China: Water Monitoring Technology and Instruments

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SUMMARY

Like most developing countries, China is putting the lion's share of its environmental investment in water and wastewater treatment. China's wastewater treatment market is large and expanding rapidly. Furthermore, the Chinese government has set the goal to establish an advanced environmental monitoring forecast system during the 11th Five-Year Plan period. Tremendous business opportunities are emerging.

In concert with increasing national infrastructure, China has issued laws, regulations and standards on wastewater online monitoring. Chinese lawmakers are suggesting more severe punishment for enterprises that excessively discharge water pollutants. Such fines are to be assessed according to the amount of monitored pollutant discharge. The operation of the online monitoring equipment is also subject to regular supervision.

In 2008, the Chinese government issued the "The 11th National Plan on Environmental Monitoring and Supervision" in order to establish an overall automatic air quality monitoring system for all the cities, an overall automatic monitoring system for the major rivers and basin, and an automatic system on desert storm and acid settlement and offshore sea areas.

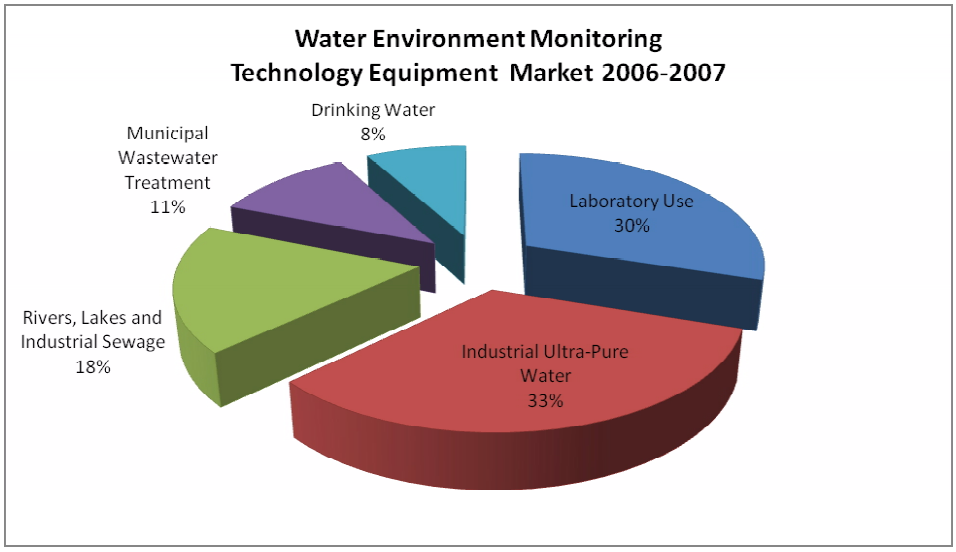
China has begun to establish a basic automatic monitoring environmental system. The three-tiered system is composed of the national, provincial and municipal levels which include over 2,300 monitoring stations and 47,000 professional experts. There are ten national environmental monitoring networks covering the major rivers and basins. These rivers and basins include the Yangtze River, Yellow River, Huai River, Hai River, Pearl River, Liao River, Song Hua River, Tai Lake, Chao Lake and Dian Lake. Those systems generate reports on weekly, monthly and quarterly bases.

