

PARTNERING IN CHINA'S ENVIRONMENTAL SECTOR

Prepared by

GCiS China International Services

under contract to the U.S. Department of Commerce



U. S. DEPARTMENT OF COMMERCE
International Trade Administration
Washington, D.C.: 2001

Library of Congress Cataloging-in-Publication Data

Partnering in China's environmental sector / prepared by GCiS China International Services, under contract to the U.S. Department of Commerce.

p. cm.

1. Pollution control equipment—China. 2. Pollution control equipment industry—United States. 3. Investments, American—China. I. GCiS China International Services. II. United States. International Trade Administration.

HD9718.C62 P37 2001

382.67'373051—dc21

2001039878

The full text of this report is available on the International Trade Administration's Internet site at www.environment.ita.doc.gov. Reprints on paper or microfiche are available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; www.ntis.gov.



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Abbreviations

ADB	Asian Development Bank	MOC	Ministry of Communications
AGSR	AquaGuard Spill Response	MOFTEC	Ministry of Foreign Trade and Economic Investment
APC	air pollution control	n.a.	not available
ATL	advanced trade liberalization	NEPA	National Environmental Protection Agency
BOD	biochemical oxygen demand	NPC	National People's Congress
COD	chemical oxygen demand	PCB	polychlorinated biphenyl
CRAES	Chinese Research Academy for Environmental Sciences	POU	point-of-use
DAF	dissolved air flotation system	RMB	yuan renminbi (Chinese currency)
DOC	U.S. Department of Commerce	SEPA	State Environmental Protection Administration
EPEDC	Environmental Protection Engineering Design Certificate	SETC	State Economic and Trade Commission
ERM	environmental resource management	SOE	state-owned enterprise
Ex-Im	Export-Import Bank of the United States	SSCRP	Shanghai Suzhou Creek Rehabilitation Project
FE	foreign enterprise	TRIM	trade-related investment measure
GDP	gross domestic product	VAT	value-added tax
GIS	geographic information system	WB	World Bank
HR	heat resistant	WOFE	wholly owned foreign enterprise
HVAC	heating, ventilation, and air conditioning	WTO	World Trade Organization
HWM	hazardous-waste management		
IDA	International Development Association		
JV	joint venture		

Note: Unless otherwise noted, dollar figures given are U.S. dollars. The exchange rate for the Chinese yuan, or RMB, has been calculated at 8.3 to the U.S. dollar.

Executive Summary

Opportunities and Options

There are two sides to China’s environmental market. On one side is a large and growing market, created by tremendous environmental problems. Everyone acknowledges that China has deep environmental problems, and the government has taken action. It has closed factories that pollute excessively and, to some degree, has enforced its growing body of regulations. This has been coupled with ambitious environmental spending plans, which aim to reduce pollution and at the same time to grow the domestic environmental industry.

While these activities are relevant, they do not directly translate into tremendous opportunities for foreign companies in this market. On the other side of the coin, growth is still rather slow, price competition is great, and most domestic end users—industrial or public—remain

reluctant to purchase the goods or services of foreign environmental companies. U.S. companies are at a particular disadvantage compared to their European and Japanese competitors due to the greater quantity of soft money available to the latter through national loans and grants.

The accession of China to the World Trade Organization (WTO) would create more opportunities for foreign companies, from tariff reduction to investment rules, but this is hanging in the balance and will certainly not make the market for any foreign company. In sum, there is both opportunity and steep competition in this market. There are opportunities for U.S. companies, and more will open up, but the market needs to be well understood and approached intelligently.

There are numerous legal and operational options for foreign companies to participate in China’s environmental

Table Ex.1. Advantages and Disadvantages of Various Market Vehicles

<i>Vehicle</i>	<i>Advantages</i>	<i>Disadvantages</i>
Local production	Can accept payment in RMB Can (maybe) compete better on cost Closer to end user, faster delivery, other benefits Many options for manufacturing	Requires investment Could require higher operating costs Potential dangers in technology transfer
JV	Partner may provide some benefits May be easier to get investment approval	Possible theft of technology Must run business with partner More difficult exit strategy
WFOE*	No partner; a free hand in the market	No assistance from partner
Direct Imports	Easier to protect technology Lower costs all around Less risk; exit strategy easier	Cannot accept payment in RMB May face import restrictions Products will likely cost more
Representative office	Cost-effective way to enter market Can understand market better before setting up production	Only cost-effective relative to other direct-import options Operating costs for China presence
Agents/Distributors	Very useful for broad footprint of end users Can provide service	Dangers in losing control of marketing Not applicable for all products
Franchise	No need to be in China	Risk of technology theft; very difficult to monitor/control; little recourse in disputes
Direct Sales (no distributors or representatives)	No need to be in China	Operationally difficult; applicable to products with small end user footprint

*Not an option for engineering companies and manufacturers in those industries that have particular protection (such as steel).

industry. It is important for U.S. companies interested in this market to understand these options and their respective advantages and drawbacks. They are assessed in this report and summarized in Figure 2 (page 6).

In general, the decision to invest in manufacturing is closely related to the type of product involved and the technological sophistication of such products. If a company's products utilize more common technologies, or if they have viable domestic competitors, then local manufacturing becomes a must in many cases. In the environmental industry, this can go either way, as the range of design and manufacturing technologies in the industry is very large.

If a company's product occupies a critical niche and is not manufactured in China, then it is usually advisable to develop the market on the basis of import sales. When domestic competitors are able to enter the market effectively or a strong foreign competitor begins domestic production, then the investment/production decision can be re-evaluated. It is a common perception of companies that they cannot enter this market incrementally or that they have to start big in order to show their "commitment" to the market. With a few exceptions, these perceptions are erroneous. U.S. companies are advised to approach this market with strategic flexibility.

The most important requirement for U.S. companies considering direct investment in China for sales to the environmental sector is that there be a market for their goods. There are also opportunities to manufacture in China for export to other countries, and there are financial incentives to do so, though most foreign companies in any industry prefer to manufacture in China if there are opportunities in the domestic market.

Important Factors and Issues

U.S. companies interested in China's environmental market should keep the following factors and issues in mind when considering entering and/or investing in this market.

Type of Company

Unlike other industries, such as the automotive industry, the environmental industry in China consists of companies that are different in nature. There are engineering companies, instrumentation companies, traditional environmental-equipment companies, and others. U.S. companies should be mindful that each of these may face both distinct investment requirements and domestic competition.

Type of End User

End users in the Chinese environmental market vary. The greatest distinction is between domestic end users (companies and the government) and foreign companies operating in China. U.S. companies should have some idea as to which of these will likely be their target market and how best to target them.

Investment Vehicle

There are several legal investment options for foreign companies in China's environmental industry, all of which are reviewed in this report. U.S. companies should be aware of these options, their advantages and disadvantages, and the operational considerations they entail.

Macro Issues and Trends

Companies should keep an eye on three issues in particular: China's potential accession to the WTO, the strength of the Chinese economy and the pace of reforms, and potential flotation of the yuan. All of these can have significant impact on the industry, and all are addressed in this report.

Uses of the Report

The purpose of this report is to serve as a tool for U.S. companies interested in participating in China's environmental market. The report is not designed to analyze this market in great depth, such as by market size and the like, but to explain what options are available (legally and operationally), what key issues are involved, and what other foreign companies are doing, and to provide various strategic recommendations. The report can be of use to U.S. companies of any size, and they need not be dedicated environmental companies to find a place in the market.

This report is designed to be a starting point for the consideration of entry into the Chinese market or investment in China and not as the only source of information. It is strongly recommended that companies interested in this market communicate with other foreign companies already on the ground in China, many of which are listed in this report (see Appendix). The U.S. Department of Commerce (DOC) is also a useful resource and can recommend other resources. Finally, before entering this market in a significant way, it is recommended that company representatives make a trip to China to get a better view of the situation in person.

Key Parts of the Report

This report comprises three main chapters.

Chapter 1, “Introduction,” takes a brief look at the environmental industry in China in terms of end users, financing, government involvement, and opportunities for U.S. and other foreign companies.

Chapter 2, “Strategies and Paths of Entry,” is the main qualitative portion of the report and assesses the strategic options for U.S. companies in China’s environmental market in light of many important issues. These include:

- Rationale and options for local production
- Rationale and options for selling through direct imports
- Differences in options for engineering and equipment companies
- Options and procedures for establishing a joint venture (JV) or wholly owned foreign enterprise (WOFE) in this market
- Strategies for partnering
- Options and recommendations for investment in industry zones
- Strategies for using agents and distributors
- Foreign companies active in this market

- Case studies of environmental projects and partnerships
- Analysis of technology transfer
- Options and strategies for subcontracting engineering services
- The potential impact of the WTO

Chapter 3, “Profiles,” consists of profiles of the following groups:

- 23 domestic environmental companies
- Six industry zones
- Three domestic environmental organizations

U.S. companies interested in this market may consider approaching one of the companies profiled in Chapter 3 for partnership or at least reviewing the profiles to see what kind of companies make up the domestic competition. The six industry zones include one dedicated environmental industry zone and an additional three that emphasize this industry. If a company decides to set up production in China, it may consider investing in one of these zones or at least learning more about what the zones offer. The three domestic environmental organizations may offer useful services to foreign companies interested in this market.

Chapter 1

Introduction

The Environmental Market in China

There are two sides to China's environmental market. On one side is a large and growing market, created by tremendous environmental problems. Everyone acknowledges that China has deep environmental problems, and the government has taken action. It has closed factories that pollute excessively and, to some degree, has enforced its growing body of regulations. This is coupled with ambitious environmental spending plans, which aim to reduce pollution and at the same time to grow the domestic environmental industry.

Toward this end, the government encourages technology transfer in this area and facilitates it by making foreign investment in the industry easier than in others and setting up dedicated environmental-industry zones. The government has also signed various agreements with foreign countries, including the United States, for cooperation and increased investment in the market, along with setting up bilateral environmental associations with foreign countries and companies.

While these activities are relevant, they do not directly translate into tremendous opportunities for foreign companies in this market. On the other side of the coin, growth is still rather slow, price competition is great, and most domestic end users—industrial or public—remain reluctant to purchase the goods or services of foreign environmental companies. U.S. companies are at a particular disadvantage compared to their European and Japanese competitors due to the greater quantity of soft money available to the latter through national loans and grants.

The accession of China to the World Trade Organization (WTO) would create more opportunities for foreign companies, from tariff reduction to investment rules, but this is hanging in the balance and will certainly not make the market for any foreign company. In sum, there is both opportunity and steep competition in this market. There are opportunities for U.S. companies, and more will open up, but the market needs to be well understood and approached intelligently.

Key Government Numbers

The following is a review of some key financial figures for the Chinese environmental sector.

The Chinese government, during the ninth five-year plan, stated that to achieve China's environmental goals during this (1996 through 2000) period would require the investment of \$54 billion (RMB 450 billion). This is the first time that this sort of figure has been provided for the environmental sector in a five-year plan.

China will need annual environmental investments of \$10 billion, with about half from overseas, according to the head of the SEPA, the State Environmental Protection Administration.

Funding for environmental projects in China (loans and grants) from Canada, Europe, and Japan has exceeded \$3.3 billion. That from the United States is considerably less.

China will spend between \$14.5 billion and \$18.1 billion to combat air pollution in 34 major cities according to an amendment to an anti-air-pollution law submitted to the National People's Congress (NPC) in 1999.

China currently spends about 1 percent (\$12 billion) of its gross domestic product (GDP) on environmental expenses but aims to boost this to 1.5 percent. Macroeconomic statistics in China can be dubious or even false, so statistics like this must be viewed in this light.

Foreign investors (including joint ventures [JVs]) account for approximately 10 percent of environmental spending in China. Another 10 percent is accounted for by international soft money from agencies such as the World Bank (WB) or donor countries.

Status of the Market

The Equipment Market

The environmental market in China is best thought of as two markets, equipment and services; the latter refers mostly to engineering and consulting, though it could

also include training, project management, and other services. There are two main kinds of companies in the equipment market, those that sell dedicated environmental equipment and those that sell other types of equipment that can be used in environmental applications. An example of the first is WL Gore, which sells air pollution control (APC) equipment, and an example of the second is ITT Flygt, which sells pumps for many applications, including environmental.

At present there is greater demand for equipment than for engineering services, especially among domestic end users. The greatest demand is for high-technology and/or niche equipment. Lower-technology equipment faces very strong competition and in almost all cases will be much more expensive than competing products produced domestically. Even the high-technology equipment must be priced reasonably, and U.S. companies often register the best sales in this market with their lower-cost models. There is, for example, demand for the following kinds of equipment (partial list):

- High-performance pumps
- Process controls
- Metering, monitoring, and/or sensor instrumentation (air and water applications)
- High-performance membranes
- High-technology blowers
- Specialized high-technology APC equipment
- Specialized wastewater treatment equipment, such as oil skimmers, DAF units, and others
- Advanced incinerators
- Analytical test equipment
- Advanced (but low-cost) equipment to treat sulfur dioxide (in particular) and nitrogen dioxide (top-of-the-line equipment is not necessary)
- Chemical feed pumps
- Aeration equipment, such as mixers and specialized nozzles
- Other niche equipment

For example, if a water or wastewater treatment plant purchases foreign equipment, it is usually because products with the same performance cannot be found in China. For such a facility, this will usually be limited to high-performance pumps, metering equipment, controls, and test equipment. This is even the case for a plant with foreign investment, such as the Baoshan Water Treatment Plant, built and operated by Thames PLC outside Shanghai. A U.S. company should not assume there is a market for its product in China. Some form of market assessment or market knowledge is highly recommended.

