

Shanghai International Urban Environment and Sustainable Development Conference Proceedings



*June 27–29, 2001
Shanghai, China*



Shanghai International Urban Environment and Sustainable Development Conference

May 2002

Compiled and edited by
Lee Joanna Harper
Vellet Fernandes

Proceedings document of the
Shanghai International Urban Environment
and Sustainable Development Conference
held on June 27-29, 2001 in Shanghai, China

Contents

Preface v

Acknowledgments vii

OPENING PLENARY SPEECHES

Xu Kuangdi, Mayor of Shanghai 1

Yukon Huang, World Bank China Country Director 3

Dr. Heinrich v. Pierer, President and Chief Executive Officer, Siemens AG 5

Han Zheng, Vice Mayor of Shanghai 7

Kristalina Georgieva, Director, Environment Department, World Bank 11

Mr. Ernst H. Behrens, President and Chief Executive Officer, Siemens Limited China 17

Mr. Ravi Parthasarathy, Vice Chairman and Managing Director, IL&FS LIMITED 21

The Opening Plenary speeches are also available, together with a complete set of the presentations made at the conference, on the CD-ROM attached to this document.

Preface

Shanghai International Urban Environment and Sustainable Development Conference

June 27–29, 2001
Shanghai, China

With accelerated global urbanization, ever-expanding population and related urban environmental degradation, a critical issue for city authorities in the new century is how to provide a safe urban environment for their citizens. There is a pressing need for cities to come together to tackle these common problems.

Shanghai Municipal Government, in collaboration with The World Bank and Siemens AG, held a conference entitled Shanghai International Urban Environment and Sustainable

Development Conference, from June 27–29, 2001. The conference provided an excellent opportunity to bring together representatives from leading cities of the world, environmental professionals and industries, to discuss their concerns as well as needs related to urban environmental issues, and explore possible paths and solutions for urban environmental sustainability.

The aim of the Conference was to facilitate exchange of information among the participating cities and different organizations on urban environmental management issues, to foster fruitful discussion and to promote greater cooperation and networking between Shanghai and the participating cities as well as leading consultants in the area of urban environmental protection. The Conference also encouraged in-depth exploration of links between urban environmental quality and effective management strategies and tools and thereby help create better urban environments in the 21st Century.



Acknowledgments

The Conference could not have taken place without the energy, cooperation, and resources of the following people and organizations:

The Organizer: Shanghai Municipal Government; Co-Organizers: The World Bank, Siemens AG; Sponsors: GTZ, The Clean Air Initiative for Asian Cities, Roche (China) Limited; Implementing Agencies: Shanghai Environmental Protection Bureau, Shanghai Finance Bureau; Shanghai Water Engineering Company (SWEC), for providing additional financial assistance; Austin AUSINO, in particular Ken Rippin and his colleagues, George and Alice, for their integral organization-

al support; Michael Schmitt and his courteous and attentive staff at the Jing An Hilton Hotel; and all the other tireless helpers and volunteers in Shanghai whose time and effort made the conference possible.

Our sincere thanks also go to Kristalina Georgieva of the World Bank's Environment Department for financial support allowing the creation of this document; and to Jim Cantrell and Gerardo Cruz for their tireless work, good humor, and creative energy in designing and putting this document together.

Photos courtesy of Curt Carnemark, Lee Harper, and Mara Warwick.



Aerial view of the Bund riverfront, Shanghai.

Xu Kuangdi

The Opening Speech on International Environment and Sustainable Development Conference

Xu Kuangdi, Mayor of Shanghai, China

Respectfully yours:
Ladies and Gentlemen:

Today, we have pleasure to share our time with friends all over the world to discuss the problems of urban environment and sustainable development, which will provide us useful experience in improving environment quality and promoting urban sustainable development in Shanghai. On behalf of Shanghai municipal government and people, and in my own name, I would like to extend my warm welcome to all the guests. I would also like to express my congratulations on the successful opening of conference.

Environmental protection and sustainable development become a wide-regarded topic concerning our human being's living, especially for a dense populated city. As a mega-metropolis, Shanghai is putting growing emphasis on environment today. We know that the development of urban economy is foundation for improvement of people's living standard, but we will never develop economy at the cost of environmental damage. Only environment and economy grow harmoniously, can real high quality living be achieved, and city have continual energy and vital force.

To realize the co-profitability of economy and environmental protection, we have made strategic industry restructure, which enable our

industrial-centered city shift to open and universal functional economy-centered city. We tried hard to reduce pollution from start point, and encourage clean production process. These years, the expenditure on environment is climbing up to 14 billion yuan, accounting for 3.12% of Shanghai GDP, which is unprecedented in Shanghai's history. In addition, we have been taking many measures on pollution control and ecological construction, and carrying on "Three-year Action Plan" on environment protection to expedite improvement of urban environment.

To make water cleaner in Shanghai, we focused on Suzhou Creek to push forward a citywide rehabilitation campaign on water environmental treatment. In three years, we finished rehabilitation of 15 thousand kilometers waterway. The long time polluted creeks are turning clean; to make sky clearer, we improved balanced energy use and encouraged use of clean energy; to make land greener, we have opened 2,430 ha of new public green spaces since 1998. The public green space per capita will reach to 5.5 square meters this year, and the green space will cover 24% of the city proper.

In the future, we determine to build Shanghai to an international metropolis with prosperous economy, civilized society and graceful environment, which is an important task endowed by history. Shanghai people have been making untiring endeavor to make it come true.

Finally, I would like to express my thanks to all guests who come from afar and give counsel to Shanghai's development. Let's pool our efforts to create a more beautiful tomorrow.

I wish the conference a complete success!

Thank you!

Yukon Huang

Welcome Speech

*Yukon Huang, World Bank China
Country Director*

Honorable Mayor Xu, Vice Mayor Han,
Director Hong (SEPB),
Ladies and Gentlemen:

It is a great pleasure and honor for the World Bank to be a co-organizer of this important conference as part of our collaborative program with Shanghai Municipality.

China is undergoing two profound transitions—from a command economy to a market economy, and from a rural, agricultural society to an urban society. These changes put great stress on the environment and the social fabrics of its cities, presenting challenges of management, finance and equity, to mention a few.

The Shanghai government has shown strong leadership in recognizing the importance of the urban environment for sustainable economic growth, most recently eloquently articulated in its new Five Year Plan. Shanghai has made remarkable achievements in the 1990s, both in restructuring the city's economy and upgrading its infrastructure, while at the same time protecting and improving its environment. It is an engine of growth in China, and a leading city-region in Asia. Shanghai has in many areas set an example for environmental policy and institutional reforms for other cities in China, and is increasingly becoming an important 'resource' city for Asia and beyond.