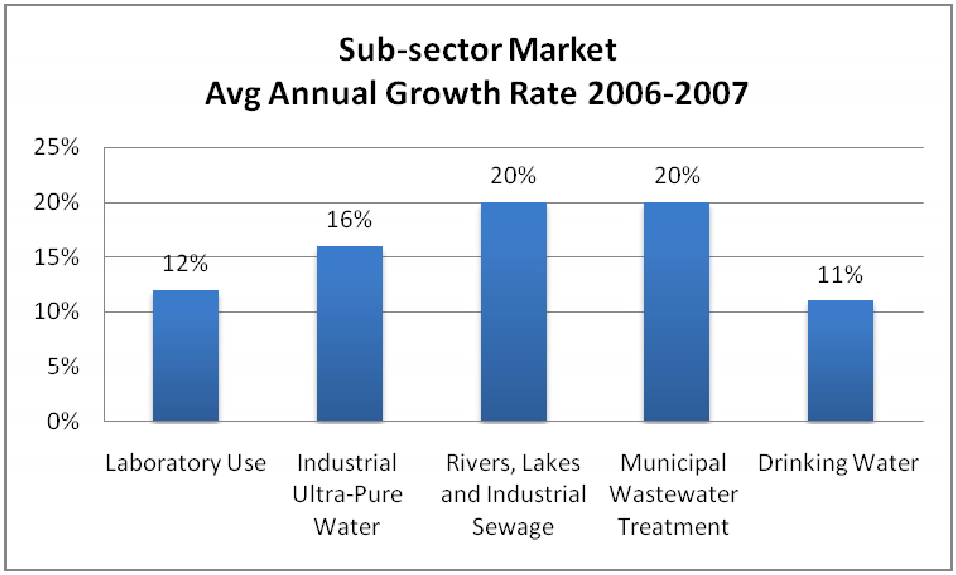
During the 11th Five Year Plan period, it is projected that all key sources of pollution will be equipped with automatic monitoring instruments. Currently, China is moving towards monitoring the pollutant sources of key manufacturers in heavy polluting industries. The major monitored parameters include CODCr, NH3-N, TP, pH, temperature and water flow, all of which are capable of monitoring U.S. products.

MARKET DEMAND

Water quality. At present, polluted water sources, out-dated facilities and poor water quality monitoring are the three major obstacles to ensure quality of drinking water. China continuously produces monitoring, portable monitoring, and large laboratory facilities, but such products are not very advanced and lack in variety and quality. Consequently, China imports high-quality analytical devices, special monitoring devices, and auto-monitoring systems from abroad. At the same time, Chinese monitoring equipment still commands a very high market share in China because of its relatively low price.

Market share. Currently, the water monitoring market is dominated by technology and equipment used for industrial ultra-pure water at 33%, followed by those for laboratory use at 30%. Rivers, lakes, and industrial sewage monitoring technology take an 18% market share. Municipal wastewater treatment and drinking water technology together make up a little less than 20% of the market.





Source: Anonymous industry report

Monitoring technology for rivers, lakes, and industrial sewage and municipal wastewater treatment are the fastest growing sectors at an average annual growth rate of 20%. Other sectors including industrial ultra-pure water, laboratory use, and drinking water have a slightly slower growth of 16%, 12%, and 11% respectively.

Improvements. Effective environmental management begins with improving environmental data collection in both scope and accuracy. Given the necessity of effective environmental management, pollution control and monitoring equipment has great market potential in China. Given the short history and inadequate marketization of the environment monitoring industry, quality of locally produced monitoring equipment is relatively poor.

Chinese Ministry of Health is beginning to establish a comprehensive network monitoring drinking water quality. The network will start from Beijing, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Hunan and Guangdong. The continuing online emissions monitoring equipment (CEM) is an essential component of China's plan of an integrated environmental monitoring network. China will need to introduce high-level automatic online monitoring instruments and relevant computer network technology and equipment in order to achieve its goals.

Ministry of Environmental Protection. With the reorganization of the Ministry of Environmental Protection (MEP) that was upgraded to ministry level in March of 2008 from State Environmental Protection Administration, the ministry has decided to establish a new department specializing in environmental monitoring, demonstrating the government's resolution to strengthen China environmental monitoring capacities.

Through the reform of Chinese government administrative structure, the MEP has focused on macro administration, law, and regulation enforcement. Monitoring has become the main factor in the MEP's administration both in urban and industrial sectors.

The national monitoring network under the MEP consists of over 4,700 monitoring stations. There are an additional 2,000 environmental monitoring stations not associated with the MEP in other industrial sectors. However, all industrial stations are required to share information with the national environmental monitoring system, which is macro-managed by MEP. Environmental Monitoring Stations (EMSs) are independent subsidiaries of the local Environmental Protection Bureaus (EPB) that are responsible for environmental monitoring. The EPB uses the monitoring data to verify the discharge status of facilities.