The Service Market

At present, there are fewer opportunities in China's environmental market for U.S. engineering companies than for equipment companies. If China joins the WTO, there will certainly be greater opportunities for foreign companies in this sector, as many legal barriers will be removed, but foreign companies will still have to compete on price and form the right relationships, as they do now. In the current market, there are two main areas of opportunity for U.S. engineering companies.

1. Contract work for foreign companies with operations in China. This can be in design, project management, or environmental assessment for the water/wastewater, air treatment, or hazardous-waste management (HWM) needs of a foreign factory. For example, PACT focuses mostly on designing industrial water treatment systems for companies with foreign-investment.

2. Participation in foreign-funded projects. This has meant soft money, either from international organizations like the WB and Asian Development Bank (ADB), or from a specific country. Numerous countries, particularly Japan, Germany, France, and the Scandinavian countries, provide funding for Chinese environmental projects provided that the design contract goes to one of their national companies. However, the WB and ADB have been phasing out soft-money environmental projects in China and no longer include this in their soft-money-lending facility, the International Development Association (IDA).

Many in this market believe that opportunities among domestic end users will arise, but not right away and only gradually.

Differentiating End Users and Funding

In China's environmental sector, there are significant differences between types of funding and types of end user, and this is illustrated in Figure 1. The opportunities differ greatly when the funding is foreign and when the end user is municipal or private.

As Figure 1 illustrates, the current opportunities depend greatly upon what product or service a foreign company offers, where the funding comes from, and the end user.

Municipal and Public End Users

With municipal or public end users, there are very few opportunities for foreign engineering companies without foreign funding, and even then the margins can be small and the bidding process extensive. French compa-

Figure 1. Markets (Opportunities) for U.S. Companies in China's Environmental Sector

<i>Project</i>	<i>Market</i>
Air treatment for an SOE	Few opportunities for foreign companies
Wastewater system for a foreign factory	Market not large, but there are opportunities
Water treatment plant; special project	Some opportunities for equipment, few for service
ADB-funded project such as Suzhou Creek	Foreign companies (both service and equipment) desired, but margins can be small

nies have been very active in this market with French government-sponsored financing. Japan and Germany also have considerable environmental loan programs for China. An exception to this is a water treatment plant built and funded (on the build-operate-transfer [BOT] model) by Thames PLC of England. However, Thames has had difficulty finding new domestically funded projects. U.S. companies can and do compete actively for internationally sponsored projects, and this represents a sizeable portion of the market for U.S. engineering companies in this market.

For equipment manufacturers, the market among public end users is still tough but is starting to pick up as end users demand more reliable products. U.S. companies in China, while conceding that the market for domestically funded public projects is small, have seen positive signs coming from this market in the past one or two years. For example, Fisher Rosemount has recently received an increasing number of inquiries about its analytical equipment from water and wastewater facilities. Foreign companies have an easier time selling equipment to foreign-funded public projects, though the potential for this market is not as large.

Private End Users

There is little market for foreign services or equipment among private domestic end users in China. Chinese companies do not feel much obligation to put "unnecessary" equipment in their facilities. When forced to do so, they go for the cheapest way, and there are thousands of domestic environmental companies with cheaper products and services waiting to serve them. Only recently, for example, have there been sales of foreign scrubbers to Chinese companies with their own funding. This market will take longer to develop, and U.S. companies should not rely on it for significant sales in the short or even medium term.

Among foreign-funded private end users, the market is limited, but there are many opportunities for both engineering and equipment companies. For a variety of reasons, foreign companies that manufacture in China frequently install environmental systems in their facili-

ties. The most common is a wastewater system or facets of an APC system. Some of these companies also need either project or assessment work in HWM and even training. Environmental Resources Management (ERM), for example, is sometimes called in to do environmental training in areas such as hazardous-waste disposal.

Note: State-owned enterprises (SOEs) here are not considered public or municipal.

Key Issues

The following are some issues of prime importance in this market.

Funding

This is always the first question in the environmental market. Over 80 percent of the funding for environmental projects in China is from domestic sources, and most of it is from provincial or municipal sources or companies. For any endeavor in this market, U.S. companies should always bear in mind where the funding will come from.

U.S. Government Assistance

The U.S. Export-Import (Ex-Im) Bank has established an Environmental Exports Program that increases the level of support it provides to exporters of environmentally beneficial goods and services, as well as to exporters participating in foreign environmentally beneficial projects. This program affords exporters a special level of support in conjunction with either the Ex-Im Bank's insurance program or its loan and guarantee programs. The Ex-Im Bank is active in China, though its environmental programs have not been nearly as successful as those of other countries due to less favorable loan rates and other issues. Nevertheless, U.S. environmental companies should consult with the bank and other U.S. government-sponsored funding programs with application in this market.

For a list of procedures, documents, guidelines and other information, access the Ex-Im Bank Web site at www.exim.gov.

Project Approval

Getting environmental projects approved in any country is complex and fatiguing, and this is especially the case in China. U.S. companies should be prepared for this. It should also be kept in mind that projects are not always awarded upon (American ideas of) merit, and projects are often divided among several companies, apparently just for the sake of division.

Regulations and Enforcement

Environmental laws and regulations in China are becoming stricter and more numerous, though enforcement is arbitrary and inconsistent. An important SOE (like Capital Steel) can continue to pollute, whereas smaller, less important factories are shut down.

WTO

If China joins the WTO, it will have an impact on the market for environmental technologies. This topic is discussed in Chapter 2.

Notes on Methodology

This study was done mostly by primary research, which consisted of many in-depth interviews with do-

mestic companies, U.S. and other foreign companies operating in China's environmental sector, and government officials. There was also considerable background or secondary research, particularly for government information. Primary research was important for this study because it helped to show a better picture of the real situation U.S. companies face in this market.

The study relied heavily on input from U.S. and other foreign companies active on the ground in China. Most of these companies have been active in China's environmental market for many years, and their experiences and challenges are particularly relevant to U.S. companies that will also pursue this market and thus will face similar challenges. The companies contacted, among other companies, are listed in the List of Contacts.

Definition of "Environmental"

This report addresses opportunities in China's environmental sector, whether for dedicated environmental companies or companies that sell in this sector among others. This industry naturally encompasses traditional spheres of pollution control and process technology and also includes areas such as indoor air quality (e.g., dust collection), though some areas, such as automobile emissions control companies, were not emphasized.

Chapter 2

Strategies and Paths of Entry for U.S. Companies in China's Environmental Sector

Options for U.S. Companies

Market Entry Alternatives for the Industry

It is very important for U.S. companies taking a serious look at China's environmental market to understand what the investment alternatives are and in particular to decide whether to set up local production or to sell through importing products. Several options are available, more for equipment than engineering companies, and which to select depends greatly upon the size, strategic objectives, end users, and product or service of the company.

Rationale and Options for Direct Investment

In general, the decision to invest in manufacturing is closely related to the type of product involved and its technological sophistication. If a company's products use more common technologies, or if they have viable domestic competitors, then local manufacturing becomes a necessity in many cases. In the environmental industry, this can go either way, as the range of design and manufacturing technologies in this industry is very large. There are two primary considerations:

1. Technology transfer. The company must decide whether technology can be transferred to this market, either officially or unofficially, in the right way. If a company thinks that its design (through reverse engineering) or manufacturing process technology can easily be copied, it may decide not to localize production.

2. Pricing and market analysis. The company must decide whether its products can be sold in this market without being produced locally or whether key components can be manufactured or sourced in China to lower costs significantly. A market demand price threshold analysis is very useful in determining this.

Figure 2 lists possible Chinese market vehicles for the environmental industry and summarizes many of their advantages and disadvantages. The definitions and particular requirements of these vehicles are covered below.

The two greatest advantages of direct investment in China are the following:

1. Companies can accept payment in RMB. That is, companies can be paid in China. This is important in that domestic companies and government organizations often have great difficulty paying in U.S. dollars. Foreign currency is tightly controlled and thus is often reserved for the most critical portions of a project. This typically means equipment that is not available in China.

2. Products manufactured in China are taxed much less than their imported counterparts, and there are shipping costs on top of this. Local sourcing for select components will render the final price even lower.

These advantages hold true today but may change significantly if China joins the WTO (see below).

As the environmental market in China, while growing, is very competitive, with limited opportunities for foreign companies, starting small and smart and then growing as circumstances allow is often a good strategy. Some U.S. companies, after having established a presence in China through a representative office, may decide that this is enough, or they may decide to go ahead with direct investment.

Local production means having a manufacturing facility in China, and this can only come through a JV or wholly owned foreign enterprise (WFOE), each of which is discussed in greater detail below. There are several operational (as opposed to legal) options for manufacturing:

- Making one or more products or components through a mechanical manufacturing process;
- Importing key components, sourcing the rest locally, and assembling them; or
- A combination of these.

The point to emphasize is that there is considerable flexibility in what qualifies as local production. For example, WL Gore imports its filtration fabric, sources most of its other APC system components, and assembles these at its facility in Shanghai. A U.S. environmental company seriously considering setting up local production in this market should consider all the possibilities in terms of sourcing, manufacturing, and assembly. These vary greatly by product. It may be possible to source 90

Figure 2. Advantages and Disadvantages of Various Market Vehicles

<i>Vehicle</i>	<i>Advantages</i>	<i>Disadvantages</i>
Local production	Can accept payment in RMB Can (maybe) compete better on cost Closer to end user, faster delivery, other benefits Many options for manufacturing	Requires investment Could require higher operating costs Potential dangers in technology transfer
JV	Partner may provide some benefits May be easier to get investment approval	Possible theft of technology Must run business with partner More difficult exit strategy
WFOE*	No partner—a free hand in the market	No assistance from partner
Direct Imports	Easier to protect technology Lower costs all around Less risk; exit strategy easier	Cannot accept payment in RMB May face import restrictions Products will likely cost more
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Agents/Distributors	Very useful for broad footprint of end users Can provide service	Dangers in losing control of marketing Not applicable for all products
Franchise	No need to be in China	Risk of technology theft; very difficult to monitor/control; little recourse in disputes
Direct Sales (no distributors or representatives)	No need to be in China	Operationally difficult; applicable to products with small end-user footprint

*Not presently an option for engineering companies and manufacturers in those industries that have particular protection (such as steel).

percent of components and materials locally and import or manufacture one or more key components.

While there are local sourcing requirements for various industries, most companies in the environmental industry (and in general) that produce in China source for economic reasons and exceed these requirements. Numerous components, from casings and mounts to steel parts and pipes, and many others, are much cheaper in China and often of acceptable quality. Furthermore, components can first be imported and then sourced locally once a company has found reliable suppliers. This can take time and is very difficult to do from abroad, so companies may wish to plan for a phased approach to sourcing and/or begin to investigate procurement well before local production commences. It is also very wise to check with companies that already manufacture in China (see List of Contacts) and the U.S. DOC.

The most important requirement for U.S. companies considering direct investment in China for sales to the environmental sector is that there be a market for their goods. There are also opportunities to manufacture in China for export to other countries, and there are financial incentives to do so, though most foreign companies in any industry prefer to manufacture in China if there are opportunities in the domestic market.

The following are some U.S. environmental companies with representative offices in China: Fluor Daniel, CH2M Hill, Fluke Corporation, Donaldson (Torit), and Earth Tech.

Options and Rationale for Direct Imports

If a company's product occupies a critical niche and is not manufactured in China, then it is usually advisable to develop the market on the basis of import sales. When domestic competitors are able to compete more effectively, or a strong foreign competitor begins domestic production, then the investment/production decision can be re-evaluated. It is a common perception of companies that they cannot enter this market incrementally or that they have to start big in order to show their "commitment." With a few exceptions, these perceptions are erroneous.

Selling to China through direct imports can take several legal and operational forms:

- A representative office only (sales are carried out through this office);
- A network of distributors managed by a representative office;
- Use of distributors or agents without a representative office;

- Licensing agreements;
- Direct sales to China without agents, licensees, or distributors.

Of these, the most common and most effective for the environmental industry are the first three, two of which require a legal presence in China.

Licensing Agreements. Licensing agreements, while technically possible, are in all likelihood not a smart option for U.S. companies in this market. Licensing amounts, in essence, to a technology transfer agreement on a compensation-per-unit basis. There is no effective way for the company to verify sales and very limited effective recourse if a dispute arises. The only real recourse is the Chinese legal system. As many U.S. environmental companies tend to be small to medium-sized with no leverage in this market, this is probably not the best path to take.

Direct Sales without Agents, Distributors, or Licensees. This option does not have the pitfalls of licensing, but operationally it can be quite difficult. Direct sales could include Internet sales, though few end users in this market (and hardly any domestic companies) will be interested in purchasing products or services through this channel or be able to use the required payment methods. This may change in the next several years. It is also possible to sell equipment with other foreign companies as part of a package, though this would not be selling to end users in the China market.

It is likewise possible to come to China on occasion to market, preferably from another Asian office. This is more feasible, and some companies do it, but it also has some distinct disadvantages. If the end users (or purchasing decision-makers) for products are numerous, such as for pumps, this approach will not work. In marketing for large projects, the approach is feasible, but the company will need to come to China on a very regular basis to make and maintain relationships and provide proper incentives. This could make costs even greater than those for maintaining a permanent presence in China.

Use of Distributors or Agents, With or Without a Legal Presence. The decision whether to use distributors, in what way, and to what extent really hinges upon the end user base for a company's products in China. If there is a large footprint of end users, it is best to use a wider range of distributors. These can be segmented regionally or by product type. If there are just a few end users (see the AquaGuard Spill Response [AGSR] case below), a single distributor or agent is probably best.