This conference offers an opportunity to both learn from Shanghai and to share national and

international expertise and experience, drawn from major cities, academia, and industry (the private sector).

This is a rare opportunity to discuss some of the challenges to urban environment improvement that cities across the world are facing: industrial pollution control, air and water quality management, and financing for sustained improvements. I would like to thank the Shanghai Municipal Government for providing such an opportunity. The conference is particularly important in light of the emphasis the Chinese Government has given to the role of urbanization in the next decade.

I would like to make a few points on the subject of the conference.

In their quest for improved livability and competitiveness, cities around the world are giving more attention to urban environmental issues, and increasingly so from a regional perspective.

China's further opening to the outside world, signaled by its joining the WTO, will lay out the necessary conditions for progressive urban devel-



Delegates are welcomed to the Conference during the opening plenary session.

opment. But competition between cities, both within and from outside China, is stronger than ever. Local, regional and global issues are converging. Cities are increasingly involved in global competition, for financing, for investments, and more, and need to be highly proactive to prosper in this new environment. Continued augmentation of environmental infrastructure coupled with optimization of existing assets will be critical for the competitiveness of cities like Shanghai.

Cities around the world are also making greater strides in changing the role of the government from a service provider to more of an enabler and facilitator for service delivery. The environment of cities depends on the quality of various municipal services, and the efficiency and effectiveness of these services, in the end, will determine the livability and quality of life for its residents. This is also increasingly becoming an important element of a city's global competitiveness.

Water and air transcend jurisdictional boundaries, and consequently need to be addressed on a regional basis. City management must not only deal with core urban areas, but peri-urban areas of surrounding cities and towns and the rural hinterland, implications of river basins etc. Shanghai is a good example, with a large metropolitan areas, and being situated at the heart of the Yangtze Delta Economic Region.¹

The World Bank has a long and productive collaboration with Shanghai in improving the city's urban environment and infrastructure. During the last 20 years we have had the opportunity to assist Shanghai in its institutional reforms and capacity building, and have provided financing for

a large and diversified portfolio of investment projects corresponding to lending of close to \$2 billion, or about 5% of the total lending to China, including projects for improved water and wastewater management, roads, ports, and power supply. The Shanghai Municipality was one of the earliest in China to corporatize the wastewater operations and to implement a wastewater tariff. It was also the first to successfully implement a citywide urban information system for the planning and management of urban construction.

Shanghai has demonstrated that rapid economic development does not need to be at the expense of environmental degradation. Indeed, Shanghai has shown that an attractive environment is an indispensable ingredient of a city's competitiveness.

Again, we are pleased to have the opportunity to contribute in a small way as a partner with Shanghai to advance the important subject of this conference. The challenges are many.

On behalf of the World Bank, I welcome you to the conference and wish you productive deliberations.

Thank you.

Note

1. This includes Jiangsu, Zhejiang and Anhui Provinces. This Region has a population of about 200 million, and is the principal economic producer in China, providing 22 percent of total national GDP and about 40 percent of the secondary sector GDP in China. In particular, the city is the "anchor" of a growth corridor which include the cities of Hengzhou and Ningbo in Zhejiang province.

Dr. Heinrich v. Pierer

Welcome Speech

*Dr. Heinrich v. Pierer
President and Chief Executive Officer
Siemens AG*

Ladies and Gentlemen,
I really wish I could be addressing you in person today at what promises to be an extremely interesting conference. And I especially regret not being able to see many friends and revisit one of the most dynamic and fascinating cities in the world—a city our company is proud to be associated with for over 120 years. Thank you, Mayor Xu Kuangdi, for giving me this opportunity to join you all today in spirit, if not in person.

It is a great honor and privilege for Siemens to join with the Municipality of Shanghai and the World Bank as an organizer of this important conference. This is a fitting continuation of a project that we began together years ago, when we created a joint vision of sustainable megacity development in the 21st century. Our vision of Shanghai was presented to millions of visitors at the EXPO 2000 in Hanover, Germany, last year. And this vision, I am pleased to hear, will be the theme of Shanghai's application to host the World Exposition in 2010. Obviously, sustainable urban development and sound environmental policy are key factors in shaping the quality of life for the generations to come.

Urban development has made remarkable progress in China, particularly in the last decade. Living conditions, infrastructure and the urban environment have improved continually, and cities have made a tremendous contribution to the

Professor Xu Zuxin of the Shanghai Environmental Protection Bureau, Dr. Walter Schusser of Siemens, and colleagues continue the discussions over a meal.



rapid, healthy and impressive development of China's economy.

Although the pace of urbanization in China has been quite high over the past twenty years, the level of urbanization in the country is still below other developing countries. Experts say the first half of this century—especially the first 20 years—will be marked by extremely rapid urbanization. The level of urbanization is expected to reach the 50 percent mark in China by 2020. This means that millions of rural residents will be moving to cities. The living space, jobs, life-style and consumer behavior of countless millions of people will change radically. This will have an enormous impact not only on social and economic themes, but on issues of resources and the environment as well. The scope and intensity of this development will be unprecedented in human history.

All stakeholders in China's future—from government agencies and institutions, municipal authorities, the business community and the gen-

eral public—must work closely, constructively and relentlessly to master this unique challenge. Ways must be found to adapt urban infrastructures, economic structures, industrial structures and social structures to meet changing needs. And to ensure an ever better quality of life.

Here, again, we are talking about creating a better quality of life that is sustainable. Things like adequate living space, efficient transportation systems, good work and shopping facilities, reliable power and water supplies and waste water disposal, effective air and noise pollution control, modern communication systems.

Future needs have been identified. Visions have been defined. We have the solutions at hand or have the resources to find them. It is now up to all of us to see how Chinese cities, and among them Shanghai, can best turn these visions into reality.

The most effective way of achieving this, of course, is finding the right partners. In urban development projects of such vast scale and importance, there are enormous advantages in creative and reliable public-private partnerships. Private partners like Siemens can develop and

offer the complex infrastructure solutions required by the cities of the future. These solutions include everything from smart information and communication networks, innovative public transport and private traffic control systems, complete airports, highly efficient power plants, telemetric healthcare services, building automation systems and financing concepts. And they include pioneering world-class solutions like the Transrapid train system that will soon connect Shanghai's airport with the city. And each of these solutions, I should add, is backed by our strong corporate commitment to environmental protection and sustainability.

This joint Shanghai Conference is certainly a major step toward developing “better cities for better life”—in the spirit of our slogan for Shanghai EXPO 2010. It is now in our hands to do what we say. To move boldly and without delay to implement innovative solutions for tomorrow.