11th Five Year Plan. In order to reduce major pollutant COD by 10% by 2010 according to the 11th Five Year Plan, MEP required the below measures taken to enhance national water monitoring management:

- By 2010, all urban wastewater treatment plants are required to install automatic online monitoring systems to achieve real-time monitoring of the operation and discharge of plants.
- In order to perfect the early warning system of drinking water sources, monitoring and management of drinking water sources need to be improved. Analysis of monitored results should be conducted at least once a year for centralized drinking water sources.
- Monitoring of key water basins and major projects including the South-to-North Water Transfer Project and Yellow River Xiaolangdi Project should be perfected, and quality monitoring of border rivers including Heilong River, Yalu River and Yili River should be enhanced.
- Full supervision and monitoring of hazardous and toxic sewage sources along rivers and lakes are required. Regular water quality monitoring report system will be established by 2010.
- China will set up a national environment emergency response monitoring network. All provinces, cities and river basins should be equipped with water and air environment emergency monitoring vehicles and equipment, and key sea and river ports should be equipped with emergency response monitoring ships.
- China will step up efforts to build up national automatic surface water monitoring stations with an enhanced focus on monitoring of provincial border rivers and river outlets.
- County monitoring stations should be equipped with regular lab apparatuses. By 2010, 90% of eastern region, 80% of central region and 60% of western region stations should meet national standards.
- On-line automatic monitoring equipment, pollution accident emergency response monitoring technology and equipment as well as remote monitoring systems will see development in preferential areas within the 2006-2010 Five-year plan.

However, implementation of the plan seems to be behind schedule. The year 2007 was the first year to witness the decrease of two primary pollutants COD and SO_2, making it a difficult task for the country to achieve the 10% target within the remaining three years.

In order to meet the 10% decrease goal, China needs to quicken the speed of clean-up, thus bringing about tremendous market demand as well as huge market opportunities for foreign water environment monitoring technologies, equipment and services.

MARKET DATA

Worldwide imports by rank. U.S. companies face stiff competition from Japan, Germany, France and other European countries. However, high-tech U.S. products in this field are of good quality and reasonable price, which should help U.S. producers capture a sizable market share.

Total Imports from the United States to China						**% Share**		**% Change**
HS	Description	2005	2006	2007	2005	2006	2007	07/06
902511	Therm,N Cmbn W O In	0.235069	0.249731	0.632019	1.46	1.01	2.7	153.08
902519	Other	4.359015	7.235088	5.655451	27	29.13	24.2	-21.83
902520	Barom,N Cmbn W O In	0	0	0	0	0	0	0
902580	Hydro thermo pyrometer	4.617388	8.861226	7.613947	28.6	35.68	32.5	-14.08
902590	Parts	6.921312	8.487724	9.509957	42.9	34.18	40.6	12.04
90261000	Instruments/App	74.127644	71.945611	86.87492	100	100	100	20.75
90282000	Liquid Meters	0	0	0	0	0	0	0
90282010	Water Meters	0.023033	0.021159	0.02897	0.8	0.37	0.88	36.92
90282090	Other Liquid Meters	2.844625	5.690538	3.275761	99.2	99.63	99.1	-42.43

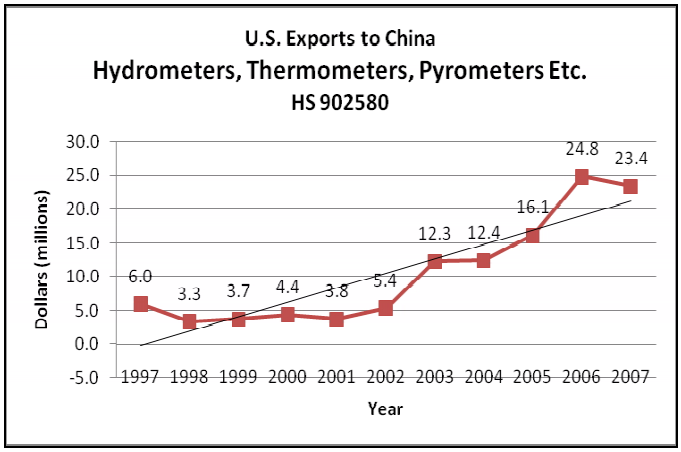
Imports of sample products by country:

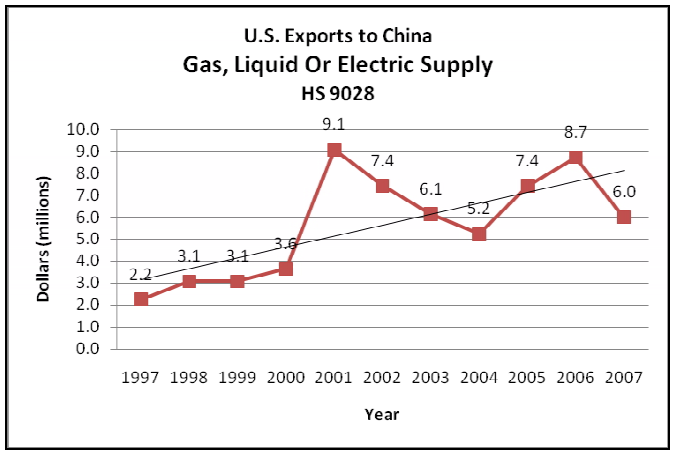
Hydrometers, Thermometers and Pyrometers Imports (HS 902580)						**% Share**		**% Change**
Rank	Country	2005	2006	2007	2005	2006	2007	07/06
1	United States	4.617388	8.861226	7.613947	18.39	33.47	21.56	-14.08
2	Japan	5.655408	5.526159	5.624171	22.53	20.88	15.92	1.77
3	Germany	3.492247	2.588245	4.814448	13.91	9.78	13.63	86.01
4	Italy	0.260789	0.508626	4.504919	1.04	1.92	12.75	785.7
5	Finland	0.796396	0.632703	2.50842	3.17	2.39	7.1	296.46
6	United Kingdom	0.977187	1.884912	2.225088	3.89	7.12	6.3	18.05
7	Taiwan	2.774938	1.086625	1.318968	11.05	4.11	3.73	21.38
8	Singapore	1.01583	0.607708	1.005949	4.05	2.3	2.85	65.53
9	Korea, South	1.335104	1.337173	0.929029	5.32	5.05	2.63	-30.52
10	France	0.327311	0.159727	0.86488	1.3	0.6	2.45	441.47

Water Meters Imports (HS 90282010)						**% Share**		**% Change**
Rank	Country	2005	2006	2007	2005	2006	2007	07/06
1	Germany	0.419897	0.398074	0.888251	36.38	28.55	50.4	123.14
2	Japan	0.349177	0.134232	0.250184	30.25	9.63	14.2	86.38
3	Israel	0.124536	0.138173	0.151505	10.79	9.91	8.6	9.65
4	Denmark	0.00346	0.13823	0.127272	0.3	9.91	7.22	-7.93
5	France	0.102258	0.052461	0.123167	8.86	3.76	6.99	134.78
6	United Kingdom	0.004126	0.066256	0.066391	0.36	4.75	3.77	0.2
7	Taiwan	0.027085	0.089218	0.049813	2.35	6.4	2.83	-44.17
8	United States	0.023033	0.021159	0.02897	2	1.52	1.64	36.92
9	China	0.044403	0.341234	0.018482	3.85	24.47	1.05	-94.58
10	Switzerland	0.000861	0.000913	0.017532	0.08	0.07	1	1820.26

*Dollars in millions
Source: World Trade Atlas

Imports from the United States. Though water monitoring technology and instruments imports from the United States have fluctuated throughout the past decade, it is on a general increasing trend as indicated by the graphs below. Certain products such as hydrometers, thermometers, and pyrometers, have experienced a steady growth this past decade, while others, such as gas, liquid, and electrical instruments, have experienced greater instability in terms of sales.





Source: World Trade Atlas

BEST PROSPECTS

The demand is great in China for advanced low-cost monitoring instruments and equipment. Based on conversations with industry experts, the following instruments may provide the most opportunity:

- Remote Network Monitoring System and Alarming System for Water Network
- Video Monitoring System
- Information Network System and Database Management System
- CODCR Online Automatic Monitoring Instrument
- TOC Water Quality Analyzer
- UV Absorption Automatic Online Monitoring Instrument
- pH Water Quality Automatic Online Analyzer
- Ammonia & Nitrogen Water Quality Automatic Analyzer
- Total Phosphorus Water Quality Automatic Analyzer
- Ultrasound Open-Channel Meter
- Electro-Magnetic Flow Meter
- Water Automatic Sample Collector
- Data Collecting and Transfer Equipment
- Thermometers
- Flow Meter

KEY SUPPLIERS

U.S. firms are facing both domestic and third-country competition like large, government-subsidized European competitors. Though growing very fast, the industry is still in its early stage of development due to a short development history and inadequate marketization.