Subject to serious market potential analysis, in general, a larger distributor network should be managed directly from a representative office, WOFE, or JV in China proper. Successful remote management of and commu-

nication with a substantial distributor network in China is difficult, and instances of success are rare.

Another advantage of managing such a network "in country" is that it allows for the network to be grown in a rational and controlled fashion. Foreign companies have frequently run into channel management problems by trying to establish their distributors too quickly. The problems in establishing a distributor network typically encompass the following:

- Insufficient knowledge of the distributor;
- Insufficient knowledge of the Chinese market;
- Insufficient knowledge of Chinese business practices;
- Insufficient knowledge of government regulations and authorities;
- The need for market education;
- The need for distributors to have sufficient technical and product knowledge;
- Immature, or not sufficiently localized, financial and contractual procedures and arrangements;
- Inadequate communications between distributors and channel management personnel.

For further discussion of distribution, see the discussion that begins on page 11.

Establishing a Representative Office. Several U.S. companies active in the environmental market in China highly recommend establishing a representative office before making a direct investment. This is advisable for the following reasons:

- It will allow the U.S. company to become more familiar with the market and to get a better picture of what the market for their products and services is and what the customer wants.
- It will allow the company to promulgate its brand and start to make key relationships, both of which are very important and in China can take longer than in Western countries.
- It will allow the U.S. company to get a much better idea of the operations side of the environmental business in China: costs, procurement, laws and regulations, and, perhaps most importantly, market practices.

A representative office, while it cannot accept payment in RMB and cannot manufacture, is a convenient vehicle for the sale of imported products, which are paid for through standard import procedures (for example, letters of credit). Representative offices can market products or coordinate distributors to do so, bringing man-

agement and coordination that cannot be done effectively from overseas. Provided that the products can be imported legally and in a cost effective manner, and that there is a market for them, all the important aspects of a company's operations (marketing, channel management, payment pathways, and legal standing) can be carried out effectively and economically through this vehicle.

Environmental Industry Investment Guidelines

As of early 2000, there were no specific investment regulations for the environmental industry in China, and no regulations that distinguish U.S. companies from other foreign companies. Officially, the Environmental Protection Office of Energy Saving and Comprehensive Utilization Department and the State Economic and Trade Commission (SETC) have the primary responsibility for developing the domestic industry, while the SEPA in practice is still actively involved. A group of government agencies led by the SETC and the SEPA is currently researching the procedures of investment and technology transfer for the industry and will make formal recommendations to the NPC. Even then, some of these proposals may be superceded by the WTO agreement, if and when China joins that organization.

The laws that currently govern investment in China's environmental sector depend upon what product or service the foreign company provides. Some of the investment laws that govern equipment companies are different from those governing service (which normally means engineering) companies.

Current specific investment guidelines and procedures are provided below, and it is also advisable to access the full set of official guidelines and procedures from the Ministry of Foreign Trade and Economic Investment (MOFTEC). The U.S. DOC follows these issues closely and should also be consulted for updates.

Establishing a JV in the Environmental Sector

Options

Establishing a JV is the cheaper of the direct investment alternatives. Basically there are two types of JV in China: the equity JV and the cooperative JV. The primary difference is that the cooperative JV is a contractual arrangement that may or may not be a legal entity as well, depending upon the nature of the contractual arrangements and the intent of the partners. Cooperative JVs are more common for project-based cooperation and for trial "engagements" prior to the marriage that an equity JV represents. Cooperative JVs are also more common for smaller companies.

In general, foreign participation in JVs can be segmented into service (engineering and consulting) companies and manufacturing (equipment and product) companies.

In either case, Chinese law stipulates that foreign contributions must be no less than 25 percent of the contributed investments. Some sectors have further restrictions (such as engineering; see below), while others are treated more liberally. With companies participating in the environmental sector covering such a wide range of products, services, technologies, and industries, it is imperative for each case to be researched completely and considered in its specific circumstances.

In practice there is a great deal of variation in the application of such contributions and in the approval of various ventures. Regional policies, domestic partners, specific industries, and various loopholes all commonly have an impact on the organization and approval of JVs.

For U.S. engineering companies that want to be paid and/or manufacture in China, a minority stake in a JV is at present the only official option. Foreign companies are not allowed to own more than 49 percent of an engineering JV and cannot establish a WOFE in the country. Some foreign engineering companies are able to operate and get paid by having a local design institute sign off on their projects, but this operational shortcut does not constitute official status and entails several forms of risk (legal, payment, quality, etc.). If an engineering company does not need to be paid in RMB, there is no compelling reason to establish a JV in China. While most foreign-funded projects are not paid for in RMB but in U.S. dollars, local projects for foreign companies in China (such as a factory) may require payment in RMB.

Most foreign equipment companies that want to participate in China's environmental sector can take either a majority or minority stake in a JV or even go 50-50. This applies to most kinds of environmental equipment, where there is a market for foreign products but may not apply to lower-technology items (such as steel products), where the domestic industry receives greater protection and there are few opportunities for technology transfer. If there is an option to take a majority stake, this is usually advisable, as it is the majority partner that controls the management and finances and thus the company. The main advantages of a JV are:

- It's typically cheaper than a WOFE.
- The foreign company can take advantage, in some cases, of existing manufacturing facilities, sourcing of parts, government relationships, and the like.
- It will allow, in many cases, some level of quick access to existing sales channels, relationships, and knowledge.

For environmental equipment, the last point is the most important. Many U.S. or other foreign companies that invest directly in China to sell environmental products choose to partner with a domestic company in a JV not to save investment costs, but to take advantage of the partner's sales channels and relationships. This is particularly the case in business-to-business markets such as the environmental sector because, in contrast to consumer markets, the personal relationships needed to sell expensive pieces of equipment take considerable time and effort to develop. Also, for both equipment and engineering companies, domestic partners (particularly well-connected ones) can be very helpful in dealing with government relationships and bureaucracy.

Naturally, the main disadvantage of a JV—even if the U.S. company has a majority stake—is that the company has to operate in China while it is married to a Chinese company. This is not an inherent disadvantage, but many undesirable things can and do happen.

- Cultural and business differences are difficult to bridge and may hinder operations.
- Products and technology may be copied.
- The domestic partner does not carry out its responsibilities.
- Exit strategies and getting cash out can be more difficult.

The most common JV problem is one of cooperative intent. This can be traced to two main root causes:

1. It is often the case that either the foreign partner, the Chinese partner, or both come to the JV with short-term income objectives and are not really oriented toward the medium- and long-term development of the project. This inevitably leads to failure of the JV when added to the normal operational and managerial difficulties of operating in China while dealing with a wide range of operational and communications issues.

2. The second issue is one of control. It is frequently the case that the Chinese partner will exercise effective control over the JV, regardless of equity participation. Typically, this is because the JV staff will be brought over from the Chinese side. These people tend to retain their parent company's world views, objectives, and relationships, creating effective, even if not official, Chinese control of the JV. Successful JVs have dealt with this problem in several ways, the most typical being patience and continual in-depth participation, interface, and communication. A less typical but more immediately effective method is to organize a clean slate where the JV managers are responsible for hiring all JV personnel. In this case, a deliberate attempt is usually made to restrain

the Chinese partner's personnel from dominating key positions within the JV.

Some examples of U.S. environmental companies with JVs are Fisher Rosemount (several JVs), ERM, and WL Gore.

Procedures

The procedures for establishing a JV are clearly defined. After the U.S. (or other foreign) company has reached agreement with the domestic company, the proposed JV must be agreed upon and approved by various government ministries. For the environmental sector, if the company is clearly an environmental company and will sell mainly to the environmental sector, then there is an additional ministry involved.

First, agreement is needed from the following ministries:

- Local MOFTEC (Wai Jing Wei)
- Local State Administration of Industry and Commerce (Gong Shang Ju)
- Local SEPA (Huan Bao Ju) (for environmental companies)

Then the JV must be approved by the following national ministries in Beijing:

- MOFTEC (Wai Jing Wei)
- State Administration of Industry and Commerce (Gong Shang Ju)
- SEPA (for environmental companies)

The domestic partner in many cases is very helpful in getting the local ministries to approve.

The requirements can vary by location and industry. Not all Chinese partners are capable of shepherding this process effectively through to approval. U.S. (and other foreign) partners are highly advised to retain professional assistance in this endeavor, as there are a number of areas where homework and verification performed in advance will save considerable time and expense. Retaining professional assistance may also lead to an early exposure of unqualified or disingenuous prospective Chinese partners.

The following documents are needed for applications for JVs and cooperative enterprises (the original is needed unless otherwise specified):

- Application report of the Chinese project unit
- Contract and constitution of the JV or cooperative enterprise

- Duplicate of the Chinese business license of the Chinese partner (with the seal of the Administration of Industry and Commerce)
- Legal business certificate from the foreign country
- Credentials of the legal representatives of each party
- Credit certification of each party
- Appointment letter of directors and letter of recommendation from the general manager and vice general manager
- List of directors
- Resumes and identification cards of Chinese directors
- Checklist of imported materials
- Approval of the related managerial department (should be attached to state-controlled projects)
- Permit and quota instructions issued by the MOFTEC if an import-export license is involved
- Advice letter of name registration and approval of JVs and cooperative enterprises
- Application form for registration of enterprises with foreign-investment
- Registration form of legal representative of enterprises with foreign-investment
- Other documents as necessary

Common Hybrid Investment Formats

Under China's evolving regulatory environment, a number of investment formats have developed that have the appearance of a JV but operationally work as a WOFE. These are typically legal, but care must be taken with some formats, as they are clearly illegal under current Chinese law. Some foreign investors have made the calculated bet that a marginally legal structure will eventually be opened and/or legally recognized. There are many instances of this. In telecommunications, foreign companies that partnered with China Unicom in operating ventures clearly did so illegally and have been called on it, resulting in significant losses. On the other hand, the retailing ventures of many companies, likewise clearly in conflict with existing Chinese law, have been allowed to continue and are being legalized.

The most important of the alternative formats is the structuring of a large majority holding (cooperative or equity) in the range of 95 to 98 percent. This basically amounts to the Chinese side renting itself (its name and legal status) out for an annual fee. This is common in industries where JVs are allowed but WOFEs are not.

There are a variety of such strategies now active in China. Extreme caution must be used when entering into such a structure. Again, the specifics of the case must be researched, and the assistance of an experienced professional third party is highly recommended.

Establishing a WOFE in the Environmental Sector

Options

The wholly owned foreign enterprise (WOFE) is currently the most popular structure for foreign investment in China. This is due to the increased legal acceptance of and support for the format from the Chinese government as well as the low success rate for JVs in general (and all of the horror stories that have resulted). For companies that want to sell equipment to China's environmental sector, a WOFE is a possibility, but for an engineering company it is not. According to Chinese law, foreign engineering companies are not allowed to establish WOFEs in China, though this will likely change with membership in the WTO. In general, it is best to establish a WOFE unless a partner offers something truly valuable.

The main advantage of establishing a WOFE in this or any sector in China is that the foreign company can operate freely without having to cooperate with a domestic partner, with all the disadvantages that can entail. At the same time, the foreign company forgoes advantages such as access to existing sales channels, local knowledge of sourcing, and help in government relationships. For equipment companies, the investment requirements (registered capital) are normally lower than the necessary operational investment, so this should not be a major hurdle. It is really a question of whether the foreign company wants a domestic partner.

Some examples of U.S. environmental companies with WOFEs are BHA New Environmental Technology, PACT, and General Signal (Lightnin Mixers).

Procedures

Like the JV, the procedures for establishing a WOFE are now well established. The approving authorities are the same, and many of the document submissions are the same. It is important to remember that the Chinese authorities typically scrutinize WOFE investments more closely than JVs, with the objective of ensuring that they fully comply with relevant policies (both published and unpublished). In general, with the Chinese authorities' emphasis on capital investment and technology transfer, there is a preference for foreign companies to enter into JV agreements. The realities of declining foreign direct investment, regional competition, and the general dissatisfaction with the overall success rate of JVs has forced a gradual, and continuing, loosening of WOFE investment regulation application. It is thus very important to investigate the issues of WOFE investment on a case-specific basis with the assistance of professional, local (Chinese) expertise.

The following documents are needed for WOFEs (the original is needed unless otherwise specified):

- Application form for registration
- Constitution of enterprise with foreign-investment
- Feasibility study report
- Registration certificate and legal representative certificate (recent certificate issued by the registration institution); if investment is in one's own name, house property certificate and domicile certificate
- Notarized trust deed that the legal representative gives to the trustee
- Credit certification issued by the savings bank of the company
- Balance sheet of the company for the last three years
- Plan for balancing income and expenditure
- Checklist of imported materials
- Approval of related managerial departments (attached to state-controlled projects)
- Permit and quota instructions issued by the MOFTEC if the import-export license is involved
- List of directors (with the signature of the legal representative of the foreign company and the official seal)
- Letter of appointment of general manager and vice general manager (with the subscription of the legal representative of the foreign investment company)
- Application form for registration of company with foreign-investment
- Registration form of the legal representative of company with foreign-investment
- Other documents as necessary

Strategies for Using Agents and Distributors

Using Agents and Distributors in the Environmental Sector

Using agents or distributors is an option for companies with an official China presence and those without one. This really applies only to sales of products or equipment. Foreign environmental service companies may have partners or affiliates in different parts of China, but these are not classified as agents or distributors. For a U.S. company whose products have only limited application in China, or that wants to get into this market incrementally, this is a strong option. For example, LMI, whose chemical feed pumps use leading technology but do not have a huge market, has been able to penetrate this market successfully through the use of distributors managed from a representative office.

