Environmental Report
Expo 2010 Shanghai China

Bureau of Shanghai World Expo Coordination

Shanghai Environmental Protection Bureau

2009.6

Contents

Foreword

On December 3rd, 2002, Shanghai won the bid of hosting Expo 2010 at the 132nd General Assembly of Bureau of International Expositions. Given its theme “Better City, Better Life”, Expo Shanghai is expected to be a “successful, splendid and unforgettable” event and a platform for every exhibitor to explore sustainable models of urban development and better city life.

As a megapolis, Shanghai has always been exploring an appropriate mode of sustainable development with accelerated efforts in building a resource-effective and environmentally friendly city. For years after it won the right to hold Expo 2010 in particular, it has successively implemented a series of Three-Year Environmental Action Plans on to build a more environmentally friendly city, thus achieving lasting improvement in environmental quality along with its rapid economic growth. The concept of environmental protection is actively promoted in Expo site during the period of planning, construction, operation as well as reusing after the Expo with extensive application of environmental and energy-conservation technologies such as solar photovoltaic, river water/geo-thermal heat pump, ice thermal storage, LED, rainwater reuse, renewable energy vehicles and low-carbon technologies in order to make Expo 2010 a good example of friendliness to the environment and take the lead in shaping a sustainable mode for future urban development. Meanwhile, through comprehensive publicity and education as well as public participation, environmental awareness has been enhanced among the public to build a green atmosphere for hosting the environmentally-friendly Expo.

This Environmental Report, jointly launched by Bureau of Shanghai World Expo Coordination and Shanghai Environmental Protection Bureau, is designed to present a panoramic view of efforts made to hold an environmentally friendly Expo in Shanghai, explore modes of sustainable urban development and promote the concept of a green environment. From the perspectives of Shanghai, the expo site and public participation, the report gives a detailed description of contributions and practices on environment from all sectors of the city toward the Expo theme of “Better City, Better Life” for over 9 years since Shanghai won the bid to host expo 2010.

This report is organized with great support from Shanghai Municipal Development and Reform Commission, Economic and Informatization Technology Commission, Urban Construction and Communications Commission, Agriculture Commission, Water Authority, Afforestation and Environmental Sanitation Administration, Transport and Port Authority and other governmental agencies. The editorial board of the report has used for reference the experiences of Beijing 2008: Environmental Protection, Innovation and Improvement and Environmental Report for Expo Aichi 2005, consulted with the Expo Environmental Advisory Group and other experts and adopted recommendations from several environmental organizations and communities. Many thanks are due to all mentioned agencies, organizations and experts for their contributions. It is only around 300 days to the opening day now. During this period in-between, we will guarantee the continuity of environmental initiatives by relevant departments and agencies and make follow-up expert review and assessment.

Bureau of Shanghai World Expo Coordination
Shanghai Environmental Protection Bureau
June 2009

1 Green Expo 2010 Shanghai China

With “Better City, Better Life” as its theme, the bidding for World Expo 2010 Shanghai China was officially initiated in 2000. Sustainable urban development mode, lifestyle and sound urban ecological environment lie at the heart of the Expo theme. In order to turn Expo 2010 into a resource-efficient and environmentally-friendly gala, the Organizer has accelerated the green process of Shanghai by practicing and interpreting the Expo theme in the following manners: improving environmental protection, publicizing and demonstrating green Expo concept, and raising public awareness on sustainable development and enhancing public participation.

1.1 Shanghai’s Strategies and Goals of Environmental Protection

In accordance with the strategic aims of "upholding the concept of sustainable development characterized by all-round, coordinated and sustained development in urban construction and development, and establishing Shanghai into a modernized cosmopolitan city and one of international economic, financial, trade and shipping hubs" set out in the Shanghai City Master Plan from 1999 to 2020, we have, on the occasion of hosting Expo 2010, made clear the aims and tasks for 2000-2010 environmental protection and focused on human, material and financial resources as well as policies to enhance environmental protection and ecological conservation, thus boosting the coordinated development among economy, society and environment.

1.1.1 Strategic Concept

Taking the opportunities of hosting Expo 2010 to implement the strategy of sustainable development, we should take energy conservation and sustainable environmental improvement as our central tasks in order to meet the requirement of “being people-oriented, making a priority of addressing root causes, achieving urban and rural integration and aiming for perfection”. Under the guidance of Shanghai Three-Year Environmental Action Plan, we should employ economic, legal, technical and administrative means to continuously strengthen the whole-process prevention and control of pollution so as to earn the title of “a National Model City for Environmental Protection” and create a sound ecological environment for successfully hosting Expo 2010. The advanced concept of sustainable development will find its full expression in thematic interpretation of Expo 2010 so that we can stage an environmentally-friendly World Expo. In order to advance the transformation of economic growth mode, we should blaze new trails in achieving coordinated development among economy, environment and society for such a mega city as Shanghai so as to speed up the process of turning Shanghai into a resource-efficient and environmentally-friendly city.

1.1.2 Objectives and Priorities

Being people-oriented, putting environment problems about which the public are most concerned on top agenda. By combining the short-term objectives with the long-term ones and giving priority to tackling the pressing environment problems, we will make exertions to safeguard the safety of drinking water and exercise more strict controls over motor vehicles, fugitive dust and noise so that good air quality rate will reach over 90%. Meanwhile, we will explore the path to the solution of combined-pollution problems by controlling the pollution of nitrogen and phosphorus in water body as well as nitrogen oxides and volatile organic compounds in air so that improved environmental quality will be felt.

Giving priority to addressing root causes, accelerating the transformation of development mode and strengthening the control over pollution sources. We will continue to improve the system of coordinated economic and social development and take energy-conservation and emission-reduction as important measures and means of transforming economic growth mode so as to attain the following objectives during the Eleventh Five-Year Plan Period: on the basis of 2005, energy consumption per unit GNP will decline by around 20%, sulfur dioxide and chemical oxygen demand will be cut by 26% and 15% respectively. More efforts will be made to boost the development of circular economy and carry out the environmental impact assessment system in order to prevent pollution by means of planning and decision-making from the outset.

Pursuing Rural-Urban Interaction, attaching more importance to pollution control and ecological conservation in suburban areas. Focusing our attention more on suburban areas while not ignoring urban areas, we should put environmental protection and ecological conservation on top agenda to narrow the gap in environmental quality between urban and rural areas. More efforts should be made to improve environmental infrastructure in order to achieve the following results: sewage treatment rate will reach over 80%; harmless disposal rate of domestic garbage will rise to 85%; hazardous waste will be at all-round secure disposal. Green space and ecological conservation will be strengthened so that regional green coverage rate will reach 38%, with public green land per capita rising to 13 square meters.

Making Innovations in Management, solving environmental problems through legal, economic, and technical means. Legal regulations and policies will govern and guide environmental practices. Environmental protection will be promoted through market-based instruments, science and technology advancement as well as necessary administrative means. Emphasis will be laid upon the shared responsibility for environmental protection of people from all walks of life. We will guide citizens to protect environment of their own will.

1.1.3 Platform and Measures

Shanghai Municipal Government takes Shanghai Three-Year Environmental Action Plan as an important platform of advancing the green process of the city to boost key environmental projects, such as energy-conservation and emission reduction, the title of National Model City for Environmental Protection and environmental rehabilitation for 600-day Action Plan to Welcome World Expo. Since 2000, we have, on the occasion of hosting Expo 2010, made headway in going through three rounds of Three-Year Environmental Action Plan in a row, thus pushing forward the building of a resource-efficient and environmentally friendly city. Presently, the fourth round of Three-Year Environmental Action Plan has been unveiled and will be starting the implementation in early 2009.

The First Round of Three-Year Environmental Action Plan (2000-2002). By undertaking 110 projects in five priorities, we have alleviated the environmental problems such as watercourse pollution, direct discharge of sewage and pollution of domestic garbage, and paced up in green space construction and rehabilitation of heavily polluted areas.

The Second Round of Three-Year Environmental Action Plan (2003-2005). We have put forward the aim of laying a solid foundation of environment for hosting Expo 2010 in major objectives. On the basis of the achievements in the First Round, we have supplemented a priority of Ecological Coneservation and Construction for Rural Areas. By implementing 289 projects in 6 major areas,

we have enhanced the capacity of sewage treatment and garbage disposal facilities, accelerated urban green space construction and fulfilled the rehabilitation of Wusong and Taopu Industrial Zones.

The Third Round of Three-Year Environmental Action Plan (2006-2008). We have set out 252 projects in 6 major priorities so as to speed up the settlement of outstanding pollution problems left from the past. We have raised the capacity of environmental infrastructure, as evidenced by the rehabilitation of polluted watercourses, control over coal ash, fugitive dust and motor vehicle exhaust, and the rehabilitation of Wujing Industrial Zone and retention of sewage collection in industrial zones. Meanwhile, building a resource-efficient and environmentally friendly Expo Park has been listed as one of our top priorities.

The Fourth Round of Three-Year Environmental Action Plan put in practice during 2009-2011. The tasks in seven areas have been set out in this round of Three-Year Environmental Action Plan. On the basis of previous rounds, "circular economy and cleaner production" have been regarded as priorities, and the contents like "noise pollution control" supplemented. The overall plan covers 260 projects with an expected investment of over RMB 82 billion. We will concentrate on further enhancing the capacity and level of environmental infrastructure such as sewage treatment and domestic garbage disposal, and make exertions to address the concerned problems of motor vehicle, fugitive dust, watercourse, and noise pollution, industrial zones and rural environment as well as potential ones of ozone, haze and water body eutrophication. Priorities will be given to the control of pollution sources and innovations in environmental management mechanism and policies.

Figure1-1: Progression of priroities from the first round to the fourth round of Three-Year Environmental Action Plan

Achievemnt of the Three-Year Environmental Action Plans

1. With the establishment of Shanghai Environmental Steering Committee, the environmental management system has been gradually improved to generally form a working pattern of expediting environmental protection through concerted efforts of the entire society. The capability and level of pollution prevention and control, and ecological preservation have continuously been enhancing.

2. Construction of environmental infrastructure has been pushed forward substantially, as evidenced by the rates of urban sewage treatment and of harmless disposal of domestic garbage reaching 75.5% and 76.95% respectively, and by the completion of flue gas desulphurization projects for 94% installed capacity of coal-fired power plants.

3. Comprehensive environmental rehabilitation has attained remarkable results. Suzhou Creek, Wusong and Taopu Industrial Zones, and other major areas have taken on a distinct improved look in terms of environment.

4. Reduction of pollutant emission has made much headway. The emission volumes of sulfur dioxide and chemical oxygen demand have been cut down by 13.04% and 12.27% respectively compared to that in 2005.

5. Environmental quality is taking a turn for the better amid stability. The good air quality rate has stood at over 85% for six years in a row; aquatic environmental quality has leveled off; green coverage rate has amounted to 38%; public green space per capita has risen to 12.5 square meters.

6. According to the opinion polls by Gallup Consulting Corporation, 86% of citizens believe that more importance and investment have been attached to environmental protection, 94% think that the Government has done a good job in this regard and 87% hold that overall environment quality of Shanghai is rising.

1.2 The Green Concept of Expo 2010

In preparing for and hosting Expo 2010, the Organizer will interpret Expo Theme “Better City, Better Life” in line with the concept of sustainable development, put harmonious co-existence among “Human, City and Earth” under spotlight and lay emphasis on urban responsibilities under the circumstances of environmental changes. Advanced environmentally friendly and energy efficient technologies will be applied and promoted so that we can stage an environmentally friendly World Expo and set it as a paragon of sustainable urban development.

Emphasizing the Sustainability of Expo Site Planning. Expo Site is planned to be located on both sides of the Huangpu River in the center of Shanghai that echoes the Expo Theme of “Better City, Better Life”. The both sides of the Huangpu River, the Mother River of Shanghai boasting profound historical, cultural and landscape resources, constitute a major part for urban development and renovation. As hosting Expo 2010 is to accelerate the renovation of old districts, the demolition of old residential quarters and docks as well as the closedown and relocation of polluting factories there have evolved this area into an important scenic spot and an ecological corridor, thus further optimizing the functional layout and industrial structure of Shanghai.

Emphasizing the All-round Environmental Management. Having taken into consideration the potential environmental impact of Expo 2010, the Organizer has established an environmental management system and ascertained responsibilities and tasks. We have carried out the environmental impact assessment in course of planning, published a Green Guide and initiated the Environmental Quality Improvement Plan in our preparations so as to minimize the environmental impact as much as possible. Tap water in Expo Park can be potable directly. Overall green space exceeds one million square meters. The layout of biological habitat patches is reasonable. The

ecological corridor runs through Expo Park.

Emphasizing the Development, Application and Demonstration of Advanced Environmentally friendly and Energy-Efficiency Technologies. Concentrating on the Expo construction, energy, environment, operation, exhibition and security, the Ministry of Science and Technology has taken the lead in tackling technological problems to spread green communications, green energy, green buildings, green engineering and green office in order to enhance application efficiency of energies and resources, and reduce waste discharge. Technologies and concepts of new energies will be on display in specific pavilions. The utilization rate of clean energy for Expo Park will reach over 50%; public transport will realize zero-emission; all wastewater will be collected and treated; 30% of rainwater and wastewater will be reclaimed to comprehensively use; all building waste and garbage will be recovered while the reuse rate will go beyond 50%.

Emphasizing Post-Expo Use of the Sites and Facilities. After Expo 2010 winds up, the area will be oriented toward an urban cultural and exhibition center, a riverside residential quarter and an ecological landscape corridor. The permanent buildings in Expo Park will be retained as exhibition halls and entertaining centers; and after the temporary buildings are pulled down, the part area will be redeveloped into new ecological residential quarters.

Actively Responding to Global Climate Change and Taking City's Responsibilities. In response to the initiatives of low-carbon development and protection of ozone layer, we will strive to reduce carbon emission and use of ozone-depleting substances (ODS).

Emphasizing Environmental Cooperation for Expo 2010 and Encouraging Public Participation. We will team up with international organizations like United Nations Environment Programme(UNEP), governments of the countries all over the world, non-government organizations (NGOs) and enterprises to draw on their advanced concepts and technologies of environmental protection and conduct diverse activities in this regard so as to create a favorable green atmosphere for Expo 2010.

1.3 Environmental Publicity, Education and Public Participation

We take the hosting of Expo 2010 as an important opportunity to publicize the concepts of "sustainable development" and raise public environmental awareness. Governments, enterprises, social groups and the public have participated in various activities of popularizing environmental protection to create a favorable atmosphere.

Furthering the Environmental Publicity and Education by the Governmental Organs. Against the background of "Welcome World Expo and Build a National Moclel City for Environmental Protection", we will take advantage of great events, such as World Environment Day and World Earth Day, projects like energy conservation and emission reduction and Three-Year Environment Action Plan, to undertake extensive environmental dissemination by means of news media and community educational platforms so as to popularize the concept of sustainable development and raise public awareness in this regard.

Conducting Practical Activities of Environmental Protection by Social Groups and Enterprises. We will encourage people from all walks of life, in particular those who care about environment such as social groups, enterprises, non-government organizations and volunteers, to conduct activities of environmental protection with the theme of "Welcome World Expo and Environmental Protection with You", and to disseminate the concepts of green travelling, green

consumption, green life, and etc.

Strengthening Exchange and Cooperation between Governments and the Public. In order to make the concept of sustainable development find its way deep into the hearts of citizens and let more of them take part in activities of environmental protection and resource conservation, governments at all levels of Shanghai have continuously expanded the channels and platforms for public participation so that it is accessible to experts, scholars and ordinary citizens to provide suggestions and participate in green activities in order to make a green home of Shanghai through concerted efforts.

2 Devoted to Environmentally Friendly Shanghai

Shanghai is one of the traditional industrial bases and modern economic centers in China. As a big economic aggregate with fast developing pace, the city features high population density, small city region, scarce natural resources and limited environmental capacity. All the above means it has to explore a sustainable development approach with rationalized industrial layout, highly efficient resource utilization and harmonic co-existence of human and nature. More importantly, Shanghai is dedicated to conserving the ecological environment we live in and building a resource-efficient and environmentally friendly city.

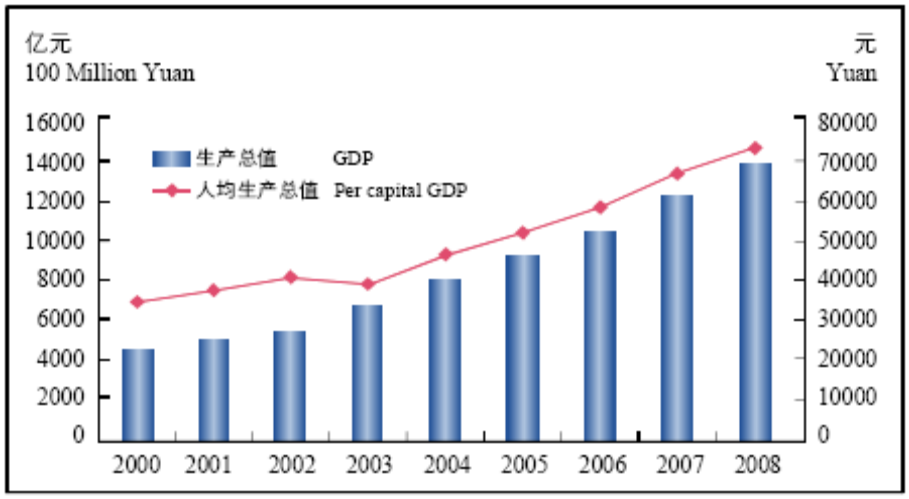

Figure2-1: Annual GDP and per capita GDP of Shanghai

Facts about Shanghai City

Shanghai is the metropolis situated at the mid-point of the west-pacific coastline of China and has a northern subtropical monsoon climate. By the end of 2008, Shanghai has a land area of 6340.5 square kilometers and consists of 18 districts and 1 county. It has around 18.88 million permanent inhabitants. The GDP of Shanghai in 2008 reached RMB 1,370 billion Yuan. Three-industry structure was 0.8 : 45.5 : 53.7. The per capita GDP was about RMB 72,000 Yuan. The GDP and per capita GDP in 2008 have been 3 and 2.1 times respectively as compared to those of 2000.

2.1 Management System and Mechanisms of Environmental Protection

In recent years, Shanghai has set overall plans to coordinate social development and environment under the guideline of Scientific Outlook on Development. By actively exploring new environmental management systems and mechanisms, it tries to construct a framework for environmental protection “led by the government, operated by the market and participated in by all”.

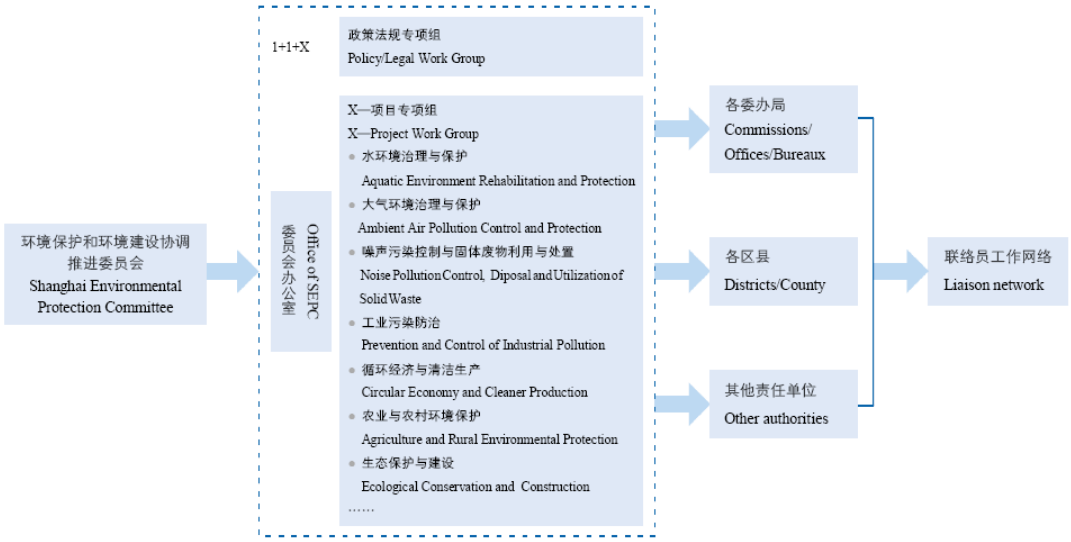

Figure2-2: Environmental Coordination Mechanism in Shanghai

2.1.1 An Integral Environmental Coordination Mechanism

In 2003, Shanghai Municipal Government established Shanghai Environmental Protection Committee (SEPC). The mayor and vice mayor serve as Chairman and Vice Chairman respectively. The SEPC Office set up in Shanghai Environmental Protection Bureau(SEPB) is responsible for coordination, communication, inspection, evaluation and feedback tracking. Meanwhile, various task forces were set up and led by related government agencies to work in joint efforts under an efficient coordination mechanism in order to promote the environmental protection in the city. The number and programs of the work groups vary based on work focus of different stages.

2.1.2 Environmental Management Systems at Municipal and District Levels

SEPB is the competent authority responsible for planning, policy making and organizing municipal environmental protection work. In October 2008, SEPB was adjusted to be an agency as a constituent department of the municipal government so as to promote its position and function thereof.

In light of the principle that the local governments are responsible for the environmental quality under their respective jurisdictions, environmental protection agencies are set up in all 19 district and county governments. Dedicated personnel are also designated in every township government to implement a complete network of environmental protection work.

2.1.3 Investment Mechanism for Environmental protection

Shanghai has greatly emphasized the investment in environmental protection all along especially since the city was awarded the right to host the Expo 2010. During 2000-2008, annual investment in environmental protection accounted for over 3% of the city's GDP with an accumulated fund of over RMB 225 billion Yuan, about 60% of which were allocated by the government revenues. Investments in environmental protection in 2008 reached RMB 42.237 billion Yuan, about 3 times of that in 2000. In recent 5 years, annual increase in such investment has reached 18.0%, exceeding 12.8% of annual average GDP growth in the same period.

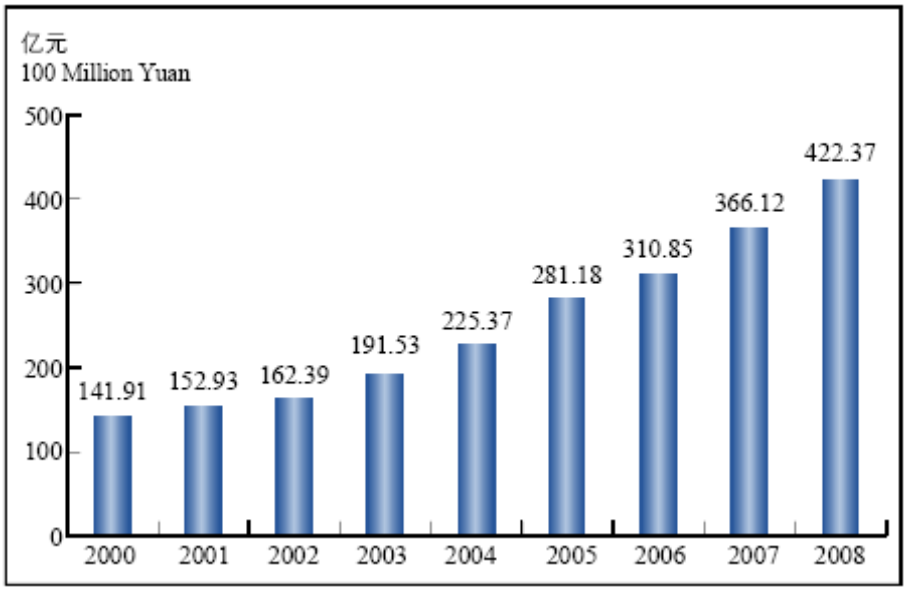

Figure 2-3:Annual Investment in Environmental Protection in Shanghai in Recent Years

2.1.4 Environmental Legislation and Supervision System

At present, Shanghai has established a relatively sound environmental legislation system. Under the framework of related national laws, administrative regulations and sectoral rules, Shanghai goes further by formulating 3 local regulations, 19 governmental rules and various norm documents that cover all aspects of environment including atmosphere, water, oceans, solid waste, noise, soil, radiation as well as biodiversity conservation.

Meanwhile, to enhance law enforcement and supervision with the measures of improving pollution prevention, access criteria and policy guidance, Shanghai strengthens the supervision over pollution sources and has established a joint enforcement teams combining three forces such as environmental monitoring (base), supervision (means) and regulation (platform). At the same time, an Environmental Emergency Management System has been set up to enhance environmental emergency response capabilities. In 2006, Shanghai Municipal Emergency Response Plan for Pollution Accidents was formulated and enacted to improve reaction capabilities for dealing with environmental pollution accidents.

In addition, Shanghai Municipal People's Congress (SMPC) has established an Urban Construction and Environmental Protection Committee (UCEPC) and Shanghai Municipal Political Consultative Conference (SMPCC) has established a Population, Resources and Environment Committee to enhance examination and supervision on environmental protection work of the government. Environmental protection work of the government is reported to SMPC and SMPCC periodically, which in turn bring up many motions and proposals that play a very important role in promotion of environmental protection work.

2.1.5 Environmental Monitoring Network

The Environmental Monitoring System of Shanghai City consists of Shanghai Environmental Monitoring Center and 19 district/county-level environmental monitoring stations. This two-tiered environmental monitoring network covers the jurisdiction area of Shanghai. The environmental

parameters monitored include surface water, sewage, ambient air, waste gases, vehicle emission, noise, soil and biota.

In respect to water quality monitoring, 148 municipal control cross sections/monitoring points are set up, covering the Huangpu River, Suzhou Creek, Dianshan Lake, Yangtze estuary and centralized drinking water sources, provincial border cross sections of Taihu Lake Basin and other major watercourses in the city area. Regarding air quality monitoring, 45 automatic monitoring sub-stations and 23 manually monitoring sub-stations are set up to cover 19 districts/county. For monitoring major pollution sources, the city has established 203 sets of key atmospheric pollution source online monitoring systems and 187 sets of key aquatic environment pollution source online monitoring systems by the end of 2008. As to environmental emergency monitoring, the city has equipped with emergency monitoring vehicles and on-the-spot emergency monitoring equipment.

Figure 2-4:Online Monitoring Facilities inWastewater Treatment Plant

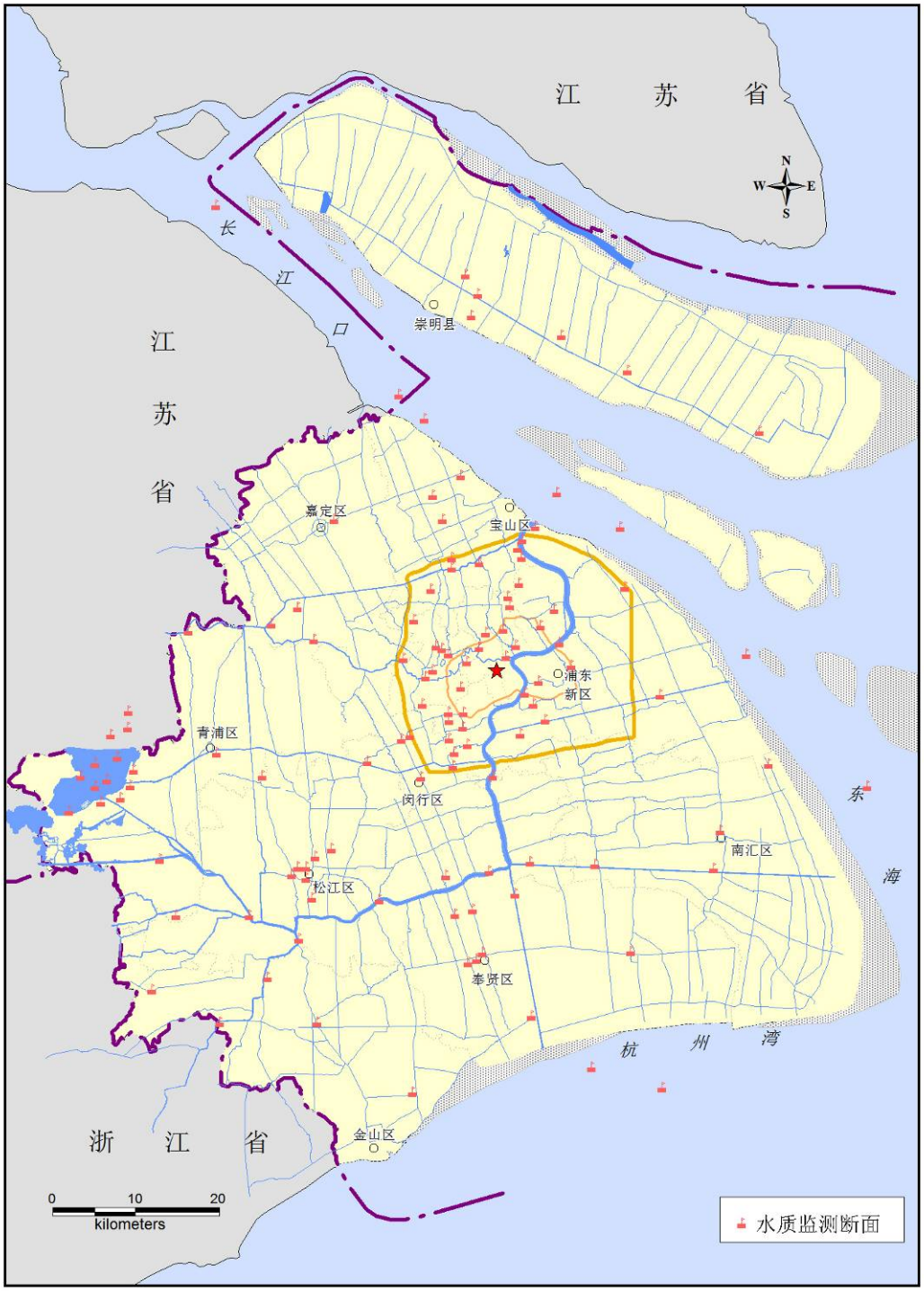

Figure 2-5:Layout of Surface Water Quality Monitoring Sections in Shanghai

Figure 2-6:Ambient Air Emergency Monitor Vehicle and Automatic Monitoring Stations

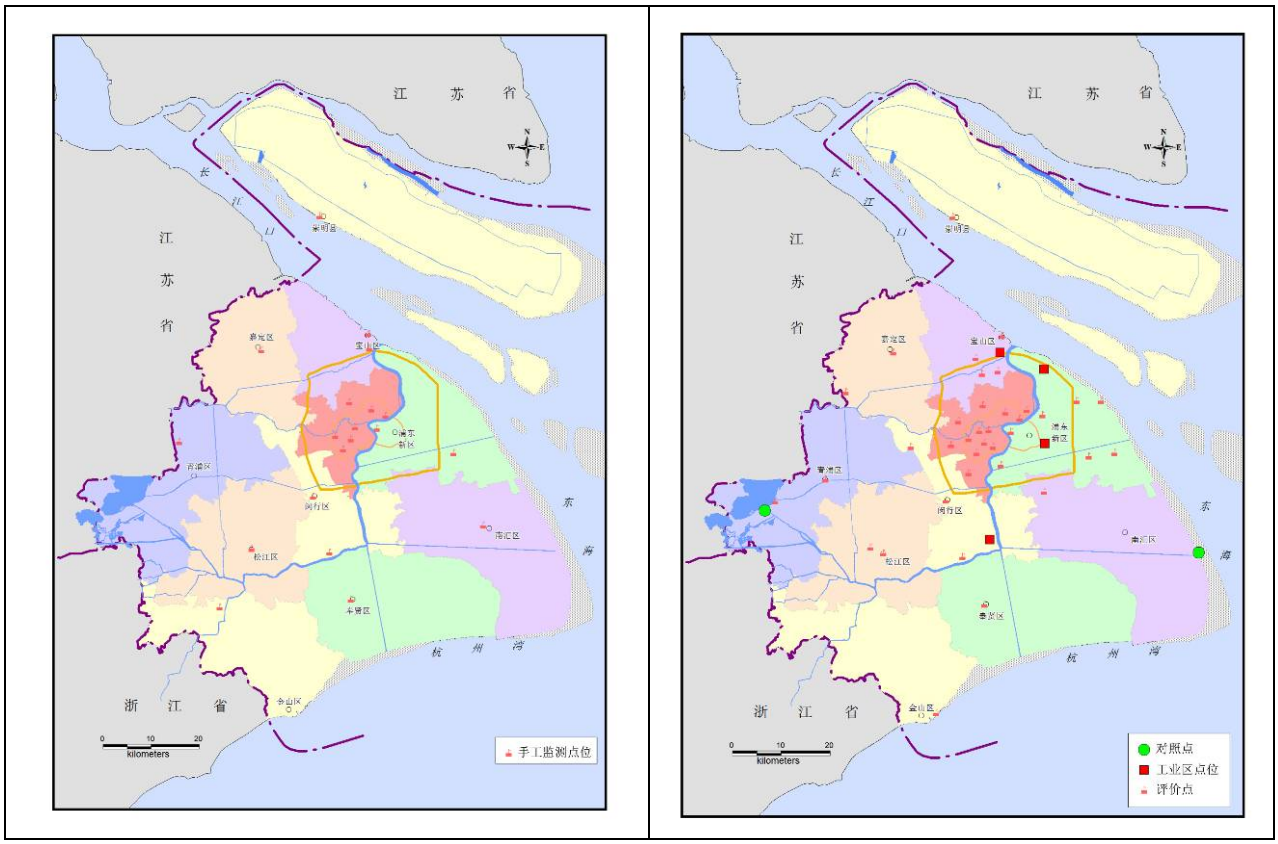

Figure 2-7:Layout of Ambient Air Quality Monitoring Stations

2.1.6 Information Disclosure and Public Participation

Strengthen Information Disclosure. Environmental information disclosure system has been built up. Shanghai Environmental Bulletin is published annually and Daily Announcement on Ambient Air Quality are issued to the public. Websites such as Shanghai Environment (both in Chinese and English) and Shanghai Environment Hotline are built up to provide overview on major strategies, policies, measures and results of environmental protection efforts and to post catalogue of information disclosure of government. The public can also apply for the content that needs to be disclosed. To enhance communication with the public, a 24-hour environment hotline service (phone number: 12369) has been put through to facilitate public supervision and reporting, to

involve public ideas on environmental protection work and to understand public requirements thereof on a timely basis.

