise in general and its ability to ultimately comply with environmental laws and regulations.

c) Phase III: Wastewater Treatment and Air Pollution Control.

This phase involves the designing and installing wastewater treatment and air pollution control equipment and programs. These programs may require fundamental changes to provide a cleaner process and include expensive emission control equipment to treat wastes.

d) Cleaner Production Programs

(i) Vietnam National Cleaner Production Center

Vietnam National Cleaner Production Center (VNCPC) is striving to become a recognized center of excellence in providing technical assistance and training to industry on cleaner production. It intends to act as catalyst and provide a coordination role in promoting the application of cleaner production to contribute to sustainable industrial development in Vietnam.

The VNCPC will conduct a number of demonstration projects (four in the North, four in the South, and two in Central Vietnam) introduce the Cleaner Production concept and provide opportunities for practical experience for industry personnel. The VNPPC will conduct training courses directed at human resource development to build the capacity of Vietnam scientists and engineers to undertake cleaner production assessments and implement environmental improvements. The VNCPC will act as source for Cleaner Production information. It will provide the information on cleaner production strategy, methodology, and solutions to users in industries, consultants, institutes, industrial associations, and universities.

The work of the VNCPC will hasten the development of enterprise level environmental management in Vietnam by:

- by increasing the knowledge of cleaner production practices
- by providing training to increase the capacity of Vietnamese scientists and engineers to make use of cleaner production techniques, and

- by raising awareness of the benefits to cleaner production.

The VNCPC will conduct one demonstration project in Hanoi.

(ii) Vietnam Canada Environment Project

The Vietnam Canada Environment Project (VCEP) has conducted two demonstration projects on industrial pollution management in Hanoi: 1) Southeast Asia Brewery Ltd. and 2) Hanosimex (textile factory). These demonstration projects recently completed cleaner production assessments for each enterprise. A number of recommendations for improvements are economically positive and will provide environmental benefits were made. Most of the recommendations relate to energy conservation (cooling water recycling), water conservation, and material recycling. The next step is for the enterprises to agree with the Hanoi DOSTE on the approach to be undertaken to implement the proposed recommendations.

The VCEP demonstration projects are evidence that enterprise level environmental management is viable, that environmental awareness is increasing in some industrial sector and incremental environmental improvements may be made at relatively low cost. The cost of most of the proposed improvements may be paid back in a very short time (less than one year).

c) Implementing Enterprise Level Management

The Environmental Protection Law requires that EIA reports are to be prepared for existing facilities. These reports are essentially inspections and audits of the current environmental impacts associated with existing operations. Where these facilities fail to meet environmental standards they are required by the law to undertake remedial measures to reduce the environmental impacts. In the year 2000, MOSTE will be issuing new guidelines that will require the facilities to prepare pollution abatement plans. These plans must be implemented within five years. It is proposed to use the requirements for existing facilities to produce an EIA report to ensure that compliance agreements are prepared to gradually bring the serious polluting facilities into compliance with existing laws and regulations.

It is recognized that many enterprises will face technical and financial difficulties in trying to meet the requirements of their pollution abatement plans. It will be necessary for both the Ministry of Industry (to support Central level SOEs) and the Department of Industry (to support Hanoi City

level SOEs) with programs of technical guidance to advise specific enterprises on the implementation of their pollution abatement plans.

i) Industrial Pollution Control Unit in Hanoi DOSTE

To be effective at state environmental management of industrial pollution, the Hanoi DOSTE will have to create an Industrial Pollution Control Unit (IPCU) with the following the primary functions:

- control and management of industrial wastewater,
- control and management of industrial solid waste ,
- clarify and publicize existing environmental regulations for key economic sectors
- assist industry to develop plans to bring each industrial facility into compliance with environmental regulations, and
- monitor progress towards each facility's implementation.

The IPCU will work with industrial facilities to establish compliance agreements to implement the pollution abatement plans developed during the EIAs of existing facilities. These compliance agreements will mandate a schedule of environmental improvements designed to bring the facility into compliance with environmental laws and regulations. The essence of these agreements is that the industrial facility undertakes to execute defined tasks by certain dates in exchange for freedom for punishment, except in cases of gross negligence or carelessness, for failure to meet environmental standards.

ii) Hanoi Department of Industry

The Department of Industry (DOI) is responsible for state management of industrial facilities belonging to the Hanoi People's Committee (HPC). This includes supervision of activities in the industrial sector and reporting to the HPC on these facilities. DOI is responsible for preparation of plans for industrial facilities and submission of these plans for approval to the HPC. DOI responsible for direct management of 50 facilities. DOI is under the administrative control of HPC under the professional guidance of MOI. The main legal documents that guide operations are 1) MOI guidelines on functions and responsibilities of DOI, and 2) HPC - Decision 15 on Management of Industrial Enterprises.

