

**Managing Organizations' Waste under the Environmental Policies for  
Reaching Sustainable Development in China  
(Case study: Sinopec Shanghai Petrochemical Company Limited "SPC")**

Bouanini Samiha And Fu Chuan

**International Exchange College, Nanchang University, China**

E-mail: bs\_miha@yahoo.com

ccfu@ncu.edu.cn

**Abstract.** The world economic is competing to reach sustainable development, which is a balance between economic development, social equity and environmental sustainability. However this approach can be achieved by following laws and regulations to protect the environment and provide a healthy environment for the long-run.

There are several factors that affect negatively the environment and thus may have negative effects on community and at the same time may hinder the well-being and sustainable development.

This research will focus on waste management that aims to maximize practical benefits from products and to generate the minimum amount of waste.

All industries, all communities, and all countries must ensure compliance with waste management laws and regulations, and Effective waste management helps to ensure the long term sustainability. Waste management in its different types whether solid, liquid, gaseous or radioactive; from different sources should be accomplished to reduce the harmful environmental impacts through different methods: reduction, re-use, recycling, recovery, treatment and disposal.

Waste management practices differ for developed and developing nations, for urban and rural areas, and for residential and industrial producers. And "Zero waste" seems to be a difficult but not impossible task. If various options for waste management can be integrated and applied over long periods, waste minimization can be addressed effectively and sustainably.

With the economic development in China, the quantity of waste increased, however the control of waste pollution is an important aspect of environmental protection in China and the government has set policies for governing and controlling waste management

This research will focus also on Sinopec Shanghai Petrochemical Company Limited "SPC", which is a petrochemical conglomerate with highly integrated production and operations of petroleum products, petrochemicals, synthetic fibers and plastics, also the first one in Sinopec to have been rationalized under joint-stock system. An essential link in the Company's development plan is to balance the relation between production development and environmental protection in line with the national restriction in the discharge of pollutants so as to implement the sustainable development strategy.

**Key words:** Sustainable Development, Environmental Recovery, Waste Management, China, Sinopec Shanghai Petrochemical Company Limited "SPC".

## **1. Introduction**

With rapid economic growth and massive urbanization, the world is facing environmental pollution, and no country has ever seen as larger or as rapid an increase in waste generation as China is seeing at the present time. Under environmental policies, Chinese government has identified a set of laws and regulations to find a suitable solution in order to reduce waste and to regulate the behavior of humans and economic organizations. Proper disposal of waste is necessity to minimize environmental health impacts and degradation of land resources. Systematic disposal methods are composting, landfilling and incineration. This article provides an overview of managing organization's waste according to the environmental policies in China, to reach the most important goals such as sustainable development, and discussing the waste treatment and disposal in Sinopec Shanghai Petrochemical Company Limited "SPC as a case study in China. For that first; we take a brief look on sustainable development, and the waste management for environmental prevention that help to reach sustainable development in China.

## **2. Literature review**

### **2.1 Background**

In East Asia and Latin America, openness to trade, knowledge, and technological development have been important factors in economic growth. However this rapid growth has been accompanied by negative effects on society and especially on the environment. At the same time the world economy is competing to reach sustainable development, which calls for environmental prevention. During 1950s, there were no federal, state or local government departments responsible for environmental management. Therefore the accepted

phrase for the main task of environmental managers since 1987 has been sustainable development, this later understood to be a balance between economic development, social equity and environmental sustainability. The world commission on environment and development "WCED" (1987) defined sustainable development as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The term sustainable development is an increase in well-being today that should not have as its consequences a reduction in well-being tomorrow (Edward B. Barbier, 2007). This term was also coined as part of an effort to bring environmental issues into the main stream of development. And human beings are at the centre of concerns for sustainable development (Yasmin von Schirnding, 2005). An organization can contribute to sustainable development by delivering simultaneously economic, social, and environmental benefits (Hart and Milstein, 2003). Therefore sustainable development is often framed as a social issue to which corporations should pay attention because it offers both opportunities and challenges (Luis Fernando Escobar and Harrie Vredenburg, 2010). However sustainable development is possible; once the power of market-based environmental regulation is recognized (Jon Hovi, Arild Underbal and Hugh Ward, 2011).