I wish I could join you in your searching and provocative discussions. And I am looking forward to hearing—and seeing—the results of this conference. Let me wish all of you and the event every possible success.

Han Zheng

Reinforcing Environmental Protection to Promote Sustainable Development in Shanghai

Han Zheng, Vice Mayor of Shanghai

Ladies, gentlemen, friends:
Good morning! In the first year of the new millennium the International Symposium on Environmental Protection and Sustainable Development of metropolis is convened in Shanghai timely. On behalf of the municipal government I warmly welcome all guests participating the symposium, on this occasion please allow me to introduce economic development and environmental protection in Shanghai.

National economy enters a new period of stable development

Shanghai is the largest city and one of economical centers in China, Since implementing the reformation and open policy, we firmly focus on accelerating economical development, the society, economy and construction enter a phase of rapid development, the unprecedented vitality is emerged in whole city. During 1992-2000 year Shanghai economy holds more than 10% increasing rate annually. GDP in 2000 year is 455.1 billion Yuan, the per capita GDP increase from 2300 US dollar five years ago to 4180 US dollar last year.

The function of economic center is ever-increasing

In the '90s Shanghai realized the significant change of city function. Following the deepening

of Strategic reform of industrial structure, the third industry, i.e., finance, trade, transport and communication, real estate etc. develop rapidly, the proportion of third industry in GDP increase from 31.9% in 1990 to more than 50% in 2000, Shanghai enters a new phase of development i.e. from processing industry to common development of second and third industries. Especially the market of security, foreign exchange and technical elements have certain size and radiate to whole country, Shanghai begins to develop the function of the center of market utilization of resources.

Comprehensive development of modernization construction and reformation

Shanghai firstly perform infrastructure construction, since the time of open policy and reform, total capital investment in infrastructure reaches more than 300 billion Yuan, this is more than 40 times of sum of former 30 years, among these more than 90% is invested in 90's years. A lot of major projects in road and transport, civil engineering and utility areas are completed, making feature of the city experiences tremendous change. The three-dimensional main traffic framework is basically constructed, also is the modernized communication network. The capacities of electricity supply, water supply and post communication are significantly increased; the economic development environment and living condition of the people are obviously improved.

Vigorous development of environmental protection business

In the mean time of economical development we had facing serious challenge i.e. the environmen-

tal pollution which damages the figure of the city and do harm to the public health, also the exhaust of resources will limit the further development, so the coordination and balance of economy, environment and resource are common problems in the development of international metropolis, the strategy of sustainable development and environmental protection is the only way to realize renovation and prosperity. The input to environmental protection continuously increase in '90s years, increasing rate of environmental input exceeds the increasing rate of economy, the percent of environmental input in GDP increase from 1.89% in late "eighth five-year" to 3.12% in late "ninth five-year." Totally 50.679 billion Yuan has invested in five years, which is 36.628 billion more than in "eighth five-year," since 1998 more than 10 billion Yuan is invested every year, in 2000 year 14.19 billion Yuan are invested and reach the historically highest level, in following years the environmental input still will keep at more than 3%, therefore, after ten years effort the environmental quality in Shanghai has greatly improved.

- (1) **Remediation of water environment**—the first and second phases of sewage confluence engineering are completed; the first three-year rehabilitation task is basically completed, in recent three years about 22 thousands waterways has been consolidated, total length exceeds 15 thousands kilometers; the first phase engineering of comprehensive rehabilitation of Soochow creek progress steadily, in the end of last year the blackness and odour



Shanghai's lovely skyline by night, featuring the Oriental Pearl Tower; at left.

of main stream of Soochow creek had been basically eliminated.

- (2) **Atmospheric environment protection**—The regulation of energy structure and control of tail-gas pollution of vehicles are steadily promoted. The population rate of gas usage reaches 100%, more than 420 thousand families in Pudong new area use natural gas, in recent three years more than 3300 boilers has been reformed, thus reduce coal consumption 171 thousand ton/year. Use of leaded gasoline is prohibited, and more than 30 thousand taxi and bus are use LPG and CNG. Days of 2nd class air quality increase from 70% in 1998 to 80% in 2000.
- (3) **Massively promote greening construction**—City greening has indispensable role in improving ecological environment and public health. According to the planning idea "circle, inserting, corridor, garden, forest" a lot of parks and public Greenlands are constructed: the Yan Zhong park 230 thousand m², Hong Qiao park 130 thousand m², Da Ning park 500 thousand m², Huang Xing park 600 thousand m², the Pudong century park 1.40 million m², the Lu Jia Zui central park 100 thousand m², Xu Jia Hui park 80 m², Tai Ping Qiao Greenland 50 m², Kai Qiao park and Chang Shou park 40 thousand m², etc. the construction of circular greenbelt and suburban forest is accelerated. The green area in Shanghai greatly increased through several years of effort, in recent 50 years from 1949 to 1997 year, the green area per capita increase from 0.132 m² to 2.41 m² in 1997 and reaches 4.6 m² in 2000, the newly constructed public Greenland area exceeds sum of that of past 50 years, greening cover rate in whole municipality reaches 22%.

It may be said that during the 90's Shanghai economy experiences the fastest development, and the environmental feature of Shanghai also has been significantly changed.

Today, experts domestic and overseas, economist and international friends meet together in Shanghai to carry out discussion and exchange under the title "environmental protection and sus-

tainable development in metropolis”, that is meaningful. “Sustainable development” is a new thought of development, a major change in human development idea. The premise of development is not only to consider the need of current development but also the needs of next generation should be considered, this is a new kind of development idea and strategy which is based on summary of past development experiences and reconsideration of the economical and social behavior. The following 5-10 years is a very important period for development of Shanghai, environmental protection will face more pressure and challenge. We must highly recognize the importance of environmental protection in constructing a good investment and living environment in Shanghai, under the guidance of sustainable development strategy, we will make effort to realize the coordination between economical, social and environmental benefits, further raising the competitive ability, as to the environmental protection work, the following four aspects should be focused:

(1) Firmly following the path of collective growth of economic growth

A new enterprises management mechanism which is beneficial to saving of resources, reducing the energy consumption, increasing the efficiency and protecting the environment should be formed through deepening of reformation and renovation of regime; it is based on scientific and technical improvement. By 2005 year, the contribution rate of technical improvement to industrial economy should reach >55%. In practice we will put the saving of resources on the first position, actively promote cleaner production and basically reform the past growth mode which is characterized by high input, high consumption and low efficiency.