Environment management is the responsibility of the Technical, Resource, and Environment Division of DOI. This division has nine staff. One of the

staff is responsible for environmental management. The environmental management responsibilities of the division include:

- Supervision of the operations of facilities to minimize environmental pollution and work with facilities management to solve problems
- Cooperation with the inspection division of the DOSTE
- Cooperation with the DOSTE to develop environmental regulations for industrial facilities

iii) Ministry of Industry

The MOI of Industry has an important role in implementing environmental management in SOEs. It will be many years before the individuals SOEs have the capacity and financial capability to have enterprise level environmental management. MOI must see that individual enterprises put in place effective environmental management systems. Strong policy direction and environmental guidelines are needed to ensure the individual SOEs take their environmental management responsibilities seriously. Various technical divisions and research and environmental centers within MOI must provide technical assistance to individual enterprises to: 1) identify environmental pollution problems, and 2) recommend cost effective solutions. MOI can also use its powers of inspection to encourage SOEs to implement effective programs of pollution control programs.

MOI's cooperation with environmental management authorities in the relocation of SOEs under their control and direction will be necessary to reach the goals of the Hanoi General Urban Master Plan 2020. It is likely that MOI will have to subsidize to these SOEs for relocation.

2) Relocation of Polluting Enterprises

The relocation of industry from urban areas to new industrial zones in suburban areas is a major element of planning to control pollution in Hanoi. Movement of the seriously polluting industries will have a positive effect on reducing pollution in those localized areas where industries are located within densely populated areas. Thus the local populations in those areas will benefit. However, unless new pollution control systems and more stringent environmental management are put in place in the new industrial zones there may be no reduction in the regional pollution loads.

Most new industrial zones are being constructed to promote socioeconomic development and not specifically for relocation of polluting industries. There needs to be greater coordination between the planning and development of industrial zones and planning of the relocation of existing industries. For example, each enterprise is required to find its own new site and usually must exchange the land with another enterprise.

(a) Relocation Efforts in Hanoi

The relocation of the industrial facilities is based on creating a more livable environment in Hanoi City and is mandated by the General Urban Master Plan for Hanoi to 2020. Plans for relocation include those seriously polluting facilities located in the following industrial areas:

- Thuong Dinh
- Mai Dong - Vinh Tuy - Minh Khai
- Truong Dinh - Tuong Mai - Hoang Mai
- Phap Van - Van Dien
- Chem

Facilities in other industrial areas will be required to upgrade their process technology, pollution control technology and waste management systems. The industrial zones themselves are to improve and construct the necessary infrastructure for wastewater treatment and solid waste management. Specific industrial zones that are targeted for improvements are:

- Duc Giang - Yen Vien
- Cau Giay - Mai Dich
- Cau Brou
- South and North Thang Long
- Sai Dong
- Noi Bai
- Dong Anh

Hanoi has proposed that specific industrial zones be created to allow small industries to relocate. Tranh Tri and Gia Lam industrial zones have been approved. Both these zones are about 15 -20 ha in size.

Industries have already been relocated

Industry	Company	Old Location	New Location
Textile	Dong Xuan Knitwear	67 Ngo Thi Nham Hai Ba Trung dist Old City Center	
Paper	Truc Bach Paper	253 Thuy Khue Tay Ho dist Old City Center	Co-located with Giai Phong Mechanical
Rubber	Hanoi Rubber	32 Cat Linh Dong Da dist Old City Center	Cau Dien
Rubber	Sao Vang	Thanh Xuan dist Old City Center	Xuan Hoa
Dyeing	To Chau Dyeing	53 Ngo Sy Lien Dong Da dist Old City Center	Mai Dong, Hai Ba Trung
Chemicals	Ba Nhat Chemicals	Hai Ba Trung dist Old City Center	Merged with Kien Khe Lime Enterprise 27 Van Chi, Bach Mai
Leather, Footwear	Hanoi Leather and Footwear	151 Thuy Khue Tay Ho dist Old City Center	Tanning factory move to Mai Dong (1993)
Leather, Footwear	Leather and Footwear Research Institute	151 Thuy Khue Tay Ho dist Old City Center	Discontinued research laboratory at the location