Encourage Public Participation. Shanghai has focused on encouraging the fulfillment and involvement of the whole society in environmental protection. Enterprises are also encouraged to strengthen environmental protection in their pursuit for economic success. For instance, enterprises like Baosteel formulate annual sustainable development reports, and some publish environment-related information and their countermeasures in the social responsibility reports. The public environmental awareness has also been strengthened to make their contribution. Many city residents participate in campaigns like “Stop driving for a day”, “Less disposables” and “Limiting air conditioner outlet temperature”, and actively monitor and report illegal pollutant discharge and behaviors that destroy ecosystem.

Conduct Public Satisfaction Survey on Environment. To better understand the requirements and comments on the environmental protection work of the city, Shanghai has entrusted third-party institutes to conduct public satisfaction survey on its environmental protection work since 2005. The public satisfaction survey on its environmental protection efforts in recent three years conducted by Gallup Consulting in 2008 indicated that 86% of surveyed residents thought attentions and investment on environmental protection had been enhanced, 94% thought environmental efforts had brought very good results, and 87% thought the overall environmental quality of Shanghai city had been improved.

Figure 2-8:Shanghai Environmental Bulletin

Information disclosure in Shanghai Environment website

全市环境质量

|空气污染指数与1月4日基本持平，本市空气

2009-01-04

指标	API	等级
可吸入颗粒物	31	I
二氧化硫	25	I
二氧化氮	34	I

空气 | 降尘 | 水质

发布日期：2009-01-04

区县	API指数	首要污染物	优良率%
浦东	27	二氧化硫	100
黄浦	42	二氧化氮	100
卢湾	39	可吸入颗粒物	100
徐汇	38	二氧化氮	100
长宁	40	二氧化氮	100
静安	38	二氧化氮	100
普陀	50	二氧化氮	100
闸北	42	二氧化氮	100
虹口	33	可吸入颗粒物	100
杨浦	36	可吸入颗粒物	100
宝山	55	二氧化硫	100
闵行	37	可吸入颗粒物	100
嘉定	52	可吸入颗粒物	100
金山	33	可吸入颗粒物	100
松江	48	可吸入颗粒物	100
青浦	48	可吸入颗粒物	100
南汇	33	可吸入颗粒物	100
奉贤	33	二氧化氮	100

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环保网上调查

养成良好的环保行为，有利于提升城市精神文明形象。如果遇到不环保行为，您将采取什么态度？

- ○ 坚决制止
- ○ 向有关部门反映
- ○ 气愤，但不会去阻止
- ○ 事不关已，不闻不问

提交 查看

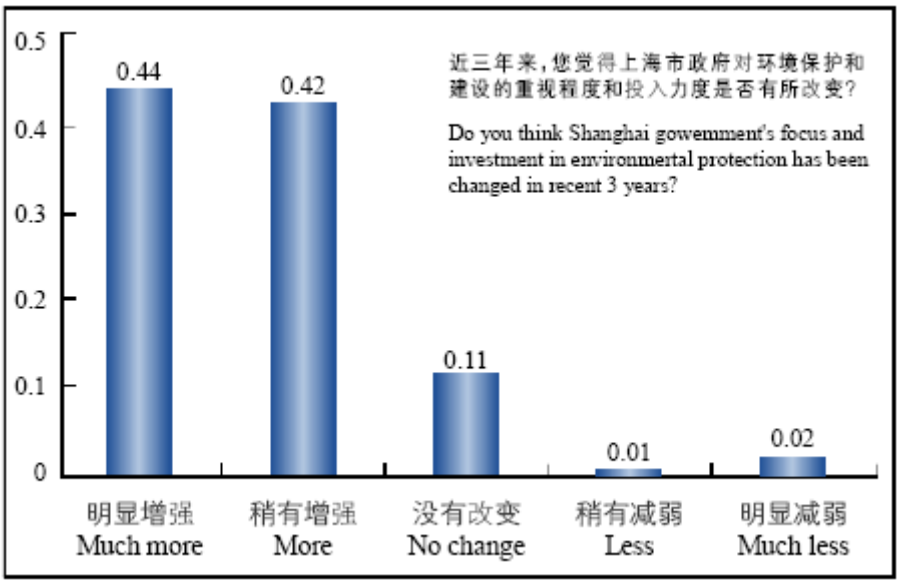


Figure 2-9:Results of Shanghai Residents'Satisfaction Survey on Environment – 1

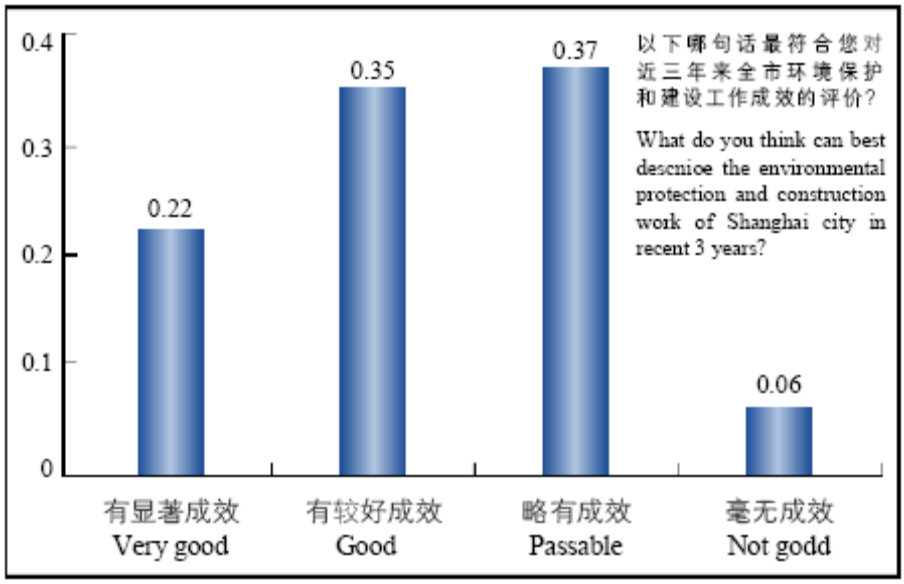


Figure 2-10:Results of Shanghai Residents'Satisfaction Survey on Environment – 2

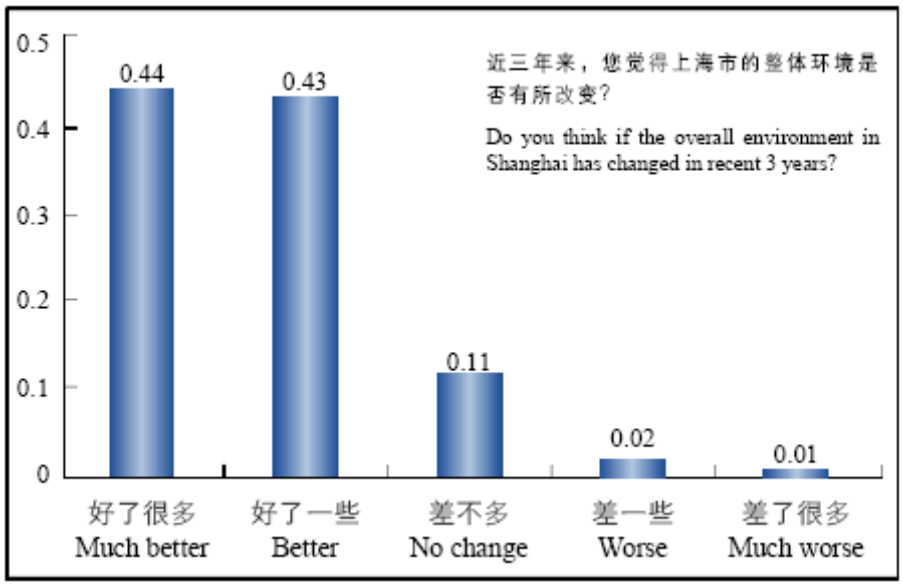


Figure 2-11:Results of Shanghai Residents'Satisfaction Survey on Environment - 3

2.2 Energy-Conservation, Emission-Reduction and the Change of Development Mode

The city orientation of Shanghai has changed several times, from "National Key Industrial Base" before the reform, "National Economic Center" in 1980s-1990s, "1 Pacemaker (Pudong New Area) and 3 Centers (i.e., economic, financial and trade centers)" in 1990s, to a modern international metropolis and "4 Centers", i.e., economic, financial, trade and shipping centers at present. The change of city orientation reflects the course of construction and development as well as the progress to explore an approach towards the sustainable development of Shanghai.

2.2.1 Readjust Industrial Structures and Functional Layouts

In light of the overall goal to develop Shanghai into economic, financial, trade and shipping centers, and following the development guidelines that is to persist in the guideline of developing tertiary, secondary and primary industries, and to persist in developing economy combined with secondary and tertiary industries, Shanghai relies on the technology advancement and development of circular economy to press ahead with adjustment of industrial structure. The guideline of "close down, suspend operation, merge with others or shift to different line of production" is brought into force against those industries with substantial resource consumption and pollutant emission, helping the transition from extensive growth relying on resource consumption to intensive growth that relying on technical advancement. The tertiary industry of the GDP is 53.7% in 2008.

Meanwhile, Shanghai has focused on the optimization of functional layout of the city. The strategy of "secondary industry making way for the tertiary" has been implemented in the downtown to withdraw polluting enterprises and develop modern service industry. The measure of "double reduction and double increase" has been adopted to increase public space and green space and to reduce building density ratio and number of sky scrapers. In suburban areas, "three concentrations" strategy has been adopted to concentrate industries to industrial parks, resettle

population to towns and upgrade the use of land to large-scale business operations.

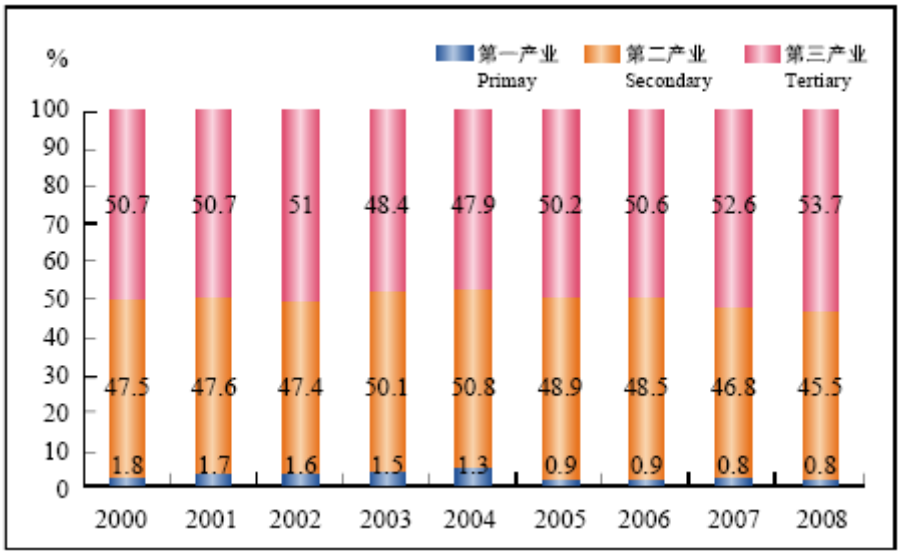


Figure 2-12:Industry Structural Ratio of Shanghai in Recent Years

2.2.2. Implement National Strategy of Energy-Conservation and Emission-Reduction

Implementation of Energy Conservation and Emission Reduction is a major task stipulated in Outline of the Eleventh Five-Year Plan of National Economy and Social Development and a major strategy for building a resource-efficient and environmentally-friendly society. To implement this national strategy, Shanghai puts forward to reducing comprehensive energy consumption per unit GDP by around 20%, reducing the Chemical Oxygen Demand (COD) discharge by 15% and cutting Sulfur Dioxide (SO2) emission by 26% in 2010 as compared with 2005. Shanghai adopted The Decision about Strengthening Energy Conservation Tasks in 2006, stipulated and implemented The Implementation Scheme of Energy Conservation and Emission Reduction of Shanghai to press ahead with the work thereof. And in 2008, Shanghai published Circular on Printing and Issuing of Procedures of Assessing and Examining Energy Conservation in Fixed Asset Investment Projects of Shanghai (For Trial Implementation), Circular by Shanghai Municipal Government on Implementation of Circular of State Council on Further Strengthening Oil and Power Conservation Work, Circular on Intensifying Implementation of Energy Conservation Common Action of Shanghai City and statistics, monitoring and evaluation plans and measures on energy conservation and emission reduction. In 2008, Shanghai Municipal Government issued a series of documents relating to the energy conservation and emission reduction.

Firstly, Optimize Energy Structure. In recent years, Shanghai has continuously strengthened energy structure adjustment. The percentage of coal in the municipal gross consumption volume of primary energy source has been reduced from 65% in 2000 to 51.3% in 2007. The provision of cleaner energies like natural gas (NG) and electricity has increased rapidly. Construction of solar energy, wind energy and other renewable energies has been initiated successfully. The installed capacity of wind power has reached 27,300 KW, the accumulated photovoltaic power generation capacity of solar energy has reached 200 KW and the total area of light utilization has reached

600,000 square meters. Shanghai is also the first to implement Green Electricity Scheme in China.

Secondly, Improve Energy Efficiency. In light of the goal of energy conservation and emission reduction, Shanghai Municipal Government has imposed strict control over market access of enterprises with high energy consumption and low added values, and has accelerated phase-out of outmoded production process. During 2003-2005, structural adjustment has been implemented on 96 enterprises. During 2005-2007, a total number of 1500 enterprises with outmoded production process have been phased out. And in 2008, Shanghai executed 522 projects and conserved energy equivalent to 1.301 million tons of standard coal. Meanwhile, Shanghai has improved gross consumption volume of primary energy source in industry, construction and transportation sectors, and conducted special inspections on energy conservation and emission reduction programs at major energy user enterprises. In addition, with application of energy conservation technologies, Energy Efficiency Standard of Major Energy Consumption Products and Energy Efficiency Labeling System and other measures have been taken to improve energy efficiency. In 2008, the comprehensive energy consumption per 10,000 Yuan GDP in Shanghai was 0.79 tons of standard coal, reducing by 31% as compared with that of 2000.

Thirdly, Control Total Loads of Pollutants. The responsibility system for meeting pollution discharge reduction targets has been enhanced and promotion mechanism as well as statistics, monitoring and evaluation systems have been established. Under the guideline of "balancing increments, reducing stocks and controlling the total loads", pollutant discharge reduction work has been pressed ahead through engineering projects, industrial restructuring, and management improvement, such as sewage treatment and desulfurization in power plants as well as adopting incentive policies on pollutant discharge reduction. By the end of 2008, the total discharges of SO2 and COD have been reduced by 13.04% and 12.27% respectively, as compared with those in 2005 and verified by the state. The pollutant emission intensity has also been reduced substantially. COD and SO2 discharges per unit GDP have dropped by 71% and 67% respectively, as compared with those in 2000.

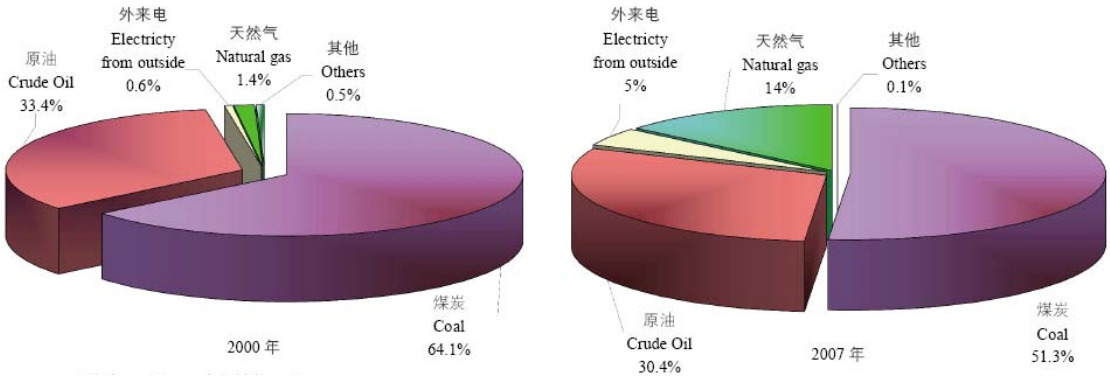


Figure 2-13:Comparison of Primary Energy Source Consumption Structure in Shanghai

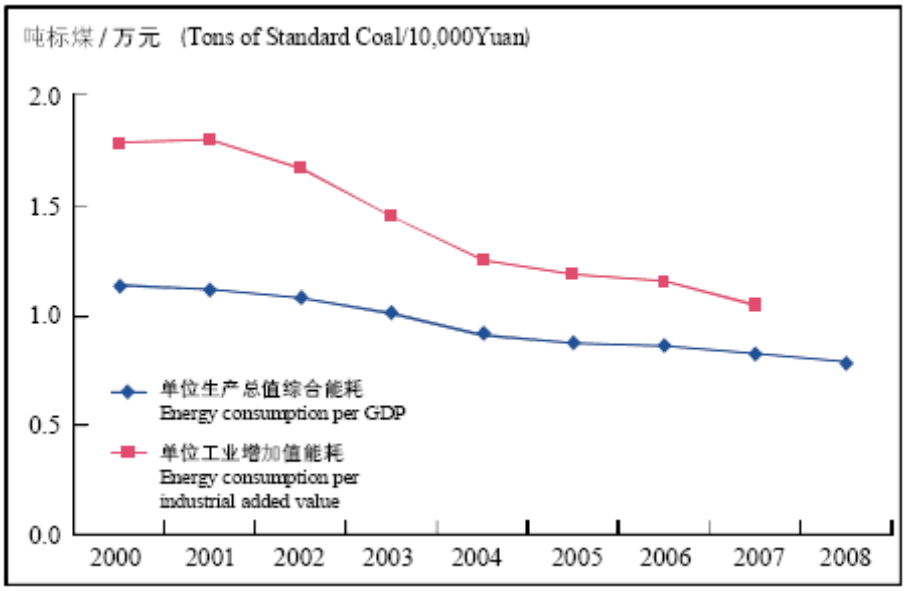


Figure 2-14:Annual Energy Consumption Intensity of Shanghai in Recent Years

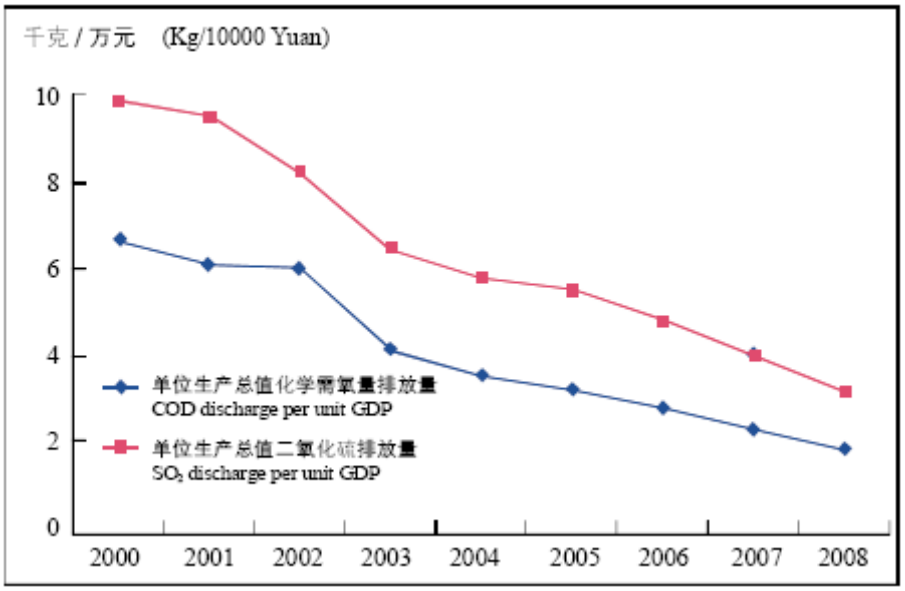


Figure 2-15:Annual Pollutant Discharge per Unit GDP in Shanghai in Recent Years

Shanghai Green Electricity Scheme

The so-called "green electricity" refers to the renewable power generated from solar and wind energies. The advantages in utilizing green electricity include not only reduction of CO_2 generated by coal-fired power and abatement of regional environmental pollution, but improvements on utilization of renewable energies, the globally accepted cleaner energy.

Though resources like solar and wind energies are free, abundant investments are still required in technologies to utilize the resources that makes the price of green electricity higher than that of coal-fired electricity. The unit price of the subscription to green electricity in Shanghai (i.e., the price gap between green electricity and common electricity) is RMB 0.53 Yuan. That is, for subscribers of green electricity, the electricity tariff includes two parts: basic tariff recorded in the electric meter based on thermal power price and the subscription price of green electricity in addition to the basic tariff. The subscription fee paid will be 100% used to develop green electricity and balance cost.

Shanghai Green Electricity Scheme adopts a voluntary subscription approach under government promotion. Guidance by government, publicity of media and green electricity marketing campaign for public welfare will improve social awareness to green electricity and encourage voluntary subscription. All green electricity-related information will be disclosed on a regular basis. The power purchase price and the subscription price of green electricity implement pricing under government approval and public bidding. The approved pricing guidelines and measures are also disclosed to the public.

The subscribers can send their application for subscription through phone (Shanghai hotline: 95598), mail, access to Shanghai Green Electricity Website or registration at appropriate outlets of local power companies. Enterprise (unit) subscribers determine the subscription amount based on regulated basic unit and minimum share; the annual minimum share for resident subscribers of green electricity is 120 kWh. Subscribers who have purchased a certain amount of green electricity will each be given a medal or certificate of honor by related municipal authorities. Qualified green electricity subscribers can use the green electricity logo. as specified.

2.2.3 Practise Circular Economy and Cleaner Production

As one of the earliest cities to practise circular economy, Shanghai has been actively exploring a development path for the circular economy in the recent years with demonstrations of pilot running.

Development of Circular Economy. In 2000, development of circular economy was officially included in Tenth Five-Year Plan for National Economic and Social Development of Shanghai and pilot projects were initialized. In 2005, White Paper of Shanghai on Circular Economy was compiled and in 2006, Implementation Plan of Shanghai for Pilot of Circular Economy was formulated. In addition, Guide to Industrial Energy Efficiency, Guide to Industrial Land Use and other fiscal policies have been stipulated to provide support to the development of circular economy. Meanwhile, multiple pilots of circular economy have been initialized. Since 2005, the construction of pilot circular economy industrial parks has been implemented in Shanghai Chemical Industry Park and Xinzhuang Industrial Park. In 2006, pilot work on circular economy

was initiated at the district/county level. New Jinhua Waste Recycling Internet Center has started recycling pilot projects of electronic wastes. Pilot projects of package reduction has been implemented in food and cosmetics industries. And Less Disposables campaign has been practised in all star rated hotels.

Demonstration and Audit of Cleaner Production Enterprises. Shanghai has established government-level implementation system and municipal-level fiscal investment system to encourage enterprises to pursue cleaner production. Since 2003, 1,000 enterprises have been selected to carry out pilot demonstration of cleaner production, aiming to achieve both economic growth and pollutant discharge reduction. During 2006-2008, three lists of pilot audit units for cleaner production among all key enterprises in Shanghai have been disclosed and compulsory cleaner production audit has been implemented. In 2008, Shanghai published Circular on Overall Implementing Cleaner Production Pilot Audit in Key Enterprises. The results showed that enterprises implementing cleaner production have made profits of RMB 475 million Yuan, and conserved 1.1984 million tons of steam, 96,000 tons of coal, 2,133.4 cubic meters of water, 908.3347 million KWh of electricity and 1,417.68 cubic meters of natural gas annually while 75,000 tons of raw materials are recycled. Meanwhile, substantial environmental benefits have been made with annual emission reduction of 528 tons of smoke and dust, 21,800 cubic meters of wastewater, 204.7 tons of COD, 991 tons of SO2, 12,600 cubic meters of waste gas, 3,150 tons of industrial residues and 34.46 tons of toxic or hazardous substances.

2.2.4 Change Life Style of Local Residents

In recent years, Shanghai has been carrying out a Public Transit Priority Strategy to encourage local residents to take green travelling approach. In addition, Government Green Procurement System has been set up. Regulation on limiting air conditioner outlet temperature in public places has been enforced. Water conservation toilet system has been widely adopted. Policies and measures have been taken to implement a payment scheme for plastic shopping bags. All the above aims to encourage local residents to adopt environmentally-friendly ways in daily working and living to reduce resource consumption and pollutant discharge.

2.3 Atmospheric Environmental Protection

2.3.1 Control of Coal Combustion Pollution

In recent years, Shanghai has imposed control over coal combustion pollution under the guideline of “controlling emission from scattered low stacks and improving those of centralized high stacks”. Since 2000, Shanghai has pressed ahead with cleaner energy replacement of coal-fired boilers. In June 2002, A Zoning and Implementation Scheme of “Zone Basically Free from Coal” in Shanghai was stipulated to help those areas to be “zones basically free from coal burning” and “zones free from coal burning boilers”. By the end of 2008, 3,200 coal-fired boilers had been replaced with cleaner energy facilities in the city and a total of 666 square kilometers of “zone basically free from coal” had been constructed, of which the area within the Inner Ring Road had been constructed as a “zone free from coal” by the end of 2005.

Meanwhile, Shanghai has further strengthened its control over the pollution of smoke and dust as well as industrial dust. The establishment of "smoke and dust control zone" has been expanded from downtown to suburban areas. A total of 3,892 square kilometers of "smoke and dust control zone" have been set up in the city.

Since 2005, Shanghai has initiated flue gas desulphurization projects for coal-fired power plants. In February 2006, Shanghai Implementation Scheme of Desulphurization for Coal-fired Power Plants During Eleventh Five-Year Plan and Shanghai Implementation Scheme on "Small Power Units Making Way for Large Ones" in Power Industry were launched to press ahead with desulphurization in the coal-fired power plants. By the end of 2008, desulphurization facilities for 10,200 MW coal-fired power units in 11 power plants have been equipped and 695 MW coal/heavy oil-fired small power units have been shut down.

Figure 2-16:Desulphurization Facilities in Baosteel Power Plant

2.3.2 Control of Motor Vehicle Emission

Control of motor vehicle pollution in Shanghai was initiated in late 1980s focusing on supervision and inspection of motor vehicles on the road. In mid 1990s, with fast growing motor vehicle population and increasingly serious motor vehicle emission pollution, Shanghai began to take active measures to control the motor vehicle pollution.

Press Ahead with Public Transit Priority Strategy. By the end of 2008, Shanghai has put into operation 9 rail transit routes with a total length of 264.3 kilometers and 1,058 bus transit lines with 86.2 kilometers of ground bus traffic lanes. A public transit transference preferential fare policy has also been introduced to guide local residents to access more public transit means. Meanwhile, a system that auctions a fixed quantity of private car licenses regularly has been implemented to impose restrictions on the quantity of private cars. Mr. Klaus Toepfer, ex-Under Secretary General and Executive Director of the United Nations Environment Programme thought highly of Shanghai for its fast development of rail transit system and once pointed out that private car license auction system implemented was a very efficient administrative measure (19th "International Business Leaders' Advisory Council for the Mayor of Shanghai").

Enforce Strict Motor Vehicle Emission Standards. On March 1st 2003, Shanghai started implementing in advance the National Stage II Motor Vehicle Emission Standard, equivalent to Euro II standard implemented by EU members, on new vehicles. Up to 2005, the National II Standard had been fulfilled by 42,000 taxies in the city and 5,400 buses in downtown area. On July 31st 2006, Shanghai started implementing National Stage III Motor Vehicle Emission

Standard, equivalent to Euro III standard, initially in bus and taxi business. And on January 1st 2008, National III Standard was started to implement on all motor vehicles. The number of taxies and buses that fulfill this standard reached 31,000 and 5,000 respectively. Recently, Shanghai has announced that it will implement in advance the National Stage IV Motor Vehicle Emission Standard, equivalent to Euro IV standard, on all light gasoline-powered vehicles to be registered and all new vehicles of public transport, sanitation, postal and municipal construction sectors since November 1st 2009. After this, the gap between emission standard for new vehicles in Shanghai and the current Euro IV standard implemented in EU will be narrowed from 7 years when it was first implemented in 1999 to 3 years at present.

Accelerate Phase-out of Highly Polluting Vehicles. A step-by-step phase-out policy on polluting vehicles has been actively implemented in Shanghai. Restricted access to downtown area has been implemented on highly polluting vehicles unfulfilling National I Standard since 2006. Up to 2008, the city has eliminated 150,000 units of highly polluting vehicles and 500,000 units of gasoline mopeds with heavy emissions.

Strengthen Control over Pollutant Emission of In-use Vehicles. The city has actively implemented the In-use Vehicle Inspection and Maintenance System and constructed a demonstration station of In-use Vehicle Inspection and Maintenance Center. A joint enforcement task force on motor vehicles was established and had conducted inspections on 110,000 motor vehicles during 2000-2008. Since November 2008, Shanghai has implemented the regulation to "stop driving official vehicles for a day every week".

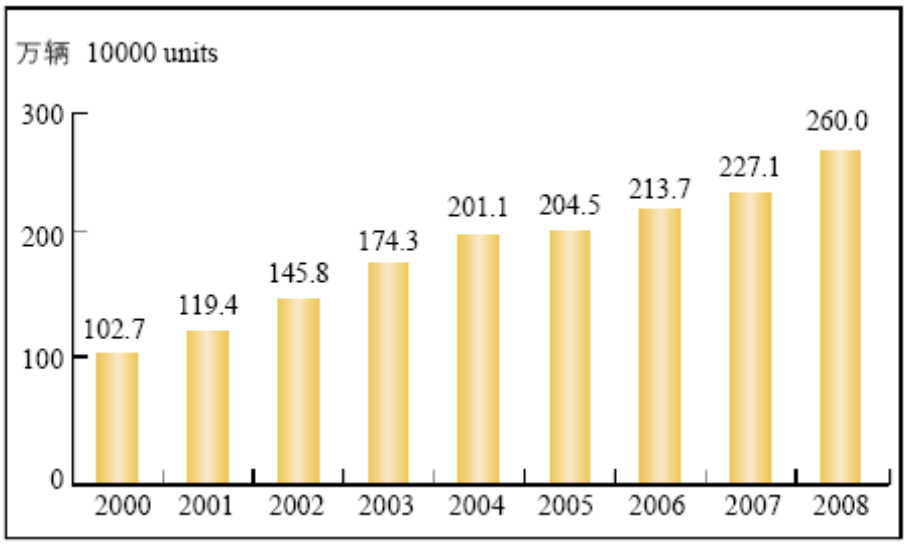


Figure 2-17:Shanghai Motor Vehicle Population in Recent Years

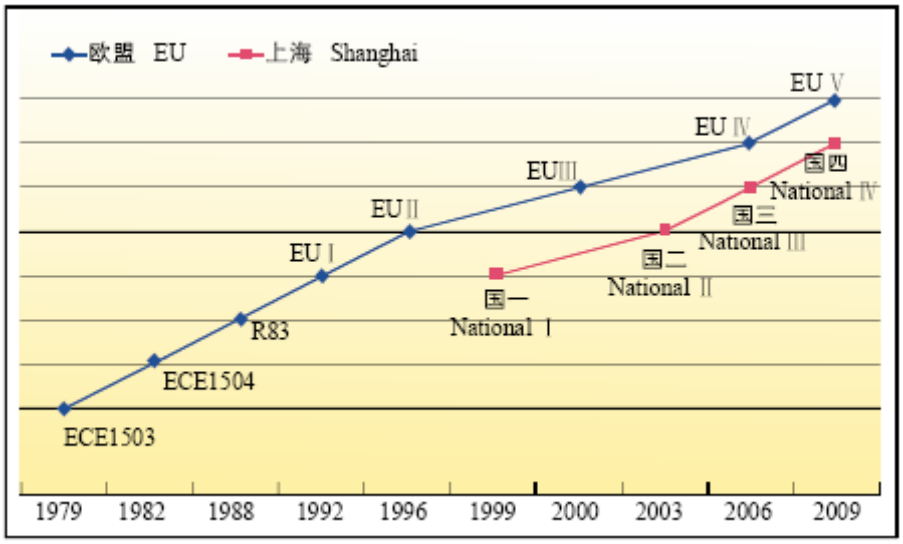


Figure 2-18:The Comparison of Executiom Time between Shanghai and EU in Motor Vehicle Emission Standards

Figure 2-19:On-road Inspection and Enforcement by Joint Task Force

2.3.3 Fugitive Dust Pollution Control

To control fugitive dust pollution, Shanghai Ordinance on Fugitive Dust Pollution Control and Prevention has been implemented since July 1st 2004 to strengthen dust pollution supervision and management on construction sites, municipal engineering, road cleaning, cargo storage and dregs transportation.