(2) Improving the industrial structure and optimize the spatial layout, reinforcing the comprehensive economical strength

Shanghai will rationally regulate urban spatial layout according to the requirement of construc-

tion of an international center, in the same time of improving function of city proper to accelerating the construction of suburban township. Based on new round of master plan the city-type industry which has no pollution, low consumption of resources and energy and high additional output as well as the high scientific and technical enterprises will be developed, we will make effort to render the percentage of high-tech industry in total industry reaches ~35%, the focus of the second industry will be transferred from city proper to suburban area gradually, the business pattern of city proper will be regulated from the points which consider raising the output of land, minimizing the pollution and transport volume, the third industry such as information technology, finance, insurance and commerce will be emphatically developed so as to raising the service level.

(3) Improving the ecological environment continually, promoting the harmonization of human and nature

Shanghai will continue to increase the input in environmental protection, making the environmental input reaches >3% of GDP annually. In 1999 year th Shanghai municipal government compiled the three year action plan of environmental protection, its focus is to increase the strength of water pollution control and actively optimize the energy structure, reinforcing the control of exhaust pollution of different vehicles and improving the atmospheric environmental quality. Shanghai will increase the harmless disposal rate of solid waste, actively promote classical collection of living rubbish and accelerating quantity minimization and recovery of solid waste. By 2000 year the harmless disposal rate of living rubbish in city proper should reach 96%, realizing the classical collection in 50% area. Meanwhile, the greening construction will be greatly enhanced, by 2002 year the public green land area per capita will exceed 6 m, greening cover rate reaches >25%, thus to create a comfortable environment for citizens. In spite of the hardness of environmental protection and construction tasks we firmly believe this goal will be realized.

(4) Further enhancing the all people consciousness of sustainable development

The environmental protection and sustainable development need the support and participation of all people. In following years Shanghai will follow the “ renovation through science and education strategy” widely develop scientific population work, optimize the distribution of educational resources, enhancing the input in education and training. To enhancing people’s consciousness of participating sustainable development action through many types of activities such as the annual “Shanghai science and tech-

nology festival” and the confirmation of ISO-14000 work, etc.

Keeping and constructing a beautiful environment is the common will of all peoples so is the goal of pursuing of Shanghai people. This symposium is an opportunity of learning of successful international experiences, it will expand the view scope of construction of a sustainable developing metropolis of 21st century. I sincerely hope all of you to offer your knowledge and good opinion.

Finally let me wish the success of this symposium!

Sincerely wish all guests a pleasant life in Shanghai! Thank you!

Kristalina Georgieva

Urban Development in the 21st Century — Can the Environment Wait?

*Kristalina Georgieva,
Director, Environment Department
The World Bank*

Honorable Mr. Xu Kuangdi,
Mr. Han Zheng,
Ladies and gentlemen:

Introduction

I am sure other visitors to Shanghai have the same reaction I do—it is breathtaking to witness the changes that have taken place in the city over the past ten years. There have been tremendous improvements in physical infrastructure and standard of living in Shanghai. As impressive as the changes one can see—such as the high-rise buildings, the transit system, the flow of traffic—are those not so apparent—like the improvements in the quality of the water, the quality of the urban air, and the management of solid wastes. Besides producing above 5 percent of the country's GDP, and raising real per capita incomes more than 4 times over the past decade, Shanghai has relocated or reformed many of its polluting enterprises; constructed sewerage and sanitation facilities for 80 percent of its waste water; instituted a ban on coal use in the central city that is reducing both soot and sulfur concentrations in the air; piloted China's program to phase out leaded gasoline, which was accomplished nationwide last year; and set new standards of urban planning in the Pudong Special Economic Devel-

*Mr. Wu Chengjian of the Shanghai EPB,
Mr. George Zhu of Austin AUSINO, Ms. Vellet
Fernandes and Mr. David Shaman, both
of the World Bank, discuss recent research on
industrial pollution control.*



opment Zone. As all of you, I received as a souvenir from the conference organizers a beautiful magnolia, the city flower of Shanghai—and I thought it fits very well with Shanghai's strong commitment to the environment. We in the World Bank are proud to have been Shanghai's partner in some of the city's environmental actions, and honored to join the organizers of this important conference.

My remarks today will concentrate on the key urban environment challenges that China and other countries face. I would like to begin by posing a question that the World Bank is often asked by our developing country partners: "Can't the environment wait? Shouldn't countries follow the **grow first, clean up later** development path—first raise income levels and then address environmental concerns?" The simple answer to this question is that good environmental conditions are not a luxury and can not wait—they are an important

contributor to quality of life and to economic competitiveness.

While maintaining and accelerating economic growth stands out as the most important goal for developing countries, environmental quality is rapidly becoming a top-of-mind concern, especially in Asia. Increasingly, ordinary people and political leaders in the developing world recognize the need to bridge the “environmental divide” with the industrialized countries at the same time and as a part of the process of closing the development gap. This is particularly important for urban areas, where most of the national income is generated. Cities can not any longer be just engines of growth: they also have to be livable, and competitive both locally and globally in providing proper environmental services – safe drinking water, sewerage, waste management, clean air.

Urban growth and environmental challenges

Major cities are home to more than 50 percent of the world’s population today, compared with only 14 percent a century ago. The highest rates of increase are observed in the poorest regions of the world. In East Asia, Sub-Saharan Africa, and the Middle East and North Africa, urbanization is proceeding rapidly, with urban growth exceeding 4 percent a year. By 2025, it is estimated that almost 65 percent of the world’s population (and an even larger share of total national economic wealth) will be concentrated in cities and towns, making it an enormous challenge to ensure that such growth is managed without seriously damaging the urban environment or the health of urban residents.

The combination of increasing urban population and growing economic activities place high demands on the natural environment and the provision of basic environmental services. Many cities and towns in the developing world are already characterized by high levels of air and water pollution, slums, deteriorating infrastructure, and poor waste management systems. The economic losses caused by environmental degradation are often substantial, reaching in some cases between 5 and 10 percent of the city’s GDP.

Population growth and physical expansion require comprehensive city development which integrates environmental management and pollution control to achieve two equally important and inter-related objectives:

- ◆ Arrest and reverse negative environmental trends to protect urban population, and especially low-income groups, from environmental health risks, and
- ◆ Ensure the capability of the cities to provide basic environmental services in order to compete successfully nationally and internationally for resources (financial and human capital, technologies, income from tourism).