Environmental and natural resources must be managed efficiently so that the welfare losses from environmental damages are minimized and any resource rents earned after internalizing environmental externalities are maximized (Edward B. Barbier, 2007). The need to increase our understanding of how we interact with our environment is fundamental learning step toward more sustainable environmental management, we wash our hands with little awareness of the catchments from which the water comes and where the waste water will go, and we turn on the heating, lights and television with little concern about the flows of energy we induce or how they were generated (Meg Keen, Valerie A Brown and Rod Dyball, 2005), we create smoke emissions from vehicles, factories and cigarettes that they are difficult to avoid. So as Thomas Sterner (2003) said "if there were private ownership of the air, then people would have to buy the right to pollute it with smoke for example. So in this way people will reduce the consumption of smoking. Therefore all environmental problems could be solved if property rights to all relevant resources (including water ways, the atmosphere, and various attributes of land-biodiversity, minerals, water, air space...etc) were to be separately and privately allocated. Therefore the importance of environmental policies is to regulate the

behavior of humans and economic organizations by setting a clear overall goal such as "zero emissions" (Jeroen C.J.M von den Bergh, 2007)

There are several factors that affect negatively the environment and thus may have negative effects on community and at the same time may hinder the well-being and sustainable development. However there is a practical advice to undertake the environmental recovery assessment by several ways. Firstly; energy conservation strategies "energy efficiency" which is a serious problem for developing countries, however it is less saturated in developed countries. Secondly; a good and favorable water management. Thirdly; monitoring air quality and mitigation of traffic originated pollution. And finally integrated waste management, and realizing waste management systems.

This research will focus on the last instruments, which is waste management that aims to maximize practical benefits from products and to generate the minimum amount of waste. Moreover, it is specified on the management of waste produced by organizations and manufactories which is called industrial waste management.

## **2.2 waste management in china**

In all of the history, no country has ever seen as larger or as rapid an increase in waste generation as China is seeing at the present time. China has been unable to keep up with the increasing demand for waste management (Wen Xin Zhang, Peter Roberts; 2007). With the economic development in China, the quantity of waste increased, and the driving forces behind that are urbanization, urban population growth, and increasing affluence. Waste management is an integral part of the urban environment and planning of the urban infrastructure to ensure a safe and healthy human environment while considering the promotion of sustainable economic growth (C. Visvanathan and J. Trankler 2009). The control of waste pollution is an important aspect of environmental protection in China. As a result, not only have land resources been wasted, but also there is large scale pollution of the atmosphere, water and soil.

According to Sarah Edmonds (2008), in many places in China, waste management is the "underdog" of Chinese environmental policies. Although the environmental question has definitely gained in importance, it nevertheless remains subordinate to the economic imperatives. This obviously contributes to a certain failure in waste management. The World Expo hosted by Shanghai city

in 2010 is also a major incentive to concentrate on environmental issues, following in the lines of the expo's theme "Better City, Better Life" thus conforming to the idea of an "Ecological World Expo" (Sarah Edmonds, 2008). Based on the statistics of the National Development and Reform Commission, during the Twelfth Five-Year Plan (2011-2015), it is expected that government funding for environmental protection will reach 3.1 trillion Yuan. For solid waste, disposal industry will reach 800 billion Yuan, The Chinese government is gearing up funding for environmental protection; its goals are to promote the scientific development, speed up the resource-saving and environment-friendly society.