Since 2006, Shanghai has included fugitive dust pollution control as one of the major tasks in the third round of Three-Year Environmental Action Plan to press ahead with the establishment of "fugitive dust pollution control zone". By the end of 2008, 728 square kilometers of "fugitive dust pollution control zone" has been set up in the city.

Meanwhile, Shanghai Environmental Protection Bureau, Shanghai Municipal Construction Commission, Shanghai Municipal Management Enforcement Bureau, Shanghai Municipal Engineering Administration Bureau and other responsible departments have strengthened supervision and inspection and implemented specific inspection and governance on fugitive dust

pollution in joint efforts. In addition, publicity on prevention and control of dust pollution has been reinforced with the distribution of 4,000 copies of Handbook on Fugitive Dust Pollution Prevention and Control to create a sound atmosphere in the society to pay attention to prevention and control of the dust pollution.

Figure 2-20:Fugitive Dust Pollution Control on Construction Site

2.3.4 Ambient Air Quality

Shanghai implements the National Ambient Air Quality Standard (NAAQS, GB 3095-1996). In recent years, Shanghai manages to maintain the ambient air quality at a stable level that fulfills Class 2 of NAAQS. The good-air quality rate has been above 85% in recent six years. And in 2008, a total of 328 days were evaluated as good-air quality and the good-air rate was 89.6%.

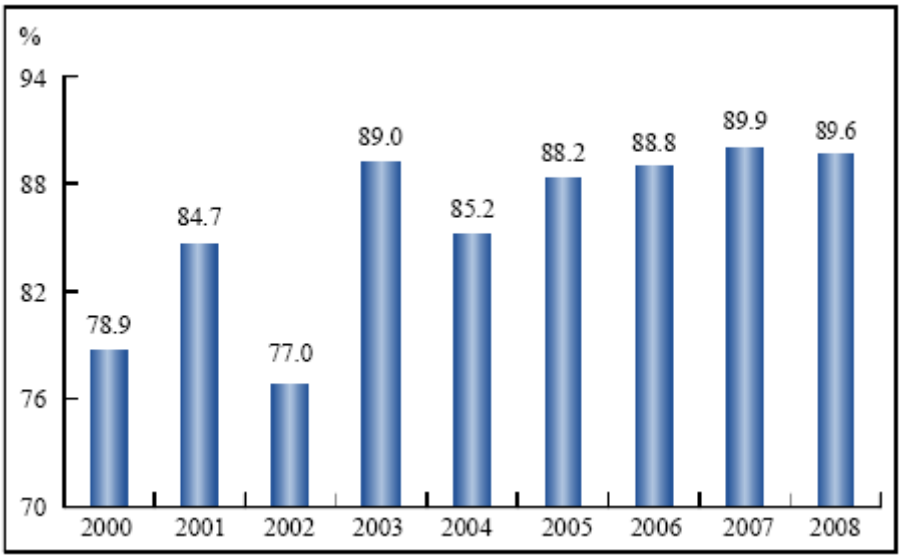


Figure 2-21:Shanghai Good-air Rate for Ambient Air Quality in RecentYears

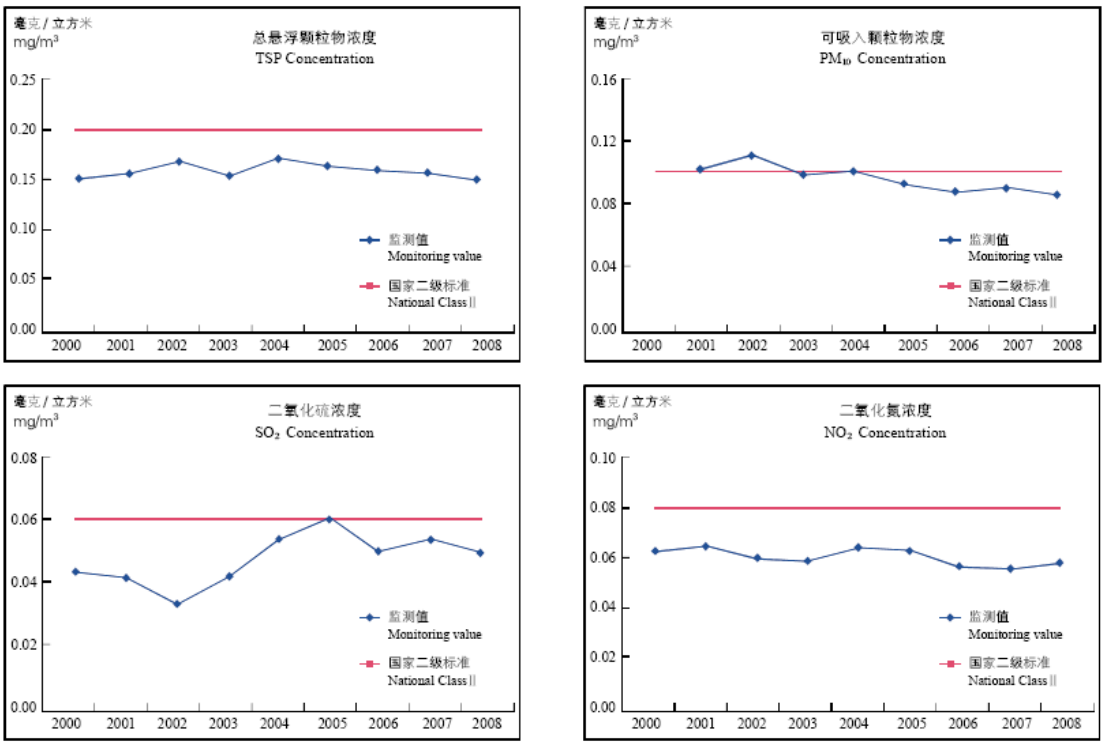


Figure 2-22:Shanghai Major Indicators of Ambient Air Quality in Recent Years

2.4 Aquatic Environmental Protection

2.4.1 Improve Sewerage System

In recent years, Shanghai has pressed ahead with the construction of wastewater treatment plants and collection sewer networks under the strategy of "centralized sewage treatment in city proper and combined sewage treatment scheme in suburban areas". Since 2000, large-scale municipal wastewater treatment plants have been built in Shidongkou, Zhuyuan and Bailonggang one after another. Meanwhile, suburban wastewater treatment plants and sewer networks have been

improved. By the end of 2008, 50 wastewater treatment plants have been built with a design capacity of 6.73 million cubic meters per day. The sewage treatment rates for towns and the city proper have reached 75.5% and 85.8% respectively.

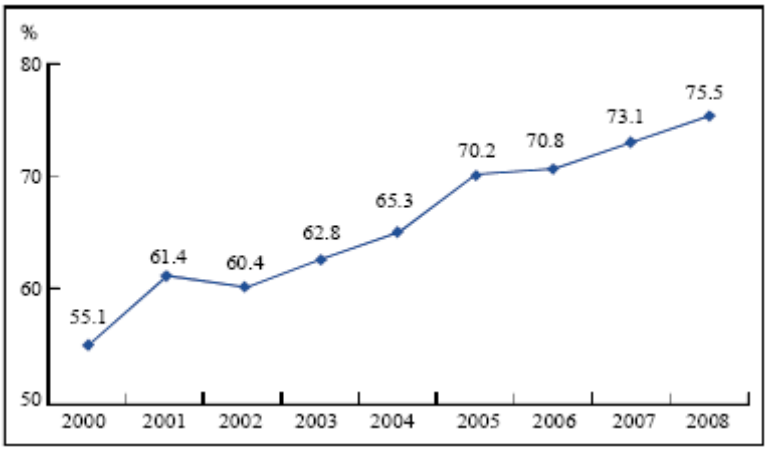


Figure 2-23:Shanghai Sewage Treatment Rate

Introduction about Bailonggang Municipal Wastewater Treatment Plant

Bailonggang Municipal Wastewater Treatment Plant is located at Heqing Town of Pudong New Area with a daily treatment capacity of 2 million cubic meters. It mainly serves 7.05 million people in Huangpu, Luwan, Xuhui and Changning districts as well as Wujing-Minhang Area and part of Pudong New Area. It was put into operation in the end of September 2008 and is the largest municipal wastewater treatment plant in Asia at present.

Bailonggang Municipal Wastewater Treatment Plant adopts a multiple anaerobic-anoxic-oxic (AAO) process with denitrification and dephosphorization to produce an effluent in compliance with Grade 2 of *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant* (GB 18918-2002). To maintain stable operation and standard discharge for sake of pollutant reduction, related environmental protection departments conduct an effluent quality inspection every week on Bailonggang Municipal Wastewater Treatment Plant and have installed automatic online monitoring equipment at its inlet and outlet. The monitoring results indicate that the effluent of Bailonggang Municipal Wastewater Treatment Plant is stably qualified. According to preliminary estimation, Bailonggang Municipal Wastewater Treatment Plant can reduce about 136,000 tons of COD in total annually.

2.4.2 Rehabilitate Medium and Small Waterways

Since 1998, Shanghai has initiated large-scale waterway rehabilitation project focusing on comprehensive environmental rehabilitation of Suzhou Creek. Through interception and control of pollution sources, ecological restoration, comprehensive flow augmentation and long-term management mechanism, the quality of aquatic environment has been substantially improved. By the end of 2008, the city has invested RMB 25.5 billion Yuan to rehabilitate over 20,000 segments of waterways with a total length of more than 18,000 kilometers. At present, black and stink conditions of the rivers have basically been eliminated within the city proper, and the water quality has been improved in most waterways in suburban areas.

Figure 2-24:Conditions of Waterways in Shanghai

2.4.3 Eutrophication Prevention and Control in Dianshan Lake

Shanghai has attached great efforts in implementing the state-stipulated Master Plan for Comprehensive Rehabilitation of Taihu Lake Basin. 30 projects in 7 categories have been undertaken, including drinking water safeguard, industrial point source pollution control, municipal wastewater treatment and solid waste management, agricultural non-point source pollution control, ecological restoration, watercourse network rehabilitation and environmental monitoring.

2.4.4 Pollution Control in Coastal Areas

Shanghai has actively involved in the Action Plan for the Environmental Protection of Yangtze Estuary and its Adjacent Sea Waters which was organized and compiled by the Ministry of Environmental Protection. Shanghai worked hard to cut down pollution load into the sea to minimize effects on the marine ecosystem through measures like control of pollutants discharge into the sea, establishment of marine preservation areas, control of shipping pollution and waste dumping into the sea.

2.4.5 Aquatic Environment Quality

Shanghai implements the national Environmental Quality Standards for Surface Water (GB 3838-2002). In general, through recent comprehensive environmental rehabilitation and infrastructure construction, Shanghai has maintained stable quality in its watercourses and improved water quality in the urban reaches of the Huangpu River and Suzhou Creek while being as good as or even better than that of the upper stream.

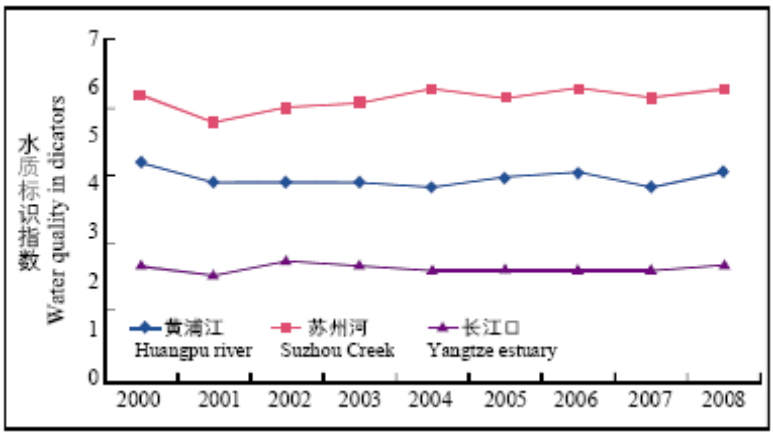


Figure 2-25: Water Quality of the Huangpu River, Suzhou Creek and Yangtze Estuary in Recent Years

2.5 Utilization and Disposal of Solid Waste

2.5.1 Disposal of Domestic Garbage

In recent years, Shanghai has established Yuqiao Garbage Incineration Plant, Jiangqiao Garbage Incineration Plant, Laogang Municipal Solid Waste Landfill and some harmless disposal facilities of domestic garbage one after another in Jiading, Qingpu and Chongming to form a complete framework including collection, transfer, incineration, landfill and comprehensive utilization.

By the end of 2008, the total amount of Shanghai domestic garbage is 6.783 million tons, and harmless disposal rate is 76.95%. Meanwhile, Shanghai has actively explored and practiced reuse methods of domestic garbage. The aerobic composting process adopted by Meishang Domestic Garbage Disposal Plant and the anaerobic fermentation process adopted by Putuo Domestic Garbage Comprehensive Disposal Plant set up very good examples of biochemical treatment technologies for domestic refuse.

Introduction about Putuo Domestic Garbage Comprehensive Disposal Plant

Putuo Domestic Garbage Comprehensive Disposal Plant covers a land area of 4.4 hectares with a daily disposal capacity of 800 tons of garbage including 680 tons of domestic refuse and 120 tons of organic garbage.

This disposal plant adopts world-class mechanical-biological treatment (MBT) based on a patent-owning Anaerobic Fermentation Treatment (AFT) technology that can reuse garbage to the maximum degree. Domestic garbage is identified and screened at first after entering this plant. Vegetable leaves, food waste and other kitchen garbage belong to degradable organic compounds, which will be sent with other similar compounds in the domestic garbage to the AFT system for treatment. The biogas produced during the AFT process is used to generate electric power. Substances that can be recycled including paper and coke bottles are sent to packaging workshop and bundled up securely, and then sent to waste recycling center. This disposal plant is able to process 280,000 tons of domestic garbage annually and generate 41 million kWh electricity power connecting to the East China Power Grid.

It is the first garbage disposal plant to be licensed with BOO (Build-Own-Operate) franchise in China.

2.5.2 Disposal of Hazardous Waste

Since 1998, Shanghai has implemented hazardous waste disposal license management to encourage public investments, privatized service and market-oriented operations. By the end of 2008, the diversified operations like landfill, incineration disposal, physico-chemical treatment and comprehensive utilization of hazardous waste have been formed up to cover 32 categories of hazardous waste, including collection, storage and disposal system to annually dispose of 420,000 tons of industrial hazardous wastes and a centralized collection and incineration system t

2.6 Noise Control and Radiation Safety Supervision

2.6.1 Ambient Noise Control

Shanghai has strengthened control over ambient noise in recent years. The Shanghai Zoning for Applicable Ambient Noise Control Standard has been stipulated to cover the whole region of the city and to enforce more stringent noise control standard in the downtown area. The regulation was officially implemented on June 1st 2008. A new noise control mechanism has been established for construction works at night to ensure no disturbance caused to local residents by major municipal infrastructure constructions. In addition, construction of "Ambient Noise Control Compliance Zone" and "Quiet Residential Quarter" has been rolled out. At present, 89 "Quiet Residential Quarters" have been set up so as to guarantee peacefulness and comfort to residential areas.

Figure 2-26:Noise Barriers in Outer Ring Road

Figure 2-27:Noise-level Display Panel

2.6.2 Traffic Noise Control

In past few years, Shanghai has improved control over traffic noise step-by-step. On one hand, engineering measures including construction of road noise barriers and greenbelts as well as reconstruction of roads in addition to law enforcement actions like no-honking of motor and non-motor vehicles have been adopted to control road noise pollution. On the other hand, vessels with outboard motor propeller are forbidden in the city watercourses and honking is limited to railway locomotives to control and reduce noise.

2.6.3 Acoustic Environment Quality

In respect to ambient noise in Shanghai, the average equivalent sound level in daytime was 57.0 dB(A) and that at nighttime was 49.9 dB(A) in 2008. During 2000-2008, ambient noise in Shanghai had stably fulfilled standards for related functional areas.

Regarding traffic noise in Shanghai, the average equivalent sound level in daytime was 71.4 dB(A)

and that at nighttime was 66.4 dB(A). During 2000-2003, traffic noise went a bit higher while maintaining at a basically stable level during 2004-2008.

2.6.4 Radiation Safety Supervision

Shanghai has been improving its radiation safety management system in recent years. On one hand, an investigation has been initiated in 2005 on radiation safety management system. The capacity building has been improved as the regulation system and the Certain Provisions of Shanghai on Prevention and Control of Radioactive Pollution have been drafted to streamline the supervision system. On the other hand, lab analyzers and field emergency monitoring equipment have been installed, Automatic radiation monitoring stations for land, water body and soil as well as electromagnetic radiations have also been built. In addition, a database for radioactive sources has been established and Radiation Safety Licenses have been granted to strengthen law enforcement and supervision.

2.7 Construction of Green Space and Forestation

2.7.1 Construction of Urban Green Space

Since 2000, Shanghai has pressed ahead with the construction of urban ecological landscape corridor (along the Huangpu River, Suzhou Creek and Yan'an Road), public greenbelts with a service radius of 500 meters within Inner Ring Road and green spaces around the city in associated redevelopment of old downtown area. The green spaces cover a total area of 33,000 hectares. And in 2004, Shanghai was awarded the title of National Garden City. Several large-scale public green spaces have been built in the downtown area including Yanzhong Green Land, Xujiahui Park, New Jiangwancheng Green Land, Changfeng Green Land, Minhang Athletics Park, North Bund Green Land, and etc.

In 2008, the green coverage increased to 38% and public green space area per capita increased to 12.5 square meters.

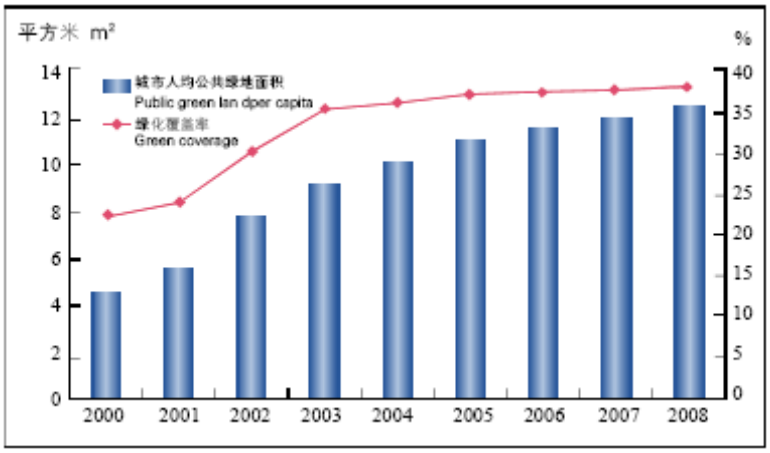


Figure 2-28:Shanghai Public Green Space per Capita and Green Coverage in Recent Years

Figure 2-29：Kaiqiao Green Land

Figure 2-30：Shanghai Haiwan National Forest Park

Figure 2-31：Shanghai Gongqing National Forest Park

2.7.2 Construction of Ecological Forestation

In light of the overall planning of "Three Concentrations" in suburban areas, constructions of woodland, especially inshore shelter forest and watershed forest have been implemented. Also, national forest parks have been built including Sheshan of Songjiang, Dongping of Chongming, Shanghai Haiwan and Shanghai Gongqing.

By the end of 2008, the woodland area in Shanghai had reached to 95,333 hectares and forest coverage rate had reached to 11.63%, as 4 times as that of 2000.

2.8 Comprehensive Rehabilitation in Key Areas

2.8.1 Water Source Protection

At present, the centralized drinking water sources of Shanghai include Upper Huangpu River and

Chenhang Reservoir at Yangtze estuary. Construction and protection of water sources have always been one of the focuses of the environmental protection tasks.

Legislation for Drinking Water Source. Shanghai promulgated Regulations for Protection of Drinking Water Source at Upper Huangpu River and stipulated rules for implementation as early as 1985 and amendments were made to this regulation in 1996. Since 2008, zoning of water source protection areas and stipulation of water source regulations have been initiated to further strengthen water source protection.

Strict Control over Pollutant Discharge into Waters. In accordance with the Regulations for Protection of Water Source at Upper Huangpu River, control over total load of pollutants in water source protection zones has been clarified and the stringent environmental impact assessment system has been implemented on the construction, expansion and reconstruction projects. Measures like special enforcement and inspection have been adopted to strengthen the management over pollutant discharge of enterprises within the water source protection zones.

Strengthen Control over Non-point Source Pollution. Shanghai has implemented zoning management on poultry and livestock rearing and strengthened control over its pollution and reuse of feces. By the end of 2005, 259 large-scale farms of poultry and livestock rearing in prohibition area have been shut down including 173 ones located within the water source protection zones. Net-cage aquatic culture in Dianshan Lake has also been prohibited.

Strengthen Ecological Preservation in Water Sources. At present, a 200-meter wide watershed forest has been planted along each side of the Upper Huangpu River with a total area of 4394.7 hectares.

Optimize Raw Water Supply Network. To ensure safety of drinking water, the third water source of Shanghai Qingcaosha Water Source project at Yangtze Estuary is under construction and will be completed in 2010. It will provide water to fulfill 50% demand of all local population. The construction of this project indicates that Shanghai has optimized its raw water supply network as "connecting two rivers for multiple supply".

Figure 2-32：Watershed Forest in Upper Huangpu River

2.8.2 Comprehensive Rehabilitation of Suzhou Creek

Suzhou Creek, previously called Wusong River, has a total length of 125 kilometers, of which 53.1 kilometers is located within Shanghai City. In the early 1900s, water in Suzhou Creek was so clean that people could see fishes swimming in the river. In 1910, Zhabei Waterworks was built

at the riverside of Suzhou Creek. With the development of modern industry along the river, pollution had become increasingly serious and the water quality had continuously degraded. Eventually, river water became black and stink and the fishes disappeared.

To clean up Suzhou Creek after 80 years of pollution, Shanghai CCP and Shanghai Municipal Government have attached great emphasis to comprehensive rehabilitation of Suzhou Creek. In 1996, Shanghai officially established a steering team for comprehensive environmental rehabilitation of Suzhou Creek and formulated Comprehensive Environmental Rehabilitation Scheme for Suzhou Creek, which clearly defined a short-term (till 2000) goal to eliminate black and stink and long-term goal to restore ecosystem of the river.

In 1998, Stage I Project of Comprehensive Environmental Rehabilitation of Suzhou Creek was initiated and till 2008 Stage III had basically completed. The project has identified the pollution sources and adopted measures including interception of pollution from six tributaries, pollution interception along middle and lower reaches, construction of sewer networks in the upper catchment, cut of load releasing from pumping stations along the river and construction of Shidongkou Wastewater Treatment Plant. Comprehensive flow augmentation within Suzhou Creek water system has been implemented by using existing irrigation works and water resources. Extensive scientific research work has been undertaken to study the sediment and oxygen reaeration and research results have been widely adopted in the project. According to overall city planning, rehabilitation and greening plantation have been implemented along the riverbanks. A science and education center for general public and an environment theme park called Mengqing Garden have been set up to let local residents better understand the rehabilitation progress.

After over ten years of efforts, Comprehensive Environmental Rehabilitation of Suzhou Creek has achieved distinguishing outcomes. Black and stink have been eliminated from the Suzhou Creek mainstream in 2000 and the major water quality parameters (dissolved oxygen, chemical oxygen demand and 5-day biochemical oxygen demand) of the river water along the urban reaches have all been in compliance with the requirement of Grade V of the surface water quality standard (for landscaping use) since 2002. In 2008, water quality in major parameters came up with those of the upstream water. Fishes have returned to the urban reaches of the river and landscape along riverbanks has also been improved to provide better living environment to local residents.

Figure 2-33：Mengqing Garden Environmental Theme Park

2.8.3 Comprehensive Environmental Rehabilitation for Industrial Quarters

Strengthen Comprehensive Environmental Rehabilitation for Traditional Industrial Quarters. Since 2000, comprehensive environmental rehabilitation has been implemented in Wusong, Taopu, Wujing and other industrial quarters through joint efforts and multi-channel funding.

Comprehensive Environmental Rehabilitation of Taopu Industrial Quarter. It is defined as one of key projects in Stage I and the Stage II of Shanghai Three-Year Environmental Action Plan. The focus of this project is to adjust industrial and production structure. 27 pollution sources of offensive odor in 21 polluting enterprises have been shut down or treated for the purpose of basically eliminating its impact on surrounding environment. Completion of this project has been a great help in successful transition of the traditional chemical industry quarter to an urban industrial park.

Comprehensive Environmental Rehabilitation of Wusong Industrial Quarter. Comprehensive environmental rehabilitation of Wusong Industrial Quarter was fully initiated in July 2000. After 6 years of efforts, 17 heavily polluting enterprises and 40 production lines have been shut down or upgraded, 43 major pollution sources have been improved and a centralized heat supply network has been constructed in the quarter. Greening construction and road dust abatement have improved the ecological environment. The volume of smoke and dust emission has decreased by 66.8% and the environment quality of the industrial quarter becomes one of the best among similar industrial zones in China.

Comprehensive Environmental Rehabilitation of Wujing Industrial Quarter. The rehabilitation work has been fully initiated since 2005. 53 projects including production line shut down and pollution control have been completed. Environment of the industrial quarter has become better on a step-by-step basis.

Construction and Improvement of Environmental Infrastructure in the Existing Industrial Zones. To press ahead with the construction of wastewater disposal facilities in the industrial quarters and achieve centralized collection and disposal with the aim to eliminate direct discharge, wastewater control has been carried out in 80 existing industrial quarters. 38 projects of environmental infrastructure construction have been identified during 2006-2008. 27 wastewater treatment plants have been constructed with a total sewer network length of 1,585 kilometers. The wastewater collection rate has reached 74%. Water quality of watercourses within the industrial quarters has been greatly improved.

Figure 2-34：Wusong Industrial Quarter Before and After Rehabilitation

2.9 Environmental Improvement for Expo 2010

A 600-day Action Plan to Welcome World Expo was stipulated in 2008 to ensure event success. To press ahead with the implementation of this Action Plan, Shanghai Municipal Government has set up a leading group chaired by Mayor Mr. Han Zheng. Three task forces have been set up in this group: Public Promotion, Formality Service and City Management. The leading group has set up an office as routine administrative organ, solely responsible for implementation, monitoring, inspection and reporting.

Comprehensive environmental campaign of city appearance is a key component of this Action Plan. In July 2008, the leading group stipulated Outline on Construction and Management of City Appearance and Environment for 600-day Action Plan to Welcome World Expo, which clearly defined the goal of "Better environment, better life". "Five focuses" were emphasized, i.e., focus on improving city appearance and alleviating administrative stubborn problems to make changes that local residents could see and feel; focus on improving living environment of local residents and solving difficulties and troubles they had repeatedly complained; focus on social and public participation to motivate local residents to participate in management of the city; focus on providing highly efficient public services to ensure safe and orderly running of the city; and focus on long-term management to formulate a management system in accordance with the law. Major tasks of this Action Plan include "Three projects", i.e., city appearance improvement, living environment improvement and city management enhancement. Those projects involve 30 task assignments. Through implementation of this Action Plan, five obvious improvements will be achieved in city appearance, management, public service, living environment and personal behaviors.

So far, the second stage of "100-day Plan" has reached its anticipated targets. The environmental campaign on the city appearance to welcome World Expo has achieved satisfactory results.

2.10 Attentions on Global Environmental Issues and Regional Cooperation

In response to global environmental issues, Shanghai has adopted measures including energy conservation and emission reduction, phase-out of ozone depleting substances, improvement of biodiversity preservation and control over persistent organic pollutants with the aim to make contributions to improve the global environment. Meanwhile, regional cooperation and coordination mechanism have been explored to make joint effort in improvements of regional environment.

2.10.1 Efforts on Global Climate Change Issue

Climate change is a global and critical topic concerned by the international community. Shanghai Municipal Government has taken active measures to control greenhouse gas emission with the aim

to make contributions in the global campaign against climate change.

Firstly, efforts have been taken to control the emission of greenhouse gas through shifting the mode of city development and economic growth, optimizing energy consumption structure and improving energy efficiency. Secondly, energy conservation and emission reduction program have been implemented to further improve energy and resource efficiency of enterprises, reduce discharge load and intensity of pollutants. Thirdly, notable advancements have been made in development of renewable energy. With policy guidelines and financial investments, utilization of renewable energy has been improved and developed in some appropriate areas, including biomass, solar energy and wind energy. And Shanghai is the first city in China to implement green electricity program. In 2008, Shanghai published Supporting Measures of Special Funds for Development of Renewable Energy and New Energy to clarify financial supporting policies on renewable energy and resource projects such as wind power, photovoltaic power with generation capacity above 100 KW, large-scale light heat utilization and biomass energy.

In addition, Shanghai has taken afforestation measures to increase the forest and green coverage.

Introduction about Shanghai Donghai Bridge Wind Power Field

Shanghai Donghai Bridge Wind Power Field is situated on the east of Donghai Bridge that connects Nanhui District and Yangshan Port. It is about 8km to the coastline in the nearest and 14km in the far end, covering an ocean area of 14 square kilometers. It is the first wind power field over the sea in Asia. The installed capacity is 100 MW and can supply power to 100,000 households. The annual SO_2 emission reduction will be equivalent to that of 50,000 motor vehicles in total.

The construction of Donghai Bridge Wind Power Field was started in September 2008 and will be completed before the World Expo 2010.

2.10.2 Ozone Layer Protection and Phase-out of Ozone Depleting Substances

As the biggest city in producing and consuming ozone depleting substances (ODS) in the past, Shanghai is confronted with a challenging task in phasing-out of ozone depleting substances. Since 1990s, Shanghai has actively participated in multi-lateral funded pilot projects and undertaken extensive work in ozone layer protection and phase-out of ozone depleting substances.

Since 1990, Shanghai has initiated 20 research projects on ozone layer protection and made technical preparations for substitution plans. Since 1994, Shanghai Environmental Protection Bureau has included related work in its annual work plan, which highlighting the phasing-out of ozone depleting substances in the pollution control and management. In addition, Shanghai has applied for and been granted multi-lateral funds to carry out demonstration projects, which have cut more than 10,000 tons of ozone depleting substances. To better implement the Montreal

Protocol on Substances that Deplete the Ozone Layer and Vienna Convention for the Protection of Ozone Layer, and in accordance with the National Scheme of China's ODS Phasing Out, Shanghai has formulated Shanghai Implementation Plan on Accelerating Phase-out of Ozone Depleting Substances (2008-2010) and initialized a three-year action plan. 20 workgroups and an expert group organized by Shanghai Municipal Development and Reform Commission and other 11 related departments have been set up to fulfill this task. So far, Shanghai has removed all production facilities for ozone depleting substances and phase-out tasks in the enterprises sponsored by multi-lateral funds have been completed. Using of methyl bromide has been stopped in agriculture and grain storage. Recycling and reuse of ozone depleting substances have been enforced in refrigeration sectors and motor vehicle scrapping. Products containing ozone depleting substances have been prohibited to sell in markets all over the city. Local fire department adopts cleaner fire extinguishing agents while the Halon substances being used for construction will be recycled. Substitutes of ozone depleting substances have been used in refrigeration industry. Fulfillment target of foaming industry, medical and non-medical aerosol industry, cleaning (solvent) industry, chemical auxiliary agent, and etc. have been pressed ahead.

Meanwhile, the enforcement supervision and publicity are carried out. In addition to a rewarding reporting system, on-site inspections have been conducted in more than 500 enterprises to crack down illegal production, application and trade of ozone depleting substances since 2007. Shanghai Customs has investigated and prosecuted 5 illegal cases of importing ozone depleting substances. For possible impacts on ozone layer in the course of World Expo 2010, Bureau of Shanghai World Expo Coordination and SEPB issued Circular on Strengthening Protection of Ozone Layer during Preparing and Staging the World Expo 2010 Shanghai to bring up initiatives and requirements on all participants for the protection of ozone layer.

2.10.3 Natural Ecosystem and Biodiversity Conservation

To protect biological diversity and key ecological conservation areas, Shanghai Municipal Government implements the Convention on Biological Diversity of UN and attaches great importance to the protection of natural ecosystem. As Dongtan Wetland and Jiuduansha Wetland are important habitats for bird migration, Shanghai has established Chongming Dongtan Birds Nature Reserve and Jiuduansha Wetland Nature Reserve, which were named as National Nature Reserves in 2005. In addition, Shanghai has established Yangtze Estuary Chinese Sturgeon and Jinshan Sandao provincial level nature reserves. The total land area of all nature reserves is 938 square kilometers, which covers 14.8% of the city area.

Since 2006, improvements on regulation and protection system of Chongming Dongtan National Nature Reserve and Jiuduansha Wetland Nature Reserve have been initialized. In July 2008, those two nature reserves were appraised as Grade A in management by the Nature Reserve Inspection organized by National Ministry of Environmental Protection. Meanwhile, to protect biological diversity and prevent invasion of exotic species, ecological control project on an exotic species Smooth Cord-grass has been initiated in Chongming Dongtan National Nature Reserve.

Figure 2-35:Chongming Dongtan Birds National Nature Reserve

Figure 2-36:National first-grade State Protected Bird : Black-faced Spoonbill

2.10.4 Control over Persistent Organic Pollutants

To implement Stockholm Convention on Persistent Organic Pollutants, Shanghai has imposed control over various persistent organic pollutants (POPs) and has been named as one of the demonstration areas for implementation capability building of Stockholm Convention in China by the National Ministry of Environmental Protection.

Investigations have been conducted for the discharge of persistent organic pollutants. In 2007, special investigations on organic pollutants (dioxins) were conducted to obtain detailed data on quantity, distribution and discharge of the pollution sources, and contamination level as well as facilities that might potentially release dioxin. In addition, study on the control and mitigation measures for dioxin pollution has been initialized.