Enterprises that are expected to be relocated

Industry	Company	Old Location	New Location
Plastics	Hanoi Plastics	27 Hai Ba Trung Hoan Kiem dist Old City Center	
Wood	Wood Enterprise	36 Thinh Hao 1 Alley, Ton Duc Thang Dong Da dist Old City Center	
	Long Bien Company	Old City Center	
Chemicals	Branch of Vietnam Antiseptic Company, Vietnam General Chemical	Duc Giang, Gia Lam Gia Lam Planned Urban Area	
Stationery	Hong Ha Stationery	25 Ly Thuong Kiet Hoan Kiem dist Old City Center	
	Post Equipment and Material	64 Tran Phu Ba Dinh dist Old City Center	

a) Process for Identifying and Planning for Relocation

(i) Enterprises Owned by HPC

The process for relocating a polluting industry begins with the DOSTE identifying serious polluters and making a recommendation for relocation. Then each enterprise prepares plan for relocation (site selection, financing, process improvement). The major problem is how to select a new site and to exchange the existing site for the new site. For example, the site that was occupied by a chemical plant is slated to become a park and Do Cho dyeing plant exchanged land with Bao Viet (an insurance company). Once the plan is prepared, it is submitted to HPC for approval. The HPC will create an appraisal committee to review the plan. After HPC approval, the relocation process can begin.

(ii) Enterprises Owned by Central Government

The enterprises from all levels of government have been proposed for relocation. Unfortunately, the HPC does have the power to force the relocation of enterprises owned by the Ministries of the Central Government. In this case, the overall approach to relocation will be similar, but another level of approval will be required at the ministerial level. First, the enterprise and the concerned ministry will have to agree in principle to the proposal from the HPC and DOSTE that the industry be relocated. Then the enterprises will have to prepare a relocation plan for approval by both the concerned ministry and the HPC.

b) Problems Encountered with Relocation

The first problem is the development of fair and economically sound procedures for deciding on those enterprises that must be relocated. Relocation will involve significant economic and social costs for a facility including:

- movement of physical plant
- relocation of the workforce
- construction of the new facilities

It is likely that the many of the worst polluting industries are also the most uneconomic. Their physical plant may have to be completely replaced. Many of their work force may have to be replaced or retrained to make use of new technology. Relocation orders may actually force the facilities to close down

or to completely restructure their means of production and replace much of their labor force.

In addition, the new location will likely have different requirements for pollution control. In general, the following conditions will likely apply to the new location:

- the existing levels of pollution will be less will be less than old location
- population levels will be lower and threats to local residents
- the new facility will likely be subject to current laws and regulations
- while the regulations will be the same the application may be less stringent.

However, the likely result will be that the new facility will have to make a greater investment in pollution control and other environmental protection measures.

(b) Establishment of Relocation Fund

It may be necessary to examine the needs for relocation in the context with the economic restructuring of the Vietnamese economy. The economics of relocation may dictate that it is better start new enterprises with new physical plant, new management, and new staff in the new locations rather invest is trying to transform facilities that are both serious polluters and economically inefficient. The net effect of these influences may mean the existing serious polluters will choose to remain in existing locations as long as possible for economic reasons. Without economic and fiscal incentives to relocate, it may difficult achieve the objectives of industrial relocation.

Consideration should be given the establishment of fund to provide financial assistance to enterprises wishing to relocate. The fund should be set up according the following principles:

- the fund will not provide grants or other forms of subsidy
- the fund will provide loans at market rates of interest
- the fund will provide only part of the funds needed for relocation expenses
- the fund will provide funding for specified relocation expenses
- the fund must operate on a sustainable basis
- loan approvals must follow a specified and transparent process

i) Relocation credit

As a general rule, enterprises will move from a densely populated urban area to a suburban area with lower population. Also, it is likely that they will move from a more valuable site to a less valuable site. This difference in the value of the site provides a potential source of funding for relocation. In the absence of market mechanism, it is difficult to ascertain the actual differences in value. However, the enterprises being relocated should receive some credit for difference in value of their site. A system of relocation credit should be created to assist the enterprise that is being relocated. In principle, the system might operate as follows:

1. the value of the two sites is determined and the differential value is calculated;
2. the enterprise that is being relocated receives credit for differential value and is allowed to apply to the relocation fund for monies to fund certain expenditures including expenditures on pollution control.

It is likely that the State Budget will be used to establish this fund. While, it is possible that the enterprises that taking over the old site (the more valuable site) may be able to contribute the cash to the Relocation fund, it is more likely that it does not have any excess capital.

(c) Establishment of Industrial Zones

The development of new industrial zones is a major tool for the socio-economic development of Vietnam. Numerous industrial zones have been planned and many have been constructed to attract foreign direct investment into Vietnam. The creation of industrial zones (IZ) is a key part of policy and strategy to hasten industrialization throughout the country. Decree 36/CP. April 24, 1997 provides the basic legal framework for IZ in Vietnam. This supersedes regulations passed in 1991 and 1994.