Foreign suppliers. Since 1990, China has improved its environmental monitoring technology by introducing advanced foreign technology. In the environmental monitoring import market, the Europe, Japan and the U.S. are the main providers. Specific competitors include Aquametrix from Canada, ISI, LAR and WTW from Germany, Lektra and OBL from Italy and MJK from Denmark.

Suppliers from countries such as Japan, Germany, France, the U.K., and Australia have strong domestic competitors whose market efforts are typically supported through favorable financing by their respective governments. Japanese firms are very active in business promotions in China and usually obtain financial support from their government in the form of soft loans and sometimes grants. European countries also use concessional financing and other forms of tied aid to help their firms to develop business in China. Companies from countries with aid programs will continue to have an important competitive advantage in the short term.

Though, U.S. firms face strong competition from Japan and European companies, U.S. environmental monitoring equipment also has a good reputation for quality and competitive pricing. Some U.S. firms, such as Tyco, Fluke, Hach, Thermo, YSI, and Focused Photonics are already well-known in the Chinese water quality monitoring market. The rapidly growing market will increase U.S. export opportunities. Several large U.S. suppliers also have set up joint-ventures in China to expand their market share.

Domestic Suppliers. Domestic suppliers are comparatively weak in this sector and are characterized by low level of concentration. As of 2006, there were roughly 140 environmental monitoring suppliers in China. Though most domestic water monitoring technologies and equipment cannot live up to leading international standards, there is rapid growth in the industry. More and more domestic firms such as Puxi, Jiangsu Dianfen, EST and Beijing Huanke, are also becoming reputable and have obtained a sizable market share in the industry.

Since the average level of environmental monitoring technology has reached early 1990s international standards, China plans to produce more advanced technology and suitable environmental monitoring equipment. However, local equipment is likely to represent only half of total equipment value in the near future because most Chinese environmental monitoring equipment is still of low quality.

Competition. Some competitor names in the sub-areas of water environment monitoring technologies and equipment:

Laboratory use

- Danaher – Hach (United States)
- Hana (Italy)
- Jiansu Dianfen (China)
- Metrohm (Switzerland)
- Mettler (Switzerland)
- Puxi (China)
- Shimadzu (Japan)
- Thermo-Fisher (United States)
- WTW (Germany)
- YSI (United States)

Industrial Ultra- Pure Water

- ABB (Switzerland)
- Danaher – Hach (United States)
- DKK
- E&H (Germany)
- Mettler (Germany)
- Rosemount
- Scan
- Seres (France)
- Signet
- Thermo-Fisher (United States)
- Yokogawa (Japan)

Rivers, Lakes and industrial sewage discharge monitoring use

- AWA
- Beijing Huanke (China)
- Danaher – Hach (United States)
- EST (China)
- Horiba (Japan)
- Kuntze
- Lar
- Seres (France)
- Shimadzu (Japan)
- Toray (Japan)
- WTW (Germany)

Municipal wastewater treatment use

- ABB (Switzerland)
- AWA

- B&L
- Danaher – Hach (United States)
- Delta Phase
- E&H -– stip (Germany)
- Gimat (Germany)
- ISCO (United States)
- WTW (Germany)
- Zulling (Switzerland)

Drinking water use

- ABB (Switzerland)
- ATI
- B&L
- Capital Control (United States)
- Danaher – Hach (United States)
- E&H (Germany)
- Feihua (China)
- HF (United States)
- Miltonroy
- Prominent
- W&T

Disclaimer: The above list is not meant to be comprehensive or exclusive, but rather for reference only.

PROSPECTIVE BUYERS

Role of MEP. The Chinese government has recognized the need to address its water pollution problems. MEP mandates rules, regulations, and standards for factories and other polluters. Individual ministries, provincial environmental protection bureaus and the MEP are all responsible for monitoring and enforcing compliance in this sector. The local bureaus are often ineffective at enforcement due to conflicts of interest with local enterprises. Often times, local governments own both polluters and regulators. Hence, the MEP is responsible for establishing environmental monitoring systems all over the country and managing national environmental monitoring. MEP helps cities and counties establish monitoring stations, and works jointly with industrial ministries to establish environmental monitoring networks.