Meanwhile, secure disposal have been conducted on polychlorinated biphenyls (PCBs) and its waste. In 2007, Shanghai investigated and dealt with 1.25 tons of polychlorinated biphenyl and their wastes, and conducted secure disposal of incineration. Synchronized monitoring was implemented during incineration to ensure the emission of dioxin in compliance with the standard.

2.10.5 Regional Cooperation in Environmental Protection

In light of coordinated development of Yangtze Delta Region, Shanghai Municipality and Jiangsu and Zhejiang Provinces have established provincial level coordination mechanism and called for high-level coordination meetings regularly. In September 2008, the State Council officially issued Guiding Opinions on Further Pushing Forward the Reform, Opening-up and Socio-Economic Development of the Yangtze Delta Region to further strengthen the cooperation in Yangtze Delta Region.

Regional environmental cooperation in Yangtze Delta has also been improved. In 2005, led and organized by the former State Environmental Protection Agency, Shanghai, Jiangsu and Zhejiang studied and worked out Planning for Environmental Protection of Yangtze Delta Region (2005-2020). In December 2008, Shanghai, Jiangsu and Zhejiang officially signed Cooperation Agreement on Environmental Protection of Yangtze Delta Region (2009-2010) to facilitate integration of environmental protection in Yangtze Delta through close cooperation in respect of: Higher market access criteria and more stringent pollutant discharge standards for regional environmental protection, Innovative regional environ-economic policies, Promotion of

comprehensive aquatic environment rehabilitation in Taihu Lake Basin, Strengthening control over regional air pollution, Establishing regional interaction system on environmental supervision and emergency response, Improving regional environmental information sharing and disclosure system. For support mechanism in regional cooperation, a joint meeting system for environmental protection between Shanghai, Jiangsu and Zhejiang has been designated to call a meeting every half year to investigate major issues on the regional environmental cooperation as well as review and make decisions on plans and documents on a regular basis. Regional cooperation has helped greatly in solving regional environmental issues and guaranteeing to improve regional environmental quality.

Meanwhile, Shanghai has been actively cooperating with other provinces and countries as well as non-government organizations.

3 Actions for Holding an Environmentally Friendly Expo

Under the guideline of Shanghai environmental protection strategy, the Organizer aims to host an environmentally-friendly World Expo. Meanwhile, ecological and environmental concepts have been embedded and environmental management has been implemented in the whole process from site selection, layout planning, design, construction, exhibition and operation to follow-up utilization. Advanced environmental and energy-conservation technologies have been adopted to conserve energy and resources and to minimize impact on the ambient environment. Development mode of environmental-friendliness has been put into practice to realize the theme of World Expo 2010 Shanghai China, "Better City, Better Life". Moreover, this event will also help people think about sustainable urban development issues and provide a platform for cooperation and idea exchange within international communities in exploring new mechanisms, technologies and actions to solve regional environmental issues.

3.1 Theme of Expo 2010

Since its inauguration in 1851, World Expo has been held for more than 40 sessions. As since the first session of World Expo with a theme was held in Chicago in 1933, the evolution of World Expo themes has reflected the ongoing progress of introspection and self-improvement of Mankind in recognition and reform of the nature. World Expos in the mid and late 1800s demonstrated achievements in the Industrial Revolution while those in the early 1900s focused on scientific and technical progression and advocacy of world peace. The themes in the late 1900s were diversified. The World Expo hold in 1974 was focused on environmental issues. World Expos in the 21st century have been characterized by exhibition of innovative paths of development, where the excessive pursuit of economic development has been replaced by sustainable development. To follow the trend, World Expo Hanover 2000 took "Resource Conservation" as its theme. Then in World Expo Aichi 2005, the theme of "Nature's Wisdom" focused on using wisdom and technologies to remove the increasing gap between human kind and Nature.

The theme of World Expo 2010 Shanghai China is "Better City, Better Life", which is the first time to take city as its theme. It aims to solve the problems confronting the cities and to strike a balance between urban development and environmental protection. Moreover, it expresses people's pursuit for better life, historic responsibility that city has to undertake in the process of globalization as well as the sublimation of environmental concepts of World Expo. However, realization of the theme requires joint efforts of people around the world through communication, cooperation, coexistence and interaction.

Taking the inspiration from the Chinese character "世" (meaning the world), the design of World Expo 2010 Shanghai China emblem depicts the image of three people-you, me, him/her holding hands together, symbolizing the big family of mankind and incorporating the World Expo's concept of "Understanding, Communication, Gathering and Cooperation". In the meantime, the elaborate combination with the "2010" complements the emblem's ingenuity in design, conveying the Organizer's wish to host an Expo which is of global scale and which showcases the diversified urban cultures of the world.

The mascot, HAIBAO, is molded according to the Chinese character "人" (meaning the people), which reflects the features of Chinese culture and complements the designing concept of the emblem. The structure of mutual support of "people" reflects a concept of joint efforts to make life better and maintain harmony between people and Nature. The main formation of HAIBAO is water in a color of oceanic blue, which expresses the human nature to stay close to the Nature as well as an attitude of Chinese people to integrate into and embrace the whole world.

Emblemof World Expo 2010 Shanghai China **Mascot ofWorld Expo 2010 Shanghai China**

Figure 3-1: Emblemand Mascot ofWorld Expo 2010 Shanghai China

3.2 Sustainability in Site Selection and Planning

The site selection and layout planning of Expo Site center on the concept of harmonious urban development, including the harmonious co-existence between people, human and nature, history and future, which will create excellent conditions for the sustainable development of social economy, and at the same time set a good example of a "harmonious city".

3.2.1 Site selection of Expo 2010

After rounds of in-depth discussions and comprehensive comparison, the location of the site of Expo 2010 has been finally selected alongside the Huangpu River Area, covering a land area of 6.68 square kilometers in total, of which the control area covers 5.28 square kilometers and the coordinating area covers 1.40 square kilometers.

Throughout the course of historical development of Shanghai, there used to be a great many of shabby dwellings, docks and warehouses, and polluting industries in the area, including 272 enterprises and institutions engaging in steel manufacture, chemical industry, power generation, port mechanics, shipbuilding and so on. Meanwhile 18,000 residents used to live in this area with an average household construction area of only 30 square meters. (Abstract from World Expo 2010 Shanghai China: A harmonious Symphony Presented by China to the World, Guangming Daily, 3/19/2007).

Along with the reform and opening up of Pudong, as well as the ongoing adjustment in industrial

structure and functional layout of Shanghai, the economic model and environment status along both sides of the Huangpu River have no longer satisfied the needs for urban development. Thus a large scale of renovation campaign has been initiated in the area after it has been identified as the Expo Site, and freight docks and industrial factories have been closed down or relocated. Hence the function of this area has been changed fundamentally, which gives rise to a new landscape area and an ecological corridor. The regional environmental quality has improved remarkably. All this has echoed the theme of Expo 2010 "Better City, Better Life" and manifested the construction of a splendid city and pursuit of fine urban life.

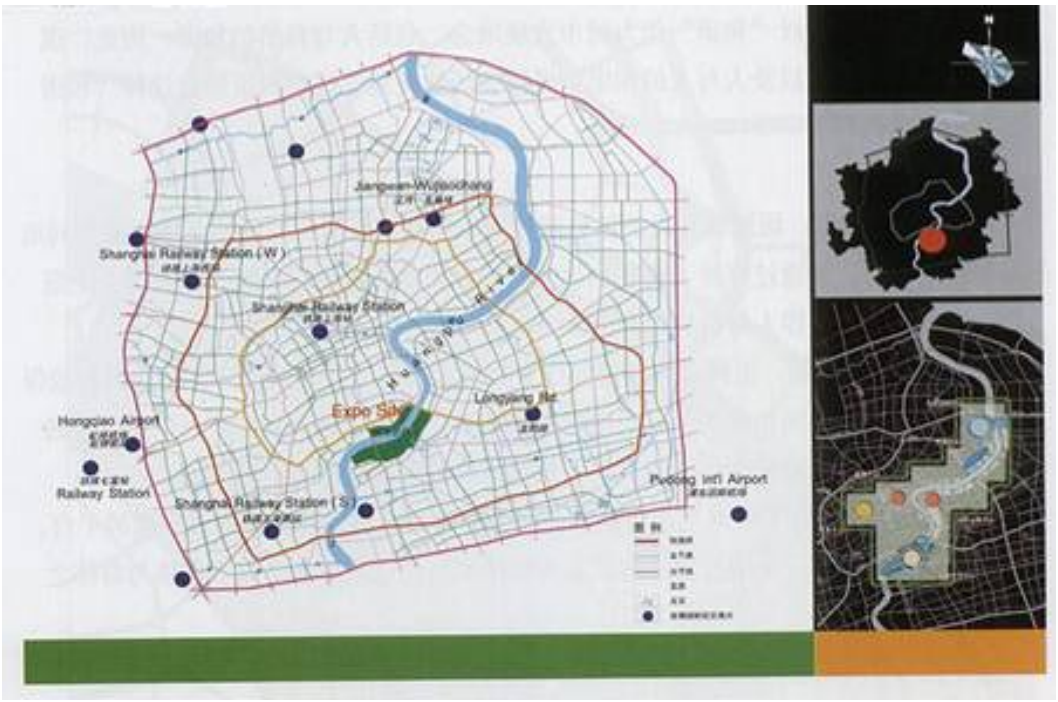


Fig 3-2: Site and Location ofWorld Expo 2010 Shanghai China

Cleaning-up ofMajor Polluting Sources in Expo Site

According to statistics in the Report on Environmental Impact of Overall Planning in Planned Area of World Expo 2010 Shanghai China, 21 major industrial polluting sources were identified in 2000 in 5.28-square-km red-line area, mainly including Nanshi Power Plant, Shanghai Pudong Iron &Steel Group, Jiangnan Shipyard, Port Machinery Co., Shanghai Solvent Factory and Shanghai Additives Factory. At present, all polluting sources in this area have been shut down or removed, thus significantly reducing the pollutant discharge there.

(1). Nanshi Power Plan was the biggest air polluting source in this area. The emission of SO_2 and dust annually reached 7225.5 tons and 1484.5 tons respectively, accounting for 80% and 88% of total emission in this area. In September 2007, this power plant was completely shut down and will become, after transformation, one of the Urban Best Practices Area cases and the energy center in the Expo Park.

(2). Shanghai Pudong Iron &Steel Group was the biggest water polluting source and one of the major air polluting sources in this area. Its annual waste water discharge reached 3126.9 tons and annual COD discharge reached 2145.5 tons, accounting for 84%and 76%of the total in this area. The annual SO2 and dust emission reached 1259.2 tons and 147.6 tons, accounting for 14% and 9% of the total. The facility has been relocated to Luojing Town in Baoshan District and will become a modern steel production base fully in compliance with environmental standards.

(3). Jiangnan Shipyard was one of the major water polluting sources in the Park with annual waste water and COD discharge of 231.2 tons and 188 tons respectively, accounting for 6% and 7% of the total in this area. The shipyard has been relocated to Changxing Island "a marine facility manufacturing base". Its original location will be built into China Shipping Pavilion.

3.2.2 Layout Planning of Expo Site

The layout planning of Expo Site has taken into consideration the appropriate distance for walk, dimensions of human figure and perception of visitors and so on, by putting forward a structural layout of 5 levels "Park, Enclosed Area, Zone, Group, Cluster" as detailed below:

Park——land area of 5.28 square kilometers for construction of Expo Park, including enclosed area of 3.28 square kilometers and supporting area of 2.00 square kilometers；

Enclosed Area——enclosed area of 3.28 square kilometers for Expo Area, with 2.38 square kilometers in Pudong and 0.90 square kilometers in Puxi;

Zone——5 functional zones with IDs like A, B, C, D, E. Average land area is 60 hectares;

Group——12 “pavilion groups” with an average land area of 10～15 hectares, including eight groups in Pudong and four groups in Puxi;

Cluster——26 “pavilion clusters” with an average land area of 2～3 hectares. Each can accommodate 40～45 exhibition units. Total construction area of “pavilion clusters” is 20～25 thousand square meters.

Figure 3-3:General Layout of World Expo 2010 Shanghai China Planned Area

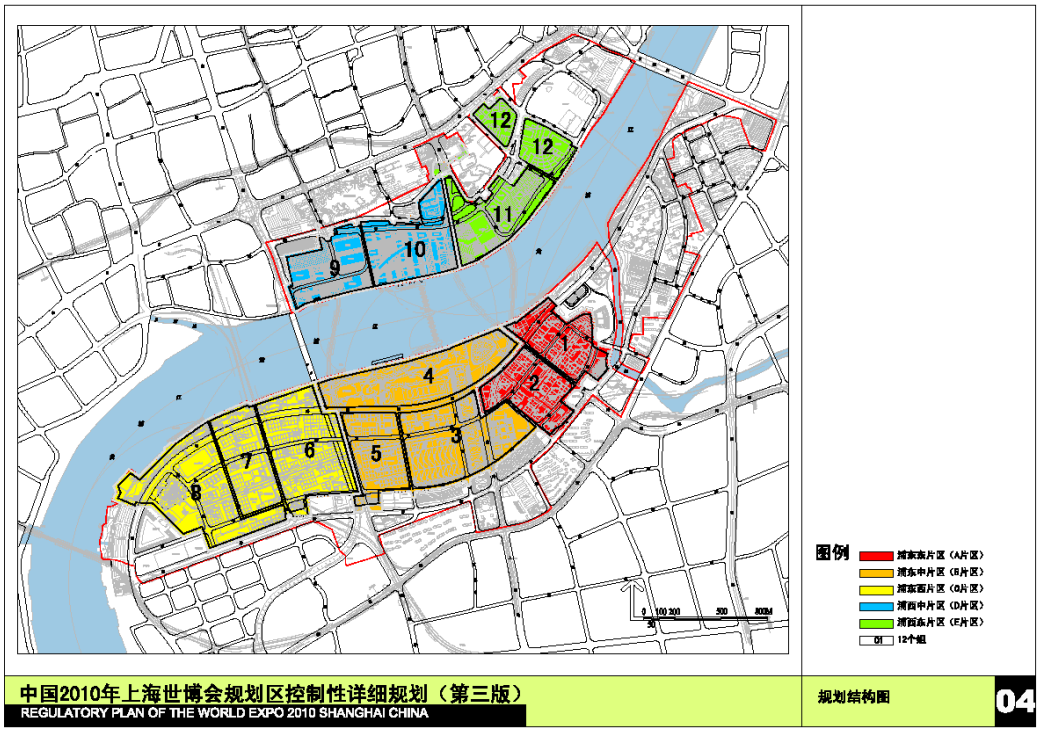


Figure 3-4:Structure Mapping of World Expo 2010 Shanghai China Planned Area

3.2.3 Utilization and Protection of Old Factory Buildings

The site of Expo 2010 used to be an early industrial development base. As the orientation of functional zones shifts, original factories have been closed down and relocated gradually. The

remaining old factories will be preserved for reuse. Expo 2010 will employ almost 1/6 of the old buildings, covering an area of 370 thousands square meters, which will become a specific expression of the concept of sustainable development for Expo 2010.

At present, Jiangnan Shipyard, Shanghai Pudong Iron & Steel Group (Shanghai No. 3 Steel Factory), Nanshi Power Plant and other old factories and facilities are under reconstruction to turn into pavilions and scenic spots for Expo 2010. Besides, some offices and hotels are to be reconstructed from the old factory buildings.

In addition, there are seven buildings listed as modern outstanding historic architecture within the area of Expo Site. All of them have been well protected. According to the planning of Expo 2010, these architectural heritages will change into the venues for exhibition, cultural exchange and recreation.

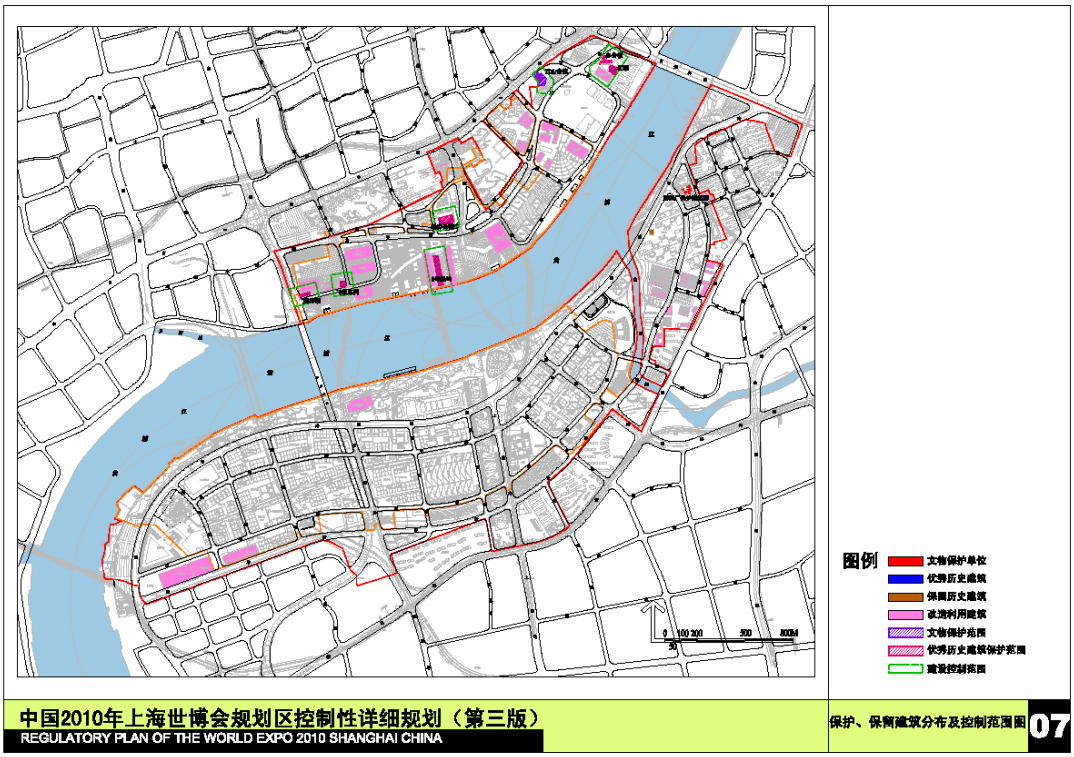


Figure 3-5:Location of Protected and Reserved Buildings for Expo 2010

Protection and Utilization Plan for Historic Buildings in Expo Site

1.Protected buildings

（1）The office building of Jiangnan Shipyard, planned to be transformed into VIP reception;

（2）The hangar of Jiangnan Shipyard, planned to be transformed into exhibition hall or cultural facilities;

（3）Old site of Navy Command, planned to be transformed into cultural facilities;

（4）Old site of 2# dock;

（5）Red building &office building of Qiuxin Shipyard, planned to be transformed into industrial museum;

（6）Sanshan Guild (Municipal Protected Historic Site);

（7）Shanghai Solvent Factory villas group (Protected Historic Site in Pudong District), planned to be transformed into a hotel.

2.Reserved historic buidings

（1）Translation house in Jiangnan Shipyard, planned to be transformed into cultural facilities;

（2）General House, planned as service facilities.

3.Industrial architecture(other reserved builings)

（1）Hull construction workshop, welding&installation workshop and processing workshop in the West of Jiangnan Shipyard, planned to be transformed into pavilions;

（2）installation and welding workshop in the East of Jiangnan Shipyard;

（3）Large-sized shipway, 1# and 3# old docks, planned to be transformed into cultural event sites for Expo 2010;

（4）Main workshop of Nanshi Power Plant, planned to be transformed into a energy centre;

（5）Buildings of Solvent Factory and small concrete buildings in Shanghai Pudong Iron &Steel Group, planned to be transformed into service facilities;

（6）Steel structure buildings built in 1985, 1988 and 1994 in Shanghai Pudong Iron &Steel Group, planned to be transformed into national pavilions;

（7）Shanghai Pudong Iron &Steel Group, planned to be transformed into an interior stage "Special Steel Stage". The original steel platformwill be turned into Audience Area. Overhead
steel path will be used as access path and theater parkway. And the original roofing petticoat pipe will be used as roof lighting and ventilation outlet;

（8）Clusters of buildings and warehouse in Shanghai Hualun Printing and Dyeing Factory, Shanghai Zhenhua Port Machinery (Group) LTD will be transformed into supplementary service facilities；

（9）Some buildings of Shanghai Hualun Printing and Dyeing Factory, Shanghai Zhenhua Port Machinery (Group) LTD. and Shanghai Solvent factory will be incorporated into the supplementary service area at the riverside in the Expo Park.

4.Public builings and municipal buidings(other reserved buildings)

Building clusters in Nanshi Power Plant (Northern Section), hotels in Pugang Group and hotels in
Shanghai Hualun Printing and Dyeing Factory, planned to be transformed into supplementary service facilities.


Sanshan Guild


General House

The Overall View of Shanghai Pudong Iron &Steel Group (By Guo Changyao)

Special Steel Stage in Rebuilding (By Guo Changyao)

3.2.4 Follow-up Utilization

To conserve resources and reduce environmental impact, the Organizer at the planning stage has taken into full account the issues on the subsequent use of the Expo Site, pavilions and facilities.

(1) The follow-up utilization of land: the planed area for Expo 2010 will be transformed into a concentration area of modern services mainly for exhibitions, conferences, activities and accommodation, which will perform the functions of conference & exhibitions, cultural exchanges, tourism and leisure and business.

(2) The subsequent use of buildings: In the enclosed area, permanent buildings (including the preserved new pavilions as well as the historic buildings) will cover about 20～25％ of the total building area among which the outstanding historic buildings cover about 10%. Within the boundary of the planned red line, permanent buildings will approximately occupy one half of the total construction area.

(3) The follow-up utilization of open space: the riverside oasis, two riverside green belts as well as the water edge projects will be reserved to form a Riverside Ecological Corridor. Inside the exhibition area, the green belts, together with elevated pedestrians' walk, can be partially retained to establish a centralized green space. The wedge-shaped green land leading towards the riverside will be partially retained. The Expo Square and the Expo Axis will be retained; the size of the individual square within the core area of non-permanent retention zone is allowed to be reduced, which will be transformed into urban centers for public activities, outdoor assembly and performance & entertainment activities. In addition, the development of the underground space will be carried out simultaneously with the construction of the Park, and will be fully retained after the exhibition. Various types of underground transportation facilities, urban infrastructure and other underground facilities will be entirely maintained after Expo 2010 as a basis for future development of the area.

(4) The further use of roads & transportation facilities: all the roads in the Expo Park and the riverside passageway systems will be retained. All metro stations, lines and facilities as well as some parking facilities in light of the transportation construction plan will be retained.

(5) The follow-up use of building materials: the construction materials for temporary venues, including green materials, are easy to assemble and dismantle, which will technically and economically ensure the dismantling and recycling after Expo 2010. Among them, those steel materials used in the elevated pedestrians' walk, as well as part of the electrical engineering devices for temporary pavilions in the Expo Park will be recycled.

The Follow-up Utilization Plan ofMain Pavilions

1. China Pavilion: an exhibition venue;
2. Theme Pavilion: an exhibition/event venue;
3. Expo Centre: an international conference center, supported with banquet halls, information centers and other buildings;
4. Performance Center: an arts performing venue as a large-scale integrated facility in Shanghai, supported with construction of cultural and activity facilities mainly for entertaining performances;
5. Expo Axis: Expo Axis of Pudong part will be retained as a whole and its follow-up use will be fully integrated with development and utilization of the underground space, enabling it to be transformed into a modern commercial corridor in Shanghai with unique landscape effects.

3.3 Environmental Management during the Whole Process

In order to fulfill environmental strategies and achieve environmental objectives, Expo 2010 has strengthened the whole process of environmental management by performing the tasks regarding environmental protection on the stage of bidding preparation, planning and design, construction and operation, subsequent utilization, etc, so that the impact on ecological environment can be minimized.

3.3.1 Establish Environmental Management Systems

Bureau of Shanghai World Expo Coordination is an institution in charge of the preparation for Expo 2010 as well as its organization, operation and management. Up to now, the Bureau has set up 37 departments with more than 700 employees. In order to fulfill its responsibilities for environmental protection, Bureau of Shanghai World Expo Coordination has established an environmental management system, in which different departments hold themselves accountable for their respective tasks. Besides, it has defined the institutional structure and job division so as to do a good job in environmental protection through concerted efforts of all departments.

Internal Environmental Management SystemEstablished by Bureau of Shanghai World Expo Coordination

1. General Superintendent: Director, Mr. Hong Hao; Standing Superintendent: Deputy Director, Mr. Huang Jianzhi.
2. Office/Visitors' Dept: handle correspondence or visit by local residents on environmental issues during construction and operation of Expo 2010.
3. Comprehensive Planning Dept.: responsible for coordination of Expo affairs, implementation of green expo concepts, execution of environmental management, coordination and supervision of execution.
4. Service Center for Participants: responsible for administrative services, public services and business services to ensure that participants can carry out green construction, green exhibition arrangement and operation.
5. Pavilion Exhibition Dept.: responsible for organization, coordination and management of exhibition projects of China Pavilion and 4 Theme Pavilions; facilitating the green operation, management and maintenance of Theme Pavilions and China Pavilion, as well as withdrawal coordination and management thereof.
6. Engineering Dept (Engineering &Construction Headquarter of Expo 2010): responsible for environmental protection during construction of venues and facilities, conducting green operation, substantially minimizing construction impact on the environment and managing solid waste in Expo Park.
7. Technical Office: responsible for related technical service and support on environmental protection, ecological construction and energy conservation during construction evaluation and approval for Expo 2010.
8. Service Center for Visitors: responsible for incorporation of environmental requirements into service guidelines and service manuals to instruct visitors to conduct in accordance with environmental regulations.
9. News/Campaign Department: responsible for information classification, compilation and news release as well as environmental education and report.
10. ForumAffairs Dept: responsible for planning, organizing and conducting forums on environmental protection, popularizing advanced concepts and technical solutions for environmental protection adopted in Expo 2010.
11. Activities Dept: responsible for organizing environmental activities under the theme of Expo 2010, and coordinating with other governmental departments and social organizations for joint cooperation on environmental protection activities.
12. Planning Dept: responsible for incorporation of environmental concepts and measures into all the plannings for Expo Site, compilation of Expo 2010 Green Guideline, and supervision and coordination for comprehensive environmental rehabilitation of the surrounding areas.
13. Traffic Control Dept: responsible for controlling traffic, advocating green commuting and promoting environmental-friendly vehicles.
14. Volunteers Department /Training Center: responsible for assigning, managing, safeguarding and training Expo volunteers, as well as increasing their environmental awareness about and expertise on environmental protection.
15. Legal Department: safeguard legal rights ofWorld Expo Shanghai and participants and offer authoritative explanation to related environmental protection laws, regulations and rules.
16. Administrative Center: responsible for administrative work in green office of Expo Administration Centre.
17. Commerce Management &Service Dept: responsible for management and service to restaurants and commerce and ensureoperation in conformity with environmental protection requirements in the Park.

3.3.2 Undertake an Assessment on Environmental Impact

In 2001, during Shanghai's bidding for Expo 2010, the Organizer entrusted professional institutions to conduct an assessment on environmental impact Expo 2010 will exert on Shanghai and finished the report World Expo 2010 Shanghai China Environmental Impact Assessment. Relevant components of the report have been officially included as chapter V in the third volume in the Chinese government's bidding document for Expo 2010.

In 2004, the Organizer embarked upon a compilation of World Expo 2010 Shanghai China Registered Report on Ecological & Environmental Impact and in 2006 formally completed Environmental Impact Assessment of the Overall Planning of the Planned Area for World Expo 2010 Shanghai China , which, based on the study of the carrying capacity of the planned area's resources and on the prediction of the change in regional pollution sources during construction, exhibition and follow-up utilization of Expo 2010, evaluated possible environmental impact resulting from the implementation of the overall planning and put forward mitigation measures and the requirements to implement a follow-up evaluation. At the same time, through a public survey on governmental websites, extensive public consultation was carried out to collect suggestions for the planning which had been incorporated into the conclusions of environmental impact assessment.

3.3.3 Compile and Publish Green Guide

In order to strengthen the environmental management in official participants' activities of construction and exhibition arrangement, Chapter D9 about environmental protection has been especially set up in Participation Guide for World Exposition 2010 Shanghai China, requiring official participants to comply with China's laws, regulations and rules on environmental protection as well as related international conventions signed by China. It raises requirements on water protection, air protection, solid waste collection, noise control and radiation safety and so on, advocates environmental concepts such as green procurement, green office and recycling, and provides information on environmental monitoring and services.

At the same time, the Organizer and the United Nations Environment Program has jointly complied Green Guide for Expo 2010 Shanghai China , which is designed to encourage all relevant participants, on the basis of complying with environmental protection laws and regulations, to further improve their environmental awareness and performance during design, construction, transportation, logistics, office and visits etc. It has taken into full consideration the factors bearing on ecological environment so as to minimize its impact. According to different recipients, the Guide is divided into green guide respectively for participants, the Organizer and visitors, which come up with different requirements for environmental protection.

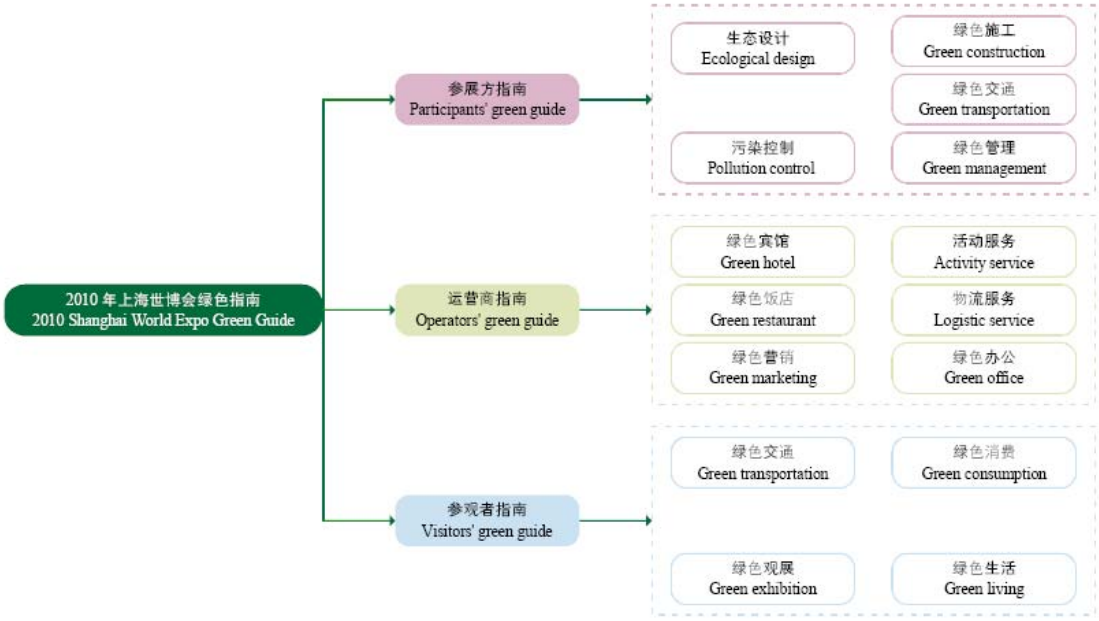


Figure 3-6:Framework of Green Guide for Expo 2010 Shanghai China

3.3.4 Taking Measures to Safeguard Environmental Quality

To meet the need for quality assessment of soil in the Expo Site, the Organizer has established a Soil Environmental Quality Assessment Standard especially for pavilions, which is close to its counterpart in Europe and America, and has also conducted pollution survey and monitoring on its soil, implemented a restoration project or soil relocation for the sites exceeding the risk limits in light of the risk evaluation conclusion.

In order to safeguard regional air quality, the Organizer has planned to further improve the forecasting and pre-warning system for ambient air quality, and started to draw up action plans on ensuring the air quality in Expo Park, surrounding areas, the city at large as well as the Yangtze Delta region, in order to speed up information dissemination on ambient air quality of the Expo Site and to take more effective measures.

To improve the water quality, the Organizer has launched a study on issues of combined rain water and sewage systems in parts of downtown area, and pollution control of pumping stations outfall into the Huangpu River, focusing on the characteristics of non-point source pollution to rivers in the city center so as to take comprehensive measures concerned in terms of regular management and emergency response for the Bailianjing River and the Suzhou Creek during Expo 2010.

In order to ensure timely treatment and disposal of solid waste, domestic solid waste in the Expo Site will be sorted out and then integrated into the city's unified system of treatment and disposal. In addition, the Site will be equipped with internationally advanced cleaning facilities and garbage collection and disposal devices including intelligent cleaning robots, sewage-cleaning vehicles, and pneumatic rubbish conveying systems etc., in order to reduce and convert solid waste into resources in a harmless manner in the Site.

Besides, the Organizer will strengthen capacity building and technical support in terms of environmental pollution emergency management, monitoring system development, and routine

supervision on pollution sources, in order to provide an overall environmental safeguard system for Expo 2010.