### **3. Data and Methodology**

This research paper is catching different data from the specified books, journals and documents, in addition; depending on the Ministry of Construction of P.R.C, Ministry of Environmental Protection of P.R.C, and compiling databases in order to analyze the organization's waste management in China. This research target is to shed light on the following questions: what is the waste produced from organizations and manufactories? How the Chinese government deals with industrial waste? Are there some methods that Chinese state follows? As SINOPEC Shanghai Petrochemical Company Limited "SPC" is the case study of this research; so is there an importance of waste management in this company? How this company deals with the treatment of waste? To find the compatible answers for these questions, we should provide enough information to analyze this situation.

#### **3.1 Waste Management Hierarchy**

Waste management is first to reduce waste generation, and separate potential recyclables at source to improve the quality of materials for reuse, including organics for composting or anaerobic digestion. Reducing waste can make an important contribution to achieving sustainability. We can reduce waste by meeting our needs using fewer natural resources, and by re-using products and recycling the materials in them (defra, 2009). What cannot be reduced should be reused if possible. What cannot be reused or reduced should be recycled,

particularly secondary materials such as metal and paper. Wastes that cannot be recycled should be recovered, usually through bacteriological decomposition. Landfilling is always cheaper than composting and incineration (World Bank, 2005). Reduce-Recycle-Reuse becomes more active in China in natural resource development and uses (Zhou Guomei, 2006). With the high pressure on natural resources in China's socio-economic development, by the end of 2005, there were 23,512 enterprises engaged in the 3R industry in China (Liu Chuang, Yu Bohua, Liu Xiangqun, 2006). All wastes should be managed in accordance with the waste hierarchy, which is one of the principles of environmental protection (EPA Victoria, 2010), and the benefits from applying waste hierarchy are both environmental and economic.

**Figure 1:** Waste Management Hierarchy



Source: World Bank, 2005

## **Recycling**

Although the state does sponsor some kind of recycling industry, the private and informal activities constitute the most important mode of recycling. That is because the informal waste picker relies on this recycling to resell the materials and make a living. As such, every thinkable material is collected, from papers to plastic, electric appliances to metals, and everything else in between. Household wastes are reused as fertilizer or incinerated to produce electricity. Industrial wastes are turned into construction materials, and hazardous wastes are turned into raw materials

again (Sarah Edmonds, 2008). In 2008 China's recycling rates was lower than other countries, because the secondary materials market in China was affected by several factors such as value to the recycler. During the 2006-2010 period; China recycled 3.6 billion tons of solid waste (China Daily, 2012). China's target is to realize 50% recycling of waste paper by 2030, over 38 million tons of waste paper could be diverted from disposal (FINPRO, 2008).

### **Composting**

Composting is an integral part of the waste processing and disposal systems (C. Visvanathan and J. Trankler, 2009). Composting is a viable option in China because over 50% of the waste stream consists of bio degradable organics. However, composting efforts have been hindered by improper separation of glass, plastic and other chemicals from the compost feed. In small operations that have been experimented with so far, the compost product has been of limited value, discouraging further composting activities.

### **Landfilling**

Landfilling is the most common method of solid waste disposal in china. At the end of 2005, there were 372 active landfills, in 661 cities in china, and then in 2006 it decreased to 324 active landfills in 656 cities. In 2007, landfill gas-to-electricity (LFG) projects were underway in Hangzhou, Guangzhou, Nanjing, Xian, Beijing, Changsha, Wuxi and Jinan. By the end of 2007, 18 LFG utilization projects had been completed and commissioned throughout mainland China (Xu Haiyun, 2011). The municipal government reportedly said that in 2011, 80% of waste from Beijing is sent to landfill. They provide high risk of contamination to surrounding land and water, and also, the methane produced by the fermentation of the wastes threatens the quality of air. So in recent years, Chinese cities are reducing landfills and making more interest to incineration by building waste incinerators, aiming to burn the trash while producing electricity.