The U.S. DOC has an agent/distributor search service. Details are provided in Figure 3.

Options for U.S. Companies

When considering the use of agents or distributors for the Chinese environmental market, U.S. companies should consider the following issues.

Choosing a Distributor or Agent. Companies can choose either a general agent (sometimes called a first-level agent) or a series of independent companies. There are companies in China that specialize in selling environmental products, though many of these will carry products from competing companies, if not competing products. According to many of these companies, as long as they do not sell the same basic models from different companies, there is no conflict, though U.S. companies may not see it that way. If a U.S. company chooses to have a network of independent distributors in China and to have no presence in the country itself (such as through a representative office), they should really consider how these distributors will be managed.

If a company aims to sell a lot of smaller units (as LMI does), then a larger network is often better. If the aim is to sell large units or packages of equipment (see AGSR below), then a single distributor or agent who has access to the right relationships and information sources may be best.

Segmentation and Control. Segmentation can be accomplished either by geography (region) or by product type. There must be some means to segment or divide responsibilities, or poaching can become a real problem. Also, while some distributors/agents operate nationwide, many are regional, and their sales scope should be limited to the region in which they are strongest. Normally, regional segmentation is the cleanest and best way to set up and manage a network, and if there is only one product, then this is a given.

Credit. Whether to give credit to distributors or end users is a key consideration. One U.S. company says that its distribution network has been a success precisely because it does not give credit of any sort. In some cases, distributors will offer credit themselves, while the foreign company bears no responsibility to do this. They are usually in a better position to do so, as they know the end users better and often know who will honor the arrangements. It should be kept in mind that legal debt collection remedies in China are only marginally effective and are time and resource intensive, and the process is often stacked in favor of the local enterprise. Thus, credit, if important and necessary, should be offered by the distributor. If trusted and capable distributors have been established, then policies and financial arrange-

Figure 3. U.S. DOC Agent/Distributor Search Service Flyer

**Agent/Distributor Search
CHINA**

Exporters! Qualified representatives are out there, and our Agent/Distributor Search (ADS) Service can help you find them.

Looking for representatives in China to expand your business and boost your export sales? We will locate, screen, and assess potential agents, distributors, and representatives for your business.

If your firm is small or new to export, or if you don't have resources for research or overseas travel, this service provides an easy, economical, quick-access opportunity to enter the burgeoning China market.

You will receive information on up to six potential agents or distributors, screened from a large pool of candidate firms. Normal turnaround time is 30 to 45 days after we receive your company's product literature. Each report is developed from on-the-spot research by U.S. Embassy staff.

Cost-effective: For a fee of **\$250** for each product line—the cost of a few phone calls to China—the ADS Service provides the contacts you need to launch your marketing efforts in China.

As the next step, if you plan a visit to China you may also order our **Gold Key Service** for appointments with prospective agents and distributors and key government officials responsible for your industry. ADS clients are eligible for a 25% discount on the Gold Key Service.

To order your ADS, contact your nearest **U.S. Department of Commerce District Office** or **U.S. Export Assistance Center** and ask for the ADS. A trade specialist will verify your product's marketability, help you prepare product literature packages, and assist you in sending your product information to us—or to other markets. China is a regionally diverse market, so **order a separate ADS for each region**: Northern and Central China (Beijing), Eastern China (Shanghai), Northeastern China (Shenyang), Southern China (Guangzhou), and Southwestern China (Chengdu).

In conducting an ADS search, we try to serve our U.S. client well by casting our net broadly. Existing agents in China are extremely likely to learn of our search even if we do not contact them. Therefore, under no circumstances can we promise confidentiality or guarantee that an existing agent will not know about the search. In fact, we strongly advise our ADS clients to tell their existing representatives up front. Please consider this policy before deciding whether to proceed with the ADS.

What you will need:

- Your **check**, issued by a major U.S. bank, for **\$250** (for each product line) paid to "The U.S. & Foreign Commercial Service" at your nearest U.S. Export Assistance Center.
- To use the ADS service, 51% of each product line must be U.S. content.
- **Twenty** sets of your product brochures and **twenty one-page letters of introduction** on your company letterhead targeted at the prospective agent to introduce your company and product.
- Tell us **if you already have representation** in China (see note above).

To contact your nearest Commercial Service District Office/U.S. Export Assistance Center, call **1-800-USA-TRADE** or visit **www.usatrade.gov**. In Beijing, call the U.S. Embassy at 6532-6924.

ments between the manufacturer and the distributor can be organized so as to facilitate wider credit availability.

Service. Companies with no presence in China need a way for their products to be serviced. This can include installation and training, along with after-sales service. A domestic company will frequently balk at purchasing a product, with reason, if there is no dedicated service provider. If a company wants to set up sales offices throughout China or make an arrangement with a company that already has them, this is one way to solve the problem. Otherwise, it may have to rely upon the distributor to do so. In this case, it is of particular importance that the company pick distributors that can do the

service well. Otherwise, it will reflect negatively upon the foreign company's brand in China.

In some cases, foreign companies have developed separate service networks on a contractual basis. There are currently several major state-run companies that specialize in this business. Such a company might be an option for a foreign company that needs nationwide coverage. Alternatively, such a network can be established and coordinated through a general agent, a representative office, or more substantial investment structure.

Other Considerations. These include length of contract (normally one year), sales incentives, means of penalizing distributors, inventory and spare parts, and assistance in importation of products.

Recommendations for Using Distributors

The basics of finding and using distributors in China are the same as in the United States. The following characteristics are desirable:

- Familiarity with industry, product, and application
- Familiarity with customers
- Sufficient business experience and scale
- Sufficient technical capabilities
- Ability to communicate effectively
- Good credit and reputation

In addition, it is often critical in China for the agent or distributor to have good relationship within the government or other end-user groups. In China, such relationships are called “Guanxi.” Guanxi is often talked about in conjunction with doing business in China. It is extremely important, especially in project-based work. Guanxi does not usually (but sometimes does) replace price and quality, but it always makes the difference in highly competitive situations. It is also critical in discovering business opportunities in the first place.

Recommendations for Direct Investment

If a company thinks it can succeed in China, then setting up the investment is just a matter of procedure. Investments, if done according to law, are almost always approved, though some take longer than others. As environmental products are diverse, the government’s official position on investment in these products is mixed. For example, the government thinks that, in general, domestic water treatment equipment is at or near international standards, so it does not encourage investment in this sector but does not officially restrict or ban it. No U.S. company contacted for this report could recall a legal investment in the environmental industry that was rejected by the government.

The Decision to Invest

It should be re-emphasized that the most important decision is whether to set up local production and in what capacity. Direct investment does not need to mean millions or tens of millions of dollars invested or very high operating costs. Unless a company is a completely dominant large player, such as General Motors (\$1.5 billion invested), it is often best to start small and grow as the company’s sales grow and as the company gains a better understanding of the market. It is also possible to invest incrementally. For example, General Signal started in 1995 with an investment of only \$500,000 and grew

its market in mixers slowly. This is also important because, in the environmental market, end users can be very slow to switch suppliers and purchases or contracts can be infrequent, so business is slower to develop than in many other industries.

Small Investment, Low Costs

Some foreign companies, when they come to China to scout investment, are somehow led to believe that they need to come in with a bang and that the market will receive them with open arms. Companies that set up manufacturing facilities have tended in the past to have excessive operating costs, which often means too many expatriates. For example, an American pump company (NASH Engineering), which sometimes supplies pumps for environmental operations, has one part-time expatriate in China, whereas its competitor (a subsidiary of Siemens) has five. Large U.S. companies, such as General Electric, are the leaders among foreign companies operating in China in localizing management, and U.S. companies with an eye on this market should take note. There is no better facilitation for the Chinese market than to have good local staff.

However, localization can be carried to an extreme. There is fierce competition for qualified senior-level management, technical, and sales staff in China. There have been many instances of local staff, far removed from direct supervision and not having long experience or deep roots in the company, getting into various forms of trouble. These have ranged from bad management methods and decisions to poor business practices to outright fraud or kickback-related activities.

Consult with the Right People

The U.S. DOC (www.usatrade.gov) is a good resource for environmental companies that want to invest in China, as this is one of the industries they pay particular attention to, and they know the ropes. It is also invaluable to talk to U.S. or other foreign companies that have a presence in the Chinese environmental market. As mentioned in Chapter 1, these people know the market firsthand and can be excellent sources for learning what to do and not to do.

Strategies for Partnering

Finding the Right Partner

There are basically three instances in which a U.S. company may have to find a partner in China’s environmental industry:

1. To form a JV
2. To find an agent or distributor
3. To subcontract engineering services

What follows is most applicable to the first point, which is finding the right JV partner. The other areas are addressed in other parts of this chapter. Assuming that a company has decided that a JV is the best way to go, the following recommendations are provided.

Key Variables to Consider. There are many variables to consider, and a few key ones:

- Technology transfer
- Type of domestic company
- What the U.S. company wants from the domestic company
- How the domestic company will fit into the U.S. company's long-term China strategy

Figure Out What You Want from a Partner. For an environmental-equipment manufacturer, this could mean access to an existing sales network, relationships, help with the government, or filling procurement and subcontracting needs. Depending upon the strategic needs of the U.S. company, all of these can make sense, and the domestic company should be assessed in some measure on its ability to fill these needs. For an engineering company, project leads and relationships, the ability to get projects approved, and relationships with subcontractors (or themselves providing these services) are of more importance. There are, again, few examples of U.S. environmental engineering companies establishing joint ventures in China. An environmental engineering company may strike up informal partnerships with domestic design institutes, but these are not contractually binding (unless on a per-project basis).

Identify Potential Partners. One place to start in finding partners is the profiles of domestic companies in this report. This, however, is a short list, though it is not difficult to get a list of companies in a particular product category from the Chinese government or U.S. DOC. There are thousands of environmental companies in China, though some consolidation is taking place. Another place to look is several of the industry zones listed in Chapter 3. Four of these zones, Yixing in particular, have numerous environmental companies and will probably have an idea of which companies are looking for foreign partners. Another good method of finding potential partners is through exhibitions. There are several environmental exhibitions per year in China in various cities (the Shanghai exhibition is normally in November). These are great places to meet companies, network, and learn about the industry, though an interpreter may

be necessary. Some key exhibitions are listed in the List of Contacts, and the DOC may have information on other (e.g., regional) ones. Finally, many of these companies have their own Web sites, which are normally in Chinese but still provide a way (with some language assistance) to do initial investigation before coming to China.

Consider the Type of Company

There are few reasons for, and many reasons against, doing a JV with an SOE (or collective). There are growing numbers of stock and private companies now in China, so teaming up with an SOE is merely an option. The key is to form a balance in terms of power and benefits. SOEs can be powerful and may have strong influence in the local or provincial government (of which, technically, they are a part). If the U.S. company is of some size, like Emerson Electric (Fisher Rosemount) or ITT, there is more balance. Combining a small U.S. environmental company and an SOE of some size can create problems. No domestic companies, SOE or not, should be expected to follow the letter of an agreement without an incentive to do so. It is particularly risky to bring in technology, even through an official transfer, and at the same time give the partner control of the market distribution. Much environmental technology, while advanced, is less difficult to reverse engineer than other technologies. A company may find itself competing against its own product within a short time.

Investigate the Company

The need to investigate the company is a given in any partnership, but in China it is not a formality, and the investigation should be especially thorough. In most cases, an off-the-shelf or off-the-Internet finance report will not do. It is useful to contact the company's clients, suppliers, and even competitors for some background information. Companies in China often keep several sets of accounting records, so inspecting the candidates' books should be done with this in mind. Probably the most important thing is to feel comfortable with the management of the company after intensive dialogue: that they understand the basics of your business, that they know what to expect, and that they are reasonable people.

Investigation should, ideally, be conducted both in person and through the use of in-country service providers. In addition to a direct site visit and discussions, it is highly advisable to do serious research into potential partners. The following is a checklist of materials and actions that are recommended prior to final selection of a distributor:

- A list of customers and interviews with customers

- A list of suppliers and interviews with suppliers
- Other companies represented and related interviews and recommendations
- Bureau of Industry and Commerce registration number
- Copy of Business License; verification that the scope of business is appropriate and legal
- Clear demonstration of technical competence
- Clear demonstration of sales competence
- Clear demonstration of ability to communicate

Some of these should be taken care of in person; others may be contracted. The local DOC representative can assist in arranging such service providers. There are also private parties that will do this for a fee, some on a custom basis and some from off-the-shelf material. Such companies include Dun & Bradstreet, Pinkerton, GCiS (the authors of this report), some law offices, and various consulting companies.

Investment in Industry Zones

About Industry Zones in China

A foreign company that wants to set up localized production in China, either with a JV or a WOFE, often chooses to do this in a designated industry zone, which can have the following advantages:

- Tax breaks
- Easier registration
- Superior infrastructure and transportation access
- Proximity to other companies, suppliers, or customers

These zones range across the eastern seaboard, even inland now, and offer facilities (land and utilities) and other benefits for companies to invest. Numerous zones are located in and around the Shanghai municipality. The benefits offered by industry zones and the rents vary widely, and U.S. companies are encouraged to shop around for the best one. Many industry zones now even have their own Web sites, some of which are listed in the appendix. There is, however, no substitute for touring these zones in person.

At present there is one official zone (Yixing) for environmental companies, located in Jiangsu Province near Shanghai, and there are plans for two more, in Dalian and Hebei. The details and stated benefits of Yixing are listed in Chapter 3. There are also a few other zones that place emphasis on the environmental industry among others. An environmental company may be directed to invest there by the government, though a U.S. company by no means has to invest in one of these zones.