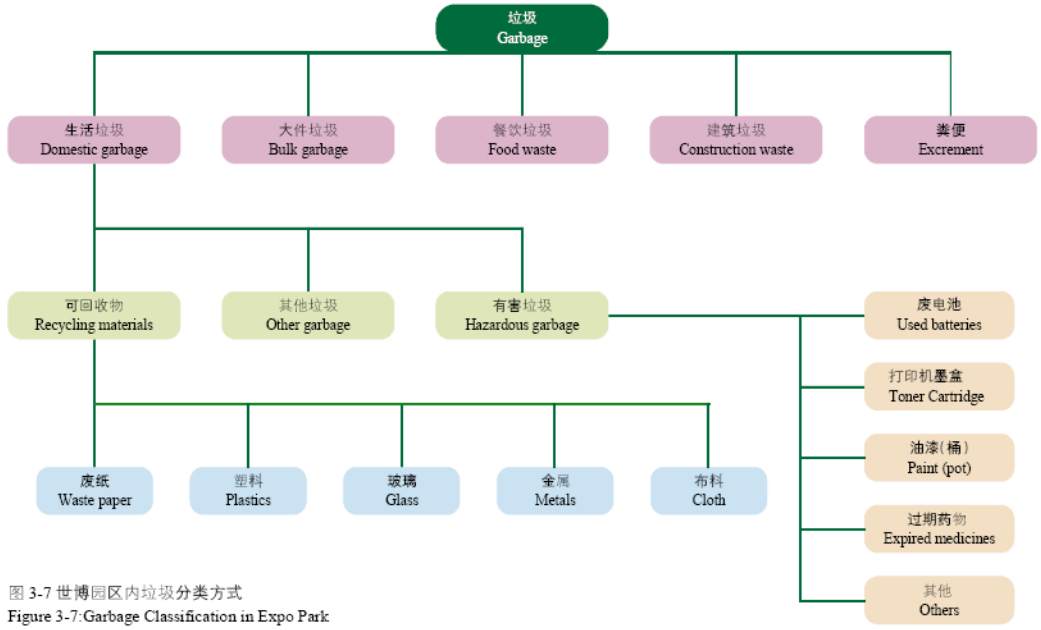


Figure 3-7:Garbage Classification in Expo Park

3.3.5 Launch “Expo Shanghai Online”

In order to let more people learn about and participate in Expo 2010, the Organizer has launched a innovative "Expo Shanghai Online" to allow visitors to "participate" in the Expo through internet so as to provide opportunities for those who can't reach the Site, thus reducing commuting and alleviating traffic pressure during Expo 2010. It also helps to reduce energy and resource consumption and garbage produced.

In addition, Expo Shanghai Online will also help visitors to understand the environmental protection concept and requirements for Expo 2010, and to learn more about the service facilities, transportation means and traffic situation in the surrounding area before they visit the Expo Park, so that they can make proper plans and arrangements, which will contribute to traffic pressure alleviation and pollution emission reduction.

Figure 3-8:"Expo Shanghai Online" Overview

3.4 Practices on Dealing with Global Environmental Change

In order to actively respond to global environmental change and to fulfill the responsibility of city management, the Organizer has tried to carry out a series of practical activities, including a low-carbon emission action to control greenhouse gas emissions, and put great efforts to curb the use of ozone-depleting substances in order to protect the ozone layer.

3.4.1 Low-Carbon Emission Action

In response to global climate change and greenhouse gas emission, the topical issues of international concern, the Organizer has fully taken them into account and embarked upon a series of studies and practices on "low-carbon emission". As Expo 2010 will last about six months, visitors are expected to reach 70 million. If the traditional model to be applied, it would result in a potential increase in greenhouse gas emission. In order to minimize greenhouse gas emission, the Organizer has taken three measures:

(1) Led by the city's industrial restructuring and elimination of outdated industrial enterprises, it has exerted efforts to close down some of the old industrial enterprises characterized with outdated technologies and low efficiency in energy utilization; it has carried out a relocation of certain enterprises and production lines to different places to fulfill technological upgrading in order to raise efficiency in resources and energy utilization.

(2) In the construction and operation process of Expo 2010, a large number of new energy technologies have been applied, such as solar photovoltaic technology, river water-source/geothermal heat pump technology, clean energy automobile and semiconductor lighting technology in order to reduce fossil fuel consumption; higher energy-conservation demands have been made in construction of the Expo Site, such as promotion of LEED green building certifications.

(3) The Organizer proactively promotes the implementation of "carbon compensation" project to offset some of the increased carbon emissions, such as construction of green space and woodland, promoting green commuting activities. At the same time, efforts are being made to explore the feasibility of encouraging visitors to buy carbon credits to offset the increased carbon dioxide emission resulting from their tours.

3.4.2 Ozone Layer Protection

In order to protect the ozone layer for the sake of human survival, according to Vienna Convention for Protection of the Ozone Layer, Montreal Protocol on Substances that Deplete the Ozone Layer and National Programs on China’s Phasing Out Ozone-depleting Substances (revised version), Implementation Program on Shanghai’s Speeding up the Elimination of Ozone-Depleting Substances (2008-2010) and so forth, Bureau of Shanghai World Expo Coordination and Shanghai Environmental Protection Bureau jointly issued "Circular on Strengthening Ozone Layer Protection during Preparation and Convocation of World Expo 2010 Shanghai China".

According to the requirements of the Circular, the project construction parties of the Expo pavilions, sponsors of market development, all types of exhibition activities and commercial activities organized by official participants, and the supporting public service sectors should all fully implement the commitments that China should speed up the elimination of ozone-depleting substances, and in the process of engineering design, procurement and construction must meet the requirements of relevant policies and regulations on ozone-depleting substances. Besides, they

should familiarize themselves with the principle of the National Organizing Committee of Expo 2010 Shanghai China in protecting the ozone layer and fulfilling their responsibilities in respective realms. They must reinforce a special review process toward products and techniques involved in ozone-depleting substances so as to meet compliance requirements. At the same time, the Organizer will carry out a project of campaign, education and training to encourage participants to display equipment, products and technologies recycling or replacing ozone-depleting substances. And a variety of environmental protection activities including theme forums will be organized during Expo 2010. Last but not least, supervision and monitoring on elimination of ozone-depleting substances will be tightened in accordance with relevant laws and regulations to ensure that the concept of "protecting ozone layer and enjoying the sunshine" would be ingrained in the minds of the general public.

3.5 Green Energy and Energy-Conservation Technologies

Urban development is increasingly subject to restrictions of energy shortages. Expo 2010 will actively explore new energy technologies and energy-conservation technologies to put them into practice, which can be taken as a reference for the adjustment of the city's future energy strategy as well as energy structure.

3.5.1 Utilization of Solar Energy

In the Expo Site, large-scale solar photovoltaic technology has been adopted. A great deal of solar cells have been installed on the roof and glass walls of the Theme Pavilion, China Pavilion, Expo Center, Nanshi Power Plant and other major facilities as well as some countries' self-built pavilions. These solar cells, whose installed capacity will amount to 4.68 megawatts in total, will be synchronized with the city’s main power grid. Among them, the Theme Pavilion will be built into the nation's largest photovoltaic integrated single building.

In addition, the street lamps, lawn lamps and other lighting systems in the Expo Park will also adopt solar lighting technology in a large-scale manner. Besides, some pavilions will adopt solar water heating systems.

Table 3-1 Solar energy application in main buildings in the Expo Park and the anticipated benefit

Applied in	Scale (MW)	Annual power generation (10,000 KWh)	Annual Standard coal reduction (Tons)	Annual CO_2 emission reduction (Tons)
Theme Pavilion	2.64	250	893	2375
China Pavilion	0.4	30	107	285
Expo Centre	1.0	100	357	950
Nanshi Power Plant	0.5	50	179	476
Total	4.73	430	1536	4086

Notes: 1. In 2007, the nation's coal consumption for power generation is 357 grams of standard coal / KWh;

2. It's estimated that 1 ton of standard coal combustion produces 2.66 tons of carbon dioxide emission.

What is solar photovoltaic power generation technology?

Solar photovoltaic is a technology of converting solar energy directly into electricity by means of the photovoltaic effect on semiconductor interface. As the essential part of this technology, the solar cells are often connected in series and encapsulated to form a module in large size, together with the power controller and other fittings, forming a solar photovoltaic facility.

The advantages of solar photovoltaic technology include less territorial restriction, renewable energy, safe, reliable, no-noise generation, less pollution, and no need of auxiliary fuels.

3.5.2 Energy-Conservation Air Conditioning Technologies

A great deal of energy-conservation air conditioning technologies have been adopted in the Expo Park, including decentralized gas-fired air conditioner, ice thermal storage air conditioner and water-source/geothermal heat pump, all of which will effectively reduce energy consumption for air conditioning.

(1)Decentralized gas-fired air conditioner

44 Decentralized gas-fired air conditioners (non-electric) are used in A, B and C plots in Puxi (31 units) and some pavilions in Pudong (13 units).

Non-electric air conditioner is not electricity-powered, which helps to reduce investment in electricity facilities. Meanwhile, it also creates economic benefits for relieving peak power consumption and making up for low gas consumption in summer. The integrated generator set is very compact, covering only half of land area for traditional air conditioners. Variable frequency control can be adopted in the cooling pump and the blower of the cooling tower in order to reduce energy consumption. Compared with traditional electricity-powered air conditioners, non-electric ones can reduce 40,000 tons of CO2 emission for half a year' operation. At the same time, Freon or its substitutes will not be used in non-electric air conditioning systems and no hazardous gases or ozone layer depleting substances will be generated thereof.

(2) Ice thermal storage air conditioner

China Pavilion, Expo Centre and Performance Center will adopt ice thermal storage air conditioning technology to make full use of valley power and reduce energy consumption. Though a set of cooling storage facility is added, the cooling system and internal air circulating system are the same as those of traditional electricity-powered air conditioners. The ice thermal storage air conditioner mainly captures the characteristics of the sensible heat of water and mobility of latent heat during water-ice phase transition, leverages on valley power to start to conserve cooling, and then releases cooling air during peak power time, thus alleviating demand-supply conflicts during peak time of the power grid.

(3) River water-source/geothermal heat pump and cold storage technology

Some constructions in the Expo Park will adopt water-source heat pump and geothermal heat pump, including Expo Axis and Underground Complex project as well as the Performance Center, Expo Centre and Urban Best Practices Area. These constructions near the Huangpu River will use the river water as the heating/cooling source for air conditioning. In summer, outdoor air with the temperature above 30 centigrade degrees will be abstracted and cooled down with the Huangpu River water before being sent indoor through the air conditioning system to provide a pleasant and comfortable indoor environment. The main function of water-source heat pump is to obtain energy

from surface water, underground water or other natural water bodies for cooling and heating. It converts summer heat accumulated in buildings into water, while in winter it unleashes energy from water, and then sends it to buildings after heated by cool-carrying agents of the heat pump. Geothermal heat pump is a highly efficient air conditioning system that uses shallow geothermal resource for cooling and heating.

With water-source pumps, higher heating efficiency can be obtained in winter compared with oil/gas-powered air conditioners, thus saving 30% of the cost. In summer, using river water (2-3 degrees below ambient air temperature) as cooling water will improve cooling efficiency by 7%.

3.5.3 Green lighting technology

Large-scale LED lighting technology will be adopted in landscape lighting in the Expo Park to reduce energy consumption. Especially in Urban Best Practices Area, LED will be the main lighting technology. It will also be widely used in the Park Plaza lighting, riverside landscape lighting, identification and intelligent tutoring system, indoor and outdoor lighting of the pavilions, etc. At the same time, as an important part of the exhibition, nightscape lighting will also use a variety of new energy-efficient lighting devices.

Figure 3-9:Design Effect of Nightscape at the Expo Park

What is LEDlighting technology?

The light-emitting diode (LED) is a new lighting source in solid state which can convert electric power directly into visible light and radiation power. With many of its advantages including lower energy consumption, longerlifetime,energy-conservationandenvironmentally-friendly, colorful, and intelligent switching, it has been recognized as an energy-conservation and environmental friendly lighting technology worldwide. Currently the luminescent efficiency of LED lighting is exceeding that of incandescent lamps, and it has demonstrated energy-conservation effect in special fields like energy conservation in landscape lighting (over neon light) by 70% , energy-conservation in traffic signal application (over incandescent lamp) by 80 % . Along with rapid technological development, LED has been widely used in LCD TV, cars, commercial and industrial lights etc.

3.5.4 Technologies of Temperature Control

Expo 2010 will be held from May to October, which is the hottest season in Shanghai. Especially in July, August and September, it is extremely grilling in Shanghai. Construction of the Expo Park

has taken into consideration all factors of temperature-control and temperature-reducing measures, namely, part of the elevated building bottoms to design natural wind field, sun-shading system design incorporated into the layout planning for elevated pedestrains' walk, and special greenbelt design giving full play to temperature reduction effect by green space. In addition, temperature-controlling and temperature-reducing materials, water body cooling technology, tunnel wind ventilation in underground spaces and so on will be adopted, which will make visitors feel more comfortable inside the Expo Park.

Figure 3-10:Sun-Shading Systemon Elevated Pedestrians' Walk

3.6 Water-Conservation and Rainwater Recycling Technologies

Although Shanghai has abundant water resource and the Expo Park is close to the riverside, the Organizer has still paid close attention to conserving water from headstream and has designed rainwater recycling systems to reduce water consumption and sewage discharge.

3.6.1 Water Conservation

Design of facilities in Expo pavilions fully takes into account water conservation requirements and adopts a great deal of water-conservation facilities, including water conservation sanitary-ware and water conservation irrigation facilities, etc. At the same time, large-scale permeable pavement has been employed in the Expo Park to reduce stormwater runoff and surface runoff pollution.

3.6.2 Rainwater recycling system

Expo Center, Performance Centre, Theme Pavilion, China Pavilion as well as Expo Axis will be installed with roof rainwater collection and recycling systems.

Domestic water inside the Expo Park is partly converted from recycled rainwater which meets reuse standard, and partly supplemented with treated Huangpu River water. It is predicted that more than one million cubic meters of tap water will be conserved.

3.7 Public Transportation and Green Vehicles

Expo 2010 expects 70 million visitors. During the time, traffic flow will oversee a sharp increase. In order to reduce environmental impacts incurred, Shanghai will keep improving public transportation network for the whole city, set up special stations, and encourage people to reduce using private cars. At the same time, the Organizer has committed itself to achieving "Zero Emission" from public transportation system within the Expo Park, and to spreading vehicles powered by clean energy in large quantity.

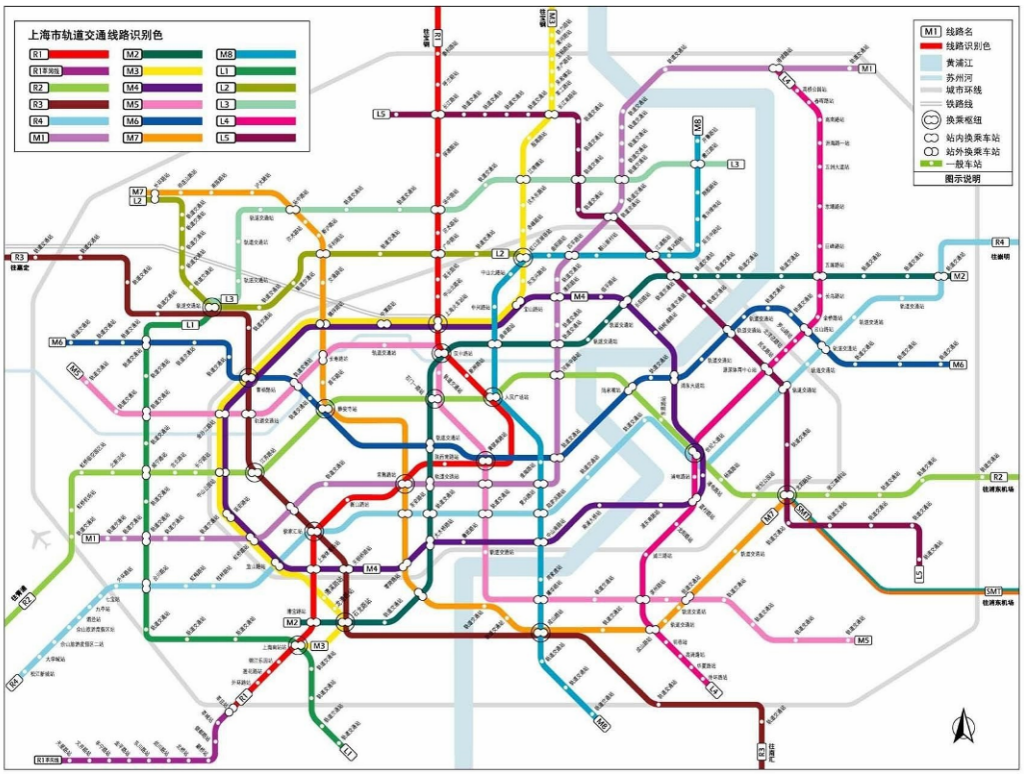


Figure 3-11:Plan of Shanghai Metro Lines

3.7.1 Public Transportation Network

Before Expo 2010 sets in, Shanghai will complete 400 kilometers of Metro Line, 300 kilometers of special public transportation lanes and 84 public transport hubs in order to provide more convenient connections and transfers among public transports.

Public transport in the Expo Park will be mainly based on Metro Lines, in addition to surface transport and cross-river ferryboat, which will assume 50%, 35% and 10% of passenger flow respectively. Metro Line 13 is designed as a special line for Expo 2010. Five ferryboat routes and four surface transport lines are designed as auxiliary lines.

At the same time, many parking lots will be constructed around the Expo Park, especially for local buses, long-distance shuttles and special Expo cars. During the process of parking lot construction, ecological and environmental protection requirements will be put into practice. Photocatalyst technology will be adopted to degrade vehicle exhausts.

Figure 3-12:Public Transport Lines and Stations in the Expo Park

3.7.2 Green Vehicles

Expo 2010 has set a target of "Zero emission in the Park, Low emission in surrounding areas". Many clean-energy bus lines will be set up inside the Park according to operating requirements. In addition, different kinds of clean energy vehicles developed and manufactured domestically will be widely used. It is predicted that there will be over one thousand vehicles, powered by clean energy, among which about 500 vehicles will be used inside the Expo Park and for linkage lines, including zero-emission super capacitor buses, fuel cell vehicles and electric buses. About 500 low emission vehicles will be adopted in the surrounding area, hybrid buses included. The use of clean energy vehicles can reduce vehicle exhausts discharge effectively, thus improving environmental quality inside the Park.

Table 3-2 Clean Energy Vehicles to be Used within the Expo Park and the Surrounding Areas

Scope	Usage	Model	Quantity	Mileage
Within the Expo Park	Public transport	Super	36	≥250km/day
		Fuel	6	
		Electric	120	
	Sightseeing	Fuel	100	about 180
	Office	Electric	150	
Surrounding	Public	Hybrid	500	

Clean Energy Vehicles

1. Super Capacitor bus

Super capacitor bus presents advantages in high power density, long lifetime, a wide scope of temperature application and fast charging and discharging. It's able to release heavy current to achieve fast startup in the moment of acceleration, and to maximally restore the instant braking power in deceleration, thereby making up for the insufficient specific power of fuel cells. As it generates no exhaust gas, it's a zero-emission vehicle.

2. Fuel Cell Vehicle

New automobile powered by hydrogen cell is a high-performance, low-noise, pollution-free, and carbon dioxide-free vehicle. The efficiency of fuel cell is up to 50%-60%. Through the recovery of surplus heat, total efficiency can reach 80%-85%.

3. Electric Bus

Electric bus features combination of super capacitor and fuel cell which forms an assembled electric pile as the power generator. Cell-capacitor electric bus operates in daytime and conducts charging in nighttime, taking advantage of valley time of the power grid, thus improving loading distribution as well as balancing maintenance efficiency of the power grid.

Super capacitor bus

Fuel cell vehicle

Electric bus

3.8 Green Buildings

3.8.1 Environmentally-friendly Building Materials

Wood is a non-polluting, easy-processing, renewable and recyclable material. Expo 2010, however, will not widely apply wood due to China's lack of forest resources. Relevant procurement requirements have been made for limiting wood utilization. Besides, the Organizer is actively exploring other green building materials, such as phase-variable heat energy storage system, thermal (cold) radiation wall materials, automatic temperature control building materials, solar energy utilization materials, intelligent insulation glass, wave absorption building materials and other new building materials for energy-conservation and energy storage and so on.

Since parts of the pavilions of Expo 2010 are temporary buildings, which will be dismantled in the future, the Organizer pays full attention to the recovery and re-use of the building materials in order to reduce construction waste. As a result in the course of selection, the concept of recycling and environmental protection has been emphasized and recycled or recyclable materials have been adopted, such as recycled wood-plastic, Glass Reinforced Cement (GRC), permeable pavement, plastic sewage maintenance well etc. Temporary buildings rarely adopt materials such as non-reusable concrete and bricks and so on. Instead, they mainly adopt reusable, easy-prefabricating and easy-assembling materials, such as steel, glass and so on, which will be recycled and reused after the dismantlement.

Figure 3-13:Permeable Pavement

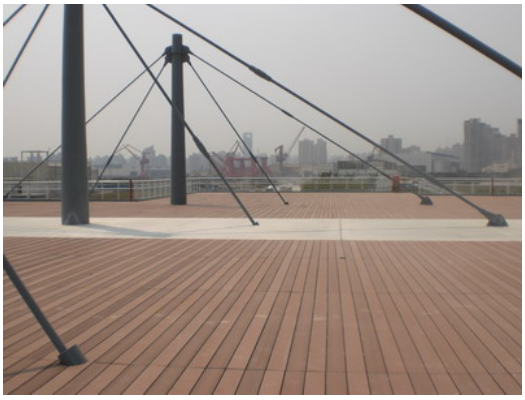


Figure 3-14 Plastic-Wood Floor of Elevated Pedestrians'Walk

3.8.2. Green Buildings

Construction of pavilions in the Expo Park will take relevent standards of green buildings into account, including conservation of energy, land, water, materials, and environmental protection and so on. The permanent pavilions in the Expo Park will be designed and constructed according to the requirements of green buildings, among which the Expo Centre is one of the very first projects recognized as “Three-star Green Building Design Evaluation Mark”. And currently, it is under application for gold medal of USA’s USGBC LEED NC2.2.

In addition, in order to explore the development trend of ecological buildings in the future, the Organizer will display 15 leading cases from all over the world in the Urban Best Practices Area by effectively integrating ecological and energy-conservation technologies, including "Shanghai Eco-Home", which will be on a par with the level of green constructions around 2030.

3.9 Green Landscape and Ecological Conservation

3.9.1 Layout and Characteristics of Greenery Systems

According to the overall planning for the Expo Park, the Huangpu River is running through the Park, which is the core part of open space. The open space and greenery landscape in the enclosed area include riverside oasis along both sides of the Huangpu River, Expo Axis, theme parks, riverside greenbelts, wedge-shaped green land, Expo Square and other squares as well as sightseeing corridor. All of these will form interlinked spatial networks, which stretch through the whole Site and lead to the riverside. As a result, all gateways will be connected, therefore giving full play to the functions of passageway, gathering place, landscape symbol and ecological corridor.

The greenery system in Expo Park features an integration of Nature and Culture, characterized by the improvement of ecological functions, increase in diversified landscapes, and preservation and enrichment of cultural heritages. The green area in the Expo Park will in total exceed 1,000,000 square meters, including Wetland Park with purification systems and other greening facilities. In respect of layout planning, the green space will be integrated with the public space along the riverside, together with the arrangement of the pavilions as well as the surrounding environment. Large-scale greenbelt will be constructed to serve as an emergency buffer zone near the main entrances inside and outside the enclosed area.

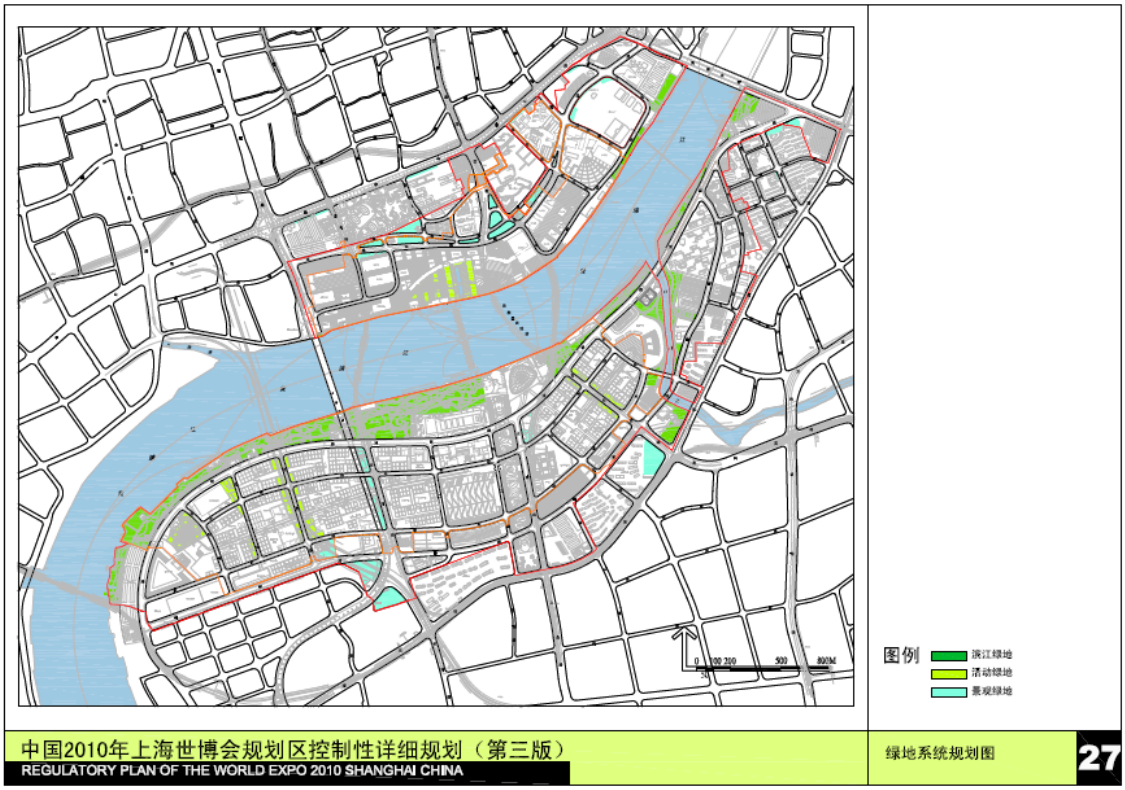


Figure 3-15:Schematic Diagram of Major Greenery System in Expo Park

Three Characteristics of Greenery System in the Park

The greenery system in the Park forms a structure of "one core, one axis, two belts and several wedges". The greenery will surely play an important role in improving the ecological environment, reforming the natural and enriching landscape scenery.

1. Improving the ecological environment

The greening rate in the Expo Park will reach 50%, which fully guarantees the ecological its function. During the exhibition period, the hot summer will occupy 2/3. Thus high green coverage rate will provide a comfortable and leisure environment in the Park. Arbor is the major choice on site, accompanied by zonal plant community, with an aim to promoting the ecological function of the greenery system, relieving the urban heat island effect, and improving urban environmental quality. Besides, in order to protect bio-diversity under urban artificial environment, measures will be taken to protect the existing wetland and build artificial wetland as habitats for animals and microorganisms. Meanwhile, certain plantation will be identified and adopted to gradually improve the soil in the old industrial site. Existing greenery resources with certain scale or with specific features will be retained and protected in the Park.

2. Enriching landscape scenery

Multiple design methods will be adopted for different regions in the Park. For Riverside Park, different designs will be applied for parts on both sides of the Huangpu River. The Pudong section highlights ecological and human-first ideas, and the layout integrates geometric style and natural style. Elevated pedestrians' walk system will be designed to satisfy tourists' need of water-friendliness. The Puxi section will be designed into an industrial site park, reflecting the industrial history, where the bar-shaped layout of dorks is preserved. Minimalism will be adopted in the design of Expo Boulevard, which makes use of the green land and water so as to create clean and rhythmical landscape. At the same time, it will also serve as a gathering place for multiple purposes. The greening design of pavilions will be in accordance with the architectural design. Featuring the introduction of different plants form the representing countries, diversified landscapes and styles will be developed. Deciduous trees are mainly used in the squares to increase the green coverage rate.

3. Extending the cultural features and attaching new essentials

By means of preserving historical traces, the Expo Site preserves the city's cultural features and enriches the cultural contents. The Riverside Park in Puxi will preserve some historic sites and existing plantation, such as docks of Jiangnan Shipyard, reflecting the historical context and spirit of the city. Compared with Puxi part, the Riverisde Park in Pudong shows a different visual angle. It tells the development history along the Huangpu River and plays a role in connecting the past and the future. The Boulevard is overarched by ginkgoes, known as the living fossil of China, which give full expression of Chinese plants. Besides, "Three Friends in Cold Weather" (three durable plants of winter: pine, bamboo and plum blossom), the manifestation of Chinese spirit, is subtly used to show Chinese tradition. The Expo Park, which features Shanghai as an all-embracing place, owns various theme parks to showcase Shanghai's cultural characteristics.

3.9.2 Houtan Park

Houtan Park is located in the original Houtan Area of Pudong, adjacent to the Huangpu River. As a core greenery landscape in the Expo Park, it covers a land area of 13.9 hectares.

The Park will highlight "harmonious co-existence of double wetlands" as a structural medium to reproduce an urban wetland landscape by protecting and rehabilitating wetland, soil resources as well as plants and animal species. Double wetlands refer to the outer part and the inner part of the

wetland. The outer part is the original wetland and restored area of the land adjacent to the Huangpu River. By means of restoration, the outer part will form a natural shelter against floods and help purify water. The inner wetland is the artificial wetland in the central part of the Park. It will play a role as a natural habitat in purifying water, protecting ecological environment and disseminating scientific knowledge.

Figure 3-16:Rendering Effect of Houtan Park

3.9.3 Expo Garden

The Expo Garden stretches to the Huangpu River in the north and Puming Road in the south, covering a land area of 23 hectares. The core landscape area is adjacent to Expo Centre, Expo Axis and Performance Centre. The designer employs two innovative ideas of “bund” and “fan” in a subtle manner. “Fan” is just like a Chinese traditional folding fan, with high arbors as its ribs. “Bund” takes advantage of ground cover plants, wandering brooks and lanes to form a three-dimensional water-and-ink landscape painting, vividly reflected on the "fan" beside the Huangpu River. In the Garden, traditional and modern landscape gardens are combined subtly, displaying a vivid world in a limited area.

5,000 arbor trees will be introduced to meet the sun-shade coverage rate in the Park. While giving priority to choosing local tree species, designers also select some unique adaptive species for educational purposes, such as Orient Fir. In addition, seven advanced ecological technologies will be applied in the Park, including temperature-reducing spraying technology, ecological porous pavement, soil restoration technology with plants, grass trampling resistance technology, ecological screen, people-accessible greening roof and ecological water treatment technology.

Figure 3-17:Rendering Effect and Photo of Expo Garden(The right photo was taken by Xiang Xinrong)

3.9.4 Bailianjing Park

Bailianjing Park is in the north of Pudong side of Expo Site, north to the Huangpu River, south to Xueye Road Bridge, west to Expo Park, east to Expo Village and supporting facilities, covering an area of 12 hectares. The designer employs “ripple” as an idea, showing the tranquility after undulatory motion, a combination after breaking apart, and a kind of growing in cracks.

The major task of ecological construction for Expo 2010 falls on the ecological landscape restoration of Bailianjing. Efforts will be exerted to improve water quality, gradually recover the aquatic ecosystem, and form a colorful landscape of water and land.

Figure 3-18:Rendering Effect of Bailianjing Park

3.10 Green Concepts and Technologies of "Four Pavilions along the Central Axis"

3.10.1 Expo Axis

The Expo Axis, together with the underground part, boasts large commercial and traffic complex. It is the largest single project in the Expo Park with a total floor area of 250,000 square meters. In order to fulfill the objective of establishing a resource-conserving and environmentally friendly venue, great efforts have been made in this project, such as ushering in sunlight through “Sunny Valley” and adopting river water source heat pump.

(1) Usher in the sunshine by “Sunny Valley”. “Sun Valley”, covered with six huge circular glass curtain walls, extends directly to the underground floor, where the sunshine is ushered in naturally. In this way, it can realize the goal of conserving resources by means of natural lighting, good air convection, and effective collection of rainfalls. Besides, as it also possesses good see-through effect, it can tell directions even in the underground.

(2) Membrane structure is effective in sun shading. The Expo Axis will be covered by the membrane with a span of 98 meters, and 833 meters long. It will bring into full play its function of shading sunshine, conserving resources, and collecting rainfalls.

(3) River water source/geothermal heat pump controls the temperature. The air conditioning system in Expo Axis is fully controlled by river water source /geothermal heat pump systems, with annual cooling capacity of 17,400 KW and 11,400 KW respectively, which is equal to burning 735 tons of standard coal less, thus reducing CO2 emission by 1,955 tons.

