

Industrial Relocation for Urban Environmental Management: Special Focus on Ho Chi Minh City (HCMC), Vietnam Overview and Analysis

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Sustainable development may be defined as achieving socioeconomic development without causing severe damage to the environment. Furthermore, most of the goals under socioeconomic development, including better living conditions and availability of natural resources for consumption, could not be achieved if there is irrepressible damage to environment. Finally to balance the supply of natural resources for meeting the intra-generation, including other species, and inter-generation needs, the environment should be protected while improving the economic situation, as well as living standards.

In many cities, small and medium sized enterprises (SMEs) and informal industries are causing major environmental damage through water, waste, air, and noise pollution. This damage worsens when there are more users with rapid urbanisation for the natural resources including water and air. Rapid urbanisation also results in bringing these polluted industries within the city limits. Therefore, the impact of their pollution is very immediate and severe. Most cities try to relocate these industries outside the city limits to achieve two environmental related goals, in addition to other socioeconomic objectives. These are goals are: to reduce the direct impact on the residents; and cleaner production (CP), as well efficient pollution control measures for various industries located within the new industrial limits, such as combined wastewater treatment.

This industrial relocation is not an easy task, as there are various local stakeholders who rely on each other. For example, the residents of a city elect their local governments; however, to run the government, most of the taxes come from economic activities and industries. On the other hand, these SMEs and informal industries provide sustenance to many local residents while producing environmental damage, which again badly affects the community. Relocation may result in job losses for local citizens and even loss of some industrial activities. To transform this vicious circle into the virtuous circle, where most of the stakeholders may come up with a win-win situation, requires a lot hard work. New policies and regulations are required for environmental protection; many incentives or subsidies are required to help industrial relocation with improved technology; public awareness is essential to allow the community to understand industrial relocation and help them get accustomed with new jobs or new location of jobs; and stakeholder dialogues to learn about the holistic impact of industrial relocation, mainly in terms of introducing cleaner production practices at new location, achieving economies of scale in introducing various combined pollution control measures.

This thematic seminar was focused on bringing international experiences to Ho Chi Minh City (HCMC) to assist in their industrial relocation plans. This report is divided into two parts. The first part is the overview of the seminar with background information. The second part briefly analyzes the presentations during the seminar.

Overview

Industrial relocation in HCMC is linked with national policies for achieving sustainable development. Initially, due to the “Doi Moi” policy by the Vietnamese Government since 1986, there has been rapid socioeconomic development. However, this has led towards environmental degradation through forest depletion, decline in bio-diversity, soil degradation, water contamination, air pollution, and accumulation of hazardous and solid waste.

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1.1 Sustainable Development Strategy in Vietnam

For achieving the targets of sustainable development in Vietnam, a draft “National Conservation Strategy” was prepared in 1986, and in 1991 a “National Plan for Environment and Sustainable Development in Vietnam for the 1991-2000 Period” was formulated. In December 1993, the National Assembly adopted the “Law on Environmental Protection” and the Law was enacted in January 1994. In 1998, the Politburo of the Communist Party of Vietnam promulgated the Directive 36-CT/TW on “Strengthening Environmental Protection in the Period of Industrialization and Modernization of the Country.” In 2000, the Ministry of Science, Technology, and Environment (MOSTE) prepared the “National Strategy for Environmental Protection for the 2001-2010 Period.”

The National Plan for Environment and Sustainable Development was adopted in 1999 to implement action plans for natural resource conservation and rehabilitation; urban and industrial pollution control; and enhancement of environmental planning, management, and institutional framework. For urban and industrial pollution control, the following programs and projects are highlighted in a UNIDO (2001) report:

- Institutional development for industrial environmental management: Industrial environmental management units are established in Ministry of Industry, in addition to National Environmental Agency (NEA) and former Departments of Science, Technology, and Environment at the local government level. These units should be further strengthened and institutionalized.
- Legal development to enforce compliance with the Law on Environmental Protection (LEP): This law was introduced in 1994 and the Prime Minister has enacted various decrees since then for industrial environmental management. These include the Oil and Gas Law, Mineral Resource Law, Ordinance on Radiation Safety, Ordinance on Natural Resources, Directive on Urgent Measures on Solid Waste Management in Urban and Industrial Areas, Decision on the Establishment of Vietnam GEF, Decision on Hazardous Waste Management, and National Plan for Oil Spill Prevention and Response.
- Additionally, the formerly named MOSTE issued a wide range of legal documents specifying environmental protection by developing a set of more than 200 environmental standards.
- Environmental Impact Assessment (EIA) is being made mandatory for various types of industries and investments.
- Environmental control and inspection are being reinforced to check pollution, and environment crime is included in Criminal Code 15/1999/QH-10. This was approved by the National Assembly in 1999 and includes “air, water and land pollution, and import of technologies, machinery, equipment, waste and substance that seriously pollute the environment.”
- Environmental monitoring and analysis is part of MOSTE and the monitoring networking is expanding. The national procedures for environmental monitoring and analytical methods have been completely formulated.
- Environmental investment is being made in various programs including a master planning of industrial environmental protection, industrial pollution prevention policy, cleaner production program, and so on.
- International cooperation for environmental protection has been strengthened with various organizations (HCMC partnership with the Kitakyushu Initiative is an example of international cooperation for environmental protection.)