### **Incineration**

Incineration of the solid takes a low profile in the waste disposal system. Waste-to-energy (incineration) facilities have become the preferred disposal option in many Chinese cities. In 2007 there were 66 WTE plants in China, and the Chinese WTE capacity has reached 14 million tons (Nickolas Themelis, Zhixiao Zhang, 2010). Incineration has several benefits such as great volume reduction and destruction of pathogens, but is constrained by high capital cost and potential toxic air emissions if poorly designed. Incineration reduces the volume of waste by 90%, and 80% of its weight. Furthermore it reduces the toxicity of the wastes that will then be put in landfills, and offer the opportunity to use the energy contained in the waste.

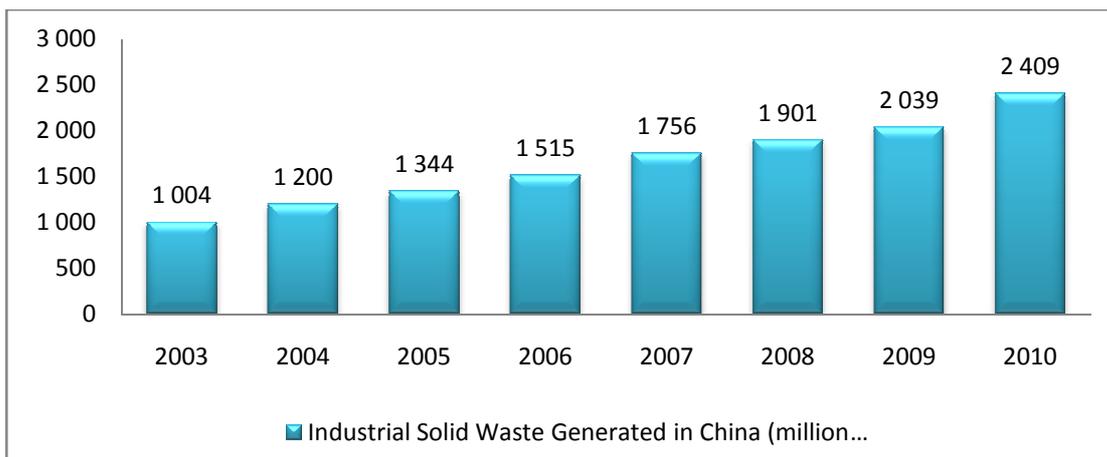
The important goal of waste management is to protect the health of the urban population and to promote environmental conditions by controlling pollution (including water, air, soil and cross media pollution) and ensuring the sustainability of ecosystems in the urban regions.

### **3.2 Industrial Waste**

Industries are a major cause for environmental pollution (Nandakumar, 2012) Industrial waste is defined as waste generated by manufacturing, industrial processes, or trade activities or from laboratories. The types of industrial waste generated include cafeteria garbage, dirt and gravel; masonry and concrete, scrap metals, trash, oil, solvents, chemicals, weed grass and trees, wood and scrap lumber, and similar wastes. Industrial waste- which may be solid, liquid or gases- is divided into hazardous and non-hazardous waste. Hazardous waste may result from manufacturing or other industrial processes, non-hazardous industrial waste are those that do not meet the definition of hazardous waste. The industrial solid waste generated in China has increased annually, and it reached 2,409 million tons in 2010. And the figure bellow shows more details for different years.

**Figure 2:** Industrial Solid Waste Generated in China (2003-2010)

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Source: National Bureau of Statistics of China; ResearchInChina, 2011

Industrial waste has been a problem since the industrial revolution; this waste can pose dangerous health and environmental consequences. According to the types of waste it generates, it can be classified as industries causing air and water pollution, and industries producing solid wastes (Nandakumar, 2012). And the table bellow shows some examples of hazardous waste generated by different industries and businesses.