Yixing now has an area of 20 square kilometers and a total of 280 companies with investments, nearly 60 of which are foreign and over 50 percent of which are environmental. Yixing will help companies with registration and staff housing among other forms of assistance. Yixing offers companies three tax-free years, with the fourth and fifth years at half the regular rate. The zone is very centrally located, though harbor facilities and major highways are not proximate. For other information on this zone, please see Chapter 3.

Considerations for Choosing the Right Zone

Choosing the right zone depends on several factors:

- General benefits
- Where the company's (potential) clients are located
- Where the company's main suppliers are located
- What sort of labor pool the company requires to meet its needs
- Price versus reliability
- Owner or sponsor of the zone
- Proximity to major city
- Strengths of Chinese companies in the zone

General Benefits. These normally include:

- Registration and other services offered
- Tax benefits
- Infrastructure (power supply, etc.)
- Logistics (proximity to ports, highways, and rail lines)
- Price
- Facilities

The features and benefits of several zones are provided in Chapter 3. Which of these are most important depends upon a given company's needs. Some are willing to pay a higher price to be in one of the Shanghai/Pudong or Beijing zones, where infrastructure is more reliable and logistics may be better. Furthermore, the WTO may erase many of the tax benefits. Some of these benefits cannot be put on paper. For example, an industry zone may have an adequate power supply, but this does not mean that it always functions properly. Zone management is also important. It is best to investigate these factors by talking to other companies in the zone.

Locations of Clients and Suppliers. If major suppliers, and especially clients, are in or proximate to an industry zone, this is a major incentive to invest in the zone. In fact, the Yixing Zone believes that this is its greatest benefit. This depends a great deal upon the particular company and its market. Numerous environmental companies have set up in Yixing, though many of

the U.S. companies in the market do not see the benefits of being there, as their clients are scattered around the country.

Labor Pool. Depending upon the manufacturing skills needed for production, a company may find that its labor needs are not met by investing in zones that are not proximate to metropolitan areas, whereas others may have no problem. If factory skills can be easily learned, the location of the zone should not be an issue. A company should also consider whether its business (finance and marketing) executives and staff will operate out of the zone and if the commute is feasible. This includes the general manager. If a U.S. national, he or she may not want to live outside commuting distance of a major metropolitan area.

Sponsor of Zone. Some zones are nationally sponsored and some locally. This is important, because in addition to the quality of the zone, issues such as company registration and operating regulations are also handled or influenced by the zone operators and/or local officials. Some U.S. companies believe that it is best to stay away from the locally sponsored zones, with the exception of municipalities with a strong track record, such as Pudong.

Choosing the Right Zone

The most important preparation for choosing a zone is to collect full information on a selection of zones and to thoroughly compare them. In addition to touring the zone, it is also a very good idea to discuss the zone with a representative of a foreign company that has already

invested in it. A company can start with the zones profiled for this report. Industry zones sell their space, and as in any property market, may represent their property falsely, so U.S. companies are advised to fully investigate their options. Finally, one U.S. company operating in China suggests that there may be greater tax breaks and easier registration for investing in one of the inland provinces.

Market Activity in the Sector

Foreign Companies Active in the Market

Many foreign companies are active in the Chinese environmental market, though U.S. companies only make up a small portion of them. Relative to other industries in China, in fact, representation by U.S. companies in this market is not strong. Even a dominant player such as U.S. Filter has only recently established a representative office in China. The number of non-environmental companies that sell products to the sector is greater than the number of dedicated U.S. environmental companies there. U.S. companies contacted for this study that have entered this market have a good understanding of its challenges, and many, but not all, are meeting with success.

Engineering Companies

There are both dedicated environmental-engineering companies and general-engineering companies active in

Figure 4. Engineering Companies Active in China’s Environmental Sector

<i>Company</i>	<i>Vehicle</i>	<i>Scope</i>
ERM	JV	Focus on environmental auditing, assessments, training, and more for private and public projects
PACT	WOFE	Specialists in industrial water and wastewater treatment
Degremont	JV	Water treatment engineering and equipment
CDM	Hong Kong representation office	Full service environmental engineering, with focus on foreign-funded projects
Sinosphere	Representative	Environmental consulting and advocacy
CH2M Hill	Representative	Full-service environmental engineering, with focus on foreign-funded projects
Thames Plc	JV	Built and operates water treatment plant in Baoshan and Shanghai with other operations
Montgomery Watson Harza (MWH)	Representative	General engineering and construction, including industrial facilities, power plants, etc.
Black & Veatch	Representative	General engineering and construction
Fluor Daniel	Representative	General engineering and construction

China's environmental sector. Camp, Dresser & McKee (CDM) is an example of the first, and Black & Veatch is an example of the second.

ERM China. ERM is a medium-sized environmental-engineering company with a five-year presence in China. ERM concentrates on the consulting side of environmental engineering, such as environmental impact assessments, ISO 14000 compliance, HWM, advice and training. Much of its work comes through foreign-funded projects (WB and ADB) and smaller projects for foreign companies operating in China.

PACT. With six years in China, PACT is a small environmental-engineering company that is concentrated mostly in China. PACT has carved itself a niche designing and managing the construction of industrial wastewater and water treatment projects for foreign companies. The company is sometimes called in to modify existing wastewater treatment systems and manages the process from design to equipment procurement and performance.

Black & Veatch. Black & Veatch is a full-service design, engineering and construction company, with several years of experience in China and many projects under its belt. These include three power plants and many manufacturing facilities. For most of these projects, the company takes responsibility for the environmental element of the project, which it often outsources. Like many foreign companies in China, Black & Veatch is localizing to a great degree and tightening operations.

Sinosphere. Sinosphere provides strategic planning, environmental management, and socioeconomic-development services in China. Utilizing capabilities developed from information and experience accrued over the last decade, Sinosphere supports decision-making and advocacy for private institutions, industry, and development agencies.

CDM. CDM is one of the most active large, full-service environmental companies in China. With significant operations in Hong Kong and marketing in China, CDM specializes in foreign-funded projects. For a given project, it can provide services such as project management, environmental assessments and auditing, and equipment procurement.

Equipment Companies

U.S. companies selling equipment to China's environmental sector greatly outnumber engineering companies. The disparity is magnified when all the companies that sell products through agents are considered. Many sell equipment on a per-unit basis, while a few offer solutions packages. Several of these companies are shown in Figure 5.

Fisher Rosemount. A subsidiary of Emerson Electric, Fisher-Rosemount is one of the world's leading ana-

lytical-instrument companies, with a manufacturing presence in China since 1992. In China, the company sells controls, flow measurement equipment, and test equipment for both water and air applications. Fisher-Rosemount has been very active (JVs and WOFEs) in the industrial market but has only recently seen much interest in its products from municipal and public end users. The company sells equipment package solutions to this market.

General Signal. The Lightning division of General Signal sells mixers for a variety of applications in China, including water and wastewater treatment. They are sometimes contracted by an engineering company (e.g., Fluor Daniel) and sometimes by domestic end users. General Signal started small in 1995 and has grown solidly since. Business picked up for them in 1999, and while the environmental market is not their largest, they are optimistic about it.

Monsanto. The Envirochem unit is a small but active part of Monsanto in China. The unit sells RCO (catalytic oxidizer) and odor control equipment, such as Bioton (Monsanto's biobed filter). Naturally, these products rely on chemical technology. Monsanto sells mostly to domestic end users but is getting more interest from foreign-funded companies. These products are currently imported, but the company may set up local production in the short term.

Filmtec. The Filmtec unit of Dow has been promoting its reverse-osmosis membranes in the China market for about eight years and has gradually increased sales to gain (in their estimate) 40 percent of the market. These membranes are mainly used in water treatment systems.

WL Gore. WL Gore, famous for its Gore-Tex technology, sells particulate filtration systems to both foreign companies and domestic end users in China. In addition to its proprietary materials technology, Gore approaches this market as a provider of high expertise and systems solutions and has been fairly successful selling to local companies this way. Gore has a WOFE in Shanghai.

Case Studies of Environmental Projects

Five case studies of environmental projects by foreign companies are provided below. For reasons of confidentiality, some information has not been included. The cases include:

1. A wastewater treatment system for a company with foreign investment;
2. A U.S. environmental-engineering JV;
3. A foreign-funded municipal project;

Figure 5. Representative Equipment Companies Active in China's Environmental Sector

<i>Company</i>	<i>Vehicle</i>	<i>Product</i>
ABB	Foreign Enterprise	APC and various solutions
AGSR	Agents	Oil spill equipment
ALB Klein	Representative	Various imported equipment
Alfa-Laval	JV	Sludge centrifuges
Baker Hughes/EIMCO	WOFE	Water and wastewater treatment equipment
BHA	WOFE	APC, with emphasis on indoor air
BOC	FE	Water and wastewater treatment (e.g., aeration) equipment and solutions
Donaldson	Representative	Indoor APC
Dow Filmtec	Many*	Reverse-osmosis membranes
Fisher Rosemount	JV(s)	Analytical equipment
Flottweg GmbH	Representative	Centrifuges, belt presses, other wastewater treatment equipment
Fluke Corporation	Representative	Environmental controls
General Signal	WOFE	Mixers (Lightnin brand)
ITT Flygt, Goulds	JV	Various pumps
LMI (Milton Roy)	Representative	Chemical feed pumps
Monsanto	WOFE	Filtration equipment
Nikuni Pumps	JV	Pumps
Shanghai KAWAMOTO	JV	Pumps; blowers
US Filter	Representative	All kinds of environmental equipment and project management
WL Gore	WOFE	APC filters

* The structure of Dow in China includes numerous vehicles.

4. Selling equipment through agents (a Canadian Company);
5. APC equipment from a U.S. JV.

An Industrial Wastewater Treatment System for a Foreign Company

PACT, profiled above, installed a wastewater treatment system for a foreign company in Jiangsu in 1999. The client was a multinational design and engineering company that built the entire plant. The managing director of PACT has been active in China for over six years and developed PACT to become very well known in this industry among foreign companies. Thus, when the client called, PACT (being local) was able to respond quickly and at the same time meet the international bidding requirements that the client expected. Being active in this market, PACT is often asked to bid on projects of this nature. The bidding, while not open to every company, was done by invitation to at least four companies. The decision came down within three months of the bidding.

Client. A multinational petrochemicals company; polystyrene plant.

Place and Time. Jiangsu Province, 1999.

System. Dissolved-air flotation followed by extended aeration biological treatment.

Bidding. Open, with about four or five companies invited to bid.

Specifications. Influent, high chemical oxygen demand (COD), oil and grease, and hydrocarbons. Effluent COD, 80 milligrams per liter; biochemical oxygen demand (BOD), 30 milligrams per liter; oil and grease, 10; 250 cubic meters per day capacity.

What PACT Provided. Design (including fabrication drawings), engineering, project management, and equipment procurement; a local design company signed off on the project.

Cost and Timing. \$500,000 (all inclusive) six months.

Equipment Used. Dissolved-air flotation (from a domestic company); oil skimmers (from U.S. company, purchased through China agent); blowers (from a domestic company); steel tanks (fabricated by PACT locally); many instruments, including an in-line COD analyzer (from a U.S. company).

Total Staff Necessary to Maintain System. Two.

Engineering Subcontracted. Detailed engineering supervised by PACT.

Why PACT Got This Project. According to PACT, they received this contract due to local presence; understanding the requirements of the client, the design institute, and the local environmental agency; combining foreign and local content for a competitive bid; and references.

Major Problems or Difficulties. None reported.

Other Comments. Each contract has its unique challenges that vary with the number of organizations involved in the project. A few such organizations are the local contract authorizing agency, the local environmental agency, the design institute responsible for the project as a whole, and the local municipality.

What U.S. Companies Should Note. First, PACT was able to get this work because they are local. They established good relationships with the general contractor, can accept RMB, and can get the project approved and completed. Second, PACT was able to find some equipment, such as blowers, of suitable quality from domestic sources. This underlines the point that the market for foreign equipment in China is very select. Moreover, the foreign equipment was purchased from the China distributors for these products, thereby underscoring the need for some sort of presence in China in order to sell products directly to Chinese companies.

A Major Multilateral Foreign Agency-Funded Project

The Suzhou Creek Project is one of the major current multilateral, foreign-funded environmental projects in China.

Background. The Shanghai Suzhou Creek Rehabilitation Project (SSCRP) consists of a proposed series of wastewater interceptors and collectors for diverting 1.1 million cubic meters of industrial and domestic discharges per day that enter the Huang Pu River through tributaries and canals. A system of pump stations, locks, and gates will help move the river water, which tends to stagnate because of tidal influences at the mouth of Suzhou Creek.

Technical Objectives. To achieve a class IV water quality standard in the lower 24 kilometers of the creek and a class III standard in the upper 29 kilometers by 2010. The immediate objective is to substantially remove the polluted water and contaminated sediments, improve the creek's color and smell by 2000, and to restore the class V standard as an annual average in the lower reaches and the class IV standard in the upper reaches by 2003.

Project Objective. The objective of the SSCRP is to remove discolored and foul-smelling water from the creek, restore water quality by 2004, and relocate night soil and solid waste collection wharves along the creek banks. The total project is scheduled to last until 2010.

Funding Agencies. ADB and others.

Executing Agency. SSCRP.

Funding and Timeline. The total project will cost an estimated \$876 million. An ADB loan of \$300 million has already been secured; the Chinese government will provide some funding, and foreign aid agencies have been invited to provide the remainder. The project officially started in 1998.