1.2 Sustainable Development Strategy in HCMC

The environment management strategy of HCMC needs to consider this city’s socioeconomic and physical characteristics. This the largest centre in the country with respect to economy and population of about 6 million. The basic physical infrastructure such as drainage and traffic system was built a long time ago,

resulting into degraded and congested facilities. The wastewater of the city is mostly not properly treated and is being discharged into natural water bodies. The dumping of illegal solid waste into the same natural bodies is resulting in severe surface and ground water pollution and flooding. With the current rates, the wastewater of the city will double by 2010. There is about four thousands tons of solid waste being generated everyday. This only includes domestic, construction, and medical waste. By 2010, domestic waste will be three times higher. Air pollution is mainly from transport and industrial activities. The vehicle growth rate of about 14% will further worsen the air quality. Industries, which are scattered all over the city, are emitting air pollution, discharging polluted wastewater, dumping solid and hazardous waste in natural bodies, and generating noise pollution.

By the end of 1999, the formerly named DOSTE developed “Orientations for Environment Protection Strategy of Ho Chi Minh City up to 2020,” and this has been submitted to the Prime Minister in 2001. This is the foundation for Project VIE96023 to develop “Strategy for Environment Management of HCMC.” This Strategy should be dynamic and feasible focusing community consultation and awareness raising; air pollution reduction; water resource preservation; industrial solid waste management; urban solid waste management; drainage and sewerage management; green space development; and environmental system management system improvement.

1.3 Industrial Relocation in HCMC

1.3.1 Industrial Structure

Industrial pollution control, through industrial relocation and cleaner production, is one of the major goals of HCMC. Industry is one of the crucial economic sectors in the city, and it contributes 34% towards GDP with about 30% industrial production value of the whole country. Foreign investment is growing rapidly, with industrial parks being constructed to fill the demand. HCMC, Dong Nai, Binh Duong, Ba Ria – Vung Tau, a part of Long An and Tay Ninh have formed southern focus point for industrial growth. The nuclear point is HCMC and three satellite towns including Thu Dau Mot, Bien Hoa, and Vung Tau. HCMC has currently two export processing zones (EPZ) and ten industrial parks (IP), out of which two EPZs and eight IPs with 469 factories are already in operation. There are about 1,000 manufactories and 26,042 craft-industrial enterprises (most of these are small and medium scale, about 70% located in the inner city). According to statistical data in 2000, the total number of craft-industrial enterprises is 27,865. Most craft-industrial enterprises are located in the inner city, mainly in districts 5, 6, 11, and Tan Binh District, and intermixed in centralised residential areas.

Economic Sector		Gross Output (Million VND)	Industrial Establishments
State	Central	18,900,731	121
	Local	5,443,962	157
Non-State		12,111,958	26,042
Foreign Investment		13,103,656	313

Most of the major state-run enterprises were constructed and built before 1975, characterized by large areas, outdated technology, and equipment so outdated that no parts are available for replacement. Typical industries are pulp and pulp paper, steel mills, and rubber processing. These enterprises have issues to address in renovating technology due to a lack of invested capital. More than 90% of state-run factories are unequipped or under-equipped for waste treatment. A major reason is poor awareness and understanding of enterprises for environmental protection. Enterprises are slow and have little interest in complying with mandatory regulations. There is also a lack of financial support mechanisms and policies from the government.

Most non-state-run industries have a “younger” history of development in comparison with state-run enterprises. These enterprises started burgeoning as the Party and the government launched renovation policies. Technological application in these enterprises varies and depends on their source of capital capacity. Many of them are actively developing innovated technology and equipment continuously. Their products meet and keep pace with market requirement, are prevalent in the domestic market, and are well competent to foreign products. Notwithstanding, some enterprises are unable to invest in cutting-edge

technology due to insufficient capital. These enterprises export equipment and technological facilities, which cannot be reused. Hence, this results in “patch up” of production technology and ineffective operation resulting in poor quality products.