Environmental health

Recent estimates suggest that premature death and illness due to major environmental health risks account for 20 percent of the total burden of disease in the developing world (18.5 percent in China)—larger than any other preventable risk factors and groups of disease. Environmental health risks fall into two broad categories:

- ◆ The first category includes **traditional hazards, related to poverty and lack of development**—lack of safe water, inadequate sanitation and waste disposal, indoor air pollution, and vector-borne diseases such as malaria.
 - Worldwide, an estimated 3 million people in developing countries die every year from water-related diseases caused by exposure to microbiological pathogens resulting from inadequate sanitation and waste disposal, water supply inadequate for personal hygiene, exposure to unsafe drinking water, and bacteriological contamination through a variety of other water uses, such as cooking and bathing. The majority of fatalities are children under age 5. Water-related diseases impose an especially large health burden in the Africa, Asia, and Pacific regions. In India alone, nearly 1 million people die annually as a result of water-related diseases.
 - More than half of the world’s households use unprocessed solid fuels, particularly

biomass (crop residues, wood, and dung) for cooking and heating, in inefficient stoves without proper ventilation; the outcome is that people—mainly poor women and children in rural areas and urban slums—are exposed to high levels of indoor air pollution. It is estimated that nearly 2 million children and women die every year in developing countries as a result. About half of these deaths occur in India and China.

- Vector-borne diseases are affected by a range of environmental conditions and factors, including inadequate drainage from drinking water and from irrigation; polluted and standing water; clogged storm drains; floods; and open sewers and certain types of sanitation. In Africa alone, *malaria* is responsible for about 800,000 deaths annually.
- ◆ The second category includes *modern hazards caused by development without environmental safeguards*—urban (outdoor) air pollution and occupational and other exposure to agroindustrial chemicals and waste.

Traditional environmental hazards affect developing countries most. Their impact exceeds that of modern health hazards by a ratio of more than 10 for Africa, 5 for Asian countries (except for China), and 2.5 for Latin America. Modern threats to human health prevail in rich countries and the European economies in transition.

Inadequate water supply and sanitation pose the largest threat to human health in most of the Bank's client countries except for China and the transition economies of Europe, where air pollution causes the most damage. Indoor air pollution is highest in Asia and Africa.

Are environmental health risks in urban areas significant enough to warren the attention of city leaders? Data suggests that a significant part of the environment health problems is related to the rapid growth of urban areas in Asia, Latin America and Africa, which is changing the landscape of environmental health concerns, especially for the urban and semi urban poor. These groups are increasingly exposed to transition risk—both

traditional hazards, such as dirty cooking fuels, primitive stoves, crowding, and poor access to water and sanitation, and risks associated with modern transport and industrial pollution. Furthermore, in some parts of the world malaria is becoming an urban issue, in part because of infrastructure failures. Climate change is likely to worsen this situation, and globalization and the liberalization of trade may exacerbate the transmission of some diseases.

Urban environmental services and economic competitiveness

Clearly, in many cities action to improve the urban environment is justified on health grounds. In addition, environmental services are needed to provide the necessary infrastructure, including water supply and sanitation, waste management, roads, and energy supplies, which allow the cities to function properly as socio-economic systems. Throughout today and tomorrow we will share experience from around the world about how cities in both developed and developing countries handle the environmental challenges of urban development in each of these areas to provide higher quality of life to their citizens and position themselves for rapid and sustainable growth.

In light of these upcoming discussions, I will limit my comments to two aspects of urban environment services: first, the provision of water supply, sewerage and waste water treatment and their growing interdependence; and, second, the emerging new environmental challenge to development planners in many cities, stemming from the impacts of climate change.

Let me start with *water supply and waste water treatment*. Worldwide, water use grew at more than twice the rate of population during the twentieth century, and many regions are chronically short of water. About one third of the world's population lives in countries experiencing moderate to high water stress, and by 2025 as much as two thirds of the world's population is expected to be under water stress. For cities to grow, availability of accessible and reliable water supply for industrial and domestic use is absolutely essential. Around the world in developed and developing

countries alike city planners are shifting their thinking of water supply systems from purely infrastructure projects in the urban setting to more comprehensive watershed management programs, integrating all competing uses of water to ensure efficient allocation and sustainable use of the resource. In Ecuador the municipal water authorities in Quito and Cuenca are allocating part of their revenues to finance protection activities in the watersheds from which they receive the bulk of their water. In the US, the city of New York has scrapped a \$3–8 billion water filtration system, and opted for a \$1.5 billion watershed protection program to surround the city's two main water reservoirs.

This integrated watershed approach warrens attention also here, in China, where water is key for development for most of the country. Fresh-water resources per capita are about 2,000 cubic meters—only one-quarter the world average, and one-third that of countries with similar income levels. However, per capita water resources in northern China are only 750 cubic meters, or roughly one-third of China as a whole. While agriculture is the largest user of water in China, the demand for water by industrial and municipal water users has been growing rapidly. Water extraction in much of northern China exceeds sustainable levels and water supply is often directly impacted by levels of water pollution. Contamination of surface and ground water poses immediate economic losses for productive sectors (agriculture, industry), and health impacts on people. Growth of urban areas requires substantial investments in municipal waste water collection and treatment—to reduce pollution and prevent contamination of fresh water supplies. Research around the world, including a study in Dalian in the mid-1990s, shows that wastewater treatment in some cases may be a more cost-effective option than securing new sources of water. Thus, a comprehensive approach to water resource management is needed to ensure the long-term sustainability of water supply, especially for dynamic urban development.

Let me now address one of the new environmental risks for which many cities will need to prepare—the impacts of *climate change*. The

projections of the Intergovernmental Panel on Climate Change indicate that most developing countries are likely to be negatively impacted by changing precipitation, weather patterns and sea level and need to take actions to adapt to today's climate variability and to long-term climate change. This means strengthening the commitment to improve health conditions, especially through the provision of water and sanitation, taking measures to reduce the impact of natural disasters through appropriate infrastructure planning, and applying sound land use and water resource management.

Risk management in the context of climate change is particularly important for coastal areas. Today, sixty percent of the world's population lives within 100 kilometers of the coast, an area that accounts for only about 25 percent of the land mass. By 2025, over 80 percent of the largest 30 cities in the world will be in developing countries, and the majority will be coastal mega cities. Sea-level rise will increase the vulnerability of the coastal system and impact the economic situation of entire regions (fisheries, water resources, agricultural production, infrastructure and human health). In every case, it is the poor who will suffer the worst consequences, as they are least able to protect themselves from the effects of natural disasters. Disasters can cause significant life loss, undermine social capital and destroy infrastructure and livelihoods on a large scale. City planners in areas likely to be significantly impacted by climate change need to adopt risk assessment approaches, especially for their long-term infrastructure investments.