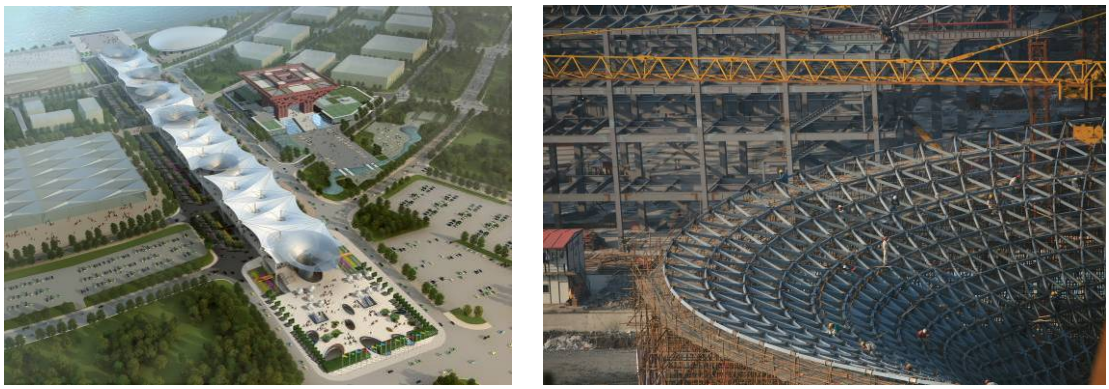


Figure 3-19:Rendering Effect and Actual View of Expo Axis

Figure 3-20:Diagramof River Water Source Heat Pump

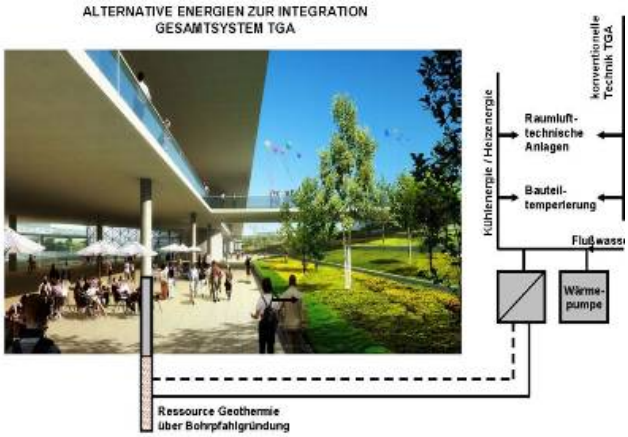


Figure 3-21:Diagramof Geothermal Heat Pump

Table 3-3 Application of clean and green technologies in Expo Axis

#	Category	Technology	Scope of Application.	Benefits on Environmental protection and Energy Conservation
1	Water conservation and utilization	Rainwater control and utilization	Roof arrangement for daily processing capacity of 515 tons of rainwater	⊕ Reduce storm runoff and pollution ⊕ Water-conservation rate over 50%
		Water conservation toilet-ware and components	All toilet-ware and components	Effective water conservation
2	Clean and renewable energy utilization	Solar energy road lamp	Road lamps in South Square	Energy conservation and environmental protection
		River water source heat pump	Cooling capacity of 17,400 KW	⊕ Annually conservation SC 490tons ⊕ Annually reducing CO2 1303 tons
		Ground source heat pump	Cooling capacity of 11,400 KW	⊕ Annualy conservation SC 245tons ⊕ Annually reducing CO2 652 tons
3	Energy conservation appliances	Smart lighting control		Conserve 20% in large space lighting energy
		Variable frequency pump for water supply	Domestic water pumps, river water source intake pumps and air conditioning system pumps	Effective energy conservation
4	Energy conservation for air conditioning	surplus heat recovery	fresh air system for air conditioning	Effective energy conservation
5	Environmental control	cooling spraying system	10-meter security check platform	Effective cooling and energy consumption reduction
		Air purification	security check area on sub-lower ground	Air purification

3.10.2 China Pavilion

China Pavilion is located in the center of the planned area. It enjoys a significant position in the main entrance of Pudong side of Expo Park with a total floor area of 160,100 square meters, and a vantage point among permanent buildings —"Four Pavilions along the Central Axis". As a platform to showcase and reflect the Expo theme, it is of great significance.

(1) Conservation of building energies. China Pavilion, in a structural design of Douguan brackets, features wooden brackets fixed layer upon layer between the top of a column and a crossbeam. In summer, the upper layer can serve as a natural sunshade, which effectively reduces the air conditioning energy consumption. Transparent extra-white glass is used for better light transmittance, with less light pollution to the surrounding areas. What's more, the glass wall adopts the hollow pattern. The facade of Regional Joint Pavilion has an interlayer, acting as a buffer layer against the climate change. In winter, sunshine pours into the buffer layer, while all clerestory windows at the top of the buffer layer are closed. As a result, the layer is heated by the sun. During the night, thermal inertia storage wall releases heat to the room so as to keep warm and reduce heating energy consumption. In summer, air windows both at the top and bottom of the buffer layer are opened to encourage natural ventilation to take away the heat in the interlayer and cool down the wall surface. The energy conserving system in China Pavilion can reduce energy consumption by 25%, as opposed to traditional patterns.

(2) Utilization of solar energy. On the roof of China Pavilion lie the solar panels with an installed

capacity of 0.302 megawatts and an annual power output of 300,000 kilowatt-hours, which equals the power generation by burning 107 tons of standard coal. It means that the emission of CO2 will be reduced by 285 tons.

(3) Utilization of rainwater. Rainwater collecting system is included in design of China Pavilion for recycling purpose, e.g. for green land irrigation and road cleaning.

(4) Ecological Greening. The general greening design of China Pavilion is divided into several aspects, including the ground greening, and the rouf greening. Meanwhile, a small-scale constructed wetland technology, with its self-purification capacity, is introduced to improve local environment.

Figure 3-22:Rendering and Actual View of China Pavilion

Table 3-4 Application of clean and green technologies in China Pavilion

#	Category	Technology	Scope of Application	Benefits on Environmental protection and Energy Conservation
1	Water conservation and utilization	Rainwater control and utilization	Roof arrangement	✣ Reduce storm runoff and pollution ✣ Reused in green land irrigation and road cleaning
		Water conservation toilet-ware and components	All toilet-ware and components	Effective water conservation
2	Clean and renewable energy utilization	Solar photovoltaic power generation	Installed capacity of 0.4 MW	✣ Annual conservation of SC 107 tons ✣ Annual emission reduction of CO2 285 tons
3	Energy conservation in buildings	Dougong brackets design	Top of the pavilion	Energy conservation by more than 25% compared with traditional construction
		Hollow glass curtain wall	Exterior walls of regional pavilions	
4	Energy conservation in air conditioning system	Ice thermal storage air conditioning	14 ice accumulator slots	Improve energy utilization efficiency
5	Energy conservation in building facilities	Energy conservation lifts	All lifts	Effective energy conservation
6	Land conservation	Permeable pavement	Squares	Reduce storm runoff
7	Environmental control	Solid waste pneumatic conveying system	Within the park	Timely collection to ensure sanitation
8	Greening of buildings	Roof garden	Roofs of national and regional pavilions	Heat preservation and beautification

3.10.3 Theme Pavilion

Theme Pavilion is located in the west of the Expo Axis. As one of the permanent buildings in Expo Park, Theme Pavilion bears an important task of displaying and interpreting the theme during Expo 2010. With the rapid process of urbanization and population growth, Theme Pavilion focuses more on the relationship and communication among the earth, city, and people, and reveals the approach towards achieving better city, better life.

(1) Natural lighting as well as natural ventilation promotes energy conservation. The shape of the Theme Pavilion borrows from the “lane” and “dormer” of the old Shanghai. In the exterior of the Theme Pavilions, dormer windows are set in a proportion for natural lighting. As for the spatial framework, the pavilion is designed with a north-south orientation to boost natural lighting and ventilation. Besides, side dormer windows are particularly designed with some opening angles so as to promote natural air convection for energy conservation. Large-scale projecting eaves fend off the direct sunlight, which is also a way to conserve energy. Due to the large space in the Pavilion, different air conditioning systems will be applied in accordance with different requirements and functions. Small-sized independent heating/cooling systems will be set up in some widely used office rooms to minimize operation cost. At the same time, air conditioning systems in big halls can be divided into groups, which can be flexibly used in small halls.

(2) Solar energy roofing functions efficiently. Large-sized solar panels will be installed on the roof of Theme Pavilion with an installed capacity of 2.825 megawatts, which boasts the largest solar energy roofing in single construction in China. The area of solar panels amounts to 30,000 square meters, with an annual power output of 2,500,000 kilowatt-hours, which equals the power generation by burning 893 tons of standard coal. It means that the emission of CO2 will be reduced by 2,374 tons.

(3) The roof is specifically shaped to collect rainfalls. Dormer windows divide the large-scale roof into several middle-sized water collecting areas. Every downward bending roof section forms a slope, which ushers the rainfall into multi-bucket drainage gutter. Then, processed with filtration and sedimentation, the quality of rainfall will be improved to satisfy the reuse criteria for irrigation or landscape uses as well as for toilet flushing.

(4) The ecological green wall contributes to improving building insulation. In addition to the ground greening area of 30,000 square meters in southern and northern squares, the eastern and western exterior walls of the Theme Pavilion are also designed as ecological walls, with a total area of 4,000 square meters, which boasts the largest ecological walls under construction. In summer, eco-wall can block thermal radiation and cool down the nearby area, while in winter it can serve as an insulating layer, without any influence on the process of absorbing heat from sunlight. In this way, it can play an important role in decreasing the wind speed nearby, thus increasing the service life of exterior walls.


Figure 3-23:Rendering Effect and Actual View of Theme Pavilion(The right photo was taken by Xu Zhengkui)

Table 3-5 Application of clean and green technologies in Theme Pavilion

#	Category	Technology	Scope of Application	Benefits on Environmental protection and Energy Conservation
1	Water conservation and utilization	Rainwater control and utilization	Roof arrangement to be integrated with vertical greening curtain walls	◆ Reduce storm runoff and pollution ◆ Reused in green land irrigation and road cleaning
2	Clean and renewable energy utilization	Solar photovoltaic power generation	Integrated with decoration and the installed capacity of 2.83 MW	◆ Annual conservation capacity of SC 893 tons ◆ Annual emission reduction capacity of CO2 2374 tons
3	Energy conservation in buildings	Double-layer energy-conservation curtain walls	Exterior walls	Heat preservation
		Exterior sunshading	Large-scale projecting eaves	Sunshading and heat preservation
		Ventilation curtain walls	Integrated ventilation and smoke exhausting design	Natural ventilation
		dormer window	Big-span roof lighting	Effective energy conservation
4	Energy conservation appliances	Energy conservation and high photosynthetic capacity fluorescent lighting LED lighting Intellectual evacuation indicator	Landscape lighting and normal lighting	Effective energy conservation
5	Energy conservation in air conditioning	Water-cooled centrifugal chiller running with variable frequency		Effective energy conservation
		Fresh air surplus heat recovery	Fresh air system of air conditioning	
6	Land conservation	Permeable pavement	Seepage brick and asphalt pavement	Reduce storm runoff
7	Environmental control	Solid waste pneumatic conveying system	Inside the Park	Timely collection for sanitation purpose
		Filters installation	Air conditioning system	Air purification
8	Greening of buildings	Vertical ecological greening curtain walls	About 4,000 m^2	Heat preservation and beautification

3.10.4 Expo Centre

Expo Centre, located in the Riverside Greenbelt of the Expo 2010 planned enclosed area in the southern bank of the Huangpu River, will function as a center of management, celebration ceremony and conference, news and forum, etc. with a total floor area of 142,000 square meters. Large amounts of renewable energies, new technologies and materials, widely used in Expo Centre, together with optimized arrangement for ecological and environmental protection, aim at realizing sustainable operation and utilization.

(1) Demonstration of green buildings. On August 4th, 2008, the Expo Centre obtained the superlative-degree certification of China Green Building——the first batch of certifications of "Three-star Green Building Design Evaluation Mark" and Green Building Demonstration Project approved by the Ministry of Construction. The Expo Centre is also the first Expo building which applies for USGBC LEED NC2.2 Gold medal standard during the history of World Expo, and it is also the biggest public building among the buildings that have won the above-mentioned awards and that are under application. The total energy consumption of the Expo Centre is 80% lower than the amount prescribed by national energy-conserving standard. The building energy-conserving efficiency reaches 62.8%, and it is expected to conserve 2,160 tons of standard coal every year; the roof greening area scale can be over 52%, and the utilization rate of recyclable building materials is higher than 5%.

(2) Solar energy utilization. The solar photovoltaic power generation capacity of the Expo Centre is 3% more than that of the building's power consumption, and the solar water heater provides 52% of domestic hot water. Therein, solar modules will be installed on the roof of the Expo Centre, with an installed capacity of 1.04 MW in total and an average annual power generation of 1 million KWh, which is equal to conservation nearly 357 tons of standard coal. And the CO2 emission is expected to be 950 tons less.

(3) Natural lighting technology. The large conference room of the Expo Centre adopts glass roof lighting system to ushering in natural light, which plays an important role of natural lighting, insulation and heat radiation, etc.

(4) Water-conservation technology. The Expo Centre adopts all kinds of water-conservation technologies, including rainwater utilization system, urban water collection and recycling system, program-controlled greenbelt irrigation system and the utilization of water-conservation toilet wares and accessories, etc, which can conserve nearly 160,000 tons of running water every year, accounting for 76.7% of the annual water consumption.

Picture 3-24:Rendering Effect and Actual Viewof Expo Centre

Table 3-6 Application of green technologies in Expo Centre

#	Category	Technology	Scope of Application	Benefits on Environmental protection and Energy Conservation
1	Water conservation and utilization	Rainwater control and utilization	Roof arrangement for rainwater collection and utilization which will be accounting for 14% of annual water consumption	⊕ Reduce storm runoff and pollution ⊕ average rainwater reclamation around 30,000 tons every year.
		Water conservation toilet-ware and components	All toilet-ware and components	Effective water conservation
		Grey water collection and utilization system	Accounting for more than 58% annual water utilization	⊕ Average annual utilization of 123000 tons of water
		Programmed greening irrigation	Greening irrigation	⊕ Conserve 50~70% VS flooding ⊕ Conserve 15~20% VS spraying
2	Clean and renewable energy utilization	Solar photovoltaic power generation	Installed capacity of 1 MW	⊕ Annual conservation of SC 357 tons ⊕ Annual emission reduction of CO2 950 tons
		centralized solar heating systems		⊕ Annual conservation of SC 58.5 tons ⊕ Annual emission reduction of CO2 155.6 tons
		River water source heat pump	Cooling capacity of 35510 KW	⊕ Annual conservation of SC 1000 tons ⊕ Annual emission reduction of CO2 2,660 tons
3	Energy conservation in buildings	Operable curtain walls		Natural ventilation
		Balanced heat supply curtain walls		Effective energy conservation
		Adjustable sunshading	Cornice	Heat preservation
4	Energy conservation appliances	LED lighting	Landscape lighting	Effective energy conservation
		Fresh air control system	Air conditioning	
		Energy conservation lifts	All lifts	
		VF water pump		
		Energy conservation device at boiler outlet		
5	Energy conservation in air conditioning	Ice thermal storage air conditioning		Improve energy efficiency
6	Land and material conservation	Steel structure	Main structure above-ground	Recyclable
		Glass curtain wall		Recyclable
		Green construction materials	Decoration materials	Reduce indoor pollution
		Permeable pavement	Ratio of permeable pavement outdoor ＞40%	Reduce storm runoff
7	Environmental control	Solid waste pneumatic conveying system	Inside the Park	Timely collection for sanitation purposes
		CO2 monitoring	Air purification and fresh air system	Guarantee fresh indoor air
8	Greening of buildings	Large scale of roof greening	52% of roof area	Heat preservation and beautification

3.10.5 Performance Center

The Performance Center is located in the Southeast of the Expo Park and in the East of the Expo

Axis. Its total floor area is around 80,000 square meters. The Performance Center will undertake all kinds of big shows and activities to meet the needs of large-scale theatrical performances. The design of the Performance Center adopts innovative architectural technologies which reflect the energy-conservation and environment-protection concept, thus turning it into a green building.

(1) Novel and energy-conservation external design. With simple elevation and small shape coefficient, the dish-shaped appearance of the Performance Center will reduce the load and energy consumption for air conditioners, thus reducing the overall energy consumption of the whole building. The main part adopts cantilever structure which has achieved external shading effects. Adopting a building enclosure structure with good performance (the roofing adopts aluminum plate and insulating course, the external wall adopts external insulation, and the glass curtain wall adopts hollow glass) and coordinating with roof greening render the heat-insulating property better. The upper cover partly adopts glass louver and takes full advantage of natural light to conserve lighting energy consumption. The Performance Center adopts LED lighting extensively in the lighting of the roofs, etc. LED lighting, higher in power generating efficiency and lower in power consumption, is an energy-conserving and environment-protecting technology.

(2) Ice thermal storage technology. According to the characteristics of peak valley load for air conditioners, the Performance Center adopts ice-storage air-conditioning technology to reduce the installed capacity of the main engine, i.e. producing ice and storing ice thermal power in the night, taking advantage of valley load, to operate in an energy conservation manner. Part of the air conditioning system is installed with heat reclamation devices to make full use of the thermal energy of the surplus air. In summer, some of the surplus air (with lower temperature) of the air conditioners will be abstracted as air intake for the cooling tower to increase cooling efficiency.

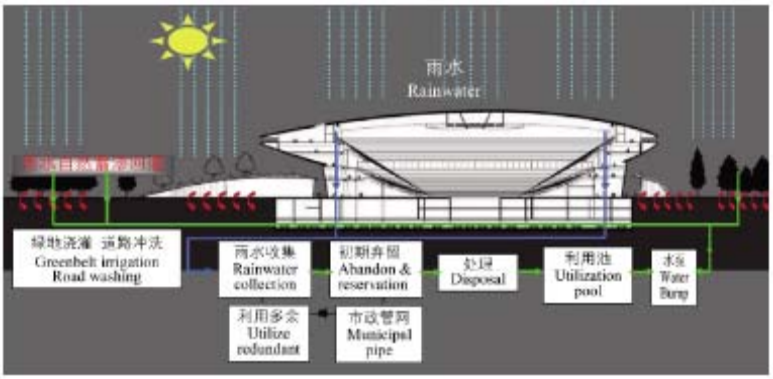
(3) Natural ventilation and wind power. The glass structure of the building is designed to be flexible, which can realize natural ventilation during the day time; while during the night, as the outside humidity increases, the building keeps closed to avoid indoor condensation. Furthermore, wind turbine-generator set will be designed on a public square in the form of kinetic sculpture to supply additional energy.

(4) Water-conservation technology. The Performance Center adopts water-conservation systems, devices and

equipents, and strengthens the utilization of rainwater. Coupled with collection and reclamation of condensate water from air conditioners for the purposes of road cleaning and green land irrigation, it tries as far as possible to transfer water through greenbelts and road surfaces, public squares and parking lots which are laid by water seepage materials to carry out natural storage and back irrigation of rainwater. At the same time, it uses programmed greenbelt sprinkler irrigation or drop irrigation and other water-conservation irrigation technologies to increase the utilization efficiency of water resources.

Picture3-25:Environmental Technology Diagramof Performance Center

Figure 3-26:Photo of Performance Center under Construction (by Xu Zhengkui)



Picture 3-27:Rainwater Recycling Diagramof Performance Center

Table 3-7 Application of green technologies in Performance Center

#	Category	Technology	Scope of Application	Benefits on Environmental protection and Energy Conservation
1	Water conservation and utilization	Rainwater control and utilization	Roof arrangement	❁ Reduce storm runoff t and pollution ❁ Reused in green land irrigation and road cleaning
		Greening spray irrigation	Greening system	Conserve 40~60% water VS flooding
		Water conservation toilet-ware and components	All toilet-ware and components	Effective water conservation
2	Clean and renewable energy utilization	Solar energy road lamp	Roads & squares	Energy conservation and environmental protection
		River water source heat pump		Improve cooling efficiency by 7%
3	Energy conservation in buildings	Disk shape profile design	Overall structure	Reduce load and energy consumption
		Cantilever structure	Cornice	Exterior shading
		Heat preservation	Roof, exterior and glass curtain wall	Heat preservation and energy conservation
		Roof light	Roof	Natural lighting
4	Energy conservation appliances	LED lighting	Flood-lighting	Effective energy conservation
		Exhaust heat recovery	fresh air system	Effective energy conservation
		Gas-powered boiler		Heating efficiency ⩾ 89%
5	Energy conservation in air conditioning	Ice thermal storage air conditioners		Improve energy efficiency

3.11 Green Concepts and Technologies of Urban Best Practices Area

In order to demonstrate the theme of "Better City, Better Life", Expo 2010 sets up the Urban Best Practices Area to enable cities to participate in the Expo for the first time, which is a piece of pioneering work in the history of the World Expo. The Urban Best Practices Area is not only an exhibition area but also an exhibition product itself which reflects urban best practices spirit. The Urban Best Practices Area Cases with international fame, innovation meaning and demonstration value will be displayed, exchanged and promoted intensively in the Expo Site, which will exert substantial influence on the future development of world cities. The third session of International Selection Committee selected 59 exhibition cases from 108 effective solicitations on March 20th, 2008, covering 54 cities from 28 countries. At the same time, Urban Best Practices Area fully reflects new ideas, new technologies and new materials as well as new processes in terms of street block planning, industrial heritage utilization and environmental design, etc. And it will serve as a paragon in renovation, which reflects urban best practices spirit.

In the Urban Best Practices Area, quite a few industrial buildings will be reserved, and will go through functional, fashionable, ecological and energy-conserving renovation. They are not only various pavilions of Expo 2010, but also innovative practices reborn of industrial heritage. In the north of the Urban Best Practices Area, as the real building exhibition cases, the buildings, open space, means of transportation and lighting facilities as well as other existing facilities will be integrated organically to establish a simulated block, to fully reflect sustainable planning concept, including mixed use, compact shape, dominance of public space, non-motorized means of transportation, as well as full use of existing buildings and facilities, etc.

3.11.1 Reconstruction of Nanshi Power Plant

Built in 1897, Nanshi Power Plant was the first national electric enterprise operated by Chinese with quite an influence. In order to meet the requirements for energy-conservation and emission-reduction within the whole city and to coordinate with the construction of the Expo Park, the Nanshi Power Plant was closed down formally in September 2007.

The main building of Nanshi Power Plant adjoins the Huangpu river, with 128 m in length, 70 m in width and 50 m in height, covering an area of 8,970 square meters; the chimney height is 165m, whose maximum bottom diameter is 15.6m; its main building structure is perfect, in which there are three power generating sets and large quantities of subsidiary facilities; it owns an integrated water abstracting and drainage system, which will be fully used during comprehensive renovation. The main building, after being re-built, will be the biggest regional energy center and environmental information & exhibition center in the Expo Park. And the power plant chimney will serve as a "harmonious tower", striving to be the first international three-star green building to be renovated from an old building in China.

The energy-conserving design of Nanshi Power Plant's renovation has achieved a major breakthrough from traditional design, taking energy-conservation and emission-reduction, and environmental protection as its purpose; the design generally adopts active and passive mode of energy-conserving technologies, renewable energies, intelligent monitoring techniques as many as ten energy-conserving measures, thereby realizing the lowest building energy consumption and the best environmental benefits. Energy-conserving technologies for buildings include thermal-dynamic engineering, power conservation, water conservation and energy conservation technologies; special energy-conserving technologies include river water-source heat pump, active modes of artificial light guide, natural ventilation, reclamation and utilization of rainwater and sewage, green building materials application and LED technologies; renewable energy technologies include solar power generation, worm wheel and worm bolt wind power generation; energy-conserving management technologies mainly include a intelligent integrated technological platform.

The general renovation of Nanshi Power Plant, through transformation of existing buildings, application of solar power generation and river water-source heat pump technologies, etc. as well as large-scale utilization of green building materials and other general energy-conserving technologies, has avoided generating large quantities of construction garbage, thus increasing urban air quality and establishing a good living environment. According to the measurement and calculation, this project adopts solar power generation technology, with an average gross generation capacity of 500,000 KWh/year, nearly amounting to using 179 tons of standard coal less. And it is expected to reduce 476 tons of CO_2 emission. Compared with traditional air-source heat pumps, the river water-source heat pump can conserve 5.77 million KWh annually, which is nearly equal to the reduction of 2,060 tons of standard coal. And it is expected to reduce 5,480 tons of CO_2 emission.

Picture 3-28: Original Outlook and Actual Viewafter Reconstruction of Nanshi Power Plant (The right photo was taken by Li Zili)

3.11.2 "Shanghai Eco-Home" Case

As an ecological demonstration building, "Shanghai Eco-Home" comes up with the designing concept of "Natural Friendly: energy conservation and emission reduction, co-existence with environment; Environmental Friendly: suiting local circumstances and showcasing domestic characteristics; and Human Friendly: people first, healthy and comfortable; LOHAS lifestyle sound and sustainable values " , echoes the theme of "Better City, Better Life", and focuses more on elaborating on the new ideas for ecological residences of "Promoting environmental protection and energy conservation, and Advocating LOHAS life".

"Shanghai Eco-Home" will apply 70% of the existing mature technologies and 30% of future frontier technologies to highlight the ecological building technologies, mainly including green, environment-protecting, energy-conserving and low-carbon techniques, etc, such as integrated solar power technologies, natural lighting and LED lighting, comprehensive utilization of rainwater and sewage, industrialized construction, intelligent integrated management center, natural ventilation, energy conservation system in regions of hot summer and cold winter, exploitation of shallow geothermal energy and independent temperature-and humidity-control air conditioning system, etc.

In respect of building energy conservation, the building mass is in a longitudinal bar-shaped arrangement, whose external wall applies inorganic thermal insulation mortars, hollow silt bricks, and FGD free gypsum board thermal insulation mortar/plate. South-facing windows adopt double layers, and north-facing windows adopt low-radiation hollow thermal insulation aluminum alloy. Sun-shading structure as well as greening technologies are also adopted. Roof greening is widely applied. And accessible roof mainly adopts reflection roofing (energy-conserving inverted roofing with reflection coating), which is partly installed with solar photovoltaic panels and mute vertical shaft wind turbine-generator set. In order to ensure natural ventilation, it is installed with many air passages. Through these technologies, it is expected to realize 60% of comprehensive building

energy conservation.

As for building materials, the main building adopts metals and blue bricks, coupled with a bit of glass, which will effectively mitigate impacts on surrounding environment.

Concerning its comprehensive control and utilization, rainwater from different levels will be collected into catchments through gravity-type roof rainwater collection systems. Besides, greenbelt and permeable pavements will be built as much as possible in outdoor public space and sidewalks to encourage natural storage, infiltration and back irrigation of rainwater. And rainwater collected from roads & streets will be reclaimed after going through natural purification by shallow ridges and plant buffer zones. The average annual reclaimed rainwater amounts to about 680 cubic meters.

Regarding vertical greening, it adopts assembled roof greening, facade wall-mounted planting modules and other technologies, to establish three-dimensional green space.

Figure 3-29:Rendering Effect of Shanghai-EcoHome

3.11.3 Hamburg Case——Sustainable New Building

The Hamburg Case adopts an environmentally-friendly and energy-conservation air conditioning system, making full use of the combination of natural ventilation adjusting system and indoor air conditioning system. The indoor air-conditioning ventilation system employs heat recovery fresh air system to reduce energy consumption and environmental pollution.

Advanced and efficient building energy control system is also an important characteristic. Combined with the building monitoring and controlling system, it forms a large-scale energy control system, making up an all-around energy control network from air temperature regulation and illumination control of offices to operation and control of primary facilities.

In the process of architectural design, the area ratio of window and door will be verified through a simulation analysis of sunlight, and thermal insulation design plans for each part will be drawn up. The main heat insulating materials include rock wool, laminated hollow glass wall and so on.

Construction of Hamburg Case takes advantage of roof and wall surface and massively adopts a solar photovoltaic system with an installed capacity of 25KW power. Photovoltaic system performs functions of automatic detection. If there is any abnormal situation, it will disconnect with the grid automatically.

Geothermal heat pump system with "energy pile" is a specific characteristic of Hamburg Case. This system has U-shape pipe coil inside the body of immovable foundation pile to exchange energy. Every three foundation piles, there is one such pipe coil for thermal energy exchange. The greatest output energy amounts to 50W/m length of pile. 120 foundation piles can provide enough energy for the whole building.

Figure 3-30:Rendering Effect of the Building in Hamburg Case

3.11.4 London BEDZED Case——Zero Fossil Energy Dwelling

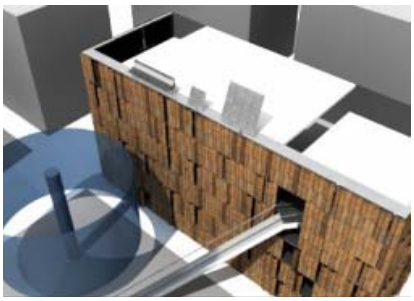
BEDZED Case employs a great deal of passive and active energy conservation techniques to achieve the goal of zero fossil energy consumption.

Passive energy conservation techniques include super thermal insulation materials——rock wool insulation, polystyrene foam and other external thermal insulation materials; low-carbon prefabricated structures; passive solar heating in winter and passive cooling system in summer; energy conservation glass used for roof window and other windows; passive cold and hot fresh air system; decontamination and ventilation system in summer; phase-variable thermal energy storage system; hermetical construction technique and monitoring system; high-level floor noise reduction system; low-temperature cold and thermal radiation system; mobile sun-shading louver; roof greening and vaporization cooling system, roof green drainage and waterproof technique; rainwater and recycled water collection and reuse system; recoverable building materials and so on.

Active energy conservation techniques include integrated roof solar evacuated tube collector; integrated roof photovoltaic panels; grid-connection, storage battery converters; roof photovoltaic panels with firm glass; solar energy-drive 4KW direct-current ground heat pumps; solar energy-drive 4KW direct-current air-source and water-source heat pumps; lithium bromide desiccant cooling systems; intelligent heat-accumulation jars; vertical shaft wind turbine-generator set integrated with the buildings; biomass particles fuel refined from agricultural wastes which can be used to generate power and heat up water.

Figure 3-31:Rendering Effect of London BEDZED Case

Table 3-8 Brief Introductions to Green Technologies Applied in Other Cases of Urban Best Practices Area

Name	Rendering Effect	Green Technology
WaterSkin House (Alsace, France)		● Control the double-water-curtain solar wall through central computer system.
Lighting Cities (Rhônes--Alpes, France)		● Integrate photovoltaic power generation into the power grid for circulation and internal consumption. ● Paint the facade with special treatment, which will conserve direct sunlight in summer.
New Horizons for Public Housings (Madrid, Spain)		● Use bamboo-based materials and other new materials to achieve sun shading and ventilation, in order to accomplish energy-conservation and emission-reduction targets.

Name	Rendering Effect	Green Technology
The Tents City of Mina (Makkah and Mina, Kingdom of Saudi Arabia)		● It features windproof, rainproof, fireproof, free debris flow, expandable, and high accommodation capacity. Enough space for sanitary fixture as well as air conditioner installation can combat rigorous natural environment.
The Revival of the Bicycle Odense Denmark Europe (Odense)		● Advocacy of traveling on bicycles to reduce energy consumption and environmental pollution
Living Water Park of Chengdu City (Chengdu, China)		● Collect, treat and reuse rainwater (sewage) effectively by means of biological self-purification.

3.12 Green Concepts of International Participants' Pavilions

3.12.1 Spain Pavilion——Natural Material and Lighting

Manifestation of Spain Pavilion is very Spanish, namely a basket weaved with wickers. The designing proposal of the pavilion is to divide the space into shapes of several baskets, and to cover the steel structure with wickers as the facades of walls. Transmission of light is an important characteristic of the whole design. It is reported that natural light can permeate into the room through steel tubes and wickers. Bamboo and translucent paper materials are used inside the room. The top employs solar panels.

This manifestation not only employs natural and environmental materials, but also reflects the concept of sustainable development, which is fully in line with the theme of Spain Pavilion——Cities of Our Fathers, Cities for Our Children.

Figure 3-32:Rendering Effect of Spain Pavilion

3.12.2 Swiss Pavilion——displaying Sustainable Development

The designing proposal of Swiss Pavilion is the first confirmed national pavilion proposal for Expo 2010. Swiss Pavilion will take up an area of 4,000m2, about three times as large as that for Aichi World Expo 2010. The top view is an outline of an imaginary future world. The designer considers the concept of sustainable development as a core, which fully reflects the combination of Nature and high-tech elements. It is an open space, with the outermost screen made from soy fiber, which can generate electricity and degrade naturally. Designer acts on Chinese Yin and Yang principle to introduce cable cars as an element of game into the design, taking passengers to get away from the hustling urban life into a fantastic natural world, while climbing up to the top of the Pavilion.

It not only reflects the unremitting efforts of Switzerland in pursuing high quality of life inside the city space and its latest achievements, but also explains its understanding and interpretation of the theme “Better City, Better Life”.

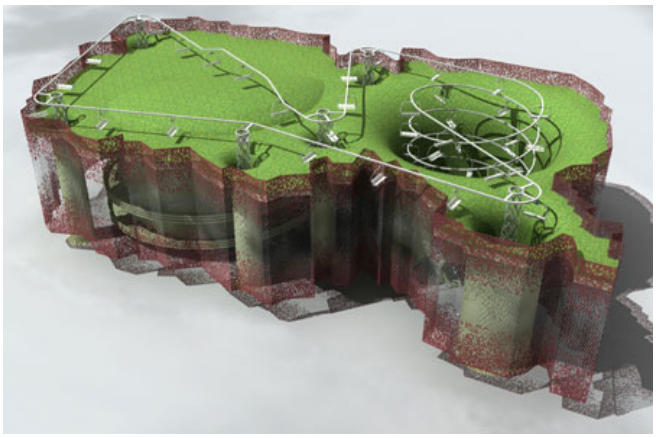


Figure 3-33:Rendering Effect of Swiss Pavilion

3.12.3 UK Pavilion——Realization of Zero Carbon Emission

UK Pavilion in Expo 2010 will present such a beautiful image to visitors: the close and fine antennae spread outward in all directions. On the top of each antenna, there is a tiny light source. All antennae flip gently in wind and create phantasmagoric light and color on the facade of the Pavilion. Apart from the outside light source, antennae of “A Pavilion of Ideas” also contain a tiny

light source on one end inside the Pavilion, creating a huge digital screen. These antennae are a structural division of this pavilion as well. Outside the building, they are located on the upward side of Public Square without any support.

For the sake of environmental protection, all materials used in "A Pavilion of Ideas" are recyclable. During Expo 2010, it will achieve the goal of zero carbon emission.