Some non-state enterprises have been established after launching the Law on Environmental Protection. These comply well with the regulations for environmental protection. Some of these enterprises have installed waste treatment facilities that meet the requirement of the standard as per their production scale.

Most of informal or cottage enterprises have primitive production technology, mainly manual labour. Therefore, their efficiency is low for material consumption and inevitably they generate much waste, resulting in gross environmental pollution. The most important issue is location of these enterprises, which are in existence in centralised residential areas. This grouping forms a number of handicraft villages such as alcohol, noodle, dyeing textile, and leather tanning enterprises. As a result, environmental issues are more complex and challenging. Because of limited space, waste treatment equipment/facilities cannot be installed and awareness and attention regarding environmental concerns is poor.

The multi-national industry is considered one of the “youngest” in HCMC. Most are located in planned industrial parks and export processing zones. Technological application is fully foreign imported and appraised by authorities. It is generally recognised that those technologies are quite advanced in the region, even up to the standards of technology in developed countries. Some outdated technologies were exported to Vietnam; however, those can be controlled and inspected. Most of the waste treatment facilities of these industries are modern and installed in early stages of factory construction.

1.3.2 Industrial Pollution

Air borne pollution: Emissions from the burning of fossil fuels and production lines are causing severe air pollution problems in HCMC. Major contributors to air pollution are comprised of acid gas emitted from metal plating, solvent gases and dusts generated from paint line, toxic gases emitted from plastic moulding, lead gas from lead soldering, solvent gases emitted from printing industry, and dust emitted from yarn and garment industries, among others. Boilers and furnaces in HCMC annually emit 578 tons of dust, 78 tons of SO₂, 84 tons of CO, 2,016 tons of NO₂, 52 tons of hydrocarbon, and 25 tons of aldehyde.

According to monitoring data, concentrations of dust in the ambient air (0.4-0.5 mg/m³) exceed allowable standards (0.3 mg/m³). Similarly, noise level is high, and odour is noticeable in open areas.

Surface and groundwater pollution: The total flow of wastewater discharged into creeks, canals, and rivers is 155,250 m³/day, with total load of BOD equal to 26,389 kg/24 hours. Most of water bodies are polluted by industrial effluent, i.e. Cai creek, Xuan Truong creek, Nhum creek (in Thu Duc district), Tan Hoa Lo Gom canal. The groundwater layer in some areas is also contaminated, such as wells in Xuan Hiep, Linh Trung ward, Thu Duc district, wells closed to factories in Phuoc Long, district 9. Drilling is necessary to access deeper layers.

Solid waste: The total amount of solid waste is estimated at 3,924 tons per year, in which hazardous waste accounts for about 705 tons/year. Treating industrial solid waste in HCMC is a major challenge. Additionally, large equipped treatment plants have not yet been established, and only small-scale recycling facilities are in operation.

Environmental protection programs in industrial sector during past years: Since 1992, HCMC has established state management activities on environmental protection. The Law on Environmental Protection and specification guidance is also carried out. In particular, many programs were developed to support those enterprises engaged in improving pollution control measures. A programme on investigating, surveying state of industrial pollution was implemented from 1993 to 1996. This program surveyed, elaborated, measured, and quantified pollution rates in 265 enterprises. It also launched a “Black Book” including 87 enterprises, as pollution rates generally exceed the permitted standards. The Programme on Cleaner Production, implemented by UNIDO and funded by the Swedish Agency for Development Cooperation (SIDA), began in 1996. The purpose of this programme is to support enterprises completing their management procedures, material-fuel saving, waste minimization, and reducing burden investment on end-of-pipe treatment. Consequently, enterprises can attain better efficiency in production and meeting

regulations on environmental protection. A programme on abatement of industrial and craft industrial pollution in HCMC was set up in 2000. This programme is the widespread propagation of outcomes of “waste minimization with cleaner production,” in accordance with the decision of the People’s Committee in 1999. A supporting programme on modernization of enterprises, low-cost production, holistic competence, and promotion of export activities, as well as a nationwide policy for construction and development of industrial parks was also introduced.

1.3.3 Relocation Targets and Strategy

The former Department of Science, Technology, and Environment (DOSTE), now the Department of Environment Natural Resources (DENR), has formulated policies for the relocation of industries causing environmental pollution, based on the Environmental Strategy in HCMC. DENR has also developed plans and procedures to undertake this industrial relocation program. The People’s Committee of HCMC has decided not to issue licenses for investment or trading in centralised residential area.