Enabling environment for sustainable urban development

What are the right conditions for cities to provide healthy environment and competitive environmental services? Experience around the world suggests that realistic, predictable and systematically enforced regulations, combined with market incentives for compliance and public “right-to-know,” define the ingredients of good environmental management. First, the government must develop a legal and regulatory framework for pro-



Urban Air Quality Management Session attendees listen and learn.

protecting common resources such as the water and the air. Second, the public must be informed about the state of the environment and of the responsibilities to protect it, and should be willing to demand products from companies with good environmental performance. Third, the financial sector must be aware the short- and long-term risks associated with polluting industries and technologies, as well as the positive financial returns to companies with good environmental practices. Finally, the private sector itself must recognize that being good environmental stewards is good business. The so-called “triple bottom line,” meaning financial, environmental, and social responsibility, is increasingly becoming the standard of good global business. Given the right incentives, the private sector will find innovative and cost-effective ways to protect the environment, including the development of technologies to save water, reduce biological pollution from wastewater, and produce energy with few air pollution emissions.

What role should agencies like the World Bank play?

Let me end with a couple of words about the commitment of my institution, the World Bank, to environmentally sustainable urban development. During the last decade we have invested more than \$18 billion in environmental projects, as well as in environmental components and objectives in our non-environmental portfolio. Nearly half of these resources went into lending for environmental improvements in urban areas. The World

Bank has been involved in a number of urban environment projects in China, including several waste water treatment plants in Shanghai, which some of you will visit on Friday.

We believe the Bank’s comparative advantage in the environment area lies, first, in our ability to leverage policy dialogue; second, in our broad sectoral coverage; third, in our extensive project development skills; and, fourth, in our convening power and global presence. We must use these strengths to:

- ◆ Encourage countries to adopt policies that create appropriate incentives for the proper management and efficient use of environmental and natural resources—for example, by reducing energy subsidies or adjusting taxes that encourage the use of dirty fuels, or by pricing water to reflect its scarcity.
- ◆ Work across sectors to enhance the environmental benefits of projects and programs that provide access to infrastructure and basic services in a sustainable manner—for example, by combining good management of water resources to benefit both upstream and downstream users, or adjusting the design of water and sanitation projects to increase their health benefits.
- ◆ Help countries develop and implement projects that focus on critical environmental problems that can be substantially improved or resolved through specific investments and policy reforms—for example, by promoting the use of clean fuels for heating to improve urban air quality.
- ◆ Bring together groups of countries and stakeholders to tackle common problems and issues of global importance such as phase out of ozone-depleting substances, persistent organic pollutants or climate change, in a coordinated manner that draws on worldwide lessons of experience.

In China, we will continue to fund priority urban environment projects where returns on investments can be sufficient to pay back loans. But most of the objectives I listed above are not about lending money; they are about knowledge man-

agement and human resources development which, in my view, are the key to China's objective of achieving environmentally sustainable development.

China's environmental challenges are significant and even top experts are sometimes overwhelmed by their scale and complexity. I don't think this should be the case. I see a different picture. I see a country that first and foremost understands that it has a serious challenge on its hands. I see a country that has the advantage of economic growth and development unprecedent-

ed in recorded history. I see a country in which environmental awareness is spreading beyond political leaders and intellectuals to include ordinary people; not only workers in large and sophisticated cities like Shanghai, but farmers in remote counties who face, every day, the problems of environmental degradation. In short, I see a country that will get on top of this challenge. It won't be easy and it won't happen overnight, but it is a worthy goal of a worthy people.

I wish great success to the work of this conference. Thank you.

Mr. Ernst H. Behrens

Living in the Century of Cities

Mr. Ernst H. Behrens
President and Chief Executive Officer
Siemens Limited China

It is a great honor for me to address the Shanghai International Urban Environment and Sustainable Development Conference. The theme of this conference is very well defined for Shanghai, which is transforming itself into a world class mega-city at a breathtaking pace.

I like Shanghai. I feel inspired each time I visit, not just because of the rapid changes that have taken place, but in particular by its promise for a sustainable and well-planned growth. As we are entering the 21st century, sustainable urban development has become extremely important because, like it or not, we will be Living in the Century of Cities.

Shanghai has made remarkable progress over recent years. This progress reflects the aspiration for and the momentum of economic growth that China is going through. When I, as head of a delegation of German entrepreneurs, visited Germany in March to promote China among German business circles, Shanghai always remained at the front of my mind as a reference for the achievements that China has made. Indeed, far-reaching economic and social changes have fundamentally transformed the country, opening it up to the world and ushering in an era of unprecedented stability and prosperity.

China has become an economic powerhouse in the region. It has managed an average of eight-percent GDP growth for a number of years in a row, and has succeeded in attracting a major share

of direct foreign investments flowing into Asia. China's upcoming accession to the WTO underscores the wisdom and effectiveness of the country's long-term development program. This move into the world organization will substantially accelerate the country's development and tighten vital links to the global community.

It is only a question of time before China becomes the world's largest economy. Whether that will occur in ten years or twenty is irrelevant. What matters is the trend. Yet this trend, as outstanding and promising as it is, will obviously bring major challenges as well. One is the inevitable and highly problematic process of urbanization, particularly when it assumes mega-city dimensions like in Shanghai.

As early as in the 1960s, the noted American architect historian and city planner Lewis Mumford summarized the process and impact of the global urbanization in his book *The City in History*. He said "Once upon a time, the city was a symbol of a whole world; today the world itself is becoming a city." Mr. Mumford was right. In the last century, the number of people living in cities grew from 200 million to around 3 billion. These 3 billion urban dwellers will soon be joined by an additional 2 billion in 2025 and the figure will climb 10 billion by 2050.

Without a doubt, cities are models of success. They are the financial, political and cultural centers that set the pace of life. Cities are perfect meeting points of goods, services and ideas of all kinds. Here, cultural diversity provides inspiration, and the "critical mass" of new ideas, products and innovative people creates a breeding ground in which both technological progress and social change can thrive.

But cities are also problem zones of the first order. In many cities around the world, as many as 60 percent of the people living there suffer under extremely high occupant densities.

Such population density has led to multiple social and infrastructural problems for the municipal authorities to provide sufficient and adequate accommodation, employment, public mobility, drinking water, sanitary services, clean air as well as public safety and education.

One does not need much of an imagination to picture this development leading to “the city as a social time bomb,” a horror scenario many experts are already warning of. So, for all of us, the primary challenge is to ensure continued “sustainable development,” which means meeting the needs of a growing urban population without condemning future generations to unacceptable pollution, disastrous climatic disturbances and depleted resources. It means finding financially manageable solutions for providing adequate power, water, mobility, communications, health care, and waste disposal for millions of people in densely packed urban centers.