**Table 1:** examples of hazardous waste generated by industries and businesses

Waste Generator	Waste Types
Chemical Manufacturers	Acids And Bases Spent Solvents Reactive Waste Wastewater Containing Organic Constituents
Printing Industry	Heavy Metal Solutions Waste Inks Solvents Ink Sludges Containing

	Heavy Metals
Petroleum Refining Industry	Wastewater Containing Benzene and Other Hydrocarbons Sludge From Refining Process
Leather Products Manufacturing	Toluene and Benzene
Paper Industry	Paint Waste Containing Heavy Metals Ignitable Solvents
Construction Industry	Ignitable Paint Waste Spent Solvents Strong Acids and Bases
Metal Manufacturing	Sludges Containing Heavy Metals Cyanide Waste Paint Waste

Source: Environmental Protection Agency "EPA", 1986

### 3.3 Environmental Policies

For environmental prevention, China has comprehensive set of policies governing and controlling waste management and Chinese government calls for "a cleaner environment". The current policy system can be divided into three different levels, namely: regulations, laws and documents issued by the State Administrative, regulations and documents issued by related ministries of central government, local laws and regulations issued by local governments. In 1979, an environmental law was: "in cases where the discharge of pollutants exceeds the limit set by the state, a compensation fee shall be charged according to the quantities and concentration of the pollutants released" (Article 18 of the China's Environmental Protection Law). Almost immediately, a few municipalities began to enforce the regulation, and in 1982, the state council called for a nationwide implementation and in 1994, more than 19 Billion Yuan had been collected from environmental levies (NEPA 1994). Researchers who studied the rate of industrial emissions per unit of output for chemical oxygen demand (COD) and the effective water pollution charge for 29 Chinese provinces and urban regions between 1987 and 1993 claim that the environmental fee has had positive effects (Wang and Wheeler 1996). The law of the P.R.C. on Prevention and Control of Solid Waste Pollution issued in 1995 is the basic and most important law with regards to solid waste management, which formulates basic requirements for dumping, cleaning up, collection, transportation, recycling, treatment and disposal.

This law was revised in December 2004 and the new version becomes effective on April 1<sup>st</sup>, 2005. In addition, some related regulations and standards have already been formulated by the State Council, the Ministry of Construction, State Environmental Protection Administration, State Development Planning Commission "SDPC", State Environmental Protection Administration "SEPA", Ministry of Finance "MOF", and the Ministry of Environmental Protection ...etc. some examples are: City appearance and environmental sanitary management ordinance 1992, Law on Prevention and Control of Environmental Pollution Caused by Solid Waste of PRC 1996, Comments on the Promoting of Industrialization of Municipal Waste Water Treatment and Municipal Solid Waste Treatment 2002, and National Catalogue of Hazardous Wastes 2008...etc. The appendix of waste control laws and regulation in china made according to Samantha Jones (2007) and other information collected from FINPRO (2008), The Ministry of Construction of P.R.C. Ministry of Environmental Protection and the State Environmental Protection, shows more laws and regulations with more detail.

## **4. Empirical Analysis**

### **4.1 Sinopec Shanghai Petrochemical Company Overview**

The company was founded in 1972. It formerly known as Shanghai Petrochemical Company Limited and changed its name to Sinopec Shanghai Petrochemical Company Limited "SPC" in 2000 (Market Publishers, 2012). It is engaged in petroleum and chemical industries in China. It is one of the subsidiaries of China Petroleum and Chemical Corporation (Sinopec Corp), also the first one in Sinopec to have been rationalized under joint-stock system. The company's major products are petroleum products, resin and plastic products, intermediate petrochemical products and synthetic fibers, including gasoline, diesel oil, aviation kerosene, ethylene, propylene, pure benzene, butadiene, epoxy ethane, polyester chips, polypropylene and acrylic fibers, among others. The company distributes its products in domestic and overseas markets, with East China as its major markets. As of December 31, 2010, the company has six subsidiaries, which involved in investment management, import and export of petrochemical products and machines, as well as manufacture and distribution of petrochemical products, synthetic fibers and resin products. An essential link in the company's development plan is to balance the relation between production development and environmental protection in line with the national restriction in