The Kitakyushu Initiative is supporting HCMC, through its pilot activity, to accelerate industrial relocation from District 4. The following top priority polluting enterprises were identifying for relocation:

- i Chemical sector: basic chemicals, batteries, pesticide, cooling chemicals, aluminum, disinfectant, dyeing agent, painting, and medical materials.
- ii Recycling industry: paper, plastic, and metals
- iii Rubber rolling and milling
- iv Leather tanning
- v Electric plating, metallurgy, and molds
- vi Pulp paper
- vii Building materials, porcelain, and glass
- viii Wood processing
- ix Food processing, fish sauce, salt, cooking oil, alcohol, beverage and brewery
- x Tobacco
- xi Livestock breeding, and slaughtering

Public awareness and stakeholder participation is targeted through local seminars, posters, leaflets, and media campaigns. This will improve the community’s understanding of the industrial pollution and its health and economic consequences. Stakeholder seminars are organised involving industries, communities, management of industrial parks, politicians, and government departments for improved stakeholder participation; based on stakeholder participation, any alterations or modifications in the relocation plan or in the mechanism can be conducted.

Tangible outcomes are expected in terms of improvement in air and water quality, and reduction of waste and noise. This will result in hygienic conditions and lower incidence of sickness episodes. Furthermore, improvements in urban ecology and land prices are also expected.

1.4 International Experiences in Financial Mechanisms

Most of the financial mechanisms are discussed in the presentations and also highlighted in the following section of “Analysis” of these presentations. These primarily include the right to sell and/or change land use status of the urban land, which is occupied by the polluted industry. The cost of urban land is quite high and that can generate good revenue to support the capital investment for relocation. In addition, other common mechanisms are subsidies or tax incentives, low-interest or interest-free loans, supporting the transformation of the industry to modern and high-tech industry, training of the workforce, and so on. Here, we highlight the experiences of Hyogo prefecture, Kobe as the major city. We also make mention of revolving funds for clean water, and brownfield management in the U.S.A.

Incentive System for Relocation into the Industrial Area in Kobe: The following chart is self-explanatory (http://www.city.kobe.jp/cityoffice/39/040/english/yugu_e.html):

Concerning Provision		Content	Inquiries
Exemptions for Purchase or Exchange of Designated Business Capital (Special Taxation Measures Act 65, Paragraph 7, Item 1)		In the case of relocating from a previously developed area of the city to a special inducement zone such as Port Island [Second Stage] Urban Renewal Area, the Complex Industrial Development Area (land for manufacturing facilities), etc., selling of business assets such as an old factory (conveyance of assets), and purchase of business assets such as a new factory (purchase or exchange of assets), there will be a reduction of income tax, corporate tax, and municipal and prefectural residence tax through a compression of accounts, etc.	Osaka Tax Consultation Office +81-6-6945-0030 Tax Consultation Office, Kobe Branch +81-78-391-3000
Special Land Ownership Tax Exemption (Local Tax Act 586, Paragraph 2, Item 16)		In the case of acquisition of land in such places as Port Island [Second Stage] Urban Renewal Area, the Complex Industrial Development Area (land for manufacturing facilities), etc. and the subsequent actual use of such land for construction of a manufacturing facility, etc., there will be an exemption from the Special Land Ownership Tax.	City of Kobe, Bureau of Financial Administration, Division of Taxation, Fixed Assets Section +81-78-331-8181
Exemptions of Greenery in Factory Area (Exemption in case of establishing a factory in an industrial development) (Regulations Concerning Factory Land, No. 6)		<p>The Factory Land Law provisions for ratio of total lot area devoted to greenery (20%) and ratio of total lot area for environmental facilities (25%, including greenery) will not apply to such places as Port Island [Second Stage] Urban Renewal Area, the Complex Industrial Development Area (land for manufacturing facilities), etc. (However, we shall ensure a fixed band of greenery in areas facing public thoroughfares as provided in the Environmental Improvement Convention.)</p> <p>Under the Factory Land Law, the ratio of productive facilities area to total lot area is set at an upper limit of 15% to 40%, depending upon business classification. However, in the Port Island [Second Stage] Kobe Compound Industrial park (land for manufacturing facilities), etc., according to Regulations Concerning Factory Land, the lot area may be more fully loaded.</p>	City of Kobe Industrial Promotion Bureau, Manufacturing Section +81-78-322-5333
Finance	Financing City of Kobe Small and Medium Enterprise Finance (Industrial Land Promotion Fund Financing)	<p>Financing of funds necessary for such acquisitions as land, buildings, mechanical equipment, etc., for small and medium enterprises moving into the Port Island [Second Stage] Kobe Compound Industrial park</p> <ol style="list-style-type: none"> 1. Limit : 500 million yen (if guaranteed by the Credit Guaranty Association, 200 million yen or less) 2. Interest : fixed rate 1.9% (as of April, 2000) 3. Term : maximum 20 years 	City of Kobe, Small and Medium Enterprise Guidance Center +81-78-360-3206