China National Environmental Monitoring Center. The China National Environmental Monitoring Center (CNEMC) is directly affiliated with MEP and is in charge of analysis and research of national environmental quality, management techniques, and environmental monitoring data. It also provides scientific and technical support for MEP. Local EMCs of provincial and municipal level are in charge of monitoring, data collecting and analysis at the regional level.

Other potential buyers.

- State-owned enterprises such as power groups which require ultra-pure industrial use water
- All municipal wastewater treatment group and plants
- All drinking water groups and plants
- Laboratories, research institutes, and universities

MARKET ENTRY STRATEGIES

U.S. firms must consider many important factors in order to remain competitive in the water monitoring market. Products need to be reasonably priced and developed specifically for Chinese market requirements.

While the economy is ultimately the determining factor, access to appropriate officials, decision-makers and project information is critical for success. In light of the potential market, the U.S. would clearly benefit from having an environmental staff in China dedicated solely to maintaining and promoting environmental programs and leads.

At present, there are three main approaches for U.S. firms to enter the Chinese market:

- Find an agent or distributor
- Set up a technical exchange agreement
- Establish a joint or venture wholly owned operation

Agent or distributor. Interested firms should carefully select their Chinese partners as well as the best approach for entering the Chinese market. U.S. companies can use the established sales network, good government relationship and after-sale service of the local agent or partner to establish its hold in the market. However, it is important to note that some joint ventures and technical cooperation arrangements have encountered problems with funding, management, and intellectual property rights (IPR) protection.

Technical exchange agreement. Finding capable agents or distributors is an advisable way to enter. Agents and distributors have been contracted in environmental management, automotive, and maintenance services markets. Because China's markets can be divided into at least six major regions: the Southeast (Guangzhou), the East (Shanghai), the Beijing-Tianjin region, Central China, the Northeast, and the Southwest (Chengdu), American companies may need to find multiple agents to cover each of China's many regional markets.

Joint or wholly owned. Companies also should explore flexible financing options with commercial banks and take maximum advantage of U.S. Trade and Development Agency (TDA) and U.S. Export-Import Bank programs. Normally, U.S. companies will choose using agent/distributor as their first-step to enter into the market. Joint or wholly owned entity will be second step in their China strategy.

MARKET ACCESS ISSUES & OBSTACLES

Bad quality domestic equipment. For the purposes of this report, environmental monitoring and analysis refers to tests performed at water and wastewater treatment facilities. Although the Chinese government runs environmental research and monitoring institutes, environmental monitoring stations, and environmental protection companies also can provide these services. However, their equipment, devices, and instruments cannot match the quality of those of developed countries. Currently, state-owned environmental monitoring stations in each province, city, and county conduct most of the water quality monitoring. Some companies have monitoring capability, but are not allowed to provide these services because they lack government authorization. This subsector is expected to grow, with new companies entering the field in response to monitoring demands in the market, the strengthening public opinion and the possibility of co-supervision with state-owned monitoring stations.

The WTO. The U.S.-China bilateral trade agreement that led up to China's accession to the World Trade Organization directly addresses the environmental sector. In particular, it emphasized China's commitments to environmental services, which include sewage, solid waste disposal, cleaning services for exhaust gases, noise abatement, nature and landscape protection, and other environmental protection services. However, environmental monitoring and pollution source inspection were not included.

Before and after China's entry into the WTO, China implemented a number of laws to protect the environment. Some have called the Environmental Protection Law of 1989 the foundation for environmental protection in China. Since 1989 there have been a number of new laws added to the list of environmental protections with one of the most recent being the Cleaner Production Law of 2003. Furthermore, foreign environmental technology is more affordable to Chinese users with lower import tariffs and foreign companies importing machinery into China will not be required to have an import license.