The task of meeting all of these requirements is formidable. So formidable, in fact, that no municipality and no central government can hope to master it alone. All stakeholders in the future—from the government, municipal authorities and business to the broad general public—must work constructively, dynamically and synergistically toward this goal.

This is where the advantages of strong public-private partnerships are most apparent. Such systemic co-operations between the public and private sectors can share risks, responsibilities and rewards while generating net benefit to both partners. We believe the future will belong to partner companies that can—and will—assume such responsibilities.

Siemens, one of the world’s largest electronics and electrical engineering companies and a leading provider of infrastructure throughout the world, has long been committed to public-private partnerships. We see ourselves as an integral part of the societies which we serve, as an active and influential voice in environmental matters, and as a good corporate citizen in the global community

as well as in each of the 190 countries where we operate.

Our deepest commitment is to help shape social development by providing viable and beneficial solutions that ensure sustainable urban development. In short, we see ourselves as an architect of the future.

Our solutions include:

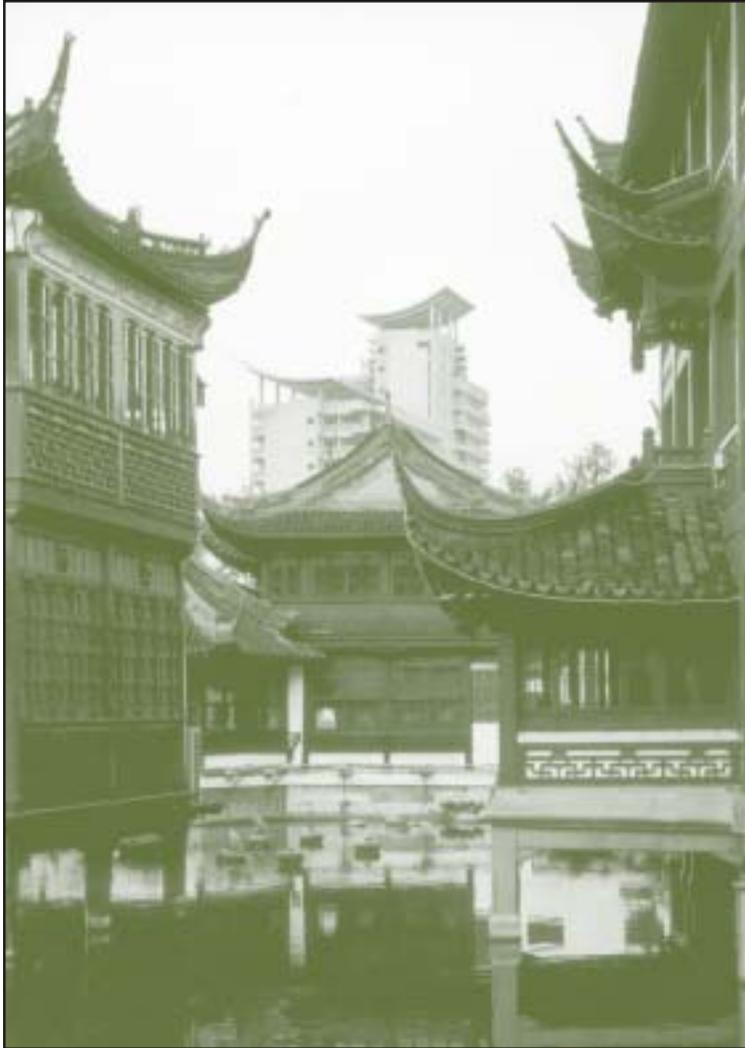
- ◆ Affordable, efficient and environmentally compatible power supplies;
- ◆ Fully integrated and networked public transportation systems that are fast, intelligent, safe and comfortable;
- ◆ Modern information and communications infrastructure designed to keep people, businesses and institutions connected across the city, throughout the country and around the world;
- ◆ Health care equipment, systems and services that ensure the well-being of the general public and improve the quality of life; and
- ◆ Lighting that keeps consumption and costs to a minimum while helping keep a city functional, attractive and safe around the clock.

Such solutions cannot simply be exported from some part of the world to China. Nor can they be pieced together on the spot without long-term commitments and strategies.

I wholly agree with Mr. Kofi Annan, Secretary General of the United Nations, who said at this year’s World Economic Forum: “The fragility of globalization poses a direct challenge to the self-interest of the corporate sector, and a central part of the solution is the need for companies to accept the obligations—not merely the opportunities—of global citizenship.”

For all of us at Siemens, accepting these obligations increasingly means building strong and lasting public-private partnerships.

In doing so, I think it is essential that all involved realize that each partnership is unique in its membership, objectives, specific role of the partners, framework, innovation, outcome, benefits and transferability. But they also share certain characteristics: they bring together the public and private sector around shared objectives; each part-



The old and the new coexist in Shanghai, as this roofline shows.

ner contributes time, money, expertise or some other resources; the partners work toward commonly defined goals; and they share decision making and management responsibility.

Before heading into any partnership, it is necessary to establish a clear governance structure that defines the roles and responsibilities of each partner. This may involve setting up new organizational forms, agreeing on the fine print regarding how each will work, defining guidelines for processes and communications, or providing a mechanism to resolve possible differences. All successful public-private partnerships maximize the two sectors' respective strengths and contributions.

Based on the experiences gathered from Siemens' more than 50 companies, 28 regional offices and numerous projects throughout China over the years, we have observed that the private sector often has the financial, technological and management resources, the operational history, and a proven track record of lowering production costs and ensuring efficient delivery. The private sector can also create economic opportunities, invest in human capital, promote environmental sustainability and enhance social cohesion.

The typical strengths of our municipal partners are their legitimized legal commitment towards the public, their administrative continuity, their social concerns, and their legal ability to enhance the performance of a partnership by easing the introduction of new technologies and applications, paving the way for projects, and by smoothing out bureaucratic hurdles.

Public-private partnerships are instrumental in setting new standards and introducing innovations. Particularly in Shanghai, which is being transformed into a world-class city at a breathtaking pace, we have the opportunity to address issues that will help determine the quality of urban life well into the future.

portunity to address issues that will help determine the quality of urban life well into the future.

This includes implementing highly efficient water treatment systems and waste management systems such as garbage collecting, separating and recycling; designing more energy-efficient buildings, and controlling air pollution. And this also includes the critical theme of infrastructure: providing sufficient affordable capacities in areas such as communications, power supplies and transportation to benefit as many people as possible.

While these end-of-pipe technologies and solutions are being put in place, expanded and modernized, one can focus on a new generation of preventative environmental protection policies.