	Hyogo Prefecture Industrial Land Support Fund	<p>Financing of funds necessary for land acquisition and construction of factories, etc. when newly purchasing land in the Hyogo Prefecture Industrial Land Support Fund Financed Kobe Compound Industrial park, Kobe Science Park, etc.</p> <p>1. Targeted industries : leading edge high-tech manufacturing operations, distribution operations, information service operations</p> <p>2. Limit : 500 million yen (if guaranteed by the Credit Guaranty Association, 200 million yen or less)</p> <p>3. Interest : fixed rate 2% (as of April, 2000)</p> <p>4. Term : maximum 10 years</p>	Hyogo Prefecture, Industrial Labor Division, New Industry Creation Section +81-78-341-7711
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Clean Water State Revolving Fund (CWSRF), USA: In 1987, amendments to the Clean Water Act created this fund for projects including publicly owned treatment works, non-point source pollution control, and estuary management. The objective is to improve water quality by cleaning up potentially contaminated sites. The U.S. EPA provides capitalisation grants to states, which are required to match them at a minimum of 20 percent. States then use these funds to assist public and private entities in carrying out state-determined priority water quality projects. The most common form of financial assistance has been loans with an interest rate of zero to the market rate and a repayment period of up to 20 years.

Brownfields Cleanup Revolving Loan Fund Pilot Program, USA: The U.S. EPA's Brownfields Economic Redevelopment Initiative is aimed to empower states, communities, and various stakeholders to carry out economic redevelopment of brownfields together for their safe and sustainable reuse. The funding for assessment demonstration pilot program is up to USD 250,000 over two years, to assess brownfield sites and to test cleanup and redevelopment models. The job training programs, each funded up to USD 200,000 for two years, to provide training for residents of communities affected by brownfields, to facilitate cleanup of these sites, and to prepare trainees for future employment in the environmental field; and, brownfields cleanup revolving loan fund (BCRLF) programs, each to be funded up to USD 1,000,000 over five years, to provide financial assistance for the environmental cleanup of these sites. These pilot programs are aimed to enlighten states, tribes, local governments, and communities with useful information and strategies as they continue to seek new methods to promote unified approach to site assessment, environmental clean up, and economic redevelopment.

Analysis

There are ten presentations; however, after combining the presentations for HCMC in single analysis, there are eight brief analyses in this part of the report. These are: HCMC, Dalian and Shanghai from China, Surabaya from Indonesia, Ulsan from South Korea, Yokohama and national experiences from Japan, and brownfield redevelopment for environmental improvement from Stockholm in Sweden.

1. Industrial Pollution, and Relocation in HCMC

Three presentations were made by the representatives of HCMC. A brief analysis on each of the presentations follows below:

Department of Natural Resources and Environment, HCMC: This presentation highlights the strategy for environmental friendly industrialisation. The city is investing in waste treatment knowledge and technology to limit waste disposal in accordance with environmental standards. The city is also investing in modern technology to promote Cleaner Production to enhance the quantity and quality of the production. The city is removing either parts or entire polluting units from the current locations. The operations of the polluting units are also being suspended either partly or completely, and/or temporarily or permanently, to change the polluted technology or production line. The city is also trying to rehabilitate the environmental degradation through various activities.

The city is forcing various measures for new as well as current industrial units. The new units should be located in proper zones and should have pollution control equipment as per the national standards. The city,

with the help of its various departments, is pushing polluted units for relocation or changes in the production line. The units, which may control their pollution through installation of pollution control/treatment equipment, are forced to do so.

This industrial removal is not any easy task, as there is lack of public awareness about industrial pollution and cleaner production issues. There is lack of coordination by the various organizations as well as efforts from the industries. Lack of capital to finance relocation or introduction of cleaner production is hampering this cause. The unstable markets for the production as well as prices of natural resources are also hampering this cause. Moreover, there is lack of appropriate policies as well the lack of the implementation of these policies. The legal system is also not effective in this area.

The removal program by HCMC includes the planning and reorganization of the polluting units, granting of licenses for new units, removal of small units to form less polluted and highly efficient large units, and development of industrial zones. The major objectives include systematic implementation of the master plan, relocated polluted units in one area for efficient use of treatment facilities, introduction of better technology and knowledge, and improvement of the efficiency and productivity of the units. As per the investigation, the 684 worst polluting units must be removed, while 1182 other units need to install pollution control equipment at their existing location. The targets for 2003 were the removal of 93 units.