Tariff of Water Monitoring Instruments (2008)

Tariff No. (%)	Description of Goods	Most Favored Nation (%)	General
9025.1100	Liquid -filled	4	40
9025.8000	Other instruments	11	17
9026.1000	Instruments for measuring or checking		

	flow or level of liquids	0	17
9026.8000	Other instruments or apparatus	0	17
9028.2010	Water Meter	10	17

Source: China Customs

TRADE EVENTS

The First Meeting of the U.S.-China Environmental Industries Forum
Date: Oct. 21, 2008
Venue: Hilton Hotel, Beijing
Host: Chinese Ministry of Environmental Protection; U.S. Department of Commerce; U.S. Environmental Protection Agency
Organizer: Chinese Association of Environmental Protection Industry
Foreign Commercial Service of U.S. Embassy
Contact: Ms. Wang Yi, Yi.wang@mail.doc.gov, Tel: 86-10-85296655 x 837, Fax: 86-10-85296558

Water Expo China 2008
Date: Nov 10-13, 2008
Venue: National Agricultural Exhibition Center
Organizer: Beijing Jiang He Bo Hua Convention & Exhibition Co., Ltd.
Messe Frankfurt (Shanghai) Co., Ltd.
Website: http://www.waterexpo.cn/

Water, Wastewater & Water Treatment China 2009
Date: Mar 4-6, 2009
Venue: Guangzhou International Convention & Exhibition Center
Organizer: China Foreign Trade Exhibition Corp.
Website: http://www.waterchina-gz.com

The 5th China Chengdu International Water Supply, Drainage and Treatment Expo 2009
Date: Mar 27-29, 2009
Venue: Chengdu Shiji Cheng New International Convention and Exhibition Center
Organizer: Chengdu Zhong Lian Exhibition Co., Ltd.
Website: http://www.water-cd.com

The 10th CWS for Water Supply, Drainage and Treatment
Date: April 28-30, 2009
Venue: INTEX Shanghai, Shanghai Mart
Organizer: Shanghai Zhongmao International Exhibition Co., Ltd.
Website: http://www.wsdwtf.com/cn/index/index.asp

Aquatech China 2009
Date: June 3-5, 2009
Venue: Shanghai, China
Organizer: Shanghai Consulate Support, CHC Expo Service (Shanghai) Co., Ltd
Website: http://www.show-info.nl/aquatechchina2008/

The 11th China International Environmental Protection Exhibition and Conference (CIEPEC 2009)
Date: June 3- 6, 2009
Venue: China International Exhibition Center
Website: www.chinaenvironment.org
Contact: Ms. Yang Yan, ciepec@163.net, Tel: 86-10-51555020, 51555021, Fax: 51555028
Ms. Wang Yi, Yi.wang@mail.doc.gov, Tel: 86-10-85296655 x 837, Fax: 86-10-85296558

RESOURCES & CONTACTS

China National Environmental Monitoring Center Tel: 86-10-84943020 http://www.cnemc.cn/	Beijing Environmental Monitoring Center Tel: 86-10-68413195 Fax: 86-10-68481400 http://www.bjepb.gov.cn/bjhb/tabid/189/Default.aspx
Tianjin Environmental Monitoring Center Tel: 86-22-23051672 Fax: 86-22-23051672 http://www.tjemc.org.cn/lxwm/lxwm.asp	Shanghai Environmental Monitoring Center Tel: 86-21-24011500 Fax: 86-21-64393639 http://www.semc.com.cn
Guangdong Environmental Monitoring Center Tel: 86-20-83563302 Fax: 86-20-83548722 http://gdemc.gov.cn/	Guangzhou Environmental Monitoring Center Tel: 86-20-83399492 Fax: 86-20-83334315 http://www.gemc.gov.cn/
Ministry of Water Resources Department of International Cooperation and Science & Technology Tel: (86-10) 63202706 Fax: (86-10) 63548037 http://www.mwr.gov.cn/	Ministry of Housing and Urban Construction Department of Urban development Tel: (010) 68394465 Fax: (010)68394664 www.cin.gov.cn
Chinese Association of Environmental Protection Administration Industry Mr. Su Fan, Director of International Cooperation Department Tel: 58933245 Fax: 58933847 Email: sufan@chinaenvironment.org; ciepec@163.net www.chinaenvironment.com	China Urban Water Supply Association Ms. Liu Zhiqi, Secretary General Tel: 88082149 Fax: 88082145 Email: liuzq@mail.cin.gov.cn www.waternet.net.cn
World Bank China Pollution Intensities www.worldbank.org/nipr/data/china	U.S. International Trade Administration-China Environment Market www.environment.ita.doc.gov
U.S. Trade and Development Agency (TDA) www.tda.gov	U.S. Ex-Im Bank www.exim.gov
Asian Development Bank www.adb.org	

For More Information

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