In practice this means preventing waste, reducing CO₂ emissions, taking a serious look at feasible renewable energy technologies or building entire districts of low energy consumption buildings.

As Shanghai is being transformed, I think it is crucial to keep three primary points in mind. Cities like Paris, New York or Shanghai need three things: identity, diversity and stability.

As far as identity is concerned, Shanghai is uniquely fascinating. I hope that the city's great character and flavor will not be homogenized to the point where it becomes just one of many interchangeable global urban centers. Cultural heritage is so immensely important in China, it must continue to be reflected in its cities. Cities throughout large parts of the world have long since discovered that heritage protection adds that critical touch of identity, that indefinable "spirit" so essential to a great city. The message here is: modernity, yes, but certainly not at any price.

The need for diversity is self-evident. It is emblematic of any world-class metropolis. China is making enormous progress in opening up to the world, and cultural diversity is the automatic product of this process.

The same is true for stability, a condition that is critically important for long-term progress and prosperity.

I am convinced that China's accession to the WTO will usher in an era of intensified interna-

tional co-operation and partnership. And, as we all know, solid trade relations are one of the most effective ways to solving conflicts and preventing misunderstandings.

The more closely China is integrated into the global economy, the greater its opportunities for economic growth. Economic growth is the most important basis for social stability. Siemens, along with many other companies from around the world, is eager to make lasting contributions to this growth. We feel our broad spectrum of infrastructure competence, our generations of experience in helping develop other cities in other countries, our readiness to transfer technologies, build up local partnerships and train local employees, make us the kind of good corporate citizen China needs.

We are proud of our strengths in China, and intend to leverage them as best we can to make an optimal contribution to the country's development.

Above all, we believe we are an ideal partner for helping cities like Shanghai find the right answers to the challenges of achieving sustainable urban development, which is a shared goal for all of us. As we are entering the new millennium, achieving this goal has become ever more crucial because we will be *Living in the Century of Cities*.

Thank you.

Mr. Ravi Parthasarathy

Salient Points Underlying Keynote Address

Mr. Ravi Parthasarathy
Vice Chairman & Managing Director
IL&FS LIMITED

I. Posing the challenge

- ◆ Globalization has irrevocably changed the economies of Nation States
 - China's imminent accession to the WTO is testimony to the foregoing
 - Consumer interest has become paramount, including in environmental issues
- ◆ Local economies will have to chart their own destinies within national and regional constraints
 - Rust belt cities have decayed
 - Textile cities have reduced in importance
- ◆ Competitiveness will be determined by
 - Infrastructure
 - Quality of life, especially environmental
 - Capacity to absorb relevant technologies
- ◆ The urban agenda cannot be addressed without attracting capital
 - Financial capital
 - Intellectual capital
 - And increasingly, a multi-cultural diversity

II. The urban conundrum

- ◆ In developing economies with a large population, success in urban initiatives can frequently lead to failure
 - For example, Bangalore attracted skilled labour, and is today bursting at the seams
 - Relentless immigration is the norm
 - In India, 50% of population would live in urban areas in the medium term
- ◆ Rapid urbanization can strain and cause the collapse of existing levels of infrastructure
 - Bombay has 14 million people—its infrastructure has been designed for less than half that population
 - Environmental degradation has ensued: it is nobody's case that development has



Reward for a hard day's work — Delegates are treated to an evening concert at the Shanghai Opera House.

a higher priority than environmental awareness. However, environmental degradation is a by-product of growth in developing economies

- ◆ Disaggregation is clearly necessary, and is typically undertaken with directed satellite growth centers
 - The process is expensive
 - It is time-consuming, not always a success
- ◆ In the ultimate analysis, there is only one lasting solution—to recognize the strengths of the local economy, and to build around it. Thus we need a two fold focus:
 - Management of major cities, and
 - Sustainable development of catchment areas

III. Service sector and urban productivity

- ◆ Around the globe, the character of major cities continues to undergo change—a contributing factor is the way technology impacts our economic processes
- ◆ Most major cities in India have changed dramatically
- ◆ Cities are increasingly service sector oriented; knowledge worker intensive, and with a demographic skew towards younger age groups
 - Cotton mills of Bombay have closed down
 - Fewer blue collar workers
- ◆ The fundamental paradigm of urban planning needs to be revisited to cater to such populations
- ◆ We talked earlier of intelligent buildings—we are now talking of productive, intelligent cities—an intelligence that goes well beyond mere broad band connectivity

IV. The four principal questions

- ◆ How do we plan for urban knowledge centres?
- ◆ How do we sustain suburban communities to alleviate continuing pressure in mega cities?
- ◆ How do we integrate the urban environmental agenda with the urban planning agenda?
- ◆ What frameworks do we utilise to catalyse the required investment?
 - Public Private Partnerships—almost a cliché today
 - We must take care that we do not replace an inefficient public sector with an expensive private sector

V. The fifth primordial question

- ◆ How do we channelise the required funds for the urban sector?
- ◆ While some authorities have greater clarity in relation to the urban agenda, our experience is that neither vision nor an action plan is lacking in almost every local authority
- ◆ The problem is funding—and unless this issue is addressed, a generalized debate on other factors would not prove very meaningful.

VI. Financing urban infrastructure

- ◆ At the macro level:
 - Government share of financing has been declining
 - World Bank has been all but absent in the urban sector in India
- ◆ We have attempted diverse prototypes of financing including:
 - Municipal Bond issues with an escrow of property taxes and octroi

- Green field water supply projects with user charges borne by industry
- ◆ Paradox of constraints
 - Budgetary support is infeasible
 - Excess liquidity prevails in the banking system
 - Financial instruments for investors are simply not available
- ◆ Given inadequacy of budgetary support, Capital Market solutions are a must
 - Bankability must be engineered and be demonstrable
 - Project Development expertise is essential
 - Need for a broader based program catering to:
 - Smaller projects
 - Projects entailing managerial solutions
 - Projects relating to simple procurement only
 - Multi-disciplinary projects
 - More complex projects including multi-modal transportation
- ◆ It is in the above context that we have initiated with the World Bank discussions relating to the possibility of establishing a National Urban Infrastructure Development Fund
 - Could be administered by one or more private sector Asset Management Companies
 - Could be accessible to any consortium of developers, sponsors and financiers
 - Would standardise the template for financing
 - It would be up to the Governmental authorities to consider targeted subsidiaries at the project level to ensure bankability
- ◆ World Bank projects are typically complex, time consuming and bundle in multiple facets of financing:
 - Unbundling of IDA and TA is very desirable
 - Directed TA and IDA could then be brought in to support individual projects taken up by the proposed Funds on a targeted basis