Bidding. According to ADB guidelines.

Foreign Companies Participating:

CDM. According to CDM, their project review helped secure \$300 million worth of ADB loan funding. CDM has helped with technical feasibility and cost analyses of planned facilities and with troubleshooting strategy decisions. For instance, CDM advised that dredging the river's heavily polluted sediments is less cost-effective than removing pollution sources. CDM operates this market mainly out of Hong Kong but is active enough in the market to have established strong relationships with local Shanghai authorities and is able to get things done effectively on the mainland.

ERM. ERM is providing technical assistance and other services for the SSCRP. The awards for some of these other services have yet to come in. ERM, with offices in Beijing and Shanghai, is well known by Chinese government officials and is frequently called upon to deliver services in this sort of project.

BOC. BOC is a British Gases industrial gases company with a WOFE in Shanghai, recently acquired by American and French interests. BOC is also bidding for a portion of this project, to treat creek pollution by the insertion of pure oxygen.

What U.S. Companies Should Note. All three of these companies have a local presence in the China market, and the first two (environmental specialists) also have an active presence in Hong Kong. For a project like this, a local presence is not mandatory, but all three companies also maintain active intercourse with the local officials, and the SSCRP in particular. Because many domestic companies will participate in this project and there could be opportunities for partnering, a local presence is necessary. Moreover, as margins for ADB projects may not be as large as for other projects, it helps to be able to operate in China in a cost-effective manner. Thus, while it is possible to bid for projects outside of China and then come in and execute them, this case shows that it is advisable to have some local presence. There are, for example, many other U.S. environmental-engineering companies as large or, as in the case of ERM, much larger than these companies that do not participate in projects like SSCRP.

Selling Equipment Through Agents

AGSR is a Vancouver, Canada, based company that specializes in oil spill response equipment manufacturing and sales, training, and consulting. It is one of the world leaders in this field. It successfully competed for a portion of the Yantai (Shandong Province) Oil Spill Response Team procurement. The Yantai project was a model project of the ninth five-year plan. It is intended to be a test bed for oil spill response centers to be established all along China's coast.

Client. The client was the Yantai Maritime Supervisory Bureau, which is directly under the Ministry of Communications (MOC).

Place and Time. The project is in Yantai, located along the north coast of Shandong province. It was originally scheduled to be completed in 1998, but due to project delays was only completed in early 2000.

System. The entire project consisted of providing oil spill response equipment, team training, a response command center, command center communications, a geographic information system (GIS), and command-and-control response training.

Bidding. The bidding was officially organized according to WB bidding rules, but owing to shifts in financing and project delays, was ultimately more of a hybrid between international bidding standards and practices and Chinese domestic standards and practices.

What was Provided. AGSR bid on the equipment portions of the project. Ultimately, they split the order with a European supplier. A wide range of oil spill response equipment was provided (oil skimmers of several sizes and types, motors, pumps, reel hoses, storage tanks, etc.).

Use of Agents. All of the foreign competitors used domestic agents to compete for this project. Thus, in the end, it became a contest between the relationships of the local agents more than a contest between the relative merits of the two brands of equipment.

The agent for the European competitor is a subsidiary of the MOC. This gave them a serious competitive advantage. At the same time, pressures for reform within the government opened up the possibility for AGSR's agent to enter the contest.

AGSR's Strategy. AGSR's agent's strategy was two-fold. The first (short-term) objective was to be successful in the immediate project by securing a portion of the Yantai order. The second (longer-term) objective was to secure its own, even stronger, relationships within this area so that it could become progressively more competitive as further projects came on line. AGSR was successful in the first objective, winning approximately 40 percent of the imported equipment order. In addition, the fierce competition between the two agents effectively

locked out any other competition from foreign companies not using agents or using weaker agents. It is too early to judge the results of the second objective.

AGSR contracted with one agent for all of China. They supplied all product materials and technical specifications. They also supported the bid with in-country visits and by hosting Chinese delegations. In addition to the strength of the agent, an important factor in AGSR's success was the quick and flexible support provided. Requirements changed numerous times during this process, and the documentation required was unprecedented in its detail. At one point, AGSR completely redesigned a product to meet MOC requests only to have it later dropped from the bid. (AGSR later went on to turn this into one of its regular products and has had excellent market success with it.)

Depending upon how it measures the future demand for its products in China, AGSR is considering setting up local production. This would be mostly assembly, with a few key components imported (AGSR would not disclose which). The emphasis would be cost-effective production for domestic market sales and some export to the general Asia market.

What U.S. Companies Should Note. There were several important keys to AGSR's success in this project. The first was flexibility. AGSR was able to move with the process rather than oppose or obstruct it. Second, this shows that for a limited number of end users, managing the process from abroad without a permanent presence in China is feasible and going with a single agent is best. This relies greatly on selection of the agent and having the patience to stay with the process, which in this case took about 18 months from start to finish. Finally, this is very much a niche product, and for more general environmental products this process may have to be modified.

An Environmental-Engineering JV

The case of Environomics is unique but could still offer U.S. companies, those involved in consulting and engineering in particular, some insight on entering and operating in China's environmental market.

Establishment of Investment Vehicle. Environomics was established as an environmental-engineering consulting JV in China in 1992. At that time, the operating procedures for establishing a JV were less clear, and Dr. Husayn Anwar, the founder, was able to establish this JV without some of the requirements that would apply today (a distinct foreign corporate partner, etc.).

Dr. Anwar had been a frequent visitor to China in the early 1990s and came to know high officials of the National Environmental Protection Agency (NEPA—since changed to SEPA). These officials later approached Dr.

Anwar about establishing an environmental-consulting company. NEPA wanted to have such a company operating in China that could meet international standards using international methods. NEPA had two specific purposes: to form a prototype consulting company that could in turn be emulated by other domestic companies and to train as many environmental professionals as possible.

According to Dr. Anwar, both of these purposes have been fulfilled, with numerous domestic environmental-consulting companies started by people connected with the company. Officially, the JV was done with the Chinese Research Academy for Environmental Sciences (CRAES), which is the main think tank of SEPA.

In 1994, ERM took a 40-percent investment in Environomics. ERM, profiled above, is one of the world's most prominent environmental consulting companies. ERM purchased an additional 35 percent later.

Operational Structure. While Environomics' first client was a domestic company, 90 percent of its subsequent clients were foreign companies. Furthermore, the domestic spin-offs and copycats were not able to compete well for foreign clients, as they could meet neither the marketing nor the technical requirements of foreign clients. In this JV, the foreign side supplied the expertise while the Chinese side supplied security, inside information, and some personnel.

Environomics' main services included providing advice on environmental auditing, due diligence, ISO 14000 standards, international development, and later occupational health and safety issues, such as asbestos removal.

Overcoming Challenges. The company was able to start rather successfully, earning \$600,000 in its first year and gaining many clients. There were some challenges, however, both internal and external. While Environomics maintained a good relationship with the most senior members of SEPA/CRAES, others in the organization whom it had to work with on an operational basis were not so helpful, might not have been placed in the JV based upon their level of ability, and were not able to contribute much to the general effort. Dr. Anwar and his crew dealt with this through attrition: having resilience and working with the people to work out a good system. This took a minimum of two years.

Environomics/ERM was also denied projects because they refused to pay kickbacks, but Dr. Anwar believes that this made them stronger in the end (see below).

What U.S. Companies Can Learn from This. What Dr. Anwar (now running Sinosphere, profiled above) can recommend to U.S. environmental companies from his experience with Environomics is summarized below.

1. Don't choose a general manager merely because he or she is of Chinese (Han) ethnicity. Foreigners should realize that while they are ethnically Chinese, people from Hong Kong and Taiwan are not considered locals by mainland Chinese and may not bring the insights, connections, and implementation ability that a local would.

2. It may be best to choose a foreign manager who is relatively young, knows the field (the technical side), and has a great deal of drive. The foreign manager should be in China because they want to be, not just as an assignment. Furthermore, the manager should work to establish a strong Chinese team, which will form the base of operations.

3. The home office should listen to their person in China and not dictate to him or her in an uninformed manner. Furthermore, the home company should try not to see things just through the eyes of their Hong Kong or Taiwan office.

4. Be patient and resilient. Do not expect immediate results.

5. As for the investment vehicle, Dr. Anwar recommended first coming to China with a representative office and then investigating potential partners. Too often companies come to China and approach SEPA, which may recommend a partner based on connections rather than suitability. Acquiring an engineering company in China may be an option, but this is not recommended by Dr. Anwar because most of these companies will have practices, management, and relationships that are unsuitable to run the company in the right way, and they will be very difficult to change.

6. On the operations side, Dr. Anwar recommended hiring two key Chinese personnel right away, one senior, who knows the system from the inside and can network and get information, and the other junior, who can be trained on the technical side and learn things the right way. He also recommended that companies get out of the U.S. consulting-business mode. This does not mean altering the technical service but rather being flexible in areas like billing, marketing, management, and the like.

7. Dr. Anwar strongly cautioned against using kickbacks to get projects. While this is common in China, and some projects can only be gotten in this way, it can create problems for an environmental (or any) company's long-term success in China. If a company develops such a reputation, then kickbacks are always expected; it will turn some clients off and attract the wrong elements.

8. Always be vigilant, and never relax.

9. Environmental-engineering and consulting companies in China should target domestic end users. This

market may not be strong now, but it is growing, and a company needs to be active in China for some time developing the market before it will bear fruit.

An APC Project

WL Gore, profiled above, was contracted for an air pollution project in Xinjiang in November 1999. Gore got this job through aggressive sales work. As noted above, Gore has a WOFE in China and sells to many clients directly. The company purchased this system due to tightening local regulations. In its three to four years of actively selling its products in China, Gore has concentrated on taking the high road in terms of expertise and service. It is more expensive than the local companies but is perceived by many end users as an expert in the field and works on educating customers about its systems and APC in general. Gore has also placed a strong emphasis on training its sales staff to have this expertise.

End User. A domestic cement company.

Location and Date. Xinjiang; November 1999.

Contaminants to be Treated. Cement kiln dust (particulate plus gaseous emissions from the process).

Particular Pollution Control Requirements. Particulate, 50 milligrams per cubic meter.

Size of Project. Approximately 10,000 cubic meters per minute (effluent).

Service Provided. Gore performed the engineering consultation at no charge and also supplied the system, consisting of high-performance Gore-Tex membrane filters.

Engineering Outsourced. Gore found a local company to engineer and manufacture the “baghouse,” which is the actual filter system. Gore provided guidance and design parameters that determined the key operating parameters.

Bidding. Open (no further comment).

Lifecycle. Gore expects about five years from the current bag system, with the current parameters.

Testing. The client would do its own testing (aside from any government inspections).

Key to this Project. Professional sales effort by Gore representatives trained to sell.

Problems. None reported.

Key Problems after Operation. At the time of this study, the system was not yet fully operational.

Success of Project. Gore considers this a key success.

Project Cost. The project cost about \$1 million (all inclusive).

What U.S. Companies Can Learn from this Case. In the first place, this case shows that it is possible to

sell engineered equipment to domestic Chinese companies, from their own budget, and shows an example of greater government enforcement of environmental regulations creating opportunities in this industry. Second, it shows what a strong sales force can do, both in terms of reach (Xinjiang is in the remote northwest part of China) and ability. If this product were sold by a standard distributor, it should not be taken for granted that they could provide the expertise required for the system and/or convince the client to purchase the system. Gore believes from its experiences in this market, Chinese customers respect and appreciate thorough, professional, and educational selling approaches.

Strategic Issues in the Chinese Environmental Market

Technology Transfer

In the light of investment in China, technology transfer comes in two forms. First there is the contractual sale or transfer of technology to the domestic (Chinese) party. This may be a product, a process, a component, or even a method of management or control. The second form is the unofficial way, where a party (the domestic partner or another party) learns the technology through other means. This is usually legitimate, such as with a manufacturing process, but sometimes constitutes theft. Sometimes technology transfer is a prerequisite for investment, sometimes it is a way to obtain a larger stake in a JV (in lieu of a certain amount of registered capital), and sometimes it is a pure sale.

The demand for technology transfer in this market is driven by several forces.

The Chinese prefer to produce domestically. The reasons for this are a complex mixture of political and economic factors, but come down to the fact that many people in China still view competition and production as a zero-sum game and act accordingly.

End users and the government bodies that influence these industries in terms of policies, loans, appointments, and the like have a bias toward products that are made in China.

It is just easier to develop an industry through buying, copying, or stealing technology rather than developing it oneself. If foreign parties are willing to participate in this, because of the lure of a huge market, then the strategy is successful.

There are specific regulations for the official transfer of technology to the domestic partner in a JV, which are summarized below. Those transfers considered large

must be made through the Foreign Economic and Trade Committee, while others can be approved by provincial or municipal departments. In the environmental industry, it is again important to distinguish between equipment and services, as the regulations governing them are different.

Whether a U.S. company should transfer technology to a Chinese company in the environmental sector depends largely upon the company's goals in this market. Few foreign companies transfer their most recent manufacturing or other technology to China. For example, in the environmental industry, a German company set up a JV in the Yixing environmental zone with a transfer of the second-most-recent generation of incineration technology, including manufacturing technology. The most recent generation remains in Germany.

The practice of technology transfer and the reasons behind it will not come to an end with the WTO. They go quite a bit deeper than any treaty agreement and will take years to change. There is also the fact that parts of the WTO rules will be very difficult to monitor and enforce (see below).