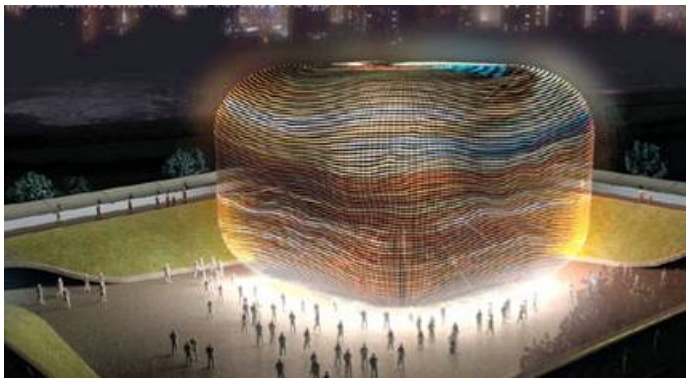


Figure 3-34:Rendering Effect of UKPavilion

3.12.4. Luxembourg Pavilion——Open Fortress Surrounded by Green Trees

The designing proposal of Luxembourg Pavilion not only gives full expression of its theme "Small Is Beautiful", but also lays emphasis on the special identity of Luxembourg as the "Green Heart in Europe", thus echoing the theme "Better City, Better Life" as well as the wisdom and initiative spirit of people in Luxembourg. Designer sets out creating a pavilion out of almost only one piece of monolith. This is actually influenced by Chinese traditional translation of Luxembourg "Lusenbao" (Chinese meaning is "forest and fortress"). Therefore, Luxembourg Pavilion sees itself as an open fortress surrounded by green trees.

Designer illustrates the concept of sustainable development through its appearance and content. Architectural structure of the Pavilion is like ramparts with many big exits, which are oriented toward adjacent space surrounded by mediaeval tower. The Pavilion will serve as a model of a city in pursuit of sustainable development through its buildings and material selection, which respects natural environment and provides modern comfortable life for urban residents and visitors. Materials used in this pavilion include steel, wood and glass, all of which are recyclable. In order to emphasize its openness, the fence walls will be imbedded with various translucent geometric planes, on which plenty information can be conveyed in Chinese characters.

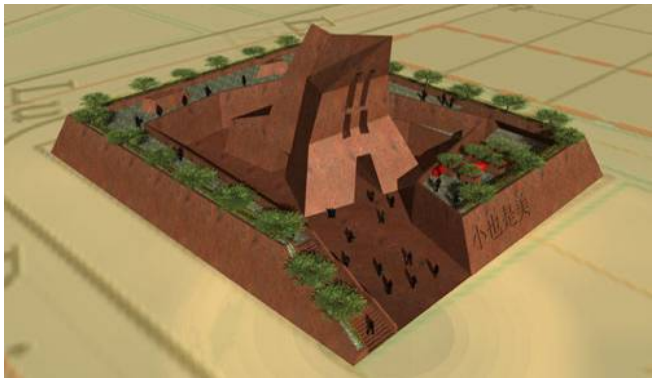


Figure 3-35:Rendering Effect of Luxembourg Pavilion

3.12.5 Finland Pavilion——Made from Environmentally Materials

Finland is the first county in Northern Europe to have confirmed to participate in Expo 2010. The designing proposal of Finland Pavilion will employ environmentally-friendly materials as the main materials for construction so as to present the Finnish concept and technologies for sustainable development to the world. The inspiration of the Pavilion design comes from the natural scenery of Finland. Island, reef, shimmering and rippling shadow, sky silhouette and permeating fragrance from wood, and other kinds of natural elements are re-interpreted to take on a new look. Just as the Nature embraces the Mankind, Finland Pavilion provides a serene harbor for its visitors in order to help people get out of the hustle and bustle of modern life.

In the near future, it is a major challenge for people to find out a path to sustainable construction so as to protect natural resources. This pavilion, like a laboratory for sustainable construction, demonstrates the solution to future urban architecture. Its objective is to work out a solution to energy conservation, low emission and environmental protection in terms of architectural modes and maintenance. The Pavilion design employs many elements. For example, the solar panels on its roof can supply power to refrigeration facilities in summer; the usage of natural ventilation can reduce demand for mechanic ventilation; air is collected from the surface under the building. The solid wall in the central hall creates a natural passage, whose internal part is a spiral slope stretching from its entrance. Openings on the side wall and the top will enhance natural ventilation. Rational location of facilities, usage of lightweight surfaces and window structure will reduce heat intensity caused by sunlight. Roof greening can balance thermal load, and rainwater will be collected from the roof for reclamation.

3D computer models will be used to assist in the whole construction process. The vertical weight-bearing structure of the Pavilion is made from steel. Its facade is composed of narrow-body components, which are assembled on site. The horizontal structure consists of wood-frame components. The floor is made up of patched-up plates. Its nterior will use wooden boards as a covering material. The outside facade will use modern paper-plastic composite boards with scaly patterns, which are an industrial recycled product. During the fabrication, all the construction components must be guaranteed to be degraded and reassembled upon completion. Steel structure is designed to possess more bearing forces, so as to make it more convenient for follow-on usage.

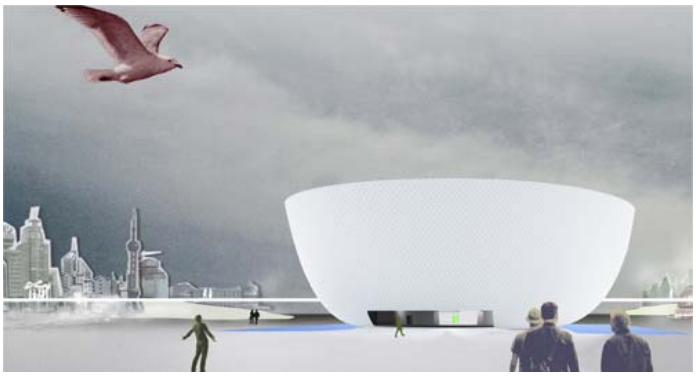


Figure 3-36:Rendering Effect of Finland Pavilion

3.12.6 Nepal Pavilion——Seeking the Soul of a City

Nepal signed the Participation Contract with the Organizer of Expo 2010, unveiling the designing proposal and theme of Nepal Pavilion on November 16th, 2007. The theme of Nepal Pavilion is "Tales of Katmandu City: Seeking the Soul of a City: Exploration and Speculation". Selecting several splendid stages of architectural, artistic and cultural centers for Katmandu during its 2000-odd-year history as its background, the design is aiming at showcasing the development and expansion of the City through changes in architectural modes. Nepal Pavilion highlights its efforts in terms of environmental protection, renewable energy application and green buildings.

Figure 3-37:Rendering Effect of Nepal Pavilion

3.12.7 UAE Pavilion——New Energy Utilization Mode

UAE signed the Participation Contract with the Organizer of Expo 2010 Shanghai, unveiling the rendering effect of UAE Pavilion on November 16th, 2007. UAE Pavilion covers an area of 6,000m2, which is one of the biggest pavilions in the Expo Site.

UAE Pavilion will tell the world a story of energy utilization in a special way, reminding people of not forgetting the experience of ancestors unravelling all kinds of difficulties. For example, visitors can learn how the ancestors sent fresh water to colonies in desert or cooled down their dwellings without consumption of electricity or other energies back in the old times. UAE is planning to demonstrate how the cream of its national culture has been preserved and how it echoes the concept of “Future City”.

Figure 3-38:Rendering Effect of UAE Pavilion

3.12.8 Canada Pavilion——Emerald

Canada signed the Participation Contract with the Organizer to participate in Expo 2010, unveiling a creative designing proposal of Canada Pavilion on January 22nd, 2008. The theme of Canada Pavilion is “The Living City: Inclusive, Sustainable and Creative”. This pavilion is located in Zone C on the eastern side of the Huangpu River, covering an area of 6,000m2. Like an “Emerald”, Canada Pavilion is composed of three large geometric buildings. Its central part is an open public area. Visitors can enter the Pavilion through this public area to enjoy different kinds of artistic performances there.

In order to demonstrate the recycling technique, the exterior wall of Canada Pavilion is covered by a special greenhouse plant. Rainwater will also be collected by drainage systems and reused elsewhere in need. In order to maximize the exhibition space, large-scale pieces of exhibits or objects are not allowed to display inside the Pavilion, which will ensure good ventilation and an open view.

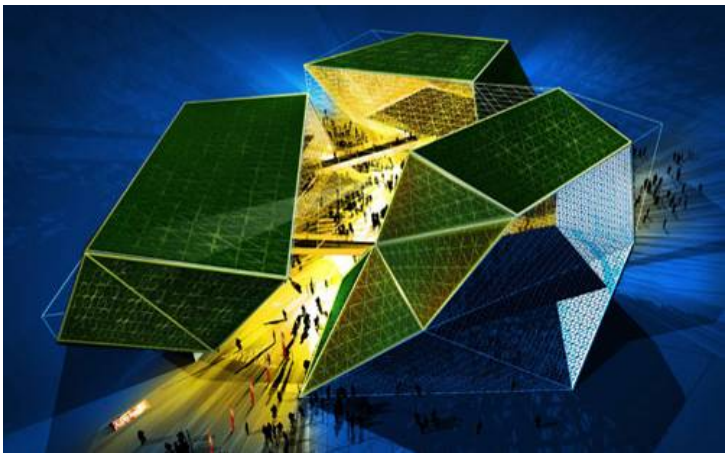


Figure 3-39:Rendering Effect of Canada Pavilion

3.12.9 Holland Pavilion——Happy Street

The designing proposal of Dutch Pavilion, named "Happy Street", is very special, which will fully interpret the theme "Better City, Better Life" of Expo 2010. "Happy Street" provides a chance for visitors to explore the theme in various ways. Designer prepares 17 buildings, each of which is actually a small pavilion, displaying the innovation in space, energy and water conservancy in Holland. Each building adopts different kinds of decoration, which caters to visitors with different interest and tastes. People can see from afar the "Happy Street", which, like a roller coaster passing by, will allure visitors to pay a visit just for fun. In the evening, the shifting and splendid lighting effects will render the Dutch Pavilion more attractive.

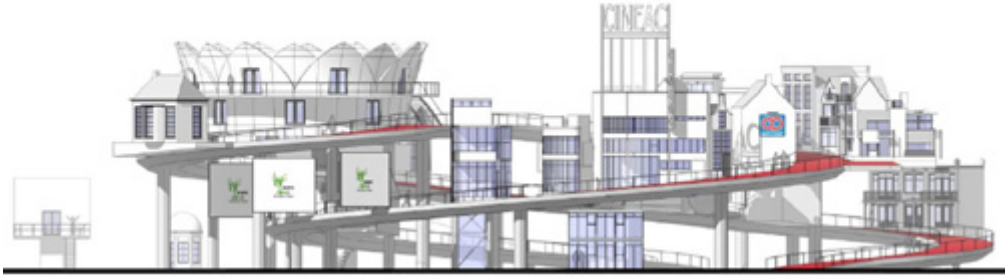
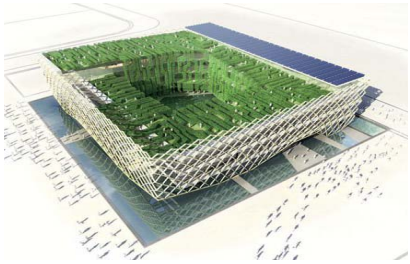
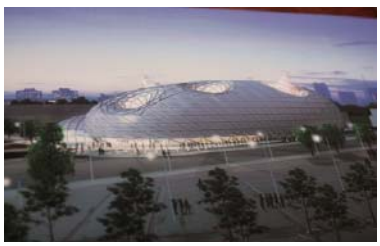


Figure 3-40:Rendering Effect of Dutch Pavilion

Table 3-9 Brief Introductions to Green Technologies of other Participants' Pavilions

Participants	Rendering Effect	Green Technology
France Pavilion The Floating Sensual City		● The France Pavilion floats above horizontal water surface. The whole building is "wrapped" by wire mesh made from new concrete materials. This design will achieve better resistance against earthquake and typhoon; it will also take on an air of water-close elegance with vertical greening plants on side walls.
Italy Pavilion "Blade" Hanging on Trilateral of Building		● The cooling system of this pavilion employs external natural airflow, transmits natural wind into the Pavilion through the "blade", and uses water flow to reduce temperature. ● As for its lighting design, natural light optimization control system and artificial light equipment will be installed, thereby reflecting the sunlight inside the room through the hall and "blade".
Norway Pavilion Adhesion of Norwegian Wood and Chinese Bamboo		● A new product—sticky bamboo originates from the combination of Norwegian prefabricated laminated wood and Chinese bamboo. It is a raw material for 15 model trees, which can be reused after exhibition.
Japan Pavilion Space Fortress——A Pavilion that can Breathe		● External part of the Pavilion is wrapped by ultra-light membrane that can generate power. Moreover, circulatory respiratory porous canals and other up-to-date technologies are used inside the Pavilion. ● Double-layer membranes with high light transmittance, coupled with inner solar batteries, will result in higher

Participants	Rendering Effect	Green Technology
		efficiency in light guiding and power generation, by taking full advantage of solar energy. ● In respect of structure, integrated semicircularly shaped roof and external walls with a lightweight structure will be employed, which will reduce the construction impact on surrounding environment.

3.13 Green Activities of Expo 2010

Technological and environmental activities of Expo 2010 aim at disseminating the idea of "Technical World Expo, Ecological World Expo", by means of game-based educational campaigns, to achieve "common recognition" through "partial participation" and to enable more and more visitors to participate, interact and understand so as to explore, experience and perceive the theme "Better City, Better Life". Those activities pay close attention to global climate change, energy-conservation and emission-reduction and new energies, and focus on "Low Carbon" activities, namely fighting against global climate change and improving urban living environment. Using Expo 2010 as a platform, activities and promotion campaigns on urban ecological and environmental protection will be launched, and the concept of sustainable development will be highlighted and disseminated worldwide.

The Organizer has taken into full account the site planning for activities during Expo 2010. Environmental protection requirements will be incorporated into overall planning and design to encourage the wide application of new energies, new processes and new materials in line with environmental protection concept in the activities, which will highlight the high- tech promotion as well as the interaction with people's heart and mind. The recycling principle of "One-time Investment, Multi-time Utilization" will be fully applied to improve project performance as well as to avoid overlapping investment.

3.14 Environment Forum of Expo 2010

Expo 2010 will set up a forum on environmental protection with the theme of "Urban Responsibilities and Environmental Changes". It's one of the six sessions of Expo 2010's theme forums, which will be held in Nanjing, Jiangsu Province in July 2010. Sponsors of this forum include the United Nations Environment Program, Ministry of Environmental Protection, China Meteorological Administration, National Energy Administration, Executive Committee of World Expo 2010 Shanghai China and Nanjing Municipal People's Government. 500 to 800 attendants will be invited, including Commissioners General of Participants Section, representatives from the United Nation Environment Program, World Meteorological Organization, International Energy Agency as well as ministerial officers and urban managers, world-class experts and representatives from related enterprises around the world.

Climate change, desertification, water pollution and other global and regional environmental problems bear on every aspect of human life and even our survival. City, as the main spatial carrier of human life, is not only the producer of all kinds of environmental problems and risks, but also the victim of such problems and risks. Urban residents can improve their living quality and render the city more harmonious only by shouldering their responsibilities to actively

participate in ecological & environmental rehabilitation, thus leaving a heritage of beautiful as well as green Earth Home to our next generations.

The forum on “Urban Responsibilities for Environmental Changes” aims to cover the comprehensive aspects of urban environmental system, environmental utilization, protection and rehabilitation with involvement from government, enterprises and the general public by clearly defining their responsibilities and to answer the questions behind the theme of the Expo 2010 from an environmental perspective: "Only an environmentally harmonious city can make life better, only actively responding to climate changes as well as all possible risks incurred can make a city better, and only by means of a resource-conservation and environmental-friendly development pattern for the city can render our Earth Home better".

4 To Create a Public Sense of Environmental Protection

Throughout the years, the Shanghai government has continuously planned and developed various kinds of public campaigns and educational programs, aiming at raising public awareness on environmental protection. Through these efforts, citizens are motivated to actively contribute in the process of building an environmentally-friendly city as well as holding a Green Expo event. Citizens are also provided the proper information channels to participate in the decision making process. Concurrently, private enterprises, non-government organizations, expert groups, green volunteers and other social organizations have also spontaneously organized diversified types of public campaigns for welcoming a Green Expo. The public awareness of environmental protection has been enhanced remarkably through the process. Citizens have started to play an active role in closely monitoring the environmental work done by both government and enterprises.

4.1 Publicity on the Themes of Environmental Protection

Taking the opportunity of major environmental events and key government projects as well as the platform of media and community, all departments of the Shanghai Municipal Government have carried out regular publicity activities and education programs in a broader manner, further leveraging on the platform built by press agencies and community network. These activities and programs have promoted the concept of sustainable development to the public, created a strong public sense of environmental protection and im

4.1.1 Publicity on World Environment Day

Every June 5th during the World Environment Day, Shanghai government organizes various diversified activities in line with public promotion activities on the theme of World Environment Day defined by UNEP as well as the respective theme of China and Shanghai. On the World Environment Day of 2009, UN chose the theme as "Your Planet Needs You! Unite to Combat Climate Change". National Ministry of Environmental Protection defined the theme of year as "Pollution Reduction in Action". The publicity theme adopted by Shanghai is "Welcome World Expo and Build a National Model City for Environmental Protection".

In recent years, Shanghai has set up several principal venues and sub-venues to facilitate the World Environmental Day's publicity activities and education programs. The activities include senior official speech, free environmental consultation, art shows, poster exhibition, public interaction, and banner display. The mass media such as STV News Channel, OTV entertainment channel and other major TV channels also broadcasted public advertisements during prime time featuring China theme for almost half a month. Meantime, relevant public advertisements have been published in the main newspapers, such as Jiefang Daily, or printed on the buses. In addition, some programs are played on the mobile TVs on the buses. Some commercial cinemas also participated in this series of publicities, such as the Orient Yongle Digital Cinema Links, which plays public advertisement on environmental protection in all their cinemas.

Figure 4-1:Poster of World Environment Day 2009

4.1.2 China Century Mission for Environmental Protection

The publicity theme of China Century Mission for Environmental Protection (Shanghai) in 2008 is defined as "Welcome World Expo and Build a National Model City for Environmental Protection". In the course of campaign, it has promoted Shanghai Three-Year Environmental Action Plan, launched programs of energy-conservation and emission-reduction, further enhancing public awareness on the importance of protecting and improving urban environmental quality, building the capacity on the legal affairs among government officials and general public so as to push forward the activities on local environmental protection.

China Century Mission for Environmental Protection was set up in 1993 and has been carried out for 15 years. This event is jointly organized by 14 departments and ministries including Environmental Protection and Resources Conservation Committee, Central Publicity Office and Ministry of Finance together with 25 media agencies. In line with the national institution, Shanghai established its own office for China Century Mission for Environmental Protection, joined by over 30 municipal government departments, major press agencies and selected social organizations. It includes Standing Committee of Shanghai Municipal People's Congress, Shanghai Municipal Government, Publicity Department of the CPC Shanghai Municipal

Committee, Shanghai Municipal Culture, Radio Broadcasting, Film and Television Administration and SEPB. Designated deputy director of Standing Committee of Shanghai Municipal People's Congress is appointed as vice director, while designated deputy Mayor as the Director. The Urban Construction and Environmental Protection Committee of Shanghai Municipal People's Congress is responsible for the overall planning, coordination and organization.

Since the launch of public campaign by Shanghai propaganda Committee of CEPC, it has greatly improved public awareness in environmental protection and encouraged environmental protection and rehabilitation within the city via its unique organizational style, broad coverage and strong publicity capacity. So far, there are over 700 journalists who have participated in various types of news reporting, published over 700 pieces of news reports in effort to promote and build a resource-conservation and environmentally friendly city.

4.1.3 Event of "9.22 Stop Driving for One Day"

On September 22nd of 2007, Shanghai encouraged citizens to adopt green transportation means in respond to world event of "Stop driving for a Day". Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, together with other leaders, took the initiatives to commute by bus or metro on that day.

Additionally, General Office of Shanghai Municipal Government issued the "Circular on Further Implementation of Resource Conservation in Shanghai" in order to apply the national requirement of "Circular of General Office of State Council for Further Implementation of Resource Conservation". Since November of 2008, Shanghai instituted the rule of "Stop Driving for One Day In a Week", by regulating that except for special purpose, all of the public-owned vehicles including governments, social organizations, public institutions and state-owned enterprises should stop driving for one day each week based on the last digital number of the car plate ie. vehicles with last digit of plate number 1 and 6 should stop driving on Monday; 2 and 7 on Tuesday; 3 and 8 on Wednesday; 4 and 9 on Thursday; and 5 and 0 on Friday.

> On September 22nd of 2007, Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, walked to a bus station at the intersection of Huaihai Road and Wukang Road, then took bus No.911 and got off at the intersection of Hongqiao Road and Shuicheng Road. He walked to Hongqiao Guest Hotel to attend the 15th Conference of China Federation of Industrial & Economics Presidium.

4.1.4 Publicity on "Welcome World Expo and Build National Model City for Environmental Protection"

On April 8th of 2008, Mr. Hong Hao, Deputy Secretary-general of the Shanghai Municipal Government and Director-general of Bureau of Shanghai World Expo Coordination, was invited to deliver a lecture on World Expo. He stated in detail the early story of Shanghai Expo's bidding process, and elaborated the key features, contents, characteristics and the preparation progress on Expo so far. He also identified the opportunities and challenges that Expo could bring to Shanghai. Mr. Hong hoped that environmental departments in Shanghai should make all the efforts to provide good environmental quality during the days of World Expo 2010 Shanghai. Also, he pointed out that the related government should fully recognize the opportunity that Expo has brought for "improving the environment and eco-system". In this manner, related projects should be planned and implemented to further improve the aquatic and air environment, air pollution

abatement, solid waste management and rehabilitation of major districts in order to achieve an overall improvement of environmental quality. Government should meantime upgrade its management capacity within these areas to be better able to fulfill these targets.

On May 30th of 2008, "Welcome World Expo and Build a National Model City for Environmental Protection" forum was held in Shanghai. The department chief of Ministry of Environmental Protection, Li Lei was invited to deliver a keynote speech. Official representatives of related departments in Shanghai Municipal Government, Environmental Protection Bureaus at the district and county level, together with some enterprises representatives were also present. Mr. Zhang Quan, Director-general of SEPB, noted that by taking the opportunity of World Expo 2010, environmental agencies should focus their resources and efforts to meet the requirement of National Model City for Environmental Protection. Moreover, publicity on environmental protection should be further strengthened, aiming at mobilizing the whole society to paying close attention to environmental protection, participating in the process of environmental improvement and voluntarily undertaking the responsibilities. To improve the city environment quality is one of most important elements in realizing the theme of World Expo 2010 Shanghai “Better City, Better Life”. Through the process of building national model city for environment, Shanghai could improve its environment. 2010 Expo will be a demonstration of an excellent city appearance and showcase the impressive achievement of China's Opening Up and its sustainable urban development.

4.1.5 Community Education Program of "Welcome World Expo and Environmental Protection with You"

In order to promote environmental education activities in the community, SEPB and Shanghai Public Education Center, have jointly organized community education program with the theme of “Welcome World Expo-Environmental Protection with You”. This program covers 19 community colleges, more than 200 community schools and thousands of residents covered by the existing community education system. The public awareness on environmental protection has hence been enhanced by the launching of series of education campaigns with the characteristics of “closing to citizens, to life and to community”. Consequently, the city has fostered a good atmosphere of “understanding, caring for, supporting and participating in environmental protection”.

It has targeted to involve 1 million local residents, by the opening day of Shanghai Expo 2010, participating in the relevant training courses and promotion activities via the community unit. In order to achieve this target, government has planned to install high quality multimedia educational facilities in the community center by stages, so that relevant training courses can be introduced. Qualified teaching personnel in local communities would be recruited in setting up groups for promoting environmental protection knowledge in diversified forms, such as forums, symposia and workshops. Citizens could therefore easily have access to excellent educational resources within the community center.

4.2 Actions on Environmental Protection by people from All Sectors of Society

The whole city, particularly social groups, enterprises, non-government organizations and volunteer organizations which are concerned with environmental protection, have voluntarily organized various environmental activities, in line with the theme of "Welcome World Expo and

Environmental Protection with You", to promote environmental concepts such as green commuting, green consumption and green living.

4.2.1 Green Commuting Program

SEPB, Bureau of Shanghai World Expo Coordination and Environmental Defense Foundation of US jointly launched "Green Commuting Campaign" on May 5th of 2009 and held press conference.

The campaign will be carried out in three stages from 2009 May to 2011 May, namely before, during and after World Expo. Attractive activities such as Online Commuting Calculation, Green Commuting Commitment Card, Green Commuting of Travelling Yangtze River Delta and Green Commuting of World Expo Sightseeing will be held to interact with general public. Participants are from various sectors of society, from company, school to car club and grassroot community. The geographical scope aims to evolve from Shanghai municipality to Yangtze River Delta and finally around the country.

This activity strives to encourage the general public to choose a more energy conservation means of transportation for the purpose of environmental protection so that the improved public awareness could be translated into real action. It also provides a precious opportunity for the general public to contribute in the building of an environmentally friendly World Expo. Meanwhile, it raises the awareness of the general public to the ecological and social problems triggered by global climate change, and to explore ways to control and further reduce emission of green house gas so as to enhance self-restoration capabilities of ecological system to cope with this threat.

Figure 4-2:Tree Planting Activities of 2010 Expo Green Commuting

4.2.2 Green Office from Individual Practice

Under the instruction of Green Guide for EXPO 2010 Shanghai China, staffs of Bureau of Shanghai World Expo Coordination proposed a series of green office initiatives from individual practice, in order to achieve an environmentally friendly world expo. The action points include:

●To promote walking on stairs rather than taking elevators for reaching offices less than 3 floors, the labels of this content are posted outside elevators;

●To promote paperless office such as establishing SMS platform and using short messages to inform meetings, using recycled papers and printing on double sides;

●To bring own cups rather than use disposable ones;

●To limit temperature of air-conditioners above 26℃ in summer and below 20℃ in winter;

●To sort solid waste and recycle useable resources;

●To offer replacement for old batteries and collection of used ones;

●To encourage commute between office and home by shuttle bus which is powered by electricity instead of oil;

● To recycle cardboard boxes and print all business cards in recycled papers;

●To use gas-fired air conditioners in Phase 2 of Office Building of Bureau of Shanghai World Expo Coordination;

●To dim or turn off lights during lunch time if possible.

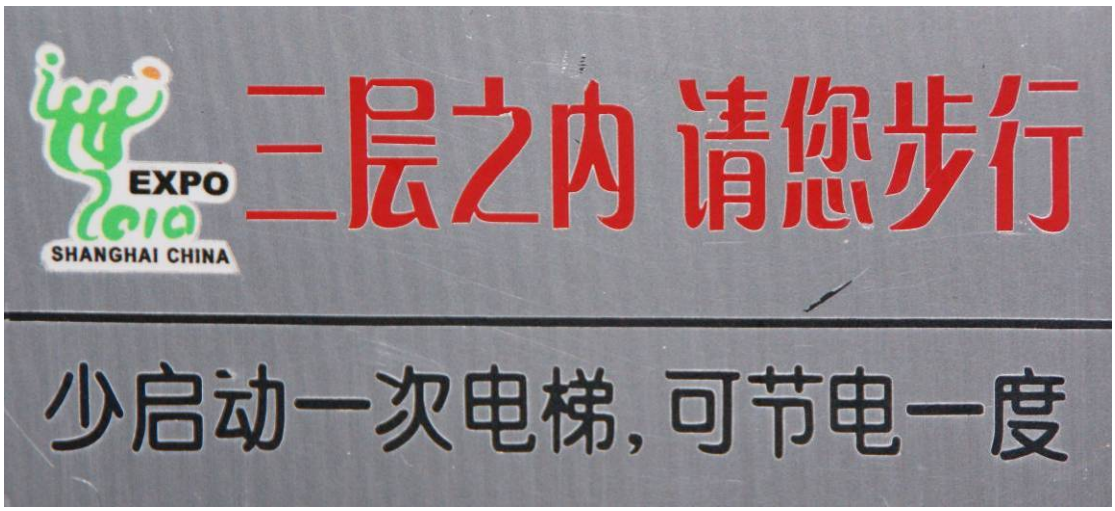


Figure 4-3: Tips in the Office Building of Bureau of Shanghai World Expo Coordination

4.2.3 LIVE EARTH: The concerts for a climate in crisis

On July 7th of 2007, former US vice president Al Gore initiated the Live Earth concerts, jointly performed in nine selected cities of seven continents for 24-hours marathon live broadcasting to a mass global audience. The concert at Shanghai station reflected the long term commitment and efforts made on protecting environment, advocated by the Alliance for Climate Protection and other international non-government organizations. It aims at inspiring the individual, private enterprises and government agencies to collectively take actions to tackle global warming. Al Gore serves as chairman of Alliance for Climate Protection as well as cooperating partner of Live Earth. He states that: "Live Earth was held across the seven continents because climate issues have

affected people across the seven continents. All people must join hands in solving global environmental problems and become a member of it".

Figure 4-4：LIVE EARTH - The global vocal concert of climate crisis in Shanghai

4.2.4 Earth Hour Campaign

World Wide Fund for Nature (WWF) sponsored the activity of "Earth Hour ", calling for one-hour light-off in all cities around the world on the last Saturday of March every year in order to send a signal to all human kind: we need to conserve energy, reduce carbon emissions and be responsible for our planet.

Shanghai Municipal Government and all sectors of society have actively responded to this initiative. On the night of March 28th of 2009, all landscape lights in more than 160 buildings were turned off for one hour from 8:30 pm to 9:30 pm, such as Shanghai Oriental Pearl TV Tower and Shanghai Municipal Government office building. WWF and Shanghai Oriental Radio Station also co-hosted a live show featured “Earth Hour- the Night at Shanghai Oriental Pearl” in respond to Green Expo’s theme on low carbon and energy conservation.

4.2.5 The activity of "Green Chips in 365 Days and Green Living for Everyone"

In the May of 2008, Intel Shanghai Product Ltd held an environmental protection campaign of “Green chips in 365 Days and Green Living for Everyone” to celebrate the 40th anniversary. Various activities were developed in the event, such as distribution of brochures and souvenirs, knowledge contest, demo of know-how, teaching environmental protection tips, signatures on environmental proposals, promoting environmental awareness by jogging rally, children’s drawing on their ideal green living, expert lectures, etc. Through these activities, participants and citizens were imparted environmental concept and relevant skills as well as exposed to Intel’s company

culture on leading a green lifestyle.

4.2.6 Selection of "Bayer Young Environmental Protection Envoys"

Since 2003, Bayer (China) Co. Ltd has held activities to select “Bayer Young Environmental Protection Envoys” by cooperating with the Shanghai Environmental Protection Publicity and Education Center as well as the College Coordination Office of Shanghai Environmental Education Coordination Committee. During the first year, the event took place at the cities of Shanghai, Hangzhou and Suzhou, consequently receiving positive responses from college students and evoking great repercussions in the public. From 2004 to 2008, this campaign has expanded to Beijing, Tianjin, Jinan, Chongqing, Hefei and other domestic cities. “Bayer Young Environmental Protection Envoys” is the selection activity with the theme of environmental protection and mainly targets college students of 18 to 23 years old. The candidates are required to be enthusiastic in participating social activities of environmental protection, also with relevant experiences. This campaign aims at encouraging more college students to participate in affairs of environmental protection and also providing an opportunity and platform for students from different regions and diversified professions to exchange ideas and experiences. This campaign so far has been undertaken for six consecutive years involving more than 600 students from more than one hundred colleges and universities in those cities.

4.2.7 "Sateri" Cup of Environmental Protection Practice Contest for College Students

In the October of 2006, Sateri International Group organized a "Sateri" Cup of Environmental Protection Practice Contest for College Students by cooperating with Shanghai Environmental Protection Publicity and Education Center as well as College Coordination Office of Shanghai Environmental Education Coordination Committee. Totally 19 student associations of environmental protection from 13 colleges and universities submitted 39 cases of environmental protection practices. Driven by a deep sense and passion, volunteers developed many activities, expressing in their respective ways to pay attention to and promote environmental protection. They made their best efforts in fulfilling the commitment to environmental protection by application to their daily life. For instance, Green Road Environmental Protection Association of Tongji University initiated a “Bag Up” campaign which even caught attention of Mr. Achim Steiner, Executive Director of the United Nations Environment Programme. Mr. Steiner himself participated in one of activities during this campaign, a painting contest of an environmental cloth bag, during which he worked out his master piece of “Billion Tree Campaign”. Mr. Steiner expressed his appreciation and recognition for the students’ actions taken on environmental protection.

4.2.8 Green Box Environmental Protection Program

From May 17th of 2007 to the end of December, China Mobile organized the activity of "World Expo-Mobile Environmental Protection Program-Green Box Environmental Protection Program". With "Account Book of Beautiful Life" distributed in all business branches of China Mobil, citizens can accumulate points by donating used cell phones, batteries and other accessories, and then exchange small Q series products tailor made by China Mobile World Expo Young Envoy. In this way, each participant can contribute to protect our beloved earth with actual deeds.