the discharge of pollutants so as to implement the sustainable development strategy. Sinopec Shanghai practices an integrated health, safety and environmental protection management (HSE), and it has set up a comprehensive set of HSE regulations, the company's overall HSE guidelines for 2010, is to adopt the scientific outlook on development, uphold the principle of "safety first, prevention foremost, comprehensive management and people first". In 2009, Sinopec Shanghai incorporated the concept of circular economy into production and promoted energy conservation, consumption reduction; water-saving and pollution-minimizing technologies through the whole process of production and operation, and it emphasized water reuse and multi-level usage. In 2010, the company was awarded the title of "Chinese Environmentally Friendly Enterprise" by all-China environmental federation, and in 2011, it won the title of "National Advanced Unit for Petroleum and Chemical Industry Environmental Protection" (Sinopec Shanghai petrochemical company "SPC", 2012).

#### **4.2 waste treatments and disposal in SPC**

Sinopec Shanghai keeps striving to achieve green growth and contribute to clear water, green land and a blue sky. However the oil production and refining process inevitably generates wastewater, waste gas and waste residues (three wastes). Therefore it has been always working on waste control and minimizing emissions, and it has invested a lot in environmental protection. According to the data from SPC' report in 2011; it has built 57sets of wastewater-treatments facilities, 45 sets of waste gas scrubbing facilities, 10 pieces of equipment for waste residue treatment and a 3,800 m<sup>2</sup> temporary stack-yard for chemical waste. The discharge of the three wastes of the company has reached the national standard, and there is no severe pollution or ecology-destructive accidents because of the scientific overall environmental protection planning, reasonable layout and the strengthening of the three simultaneities management over new reconstruction or extension projects. During the implementation of new, rebuilding, extension and technical alteration projects, rules and regulations including the "regulations on environmental protection in project construction" issued by the state council, the implementation details of environmental protection management in Sinopec's project construction and the methods of environmental protection management for project construction in shanghai have always been observed. As for environmental protection of the Company, three principles are always being followed, that is: the principal of three-level administration and two-level

inspection, the principal of influence of clean and waste water, and the principal of "Checking by Every Level and Disposing by Different Levels". The Company's 2nd-grade waste water treatment facilities are able to treat waste water of 190,000 tons per day. The discharge of all kinds of waste gases is nearly 20 million cubic meters. The waste gases are discharged into the atmosphere after burning through 38 chimneys, 40 exhaust pipes and 8 flares. The annual discharge of waste water is 150 million tons in total from all production units, i.e., 0.41 million tons per day (including directly discharged cooling sea water and domestic sewage). The waste water is pumped to the Hangzhou Bay through the new and old Suitang River Pump Stations, among which about 44.80 million tons have been treated in Water Purification Plant annually. The total solid wastes produced in the process of production are 325,000 tons, among which 286,800 tons, or 88.15%, are fly ash of Thermal Power Plant, and 38,200 tons are other kinds of solid wastes. All the solid wastes, except those being utilized comprehensively, are treated in legal ways. The waste gas treatment is equipped with acidic steam scrubbing plants, sulfur recovery plant with an annual yield of 80,000 tons and CFB desulfurization plant, with a desulfurization rate of more than 90%. In order to meet the standard for waste water discharge, the Company invested a lot in the rectification of pollution and improvement of environmental prevention. To further reduce the total discharge of sulfur dioxide so as to improve the quality of atmospheric environment, the Company reinforced the management of flue gas desulfurization of Thermal Power Plant. Sinopec always concerns itself with environmental protection, pursues clean production, produces clean products, strengthens waste control, waste reduction, and actively develops recycling economy in order to become a greener company. In general; Sinopec Shanghai deals with their three wastes by treating, recycling, and the most important is by reducing.