Official Classes of Technology Transfer

As mentioned above, technology transfer can take many forms, and this is recognized by the government. According to the MOFTEC, the officially recognized forms of technology transfer are:

- Patent permission and transfer
- Proprietary technology permission and transfer
- Importation of computer software
- Brand permission and transfer (regarding the first two points)
- Technology consulting
- Other technology services
- Cooperation in design, research, and implementation
- Cooperation in manufacturing and production
- Import of equipment and production lines
- Import of special equipment
- Others

According to the MOFTEC, all organizations with the right to conduct business in China may introduce or transfer technology into China or appoint a third party to do so. Technology transfer must be in accordance with Chinese rules of investment.

Environmental Technologies in Demand in China

There are many environmental technologies in demand in the China market now, though this does not

mean that if a U.S. company brings these to China, either as a product or service or through technology transfer, they will be justly compensated. General areas lacking in technology include APC equipment and engineering, industrial water and wastewater engineering, remediation technologies, and high-technology equipment (e.g., instrumentation). The specific technologies needed are:

- High-power water pumps and other advanced water treatment mechanical products;
- On-site monitoring equipment;
- Industrial solid-waste treatment (SWT) and hazardous-waste treatment (HWT) technology;
- Advanced monitoring instrumentation;
- Advanced technology for removal of SO₂;
- Remediation technology (all types).

However, the fact that a company's technology is not listed here does not mean there is no demand for it in the China market.

Preventing Technology Theft

Technology theft is a reality in China and comes in various forms. On the other hand, what is considered technology theft in the West, such as patent infringement, is often not seen as such in China. While technology theft, defined by Chinese law, is a crime, uncovering and punishing it can be very tricky and in most cases is not successful. The best solution is not to have technology stolen or compromised in the first place.

There are no measures to protect technology that are specific to the environmental industry. The risk depends greatly upon whether a company is manufacturing an advanced product in China, using an advanced engineering or monitoring process, etc. It is important to keep this in mind. In general, companies use the following measures to prevent technology theft:

Assess Technologies. This means two things. The first is to determine which technologies they want to officially transfer to China. The second is to assess which technologies will be exposed when the company establishes operations in China. The second can be complicated, because it can cover not just products but processes and even management techniques. It is necessary to know what technologies are exposed before a company can determine how to protect them.

Scrutinize Staff. As in any country, it is very difficult to determine which staff is not loyal, is capable of stealing technology, or both. This does not mean that staff should not be scrutinized and monitored for suspicious behavior, have their backgrounds checked, etc. This should be done methodically.

Compartmentalize. Staff and departments that have access to technology should not have access to other technology and in some cases should not even have intercourse with other departments.

Use Consultants. There are security consultants like Pinkerton that specialize in working with foreign companies to prevent unintended transfer of technology. These companies have their own methods, which include compartmentalization and employee scrutiny. They emphasize that there are no real secrets to this; rather, the key is covering all bases thoroughly and methodically. Security consultants will usually work with foreign companies in an advisory capacity or even outsource security functions. There are also international and domestic lawyers who specialize in intellectual property and protect their clients through the legal system. If a U.S. company makes a technology transfer agreement in China, it is strongly advised to consult with an international law firm with deep experience in this field in China.

Common Sense and Company Regulations. One of the best tools to protect technology is common sense. For example, a highly sensitive manual should not be left in the open. Moreover, as the security consultants emphasize, precautions like this should be taken methodically. Also, many U.S. companies that establish operations in China have existing corporate procedures for protecting technology, which should be enforced with particular vigor in this market.

Subcontracting Engineering Services

In the environmental industry, foreign companies by law are not permitted to provide many of the services necessary for project completion. In general, most services beyond the design or management functions must be performed by domestic companies, which leads foreign companies to outsource engineering services. Aside from those required by law, there are many functions that the foreign company outsources or subcontracts because it does not have the resources or expertise to perform the functions in a cost-effective manner, or the project could be in another province, at a considerable distance from the foreign company's base of operations. The services are usually, but not always, subcontracted to a domestic engineering company or design institute.

Depending upon the project, the following types of work are often subcontracted:

- Project management
- Installation of equipment
- All sorts of construction
- Detailed engineering (for example, drafting)
- Procurement of local supplies
- Niche services (for example, drilling)

Possible Arrangements

There are many contexts in which a foreign company will need a subcontractor. For example, a foreign engineering company may be responsible for the design and construction of a project, or just one aspect of it, and will need to subcontract numerous engineering tasks. An equipment company will often need to outsource the installation and integration of engineering systems. While companies may want to circumvent or cut corners on the regulations that constrict foreign engineering companies in China, this is not recommended and could be risky.

A foreign company can choose among selected domestic companies with which to cooperate in subcontracting. These companies must have proper certification allowing them to perform the specific service (see below). For official environmental projects, these certificates are awarded by the MOC and the SEPA. The SEPA can provide a list of such companies. One American company with significant operations in China prefers to assign most of the subcontracted work to the design institute that lends its stamp to the project.

Problems and Solutions

Several U.S. companies that regularly subcontract engineering services report that it can be very difficult. The main problems, which are seen in many service markets in China, are that work can be below international standards, deadlines are not honored, and subcontractors demand more fees than the contracted price once the project is under way. It is the last problem that elicits the most complaints among U.S. companies, and it is rare to find a foreign company that has contracted for engineering services in China (in the environmental or any other sector) that has not run into these problems in a substantial way. At the same time, the foreign company is expected to meet deadlines and stay under budget.

In most cases, there is really no way around subcontracting. Depending upon their needs, U.S. companies that will be subcontracting engineering services in China are advised to consider the following strategies:

Pick Your Own Subcontractors. Sometimes foreign (and domestic) companies are influenced by domestic partners or associates in choosing a subcontractor. U.S. companies should, however, resist choosing a subcontractor based primarily upon the recommendation of the domestic party. The domestic party usually has no ill intent, but in making the recommendation they may have their relationship with the subcontractor in mind more than the quality that company can deliver.

Investigate Potential Contractors. Whether recommended by someone else or not, the first thing to do is a

little background investigation on the contractor. This should really focus upon relevant project experience, with references from a reputable party.

Do Thorough Due Diligence. Building on the previous point, the role of due diligence is very critical. Basic due diligence should be carried out personally on site. The initial due diligence should be as extensive as possible.

Use Frequent Visits and Inspections. Key suppliers or contractors with problems may require a person to be on site full time. Other contractors will need to be subject to frequent, unannounced visits. After time, the regimen can be relaxed.

Pay Less Attention to Standard Western Legal Terms and Conditions in Contracts. The Chinese typically won't even read these sections. They will flip through to the areas of key concern and most likely not even read the rest.

Be Flexible with Chinese Partners and Subcontractors. Many do not understand certain standard (Western) business methods. Two examples given were performance bonds and insurance coverage. Many Chinese companies do not understand these, nor do they know how to get them taken care of. For example, one company, when reminded of the 10 percent (of contract value) performance bond requirement, simply wanted to add 10 percent to its price, thus trying to restart negotiations. It turned out that they simply didn't know what such a bond was, had never made one before, and had no idea how to go about it. The company was a major SOE.

Focus on the People, Not the Company. U.S. companies with considerable experience in China recommend that it is the team, particularly the team leader, that will make the difference. Thus, a reputable design institute with a lot of experience is only as good as the team it sends out.

Have a Back-Up. A couple of U.S. companies active in this market choose a back-up contractor for key services in case things go wrong with the original contractor in mid-project.

Consider a Single-Source Contractor. This may not be the absolute cheapest way to run a project, but it can make for easier management. First make sure that the subcontractor has the expertise to supervise all the necessary work. It may be best to do this with a company one has worked with previously.

Build a Relationship. This goes for many businesses in China but needs to be said here because this is how foreign companies best deal with the problems of subcontracting: find, through trial and error, a good partner and stick with them. This may be necessary for each service but is the best course.

According to U.S. companies that operate in China and use subcontractors, there are competent, professional domestic companies available for contract. The key is to find and/or develop them to meet your standards.

The EPEDC

There are regulations, issued by SEPA, that govern environmental engineering in China. The most important is the system of certificates, known as the Environmental Protection Engineering Design Certificate (EPEDC), which companies must have to do projects. As shown here, certain certificates are needed for certain types of projects. These cover "environmental" projects, which range from municipal and industrial air treatment, water and wastewater treatment, SWT, and HWT to zoological projects. Also, some projects in China that in the United States are classified as Occupational Safety and Health Administration-related in China are considered environmental.

The certificates are:

- **First-Grade Certificate**

Project Type: No limits.

Investment: No limits.

- **Second-Grade Certificate**

Project Types:

Wastewater: effluent, less than 3,000 tons/day; COD, under 3 tons/day.

Air treatment: effluent gas, under 60,000 cubic meters per hour; single boiler and general industrial kiln dust removal facility, less than 60 tons/hour.

SWT: except hazardous waste.

Noise Pollution: no limits.

Investment: under 5 million RMB (\$602,000).

- **Third-Grade Certificate**

Project Types:

Wastewater: effluent, less than 500 tons/day; COD, under 0.5 tons/day.

Air treatment: effluent gas, under 15,000 cubic meters per hour; single boiler and general industrial kiln dust removal facility, less than 20 tons/hour.

SWT: except hazardous waste.

Noise Pollution: Can do basic design work.

Investment: under 1 million RMB.

(Note: "Investment" refers to engineering investment.)

Applying for an EPEDC

In order to apply for first- and second-grade certificates, companies need to apply to SEPA and to get the

approval of the local SEPA and the relevant government industry ministry. For third-grade certificates, companies apply to the local SEPA. Foreign design companies must have their design qualifications checked and approved by SEPA. At project completion, the engineering company is required to turn in the blueprint and design certificate to the appropriate (national, provincial, or local) SEPA.

Procedures for and Complexities of Getting Engineering Projects

For foreign-funded projects, procedures are complex and time-consuming, but U.S. companies will understand how to proceed, as these will reflect Western standards of project approval. The necessary procedures on the government side, as outlined above, can be cumbersome but can normally be navigated without an excessive amount of trouble. The key is to get the project signed off by a domestic design institute whose certification satisfies the project's scope. The following documents are also needed:

- Application form for industrial projects
- Enterprise constitution or agreement of business in partnership
- Capital assessment report
- Field certification
- Identification card of the legal representative
- Feasibility study report

For municipally or domestically funded projects, the situation is different. Here the process is especially complex and nontransparent. Bidding is often rigged or used for ulterior purposes (for example, to use the ideas or specifications from one company and give it to another). The process can take a long time, seemingly fade away for awhile, and then become very active. The decision-making structure is likewise complicated. As mentioned in Chapter 2, if the foreign company is not bringing funding, the market is very tough. This does not mean that U.S. companies should not pursue projects now or lay a foundation for future success. There are a few things to keep in mind:

Get the Company Established in China. This means setting up some sort of presence in the market, getting the word out, establishing meaningful relationships with authorities and/or decision-makers, and of course getting a feel for the market. Several U.S. companies confide that they lost their first project(s) in China only because they were newcomers and the decision-makers were not "sufficiently comfortable" with them.

Use a Trusted Representative Who Can Work the Inside Game. Unless the U.S. company has a signifi-

cant advantage in funding, there is usually no alternative to this. The representative should know how to work the inside game and at the same time have some sort of relationship or pathway to the decision-makers. Representatives in China often portray themselves in this light, so it is best to be selective. (*Note:* Many such representatives in China combine relationships with varying degrees of corrupt practices. Great care must be taken in the selection and use of such representatives to ensure that they do not violate the U.S. Corrupt Practices Act. This will sometimes put the U.S. company at a competitive disadvantage compared to domestic competitors or those from Europe or Southeast Asia. Nevertheless, many foreign companies report that they have been able to establish themselves without resorting to questionable measures.)

Identify the Decision-Makers. This is very "text-book," but in China can be a particularly difficult task as there are often several decision-makers operating with different amounts of influence at different levels. A good inside person will gain a good understanding of this for a particular case, though in some cases it never becomes completely transparent.

Be Selective in Projects. Pursuing even one project will be a great effort, so a company needs to be quite selective in the projects it pursues.

Get a Pilot or First Project. For domestic and foreign end users alike, U.S. companies in China report that it is of great benefit to have at least one successfully completed project on the mainland that people can actually go to see. Thus, the first project need not be of tremendous size.

In sum, if a U.S. company wants to compete for domestically funded environmental-engineering projects, it must be in China and must understand how things work in China. This usually means some time must be invested without immediate gain. Even then, the going may be tough; but to do otherwise will be a wasted effort.

The Potential Impact of the WTO

The agreement reached by the United States and China in November 1999 regarding the accession of China to the WTO has generated considerable excitement in the foreign business community. How this will affect business in China, and the environmental industry in particular, remains open to speculation, though certain developments are likely.

Import Tariffs. Import tariffs for high-technology products will be greatly reduced (replaced with a uniform value-added tax [VAT] for both foreign and domestic products), allowing many kinds of environmental

products to be sold in China at a much lower cost (see below for greater details). For lower-technology products or processes, such as steel fabrication (used, for example, in water and wastewater treatment), there may still be duties. Even if there are not, most of these will remain much more expensive than domestic products and largely uncompetitive. As shown below, equipment in the environmental industry falls into different categories, which have corresponding WTO provisions.

The reduction in tariffs will be clear and enforceable. For China not to enact such reductions would mean failure to comply with the treaty. Tariff reduction will afford U.S. companies the option of exporting to, rather than producing in, China. Such a decision will depend on the potential for the company's products and on the company's China strategy. There will still be many advantages to making direct investment in China, but, with tariff reduction, one of the largest of these advantages will disappear.