Department of Industry, HCMC: This city, with about 30,000 industries employing more than 480,000 workers, produces about 1/3 of the production value of total national output. Many industries are located within residential areas. Only a few have modern technology, and most are considered major polluters. The city government is undertaking various programs to control industrial pollution. The overall targets are relocation of polluting industries from residential areas, changes in industrial and labour structures for efficiency, and renovation of urban areas. The city's Party Committee has launched a program in early 2002, which will end in 2004. There are three main objectives of this program: identification of polluting units and their relocation, planning of industrial zones for relocation, and support policies.

In 2002, the city government concentrated on the relocation of 10 main industries. In 2003-2004, the government is concentrating on formulating support policies, dissemination of plans of industrial zones for various types of industries, issuance of the list of the industries that must relocate, and guidance on the procedures for relocation. These procedures address investment, environmental pollution control, information and cooperation, pilot programs for wastewater fee collection, decentralized administration of industrial zones and the units within those zones, and operations of various departments and districts for enhancing pollution control. The government and industries must share expenditures. The administration of the industrial zones is conducted through the Steering Committee comprised of various departments.

Department of Finance, HCMC: Based on the above targets by the Department of Natural Resources and Environment and Department of Industries, financial policies and measures were carried out to settle the difficulties of industries for environmental pollution control. Nevertheless, there are still many industries that are not fully aware of their environmental responsibilities. Those industries have neither invested in pollution control equipment, nor in treating their wastewater, solid waste, and so on. Thus far, industrial pollution is rising quite alarmingly. The purpose of financial policies is to support and facilitate industries for their relocation in industrial zones, and to give support to industries for upgrading their production technology and pollution control measures. HCMC Investment Fund for Urban Development (HIFU) will consider and give these industries a loan without interest.

The preferential policies for these industries include:

- (i) Policies for generating capital source through selling of urban properties and transfer of right of land use in the city; the earnings from the sale or transfer of land use rights will be used for relocation of same state-owned industries; non-state owned industries are permitted to get a preferential loan to invest in new units.
- (ii) Policies through taxes include: exemption of cost for land lease within 3 years, preference in income tax of the company by exempting tax for first 2 years and 50% reduction for next 2 years, supplementary preference in income tax for exporting the products, and exemption of import tax for those products, which are not yet been produced within the country.
- (iii) The policy for cost of land lease in the industrial small-scale industry zones to cover the costs for infrastructure including roads and wastewater treatment plants.

- (iv) The policy for house construction for the relocation of staff and support of about VND 300,000 per person for their training to meet the skills required for cleaner production.
- (v) The policy for the redundant workers.
- (vi) The policies to encourage and mobilize industries to actively carry out relocation.

2. Industrial Relocation and Transformation in Dalian (China)

Dalian is one of the fastest growing cities of China with 11.4% GDP growth during 2002. The total investment in relation to environment protection is about 2.05% of GDP. Major industrial pollution is due to SO₂ emissions (70,000 tons), smoke (35,000 tons), and dust (20,000 tons). This city is historically one of the most industrialized cities. In 1995, the city government linked industrial structure and relocation into the overall city planning and development. This relocation and transformation of industries became the main target to implement "The Sustainable Development Strategy." The city government set up a steering committee, headed by the mayor, to formulate the relocation and transformation strategies and procedures. The guidelines have been issued in the forms of documents. Based on these efforts, to date more than 13 enterprises have been removed from the central area. This has helped to considerably reduce the level of environmental pollution.

The city government has taken five measures based on overall city planning, viz.: promising enterprise/products with good profits establish factories with new technology at new locations; unpromising enterprises with less profit are eliminated through legal recourse; several similar small-scale enterprises are moved out into one new place; large industries may break down into smaller parts to relocated polluted parts; and sale of the whole enterprise. There are various policies to help implement these measures. These include simplification of bureaucratic procedures, and support of 40% to 70% of all removal expenditures. The environmental, economic, and social benefits are evidence of the successful relocation and transformation policy. UNEP awarded the "Global 500" to this city because of environmental improvements.