4.2.9 Small Action for Big Change: Environmental Protection "Let's Go" Activity

Shanghai Environmental Science Society, Shanghai Environmental Protection Publicity and

Education Center, Shanghai Xianglv Environmental Protection Technology Co. Ltd and seven universities in Songjiang College Town jointly initiated this promotion activity for environmental protection education purposes, namely "Small Action for Big Change-Environmental Protection 'Let's go'". The purpose of this activity was to show that a small change of life habit can result in big differences in energy conservation and pollution reduction thereby contributing to building an environmentally-friendly society. This publicity lasted from March 17th to April 21st in seven universities and colleges. For instance, Shanghai International Studies University held the Handkerchief Festival to encourage using handkerchief instead of consuming a large amount of paper tissues. East China University of Political Science and Law regularly played the acclaimed environmental documentary video "An Inconvenient Truth" at campus, together with essay competition and green innovative forum. Shanghai Lixin University of Commerce launched "No Plastic Bag Day", in the purpose of stopping white pollution by promoting environmental-friendly shopping bag. Shanghai Institute of Foreign Trade held the activity, for one month, of collecting and recycling plastic bottles, which were subsequently transported to factories to manufacture environmental bags. Shanghai University of Engineering Science promoted environmental approach of adopting earthworm to decompose municipal waste in order to reduce disposed quantity, and developed the activity of adopting green potted plant. Donghua University held the charity performance of environmental protection and closing ceremony of overall campaign. Shanghai Institute of Visual Arts of Fudan University was in charge of documenting and reporting the overall campaign, filming a documentary and producing public service advertisement. According to unofficial statistics, more than 80,000 college students and faculties have participated in this campaign. Moreover, the money gained from these activities, such as adopting potted plant, recycling plastic bottles and holding charity performance, will be donated to fund planting project in Inner Mongolia.

4.2.10 University Creativity Competition for Low Carbon World Expo

For the sake of integrating the idea of low carbon with contemporary university students' daily life, at the end of 2008, the United Committees of Green Volunteers of Shanghai Universities, the Green Forum of Shanghai Universities and others alike jointly organized the "University Creativity Competition for Low Carbon World Expo". It aims at globally collecting creative ideas on promoting Low Carbon Expo and Green Expo, mobilizing the general public to pay attention to the social problems of low carbon, leading the general public to adopt correct social value system on low carbon, encouraging more people to develop activities with low carbon and low emission, consequently benefiting the whole society. The involved university students can therefore develop their own correct future vision, start business in the process of innovation and creativity thereby linking them with future society and position their own life.

4.2.11 Campaign of Greening Expo

On March 12th of 2008, in line with Shanghai Expo 2010 Theme "Better City, Better Life", young engineers of World Expo Park organized a tree planting activity in the World Expo Park, under the theme of "Green Engineering, Ecological World Expo". Senior government officials and over 100 young engineers together planted trees in the World Expo Park, contributing to the greening projects.

4.2.12 Cycling Activity of "Welcome World Expo, Add Green to Shanghai"

On December 13th of 2008, China Mobile Shanghai Company initiated a cycling activity in Shanghai themed: “Welcome World Expo, Add green to Shanghai”, attracting quite a number of general public. One hundred bicycle riders took the route to pass famous scenic spots, such as People Square, Bund and Xin Tiandi, distributing environmental post cards. Riders did not only promote green commuting by action, but also promoted environmental protection concept of Expo by encouraging more people to contribute to a Green Expo.

4.3 Public Participation and Interaction

For the sake of further promoting concept of sustainable development and mobilizing more citizens to participate in action to protect the environment and conserve energy, government departments at all levels of Shanghai have continuously expanded the channel for public participation in order to mobilize the experts, scholars and ordinary citizens to voice their suggestions and join the efforts.

4.3.1 "Green Community" Initiative

In 2003, Shanghai launched the campaign called Green Community. All districts and counties responded actively. Green community refers to the community equipped with facilities meeting with certain requirements on, environmental management system and public participation mechanism. The hardware facilities comprise green building, greening field, garbage sorting system, sewage disposal system, water conservation facility, energy conservation facility, equipment of utilizing renewable energy and other alike. The software setting refers to the establishment of a well-developed community environmental management system, public participation mechanism, sound environmental education program.

Under the guideline of Three Year Action Plan for Environmental Protection, the evaluation criteria of Green Community have integrated targets and contents to further improve environmental management and environmental infrastructure, develop environment education programs and promote green consumption. For instance, in order to reduce usage of plastic bags, residents of Green Community are given every year environmental shopping bags with logos of “Recycle and Reuse, Treasure Resources”. The Green Community has also cooperated with the Shanghai Computer Trade Association and related manufacturers in order to promote reusable ink cassettes and toner cartridges. By constructing a Green Community, public awareness on environmental protection has been improved within households and communities. People take their own initiatives on conservation energy, water and recycling garbage, in a way to actively contribute to build an energy conservation and environmentally friendly city. By the end of 2008, there are 68 Green Communities in Shanghai.

4.3.2 Establishment of “Green School”

Green School Initiative was launched in 1999. Ever since, establishment of Green School in primary education has drawn extensive attentions. The current practices include integrating the concept of sustainable development into school daily management system; enhancing the practice of energy conservation, resource preservation, emission reduction and waste treatment; enhancing the image of environmental responsibility; expanding coverage on environmental education; integrating environmental knowledge with action via both channels of teacher training and student curriculum design; enhancing the environmental awareness of school students and teachers; and

establishing a sustainable improvement mechanism of "Summary-Review" based on school records, thus in a way to ensure a continuous improvement of green culture in the school.

By the end of June in 2008, Shanghai has established 22 national green schools, 136 city green schools and more than 500 district and county-level green schools.

4.3.3 Selection of Young Envoy for Expo

To welcome the World Expo 2010, the event organizing committee has successfully held two annual events of "World Expo Young Envoy Selection". The theme of 2008 selection was defined as "protecting the urban environment toward a harmonious city". This event has encouraged students at primary and secondary schools in Shanghai to care about ecological environment, acquire the knowledge of protecting animals and plants, taking proper actions in protecting the environment. Involved students are expected to become one of those who will be engaged in 2010 Shanghai World Expo and contributed to the future development of Shanghai.

4.3.4 Public Participation in Environmental Impact Assessment of World Expo Master Plan

During the preparation period of environmental impact assessment on World Expo master plan from 2005 February to 2006 April, the organizer launched three different approaches for public participation namely online survey, written questionnaires and field investigation. This is to enable the general public to deeply understand the content of world expo park master plan. Consequently suggestions and comments could be collected within a broader base.

During the survey period, the total online hits reached 8756 and 684 valid questionnaires have been collected. The result indicated that 75% of interviewees were confident in hosting a "successful, excellent and memorable" World Expo. Most interviewees regarded the key regional environmental problems at this stage as air pollution and sanitation. 66.75% of relocated local residents in the survey regarded their living environment would be improved significantly.

4.3.5 "Green World Expo, Happy Seating" Campaign

Bureau of Shanghai World Expo Coordination and TetraPak (China) jointly initiated the campaign "Green World Expo, Happy Seating" in the June of 2009. In this campaign, dedicated recycling stands have been set up in communities and schools for collecting citizens' used TetraPak packages, which were subsequently transported to designated manufacturers to be recycled with modern environmental technologies. The final products consisting of environmental chairs and benches have then been placed in the World Expo Park, demonstrating the contribution from the general public.

4.3.6 Ban on Free Plastic Bags Campaign

Shanghai presses ahead with the implementation of the Circular issued by State Council on Limiting Production, Sale and Use of Plastic Bags. From June 1st of 2008, all supermarkets, shopping centers, commodity trading market and other retail markets have been required to charge plastic shopping bags with marked price. Additionally charges for plastic shopping bags are not supposed to be included in the total cost of sold article.

According to unofficial statistics, since the ban on free plastic shopping bags, about 60% of customers have brought along their own shopping bags while 20% have chosen to purchase environmental bags sold in supermarket. The implementation of the ban has gradually changed citizens' shopping habits. Apart from reducing white pollution, this initiative enables the general

public to realize the environmental concept of “small action, big change”. This case thus vividly demonstrates the initiatives of mobilizing whole society to participate in the action of protecting environment.

4.3.7 Mass Activity of Tree Planting to "Add Green to Shanghai and Welcome World Expo"

On June 5th of 2009, Shanghai Afforestation Commission proposed the campaign “Add Green to Shanghai, Welcome World Expo” in the event of the 38th World Environment Day. It aims to mobilize citizens to participate in action to plant green, love green, protect green and cultivate green. This campaign demonstrated the theme of World Expo 2010 “Better City, Better Life” and also actively responded to the global “Billion Tree Campaign” initiated by the United Nations Environment Programme. Ten representatives of private enterprises and residents were awarded honorary certificates by the Shanghai Afforestation Commission in recognition of their continuous efforts in planting and adopting trees. Senior officials from Bureau of Shanghai World Expo Coordination, Zhabei District Government, United Nations Environment Programme, SEPB and Shanghai Municipal Afforestation and Environmental Sanitation Administration also planted trees with local residents in the Zhongxing Road Park.

In addition to participating in tree planting, local residents also undertake further steps in greening nearby areas, such as the working places, villages, school campuses and communities. These greening activities have also taken place at the areas of residential places, watercourses, walls and roofs. This campaign encourages people to start to take action from household, working places and living districts, for the sake of improving environment. Citizens, in this manner, are motivated to voluntarily plant green, protect green and cultivate green as the form to participate in the greening process of Shanghai and showing the commitment of treasuring the planet.

4.3.8 Studying Green Expo 19th International Business Leaders'Advisory Council for the Mayor of Shanghai

The first International Business Leaders’ Advisory Council for the Mayor of Shanghai was inaugurated in 1989 when twelve board chairmen (CEOs) from internationally well-known enterprises became the first panel of members in Advisory Council to provide strategies and advices on Shanghai’s development. So far, this grand meeting has been successfully held for consecutive twenty years. Shanghai has continuously absorbed international wisdom and experiences in each discussion section annually.

On October 28th of 2007, thirty three international renowned enterprisers gathered in Shangri-La Hotel of Pudong to attend the 19th International Business Leaders’ Advisory Council for the Mayor of Shanghai, providing strategies and advices on the theme of "Construction of Resource-Conservation and Environmentally-Friendly City". Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, delivered keynote speech. CEO of Vodafone Group Plc. Sir John Bond, also the chairman of this meeting, hosted the opening ceremony and delivered a speech. During this meeting, Shanghai government leaders and members of International Advisory Council interactively discussed various issues under three topics, namely "government responsibility", "enterprises’ roles" and "public participation". One important point highlighted in the theme of 2010 Shanghai Expo "Better City, Better Life" states "Green, Environmental Protection, Energy-Conservation". The participating enterprisers outlined the importance of the relationship between environmental protection and green expo, and they

offered valuable advices and comments during the meeting.

4.3.9 International Conference on Environment and Development

On December 12th of 2008, Shanghai held the International Conference on Environment and Development. Many domestic and overseas experts on environment attended the symposium, such as Mr. Wang Yuqing, Deputy Director of CPPCC Committee of Population, Resources and Environment; Dr. Young-Woo Park (Korea), Regional Director and Representative for Asia and the Pacific of United Nations Environment Programme; Dr. Dan Dudek (USA), chief economist of Environmental Defense Foundation; Academician Tang Xiaoyan and Academician Cai Daoji; Dr. Alan C. Lloyd (USA), President of International Council on Clean Transportation; Dr. Sarah Liao, environmental advisor of 28th Olympic Games, etc.

Under the theme of "2010 World Expo and Environmentally Friendly city", the invited experts review the environmental action plans and accordingly provided valuable advice, from the point of view of urban ecology, environmental infrastructure and urban safety, industrial development and environmental protection, sustainable urban transportation, public participation, etc.

4.3.10 Environmental Advisory Panel of World Expo

To better achieve the commitment of Green Expo in Shanghai 2010 Expo, SEPB and Bureau of Shanghai World Expo Coordination set up a dedicated Environmental Advisory Panel. At present, the members of committee include Academician Tang Xiaoyan, Academician Hao Jiming, Academician Qian Yi, Dr. Sarah Liao, Professor Zhu Dajian, Mr. Shi Hanmin, Mr. Yu Xiaoxuan, Mr.Corrado Clini, Mr. Dan Dudek, Dr. Michael Walsh, Dr. James Lents, Dr. Corrado Clini, and Dr. Dan Dudek On January 15th of 2009, the first meeting of 2010 Shanghai Environmental Advisory Committee of World Expo opened in Hong Qiao Guest Hotel in Shanghai. All environmental consultants appraised the work done so far in Shanghai; meanwhile they put forward valuable opinions and suggestions on selected issues for further improvement, such as the monitoring methods of air quality and framework of World Expo environmental protection.

4.3.11 Expo and Environmental Protection of Shanghai-Xinmin Science Cafe

To facilitate citizens to better comprehend environmental protection and enhance public participation, SEPB, Xinmin Evening News and Shanghai Science and Technology Association jointly organized the 68th Xinmin Science Cafe, on November 24th of 2008. Two senior officials from SEPB, Mr. Bai Guoqiang, vice director of Shanghai Environmental Protection Committee Office and Mr. Wu Chengjian, director of International Cooperation Division, were invited as guest speakers to communicate with citizens on several popular issues, such as Three Year Action Plan of Environmental Protection, 2010 World Expo and Environmental Protection.

Xinmin Science Café is a branding column with long history launched by Xinmin Evening News and Shanghai Science and Technology Association. It features strong social interactivity. More than 60 individuals attended this science café. In the course of discussion, many citizens proposed valuable suggestions for environmental protection work of Shanghai such as recycling of Freon and e-wastes, wastewater treatment technologies, utilization of ecological embankment for watercourse rehabilitation, pollution control at industrial zones, light pollution, desulfuration efficiency at power plant, methane utilization in rural areas as well as discussion on the functions and roles of environmental NGOs, etc. This activity has effectively offered a platform for citizens to provide their comments on Shanghai environmental protection projects.

4.3.12 Forum on Green Expo: Go Along with Expo

In the afternoon of March 29th in 2009, the sixth section of "Go along with World Expo" Forum was held at Shanghai Library with the theme of Green Expo. "Four-People Talking on Green Expo" was planned and organized by the Population, Resources and Environment Commission of Chinese People's Political Consultative Conference (CPPCC). The invited guest speakers comprise of Luo Xin, Member of Standing Committee of CPPCC, Chief Creative Officer of Shanghai OTV; Shen Jianhua, Member of Standing Committee of CPPCC, researcher of Chinese Academy Shanghai Institutes of Biological Sciences; Wang Xiangrong, member of CPPCC, Director of Research Center for Urban Environment Planning & Design, Fudan University; Bai Guoqiang, Vice Director of Office of Shanghai Environmental Protection Committee. They delivered keynote speeches on a wide range of topics ranging from idea of Green World Expo, function of public participation on improving urban environment and enhancing public awareness, to the targets, responsibilities and measures taken by governments during the period of preparing and holding World Expo. Active dialogues were followed between the four guest speakers and over 160 audience.

4.3.13 Online Conversation between Experts and Cyber Users on Ecological World Expo

Three distinguished guests, namely Chen Xianjing, CEO of Shanghai World Expo (Group) Co., Ltd, Zheng Shiling, Academician of Chinese Academy of Science and Chief Theme Planner for World Expo, Wang Xiangrong, Professor of Fudan University, communicated online with cyber users on the topic of green World Expo and environmentally-friendly city in Shanghai in the January of 2006.

To respond to the question on connotation of Ecological Expo concept, Academician Zheng Shiling emphasized that concept of ecological expo demonstrated a harmony between human and environment, ranging from not only environmental aspects, but also the green concepts lies in economy, culture and social development. Taking the example of site selection of World Expo park, quite a number of excellent historic architectures are located in the park site. Apart from those listed in the key protection list, many of them are residential places and factory houses. The way that we make use of them can both preserve cultural traditions as well as reduce energy and resource consumption. This is exactly the demonstration of green expo, finding a balance between preservation and resettlement.

4.3.14 Experts Consultation on Science and Technology as well as Environmental Themed Events during World Expo 2010

On March 5th of 2008, Bureau of Shanghai World Expo Coordination held an expert consultation meeting regarding some science and technology as well as environmental themed events for World Expo and invited experts from Shanghai scientific and technological areas. About 20 experts from Shanghai Science Association, SEPB, Shanghai Science Academy, Shanghai Academicians Center of Chinese Science Academy, Shanghai Environment Science Research Institute, Shanghai Urban Science Research Association, Shanghai Residential Science Research Association, Shanghai Geological Association, and Urban Information Research Center of Shanghai Normal University attended this meeting and expressed their opinions and ideas on the initialization and planning of scientific, technological and environmental themed events for World Expo 2010 Shanghai. They contributed their professional inputs on how to undertake such kind of events in order to better

create a social atmosphere on a green and environmental World Expo.

5 EVENTS

Major environmental events taking place during the period of preparation, plan, design and construction for Shanghai Expo are documented chronologically. It reflects the progress made so far in fulfilling the commitment to host an environmentally-friendly World Expo.

2000

Shanghai initiated the first round of Shanghai Three-year Environmental Action Plan, which identified 110 key projects in 5 categories, namely, rehabilitation of aquatic environment, improvement of atmospheric environment, disposal of solid waste, urban greening and environmental rehabilitation in industrial zones.

March 17th 2000

The General Office of the State Council issued A Circular on the Establishment of Expo 2010 Shanghai China State Bidding Committee. The State Council approved the establishment of Expo 2010 Shanghai China State Bidding Committee and appointed members of the bidding committee in which Ms. Wu Yi, the State Councilor, serves as a chairman.

June 27th 2000

Shanghai Municipal Government issued A Circular of the General Office of Shanghai Municipal Government on the Establishment of Expo 2010 Shanghai China Municipal Bidding Leading Group, and decided to establish Expo 2010 Shanghai China Municipal Bidding Leading Group, to which Expo Bidding Office was subordinated.

January 16th 2001

Bidding logo of Expo 2010 Shanghai China was unveiled. Leading Group Office for Expo 2010 Shanghai China Bidding Commission invited design application from the public on slogans and posters for Expo 2010 Shanghai China throughout the country.

April 30th 2001

Shanghai Municipal Government issued Shanghai Programme for Key Special Projects of Ecological Environment Reconstruction in the Tenth-Five Year Plan Period, which includes eight categories: adjustment of industrial structure, rehabilitation of aquatic environment, improvement of atmospheric environment, development of circular economy, acceleration on greening construction, enhancement of wetland conservation, strengthening of environmental safety and construction of Chongming ecological island.

January 30th 2002

Chinese Government officially submitted the bidding report on hosting Expo 2010 in Shanghai to Mr. Loscertales, Secretary General of Bureau of International Exhibition (BIE). Bidding letters was attached thereof to leaders of BIE, endorsed by then Chinese Chairman Mr. Jiang Zemin and then Premier of the State Council Mr. Zhu Rongji.

December 3rd 2002

In the 132nd assembly of BIE hold in Monte-Carlo of Monaco, Shanghai of China succeeded to win the bid of hosting Expo 2010 through fierce competition.

March 31st 2003

Shanghai Municipal Government held a Symposium on Population, Resources and Environment as well as Mobilization Rally for the second round of Shanghai Three-year Environmental Action Plan. Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, announced the initialization of new round of Shanghai Three-year Environmental Action Plan.

March 31st 2003

Shanghai Environmental Protection Committee was established with the approval from Shanghai Municipal Government. Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, was appointed as Chairman, and Deputy Mayors Messrs. Zhou Yupeng, Yang Xiong and Tang Dengjie were appointed as Deputy Chairmen, and Mr. Hong Hao, Deputy Secretary-general of the Municipal Government, was designated as Secretary-general. Member agencies included 48 governmental departments, including Municipal Planning Commission, Legislative Affairs Office of Shanghai Municipal Government, Shanghai Municipal Bureau of Public Security and other commissions, offices and bureaus within Shanghai Municipal Government as well as governments at district/county level. An office of the Committee was set up in SEPB.

October 30th 2003

Bureau of Shanghai World Expo Coordination was officially established and Deputy Mayor Mr. Zhou Yupeng was appointed as Chief Director. BIE Chairman Mr. Noghes, Secretary-General Mr. Loscertales, Deputy Chairmen Messrs. Sewen and Halawe, and Honorary Chairman Mr. Philip, et al. were invited to attend the inauguration ceremony.

December 3rd 2003

Master plan of Expo 2010 Shanghai was finalized as well as the institutional framework thereof. The preparatory and organizing institutions consisted of four levels, including the organizing committee and executive committee at the national level, Bureau of Shanghai World Expo Coordination as well as Land Reserve Centre of Shanghai Expo and Shanghai World Expo (Group) Co., Ltd.

June 3rd 2004

The Organizing Committee of Expo 2010 Shanghai China was officially established with its first meeting held in Beijing. Ms. Wu Yi, Member of the Political Bureau of CPC Central Committee, Vice Premier of the State Council and Chairman of the Organizing Committee, was present and addressed the meeting.

September 29th -30th 2004

International "Green Expo" Symposium on Environmental Protection was held in Shanghai, hosted by Shanghai Municipal Government, sponsored by United Nations Environment Programme(UNEP) and World Bank, and organized by SEPB and Bureau of Shanghai World Expo Coordination. Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, Dr. Klaus Toepfer, Under-Secretary-General of United Nations and Executive Director of UNEP, were present and addressed the meeting.

February 4th 2005

Leading Group of World Expo Science and Technology Action Plan was established and held its inaugural meeting and First Plenary Session in Beijing, marking the official launch of Expo Science and Technology Action.

October of 2005

With the support of United Nations Development Programme(UNDP) and UNEP, the Project of "Building Shanghai as an Environmentally-Friendly City" was officially launched. It aims to help Shanghai to establish an environmental management system with high efficiency, to improve its management capabilities and to create an exemplary case of the Expo Park construction.

December 1st 2005

In Paris, BIE approved the Registration Report for Expo 2010 Shanghai China submitted by the government of China.

January 12th 2006

Shanghai Municipal Government held a meeting to summarize and award achievements made in the second round of Shanghai Three-year Environmental Action Plan as well as to mobilize the third round of Shanghai Three-year Environmental Action Plan. The second round of Shanghai Three-year Environmental Action Plan had been successfully concluded and its third round was subsequently initiated. Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, pointed out at the meeting that the work on strengthening environmental protection and ecological reconstruction was a continuous and evolutionary process.

May 10th 2006

Environmental Impact Assessment Report on Master Plan of Planning Area of Expo 2010 Shanghai China prepared by Shanghai Academy of Environmental Sciences was approved by an expert review panel. Based on the carrying capacity of natural resources in the planning area,possible changes in pollution sources in assigned areas and potential environmental impacts thereof during construction, exhibition and post event of Expo 2010, recommendations on environmental impact mitigation measures and requirements for implementation of tracking evaluation were put forword.

June 5th 2006

Besides the existing disclosure level of the information on urban air quality, SEPB issued daily ambient air quality report for 19 districts/county, including Air Pollution Index (API), pollution level as well as sub-indices of three pollutants: inhalable particulates, Sulfur Dioxide and Nitrogen Oxide.

February 26th 2007

Shanghai Municipal Government resolved to appoint Deputy Secretary-general Hong Hao as Director-general of Bureau of Shanghai World Expo Coordination.

May 17th 2007

Mr. Han Zheng, Deputy Secretary of the CPC Shanghai Committee and Mayor of Shanghai, met with Mr. Achim Steiner, Under-Secretary-General of United Nations and Executive Director of UNEP, who was conferred a Certificate of Honor as "Consultant for Shanghai Environmental Protection and Construction".

May 30th 2007

To ensure the ambient air quality within the Expo Park to meet relevant environmental standards, Shanghai Municipal Science and Technology Commission organized and carried out special scientific research of "Analysis and Application of Improving Atmospheric Environment in the Expo Park".

June 4th 2007

The 14th Session of Shanghai Environmental Protection Committee was held in combination with the mobilization rally for building a National Model City for Environmental Protection (NMCEP). It called that, by the end of 2009, Shanghai will have met the requirements for building an NMCEP, so that urban environment and appearance would be well improved to present and practice the Expo theme of "Better City, Better Life".

August 7th 2007

To implement plans issued by both the Central Committee of CPC and the State Council on energy conservation and emission reduction, Shanghai Municipal Government issued Shanghai Implementation Scheme for Energy Conservation and Emission Reduction.

October 29th 2007

The 19th Session of International Business Leaders' Advisory Council for the Mayor of Shanghai was held in Shangri-la Hotel. Renowned entrepreneurs from different countries offered their valuable advice on the theme "Building a Resource-efficient and Environmentally-Friendly City". During this session, various issues surrounding the topic "Green World Expo" were discussed among influential participants who brought forward many valuable proposals.

November 23rd 2007

Shanghai Municipal Government issued The 11th Five-Year Plan of Shanghai on Environmental Protection and Ecological Reconstruction, which identifies the framework to achieve the target of building an environmentally-friendly city by 2010 and welcoming the Expo with sound environmental quality.

January 15th 2008

SEPB, Bureau of Shanghai World Expo Coordination and UNEP jointly organized to draw up a Green Guide for Expo 2010 Shanghai China. This project was collaboratively undertaken by Shanghai Academy of Environmental Sciences and German Eco-Institute.

April 3rd 2008

Mr. Sun Jian, Deputy Director-general of SEPB, with other staffs thereof visited Bureau of Shanghai World Expo Coordination to discuss with Deputy Director-general Mr. Huang Jianzhi on enforcement of Expo environmental protection.

April 8th 2008

Mr. Hong Hao, Deputy Secretary-general of the Shanghai Municipal Government and Director-general of Bureau of Shanghai World Expo Coordination, was invited to deliver a special lecture on World Expo in Shanghai Science Hall. This was one among a series of activities in "Welcome to World Expo and Build a National Model City for Environmental Protection" campaign launched by SEPB.

April 25th 2008

Bureau of Shanghai World Expo Coordination, Shanghai World Expo Land Holding Co., Ltd and Italian Ministero dell'Ambiente e della Tutela del Territorio e del Mare (IMELS) signed the Agreement on Donation and Dedication to Design and Environmental Reconstruction of Old Factory Buildings in Urban Best Practices Area (UBPA) of World Expo Shanghai. IMELS would provide financial aid to the reconstruction project of old factory buildings in UBPA.

May 8th 2008

Mr. Zhang Quan, Director-general of SEPB, presided over a special meeting to discuss about the preparation of the 4th Round of Shanghai Three-Year Environmental Action Plan as well as environmental renew work for the 600 days before the Expo.

May 29th 2008

Mr. Hong Hao, Deputy Secretary-general of the Shanghai Municipal Government and Director-general of Bureau of Shanghai World Expo Coordination, met Mr. Wang Zhijia, Deputy Director of DRC. UNEP, to discuss about cooperation issues of environmental protection during Expo 2010 and planned to sign a memorandum of understanding thereof.

May 30th 2008

To welcome Expo 2010 Shanghai and to press ahead with the work to build a National Model City for Environmental Protection (NMCEP), SEPB and Shanghai Society of Environmental Science held a "Welcome World Expo and Build a NMCEP" forum in Shanghai Science Hall. More than 80 representatives attended this forum who were from Ministry of Environmental Protection (MEP), related commissions, offices and bureaus of Shanghai Municipal Government, environmental protection bureaus at district/county level and large-scaled enterprises.

June 5th 2008

In the 37th World Environment Day(WED), UN defined the theme as "CO2, Kick the Habit! Towards a Low Carbon Economy". MEP defined the Chinese theme of WED as "Green Olympic and Environmentally-Friendly Society". The publicity theme of Shanghai is "Welcome World Expo and Build a National Model City for Environmental Protection (NMCEP)".

July 11th 2008

Shanghai officially issued Action Programme for Strengthening City Appearance, Environmental Construction and Management for the 600-day Countdown to the Shanghai Expo, in line with the target of "Better Environment, Better Life".

August 5th 2008

The Center of Expo 2010 Shanghai China was awarded with "Green Architectural Design Label" issued by Ministry of Housing and Urban-Rural Development.

September 10th 2008

The first material exhibition case for World Expo "Shanghai Eco-Home" was commenced to construct in the Urban Best Practices Area (UBPA).

September 11th 2008

SEPB hold a press conference in which Director-general Mr. Zhang Quan introduced the progress made so far and present situations on relevant work as well as major issues in environmental protection.

November 27th 2008

SEPB initialized research project on Supporting Measures for Sound Environmental Quality for Expo 2010 Shanghai China during Expo 2010 which focused on formulating rational and effective supporting measures to guarantee sound environmental quality for Expo 2010 Shanghai China.

December 7th 2008

Bureau of Shanghai World Expo Coordination and SEPB jointly issued Announcements on Strengthening Ozone Layer Protection during Preparation and Staging of Expo 2010 Shanghai China.

December 12th 2008

Shanghai organized an International Consultation Symposium on Environment and Development by inviting environmental experts from home and abroad. Attendants provided valuable assessment and strategic recommendations for the theme "Expo 2010 Shanghai vs. Environmentally-Friendly City" in the concerned areas of urban ecology, environmental infrastructure and urban security, industrial development and environmental protection, sustainable urban transportation and public participation etc al.

December 19th 2008

Shanghai Environmentally-Friendly City Initiatives (EFCI) organized and held the Green Expo Symposium. Leaders and experts from SEPB, Bureau of Shanghai World Expo Coordination, Shanghai Academy of Environmental Science, Shanghai Environmental Monitoring Center and Shanghai Jiao Tong University attended the forum and contributed valuable ideas and recommendations to Green Expo.

December 28th 2008

"Topping out" ceremony of Theme Pavilion was held in the Expo Park. Mr. Hong Hao, Deputy Secretary-general of the Shanghai Municipal Government and Director-general of Bureau of Shanghai World Expo Coordination, hosted the ceremony. Leaders from Bureau of Shanghai World Expo Coordination, Shanghai World Expo (Group) Co., Ltd. as well as Shanghai Construction Groups and Shanghai Baosteel Metallurgical Construction Corporation attended the ceremony.

December 30th 2008

China Pavilion of Shanghai World Expo helded its "topping out" ceremony. Ms. Zhong Yanqun, Deputy Director of Executive Committee of Expo 2010 Shanghai China and CPC Secretary of Bureau of Shanghai World Expo Coordination, hosted the ceremony. Mr. Hong Hao, Deputy Secretary-general of the Shanghai Municipal Government and Director-general of Bureau of Shanghai World Expo Coordination, attended and addressed the ceremony.

January 8th 2009

Approved by the State Council, National Stage IV Emission Standard for Motor Vehicles would be effective from November 1st of 2009 in Shanghai in advance on all newly registered light gasoline vehicles as well as vehicles used in public transit, sanitation, postal service and municipal construction,.

January 15th 2009

SEPB and Bureau of Shanghai World Expo Coordination jointly held the first session of environmental advisory committee for Expo 2010 Shanghai in Hongqiao Hotel. The advisory committee includes members such as Academicians Tang Xiaoyan, Hao Jiming and Qian Yi, Dr. Liao Xiudong, Professor Zhu Dajian, Messrs. Shi Hanmin, Yu Xiaoxuan, Corrado Clini, Dan Dudek, Michael Walsh and James Lents, et al.

January 15th 2009

SEPB and US Energy Foundation signed Cooperation Memorandum on implementing management solutions of low-carbon and clean air quality for World Expo as well as for middle and long term practice. Mr. Zhang Quan, Director-general of Shanghai Environmental Protection Bureau, and Mr. Qi Ye, Deputy Director of China Sustainable Energy Project of Energy Foundation, signed this agreement on behalf of respective parties. The agreement stated cooperation framework, model and organizational structure in future 2-3 years.

February 25th 2009

Shanghai Municipal Government held a meeting to press ahead to build a National Model City for Environmental Protection and initiate the 4th round of Shanghai Three-Year Environmental Action Plan. It aims to keep Shanghai's leading position in China in the effort to protect environment and ensure good environment quality for successfully staging Expo 2010 Shanghai and to lay a solid foundation for the 12th Five-Year Plan and future development.

March 18th 2009

Bureau of Shanghai World Expo Coordination signed a Memorandum of Understanding with UNEP to strengthen the cooperation in environmental protection work during Expo 2010 Shanghai.

March 28th 2009

All sectors of society in Shanghai enthusiastically responded to the "Earth Hour" initiated by the World Wildlife Fund (WWF). Landscape lighting of more than 160 landmarks in Shanghai including Oriental Pearl Broadcasting and TV Tower and Shanghai Municipal Government Building were turned off for one hour.

May 5th 2009

SEPB, Bureau of Shanghai World Expo Coordination and American Environmental Association jointly hosted the launching ceremony and press conference for "2010 Expo Green Commuting Program". Mr. Hong Hao, Deputy Secretary-general of the Shanghai Municipal Government and Director-general of Bureau of Shanghai World Expo Coordination, awarded a Letter of Appointment of "2010 Expo Green Commuting Ambassador" to Miss Zhou Xun, Chinese famous film star and UN Goodwill Ambassador, Mr. Zhang Quan Director-general of SEPB, and Mr. Hu Jingjun, Deputy Director-general of Bureau of Shanghai World Expo Coordination, were present at the launching ceremony.

June 4th 2009

Bureau of Shanghai World Expo Coordination and UNEP jointly issued Green Guide for Expo 2010 Shanghai China, which was published both in Chinese and English and distributed through both the global news network of UNEP and official website of World Expo Shanghai.

June 5th 2009

Shanghai Afforestation Committee launched the initiative of "Afforestation in Shanghai by Everybody to Welcome World Expo". It aims to mobilize citizens to participate in action to plant green, love green, protect green and cultivate green. This measure has vividly demonstrated the theme of World Expo 2010 "Better City, Better Life" and also actively responded to the global "Billion Tree Campaign" advocated by the UNEP. Leaders from Bureau of Shanghai World Expo Coordination, Zhabei District Government, UNEP, SEPB and Shanghai Municipal Afforestation and Environmental Sanitation Administration planted trees in Zhongxing Road Green Space together with local residents.