In general, there are four types of industrial zones:

1. IZ establish to meet the needs for state owned enterprises based on VN development needs.
2. IZ established to meet demands for relocation of existing facilities from urban areas.
3. IZ for small scale processing of agricultural products and seafood – these are locating near the source of raw materials to help with rural industrialization

4. Modern IZ – that are new built to accommodate large scale industries and attract foreign investment

This last type of IZ has attracted foreign investment both in industrial zone infrastructure development and individual enterprises locating in the industrial zone. These industrial zones are costly to build and risky as infrastructure investments must be made up front prior commitments from individual companies to locate in the industrial zone. Infrastructure must be developed to a high level to compete with other industrial locations in ASEAN countries.

In principle, IZ offer a number of advantages including:

- opportunities for facilities to share infrastructure (roads, drainage, electricity, etc.)
- opportunities to create common systems for treatment of wastewater and solid waste; and
- opportunities for facilities to work together in waste exchange programs – where one facility may be able to use the waste of another facility in its production process

(d) Environmental Problems in Industrial Zones

In practice, there a number of environmental problems associated with existing industrial zones including:

- lack of cooperation amongst State agencies in the planning for IZ
- incomplete implementation of planned infrastructure – particularly centralized waste treatment plants
- no policy to force IZ Infrastructure Developer to improve the infrastructure
- lack of regulation and guidelines for environmental management in IZ
- lack of environmental management staff in IZMB and IZ infrastructure development company
- no environmental inspection and supervision in IZ

The situation with respect to wastewater and wastewater treatment is a case in point. All new industrial zones are to have a centralized waste treatment facility, however only about 25% of infrastructure developers have installed these systems to date. There are number of reasons including: 1) large initial investment cost; 2) it is difficult to estimate the capacity to design for without having a firm idea on which industries and scale of industry that will located

in the IZ; 3) it takes time to comply with procedures for approval from MOC and MOSTE with respect to construction of wastewater treatment systems; and 4) costs of operation of treatment plants are high.

3) Reform and Modernization of State Owned Enterprises

(a) Promotion and Acceleration of Equitization Program

Vietnam has embarked on a process industrialization and modernization. The early successes (i.e. GDP growth, increased wealth, macro-economic stability) of socioeconomic development have been encouraging. The industrial share of GDP has been increasing and is predicted to further increase in the early part of the twenty-first Century. However, it is recognized that the state owned enterprises (SOEs) need to restructure to increase economic efficiency. This restructuring will require new and better management, staff retraining, more sophisticated marketing and distribution, and improvements in process technology. Vietnam is experimenting with equitization, whereby workers in SOEs and outside investors may purchase equity in SOEs. In some cases, the SOEs are to be sold outright. In other cases, only part of the shares is being offered for sale. However, most the key economic sectors will remain under the control of the State.

Most state enterprises were established before the Environmental Protection Law was passed and before there was any concern for environmental problems. These enterprises were established with little if any regard to environmental pollution control. Today, many SOEs are struggling with restructuring, limited availability to capital, out of date technology, and the responsibility for social welfare of thousands of people. Because of this, they lack capital and the capacity to implement effective environmental pollution control measures.

Those SOEs that are successful in restructuring will first make new investments in process technology that will increase productivity and economic efficiency. Where possible, the state environmental management agencies and donors alike must make these enterprises aware of environmentally sound technologies. This will give them the knowledge to make wise environmental decisions when upgrading their facilities. In other words, the restructuring and equitization can be one of the most profound measures to fight against the industrial pollution.

However, the progress of the restructuring and equitization is rather slow. With regard to the equitization, only 150 SOEs are equitized to date in the country. In Hanoi City, only 30 SOEs are equitized.

Working out specific actions to accelerate the equitization is itself a big subject and beyond the scope of this environmental master plan study. However, some suggestions for the direction toward acceleration are given hereunder for consideration by the Government, referring to the suggestions made by the Master Plan of Industrial Development in the Hanoi Area by JICA which was completed in 1995.

i) Clearer and stronger determination of the Government on the equitization should be addressed, including its enactment.

ii) Privatization as a form of equitization may be considered for more efficient management of SOEs in line with the Government principle of adapting to the market oriented economy.

iii) In order to give stronger incentive and provide stronger financial strength to the equitized/privatized enterprises, at least a part of the revenue accrued from the equitization should be made available to the equitized enterprise for their investment for replacement and modernization of production facility and others. The form of this financial support can be the equity held by the Government, long-term low interest rate lending, etc. For this purpose, Equitization/Privatization Fund may be set up, the major funding source of which should be the revenue through equitization.

iv) Evaluation and clearance of non-performing assets and debts through the National Debt Resolution Committee

v) Establishment of an employment promotion system, including early retirement allowance, establishment of a job offer/hunting information network and job placing offices

vi) Provision of adequate and clear information on the financial status of enterprises (transparency of information) and adoption of modern accounting standards

vii) Separation of ownership and management of SOEs

viii) More clear adoption of the majority rule in the voting of the Board of Directors in the enterprise