3. Sustainable Development of Industry in Shanghai (China)

Shanghai the traditional economic hub of China is still growing very rapidly, as it recorded 10.9% increase in GDP in 2002. Industrial location is a part of the city planning, which aims to transform Shanghai into one of the world's major economic, financial, trade, and shipping hubs. City planning also includes the development of Yangtze River Delta and Yangtze River Economic Zone. Since the early 1990s, considerable progress has been made in the strategic adjustment in the industrial structure and distribution of the city. The proportion of hi-tech industries and the six mainstay industries has significantly increased the total output value. Due to this re-structuring of industries, the energy and raw material ratio has declined considerably leading towards lower rates of waste and pollution. However, traditional enterprises, especially rural enterprises, are still large in number, causing huge environmental damage.

The major activities to control industrial pollution include: speed up of the development of high-tech or environmental friendly industries in terms of lower energy and raw material consumption; expand and upgrade the mainstay industries through technological innovations; adjust and upgrade traditional industries with efficient and environmental friendly technologies; promote urban type industry with products including garments, cosmetics, toys, and so on; and fostering of environmental industry to make pollution control and treatment equipment available in the market at lower price and with higher efficiency.

Although considerable progress has been made in the adjustment of the industrial distribution pattern, there are still many factories in the downtown areas creating environmental and social chaos. The newly established zones in the suburbs have not brought down the concentration of the factories in the downtown area. It is hoped that by 2010, an industrial distribution pattern appropriate to a modern cosmopolitan city will be in place. The incentive policy includes permission for the right of transfer of original urban land, subsidies and favourite loans at lower interest rates, and partial exemption of taxes.

4. Industrial Relocation for Environmental Management in Surabaya (Indonesia)

Surabaya is one of the oldest industrialized cities, and took in its first major steel industry in 1808; now there are various industries supporting economic growth, but which are also damaging the environment.

This presentation highlighted the case of the NGAGEL industrial complex, which has developed since 1916. Due to industrialization in this area, the surrounding area was developed as a residential and commercial area for the workers. Commercial activities spread rapidly and started causing congestion and hardships to the residents. Old industries are also creating a lot of environmental damage and nuisance to the local communities. To overcome these problems, the government prepared a new industrial area, based on the 1978 master plan "Master Plan 2000." This NGAGEL area would be transformed into commercial area, and all the industries would be relocated to new industrial areas "RUNGKUT" in East Surabaya and "TANDES" in West Surabaya. The permits of the industries would not be renewed, so owners could convert these factories into commercial complexes. Most of the old industries are housed in historical buildings, and this heritage can help to build famous commercial complexes by keeping the original architecture of these buildings.

5. Experiences of Industrial Relocation from Ulsan (South Korea)

In most countries, the Asian Miracle boosted industrialization based on "development first, clean-up later." Environmental externalities were severe. During the recession, intense industrial activities were carried out to keep the profit level the same, especially by cost cutting measures. This cost cutting mostly affected pollution control measures. The government, to overcome the environmental damage due to industrial pollution, planned for relocation of various industries. However, relocation was mainly focused on the relocation itself, rather than improved pollution control measures, and there was lack of stakeholder participation. In Ulsan city, two major industrial parks, Ulsan-Mipo and Onsan, were developed. However, the targets for pollution control still seems to be far reaching, mainly due to reckless industrial estate planning within Onsan industrial park as well as due to irrational charging and compensation systems for relocation. Based on Ulsan's experiences, it could be suggested that pre-requisites for success, to reduce environmental damage through industrial relocation, are to build institutional capacity and to enhance management capability.

6. Relocation of Industries to Kanazawa Industrial Park in Yokohama (Japan)

Yokohama, one of the biggest and most industrialized cities of Japan, also faced the same dilemma in which most factories became part of the city centre, as a result of rapid urbanization and expansion of city limits. Due to a high level of public awareness and campaigns, it was difficult to keep those factories near residential areas. Hence, the Kanazawa Industrial Park was developed with three main objectives: after relocation, improved land utility of urban areas; strengthening of business operations by grouping the similar industries in one area; and development of overall urban centre with industrial, commercial, residential, and recreation activities in a harmony. This industrial park is established on the part of reclaimed land in Tokyo Bay, and various infrastructure services have been provided to facilitate industrial activities and pollution control.

Industries are place by type, as there are 14 classifications. Furthermore, after relocation, all the industries were required to continue to implement all possible measures for pollution control and environmental protection. Collective facilities were established, for example for wastewater treatment, and energy use was restricted to electricity and gas. The pollution control plans were mandatory and assessment of these plans is done to see if these can meet the established standards. Guidance for relocation plans and organizational restructuring has been issued. A liaison council from the industries has been established to streamline the working relationship between the administration and the industrial sector. To reduce the burden of small and medium sized businesses, subsidies were introduced to comprehensively promote relocation. These include exemption of various taxes for various durations, creation of special fund, and establishment of co-operatives by pooling a part of the taxes. Kanazawa Industrial Promotion Centre has also been established to carry out promotional activities of these industries.