## **5. Conclusions and Recommendations**

Recently china is facing the dilemma of combining fast economic growth with sustainable development and environmental conservation. The process of economic growth has been exerting increasing pressure on the ecological carrying capacity of the country. China has preliminarily set up its environmental protection system, although not very completed. The basic laws and regulations of the People's Republic of China on Environmental Protection are very important for guiding to prevention and control of waste pollution, however all

country' members should follow these laws and regulations for helping to reach these goals. The industries and manufactories are the major cause for environmental pollution; however there are some manufactories that aim to prevent the environment by following different ways in environmental protection. Therefore Sinopec Shanghai is dedicated to operate in strict compliance with national laws, rules and regulations, standards and policies, practicing a sustainable growth strategy and pursuing coordinated economic and ecological development, promoting clean production to deliver their promises to the public. The company commits itself to corporate social responsibilities and set up a good corporate, it emphasized environmental protection management on projects under-construction, and sized critical work in environmental protection. The best way to improve the future situation of the environment is to reduce the waste as possible. As a recommendation for all countries; manufactories should put more emphasis on: waste prevention and re-use, reduce and cut the amount of waste by more sustainable design production, purchasing and use as well as reuse of products and materials, promote clean production, and balance the relation between production development and environmental protection. Moreover governments should encourage and advice businesses to design and manage products more sustainably, and set a stable and clearly communicated policy framework for the long term to encourage environmental prevention and improve sustainability, and create more fees for waste minimization.

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## Appendix

<b>Laws and Regulations</b>	<b>Brief Description</b>	<b>Issuer</b>	<b>Effective</b>
City Appearance and Environmental Sanitary Management Ordinance	Includes regulations on municipal solid waste and public latrines.	The State Council	August 1, 1992
Regulations Regarding Municipal Residential Solid Waste	Regulates waste collection, transfers and treatment.	The Ministry of Construction of P.R.C	September 1, 1993
Circular of the General Office of the State Council on the Strict Control on Transboundary Movements of Foreign Waste to China	In order to protect the environment, it is forbidden to consider China as a storehouse where foreign waste may be dumped or piled therefore firm measures shall be adopted to stop such actions.	General Office of the State Council	November 7, 1995
Law on Prevention and Control of Environmental Pollution Caused by Solid Waste of PRC	First law to regulate the management of municipal solid waste.	The Standing Committee of the National People's Congress	April 1, 1996
Measures on the Management of Duplicated Form for the Transfer of Hazardous Waste.	Regulations regarding the registration, generation and transfer of hazardous solid waste.	State Environmental Protection Administration	1998
Measures on Duplicated Form for Transfer of Hazardous Wastes Measures on the Management of Hazardous Waste	The Measures on the Management of Hazardous Waste Manifests was adopted upon the discussion at the Executive Session of the State Environmental Protection Administration.	State Environmental Protection Administration	October, 1, 1999
Ban on Importation of Electronic Waste	Ban includes scrap computers, panel displays, kinescopes and is updated yearly.	Ministry of Commerce, General Administration of Customs and SEPA	January 26, 2000
Technical Policies on the Disposal of Domestic Waste and the Prevention of Pollution	Including technology standards for treatment of municipal solid waste.	The Ministry of Construction of P.R.C	June, 2000
Technical Policies on the Treatment and Pollution Prevention of Hazardous Waste	Guidance and standards of the technologies applied in hazardous waste treatment	State Environmental Protection Administration	December 2001
Comments on the Promoting of Industrialization of Municipal Waste Water Treatment and Municipal Solid Waste Treatment	Promotion of investment in these industries to improve waste disposal in urban areas.	State Development & Planning Committee, The Ministry of Construction, the State Environmental Protection Administration	September, 2002