7. Pollution Countermeasures for SMEs in Japan

Japan is a country, where various residential, commercial, agricultural, and industrial sectors have to compete for the land, due to its limited availability of plain areas. Industrial and commerce sector was occupying about 14 thousand hectares with 0.4% of land use in 1963. This rose to 62,000 hectares with 1.6% of total land use in 1989. The limited availability of land forced the formation of a densely concentrated economic society. On the industrial side, there was rapid transition toward heavy chemical

industries, and concentration of industries in major cities. Industrial pollution control strategies were based on dealing with particular problems when they arose; choosing financing between industrial development and pollution control measures; and administrative actions mainly by the local governments. Most of the pollution control measures, voluntary or mandatory, were introduced after the establishment of democracy and due to pollution protest movements. These pollution control measures were formulated and implemented with the help of policy awareness for all the stakeholders and mass media campaigns. The local governments received administrative power and a system of independent finance. The preparation of a legal system to support pollution control measures also started simultaneously.

Local plans were introduced, which include sub plans for pollution control. The first step was to designate priority areas and then implement support projects. The second sub plan was the industrial location. Due to major pollution in the 1960s, the private sector, based on the mutual agreements, made huge investments during the early 1970s. The governments established various bodies to carry out proper implementation of pollution control measures, preparation of manuals and guidelines, training for the workers, and pollution control education at school levels. Surveillance and guidance systems were also put in place for proper inspections and monitoring. Financial and technical support was also made available in terms of tax incentives for pollution control measures, low interest loans and security guarantee for the cost of pollution control measures, and establishment of the Japan Environment Corporation for technical support. Furthermore, as the private financial institutions were not willing to deal with funding for pollution control measures due to high risk and presumption of low input-output ratio in terms of cost, the governments started supporting environmental measures.

Therefore, the public financial institutions played the role of “quantitative supplement” to bridge the gap between funding requirements for pollution control measures, and the funding available from private financial institutions. To make worth this financial support, the public institutions also started research and development to improve the technology for pollution control. This “qualitative support” is more crucial, as private financial institutions can hardly invest in activities of research and development. In addition to support from financial institutions, the government also introduced various tax incentives and made regulations for imbedding pollution control costs into local costs of respective industries.

8. Experiences of Brownfield Redevelopment from Stockholm (Sweden)

Brownfield redevelopment is at the core of industrial relocation plans, as most of the old industries were also polluting soil and ground water. To redevelop these areas occupied by the old industries, there are special procedures and technologies. Brownfield redevelopment is more technical and costly in comparison to green field development, due to environmental hazards. Hence, to make brownfields as competitive as green fields, there should be proper support from the government. This support may include tax incentives, direct capital, and liability clarifications. Furthermore, the redevelopment of brownfields requires holistic management in terms of urban planning, regulations, institutions, appropriate technology, financial mechanisms, and stakeholder participation.

The case study from Stockholm shows a good example for successful redevelopment of a brownfield, especially with environmental improvement targets. Hammerbay Sjostad area was a “shanty town” in Stockholm city. The redevelopment of this area is focused on the water, the beautiful rivers around this small island. The objective is to transform an area, which was the rundown industrial dockland, into an environmental friendly city, where about 20,000 people would be living and about 30,000 would work. The environmental goal is promote a material-recycle society, where the natural cycle should be closed at as local a level as possible, where consumption of natural resources should be kept at minimum, total energy consumption should be reduced and utility ratio should be increased, consumption of fresh water is reduced, sewage is utilized for energy extraction and its nutrient content is return to the soil, building materials are renewable or recyclable and should contain minimum level of substance that is harmful for environmental and public health, all the land area is decontaminated to such an extent that residents are not at risk, transport needs are minimal, and sense of community is high for social and environmental responsibilities. This is becoming the most costly area within Stockholm city, reverting the image of cheap areas even after brown field redevelopment.

HCMC can transform these experiences for the redevelopment of urban areas, after the relocation of the industries. This city can also focus on water and can revitalize the beauty of its traditional rivers.

International and local institutions can work together to assess brownfield redevelopment plans and to arrange appropriate support for these plans. Financial mechanisms may be used to make these brownfields as competitive as green fields. Furthermore, there should be strict environmental standards to protect future users of these areas from contamination. To boost revitalization and redevelopment of these brownfields, a pilot environmental district should be planned for housing and commercial activities. This would be helpful to bring back confidence into the reuse of brownfields and may help to save huge costs in terms of urban land.