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Law for Promotion of Cleaner Production of P.R.C	Reducing pollution (including waste creation) throughout the manufacturing process by creating incentives for industries.	The Standing Committee of the National People's Congress	January 1, 2003
Plan to Construct Facilities to Dispose of Hazardous Waste and Medical Waste Nationwide	Committed 14.92 billion RMB over 3 years to build 31 dangerous disposal centers with an annual capacity of 2.82 million tons	State Development Planning Commission (SDPC), SEPA, the Ministry of Finance (MOF), the Ministry of Construction	June, 2003
Law for Environment Impact Assessment of P.R.C	Requires infrastructure and new industry construction to complete EIA that is open to public review. If enforced the increased transparency could potentially help improve waste practices in new industries and landfills.	The Standing Committee of the National People's Congress	September 1, 2003
Circular on Earnestly Accomplishing Environmental Pollution Prevention Work in the Enterprise Relocation Process	This SEPA Circular recommends that enterprises shutting down a facility that generates or handles hazardous wastes, or changing the nature of the land-use activity at the site of such a facility, should obtain site soil and groundwater contamination reports from the local government environmental monitoring stations, submit such reports to local environmental authorities for review, and develop remediation plans based on the findings in the reports.	State Environmental Protection Administration	2004
Law on Prevention and Control of Environmental Pollution Caused by Solid Waste of P.R.C	China's first comprehensive law on solid waste. Laid framework for setting standards for solid waste storage and disposal, pollution control for landfills for hazardous wastes, discharge standards for livestock, and medical waste incineration and transport. 2004	The Standing Committee of the National People's Congress	First passed 1995 and revised on December 29, 2004 and became effective on April 1 <sup>st</sup> , 2005

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	amendment tightened control imports of foreign garbage.		
Regulation to Standardize Disposal of Dangerous and Medical Wastes	Gives citizens right to complain about improper disposal of medical wastes. Allocated 14.92 billion RMB over 3 years to help build 31 dangerous disposal centers with an annual capacity of 2.82 million tons. Required Chinese enterprises to build other centers with a total annual capacity of 3.5 million tons.	National Development and Reform Commission, SEPA, Ministries of Finance and Construction	Passed in June 2003, requirements met by June 2005
Management Methods for Controlling Pollution by Electronic Information Products (a.k.a. China RoHS)	Limits six hazardous substances in the production of electronics—lead, mercury, hexavalent chromium, cadmium, polybrominated biphenyl flame retardants and polybrominated diphenyl ether flame retardants.	Ministry of Information Industry	March 1, 2007
Circular on List of Institutes for Identification of Solid Waste Attributes and Identification Procedures	The list of institutes for identification of solid waste attributes and identification procedures (provisional) is hereby issued for the purpose of implementing the Law of People's Republic of China on Prevention and Control of Pollution by Solid Wastes, strengthening environmental management of solid wastes and regulating identification of solid wastes	Ministry of Environmental Protection of P.R.C	Apr, 2008

**Waste Control Laws and Regulation in China**

**Managing Organizations' Waste under the Environmental Policies for Reaching Sustainable Development in China  
(Case study: Sinopec Shanghai Petrochemical Company Limited "SPC")**

National Catalogue of Hazardous Wastes	Solid and liquid waste with one of the following situations are included in the current catalogue (1) having one or several hazardous characteristics such as toxicity, combustibility, reactivity, or infection. (2) those waste not excluding hazardous	Ministry of Environmental Protection of P.R.C	Aug. 1, 2008
"Catalogue of Solid Waste Forbidden to Import in China", "Catalogue of Restricted Import Solid Wastes that Can Be Used as Raw Materials in China", and "Catalogue of Automatic-Licensing Import Solid Wastes that Can Be Used as Raw Materials in China".	This standard is one of the standards targeted for the environmental protection of imported solid wastes	State Environmental Protection Administration, Ministry of Commerce of the People's Republic of China, National Development and Reform Commission, General Administration of Customs, General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China	Placed in 1996 and revised 11, 2008
Imports of solid waste management practices	Regulate the import of solid waste environmental management to prevent the import of solid waste pollution according to solid waste pollution prevention laws and relevant law, administrative regulations development of this approach	Ministry of environmental protection  Commerce department  National development and reform commission, general administration of customs	August 1, 2011