Market Entry. Foreign engineering companies will eventually be allowed to be majority partners in JVs or to set up WOFEs, whereas now they can do neither.

Technology Transfer. In the short term, there will be little impact from the WTO on technology transfer in the environmental industry. In the medium to long term, provided that China is more compliant rather than less, the WTO will mean greater protection of patents and other types of environmental-technology transfer from U.S. companies. It will also mean that U.S. and other foreign companies will receive more just monetary compensation for contractual transfer of technology.

Acquisitions. It will be easier for a U.S. company to acquire a Chinese environmental company and to gain access to its customer base. At present, this sort of acquisition, particularly of an SOE, is very difficult and is only approved under certain circumstances.

Psychological Impact. This cannot be quantified, but when China joins the WTO there will certainly be a psychological impact which will affect the environmental market. This is very general but nonetheless important and will likely result in greater interest by U.S. companies in this market and perhaps a greater willingness by Chinese companies to cooperate with U.S. companies.

Cautions on the WTO

Experts on China caution that even if China joins the WTO there are certain parts of the agreement that will not be enacted and cannot be audited by international bodies. Implementation is the key. For example, if the Chinese government still wants to give subsidies to domestic companies or unofficially support domestic companies in awarding contracts, there is little that foreign

bodies can do to remedy this. Other parts of the agreement, such as reduction in tariffs and changes in investment laws, will be nearly impossible to avoid and will certainly be real.

Accession of China to the WTO will create real benefits for U.S. companies in China, though it will not make the market. Companies will still have to compete in a tight (though growing) market with numerous domestic companies.

There is also the possibility, believed by many in the international finance community, that the yuan will float in the near future. A close examination of China's economic conditions, international trade position, and capital accounts (not detailed here) supports this expectation. This will result in a shift in the competitive position between domestic and imported products. It is recommended that any serious investment analysis utilize an exchange rate of 10 RMB to \$1 U.S. after 2001.

Relevant Details of the Agreement

The following details of the WTO agreement, relevant to the environmental industry in China, are provided by the U.S. Department of Commerce.

By Category

Eliminating Non-Tariff Measures and Conditions On Investment. China's commitments to eliminate non-tariff measures and certain conditions on U.S. exports and investment all enter into effect immediately upon China's accession to the WTO. At that time, China will:

- Implement the WTO agreement on trade-related investment measures (TRIMs);
- Eliminate and cease to enforce trade and foreign-exchange balancing requirements, which link a company's level of imports to its level of exports;
- Eliminate local-content requirements; and
- Eliminate export-performance requirements.

China will not enforce the provisions of contracts imposing these requirements. Contracts, particularly those establishing JVs or WOFEs, frequently contain such requirements as a condition for government approval.

China has also agreed that, subject to the other provisions of its WTO accession package, the government (at the central, provincial, and local levels) will not make conditional import licenses, quotas, tariff rate quotas, or any other means of approval for importation, the right of importation, or investment on whether Chinese companies can supply the products or on performance requirements of any kind. Thus, China cannot condition

its approval of an investment on whether a company provides offsets, transfers technology, uses locally produced goods, or conducts research and development in China.

Local Content. China has agreed to eliminate local-content requirements immediately after it accedes to the WTO and not to enforce provisions in existing contracts that impose this requirement.

These commitments combined with the other market-opening steps that China will take, such as cutting tariffs, eliminating quotas, and permitting U.S. companies to distribute products in China, will result in better access for exports and eliminate false incentives or requirements to use domestic goods.

Technology Transfer. China will eliminate technology transfer requirements and offsets as a condition for investment approval or importation. The terms and conditions of any transfer of technology will be agreed between the parties to a contract and not imposed by the government. Exports from the United States will no longer face this barrier and companies that want to invest in China can negotiate these terms without the government interfering. China will also have to provide better intellectual property protection for technology that is transferred and eliminate requirements mandating that the Chinese partner in a JV gain ownership of trade secrets after a certain number of years.

Other Improvements. Local-content requirements and technology transfer as a prerequisite for investment approval are only two of the practices that China will eliminate as a result of WTO accession. China will also eliminate export performance requirements and foreign exchange and trade balancing requirements. If these provisions are in contracts, the government will not enforce them.

As stated above, importation and investment will not be conditioned on conducting research and development in China.

By Particular Industry

Environmental Services. Foreign service suppliers may provide environmental consultation services through cross-border delivery without having to establish themselves in China. All other foreign service suppliers may operate in China through a JV.

Construction Equipment:

Tariffs. For construction equipment, China will reduce its current average tariff rate of 13.6 percent by over 50 percent to 6.4 percent. Reductions will commence upon accession and will be fully implemented by Jan. 1, 2004.

Tendering Requirements. Tendering requirements for non-government purchases will be eliminated within two years of accession.

Trading Rights and Distribution. Currently, U.S. companies' ability to do business in China is strictly limited because the right to engage in trade (importing and exporting) is restricted to a small number of companies that receive specific authorization or that import goods to be used in production. This limits U.S. exports. China has agreed that any entity will be able to import most products, including construction equipment, into any part of China. This commitment is phased in over the three-year period, with all entities being permitted to import and export at the end of the period.

China, which generally prohibits companies from distributing imported products or providing related distribution services, will permit foreign enterprises to engage in the full range of distribution services. These rights will be phased in over a three-year period for almost all products, including construction equipment. (See separate papers on distribution services and related services.)

Other Commitments. China has agreed not to apply or enforce export performance, local content, and similar requirements as conditions on importation or investment approval. To alleviate the uncertainty associated with China's inconsistent application, refund, and waivers of its 17 percent VAT, China has agreed to apply all taxes and tariffs uniformly to both domestic and foreign businesses.

Scientific Equipment:

Tariffs. China will reduce its tariffs on scientific equipment from its current average of 12.3 percent to 6.5 percent. Reductions will commence upon accession and will be completed by Jan. 1, 2003. If WTO members agree to and adopt the scientific equipment sectoral initiative that originated in the Asia-Pacific Economic Cooperation (APEC), China will join this initiative and eliminate its tariffs on these products.

Tendering. Tendering requirements for non-government purchases will be eliminated within four years of accession.

Trading Rights and Distribution. Currently, U.S. companies' ability to do business in China is strictly limited because the right to engage in trade (importing and exporting) is restricted to a small number of companies that receive specific authorization or that import goods to be used in production. This limits U.S. exports. China has agreed that any entity will be able to import most products, including scientific equipment, into any part of China. This commitment is phased in over the three-year period, with all entities being permitted to import and export at the end of the period.

China, which generally prohibits companies from distributing imported products or providing related distribution services, will permit foreign enterprises to engage

in the full range of distribution services. These rights will be phased in over a three-year period for almost all products, including scientific equipment. (See separate papers on distribution services and related services.)

Other Commitments:

China has agreed not to apply or enforce export-performance, local-content, and similar requirements as conditions for importation or investment approval.

China has agreed to implement the Trade-Related Intellectual Property Agreement of the Uruguay Round upon accession to the WTO.

China has agreed to join any of the advanced trade liberalization (ATL) sectoral initiatives, including the environmental-equipment initiative, adopted by the WTO members.

Chapter 3

Profiles of Companies, Industry Zones, and Environmental Industry Organizations

This chapter profiles 23 domestic environmental companies, six industry zones, and three environmental-industry organizations in China. Please note that none of these are officially recommended for partnering, investment, or association.

Domestic Environmental Companies

Following are profiles of 23 domestic environmental companies. While none of these are officially recommended, U.S. companies that wish to enter China's environmental market may consider partnering with one of these companies. This group is only a small sample of the numerous environmental companies in China, and these are by no means the only ones to consider. They were selected according to the following criteria:

Attitude Toward Foreign Cooperation. Only companies that would like to cooperate with a foreign company, with or without conditions, are profiled.

Type of Company. This varies, but a disproportionate number of stock and private companies are profiled, as these types of companies tends to be more market oriented and, as mentioned in Chapter 2, may make a more suitable partner for a foreign environmental company. SOEs and JVs are also profiled.

Geographic Mixture. Profiled are companies from the Yangzi River basin (including Shanghai), the Beijing-Tianjin corridor, the Northeast (Dalian, etc.), Guangdong, and some inland cities.

Size. This was not the most important consideration, though, in general, companies that might be too small for a U.S. company to benefit from cooperation with them were not profiled.

Experience with Foreign Companies. This includes both companies with such experience and those without.

Product Type. This varies. Some are design institutes (for engineering), while most produce various types of equipment.

Kelin Group. Wujiang Baodai Dust Removal Co., Ltd.

Telephone Number: +86 (512) 336-5180

Address: Bache Town, Wujiang, Jiangsu

Fax Number: +86 (512) 336-5888

Number of Sales Staff: 60

Number of Technical Staff: 30

President: Song Qi

Ownership (type): Stock

Major owners: Kelin Group

Year Established: 1979

Products/Services: dust removal instruments; pulse and anti-blow (40 kinds, more than 300 specifications); incinerators; installation; maintenance; equipment retrofits.

Company Description: The company started as a manufacturer of dust control equipment and then moved into incineration. Products are mostly sold direct, and the company has an 18,000-square-meter factory. There are sales offices in several cities, including Beijing, Shanghai, Suzhou, Chengdu, and Urumuqi.

Sales Volume (millions) and annual growth rate (percent): 1997, \$2.5 (n.a.); 1998, \$2.6 (4 percent); 1999, \$3.0 (13 percent)

Market Outlook: According to the company, there are many environmental companies in China, even in Jiangsu, but some do not have what it takes to succeed. This company has an advantage in that it knows how to work well with metal and can perform its own installations expertly. It plans to spend more money and effort improving its incinerator technology.

Example of Recent Project

Project Name: Baogang third-term project—dust removal equipment

Industry: Metals

Location: Shanghai

Foreign Partner: None

Date Completed: November 1999

Experience Working with Foreign Companies: None

Areas of Cooperative Interest: They are looking for a means to acquire advanced technology, particularly incinerator technology, if it will benefit both parties.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration Number: (not available)

Suzhou Xiechang Industrial Dust Removal and APC Equipment

Telephone Number: +86 (512) 721-9202

Address: No. 28, Bei Qing Nian Road, Railway Station, Suzhou, Jiangsu

Fax Number: +86 (512) 721-2786

Number of Sales Staff: more than 80

Number of Technical Staff: 32

President: Mr. Li

Ownership (type): Stock

Owners: Zhenda Industry Stock Co., Ltd. (Suzhou)

Year Established: 1991

Products/Services: DCF-Z right-angle electromagnetic pulse valve; DCF-Y submerged electromagnetic pulse valve; pulse spray and blow controller; frame.

Company Description: The company operates throughout China and places an emphasis upon service and maintenance. They sell products directly and do not rely on distributors.

Sales Volume (millions) and annual growth rate (percent): 1997, \$1.2 (n.a.); 1998, \$1.2 (n.a.); 1999, \$1.5 (20 percent)

Market Outlook: Environmental standards are increasing, so the market is better and should improve even more. For this kind of equipment, most end users prefer imported equipment, but the company thinks that the quality of its products is comparable. In addition, its prices are lower and the company is better able to provide service. It will keep an emphasis on frames, of which it sold a total of 50,000 in 1999.

Example of Recent Project

Project Name: Shanxi Taiyuan Iron and Steel Plant-frame

Industry: Iron and steel

Location: Taiyuan, Shanxi Province

Foreign Partner: None

Date Completed: November 1999

Experience Working with Foreign Companies: None

Areas of Cooperative Interest: A foreign company that can bring advanced technology and a good reputation. It would also be best, though not crucial, that the company be in their part of the industry.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration Number: (not available)

Jiangsu Yihuan (Group) Co.

Telephone Number: +86 (510) 755-1093

Address: No. 169, Renmin Road, Fenshui Town, Yixing, Jiangsu Province

Fax Number: +86 (510) 755-1188

Number of Sales Staff: More than 1,000

Number of Technical Staff: About 100

President: Han Hao-zhong

Ownership (type): Stock (no further comment)

Year Established: 1976

Products/Services: bio-oxidized sewage system; HBR treatment system; wastewater treatment system (use of pure oxygen); other wastewater technologies; maintenance; design; installation.

Company Description: This company has been active for over 23 years and has a factory area of 80,000 square meters. They operate throughout China, with sales offices in almost every province. The company does not use distributors. Jiangsu Yihuan can install complete systems or just sell the equipment.

Sales Volume (millions) and annual growth rate (percent): 1997, \$20.5 (n.a.); 1998, \$9.6 (-113 percent); 1999, \$9.7 (1 percent)

Market Outlook: Jiangsu Yihuan thinks that end users are demanding higher technology, and Yihuan is doing its best to stay on top of this. The company thinks that it is key to hire solid engineers and train them methodically. They expect the market to get better and think that their position in the market is strong.

Example of Recent Project

Project Name: Kunshan Sewage Plant—Supply water treatment system

Industry: Environment Protection Bureau, City of Kunshan

Location: Kunshan, Shanghai

Foreign Partner: None

Date Completed: Late 1998

Experience Working with Foreign Companies: A German company has shown great interest in its marketing position, brand, and fixed assets (no further comment here). They have also been approached for cooperation by a Vietnamese company.

Areas of Cooperative Interest: Something that could help them acquire technology on the cutting edge of water and wastewater treatment and gain greater exposure to the management methods of foreign companies.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration Number: (not available)

Shanghai Lidu Environment Protection Equipment Co., Ltd.

Telephone Number: +86 (215) 858-2758

Address: No. 178, Longdong Da Dao, Shanghai

Fax Number: +86 (215) 858-2758

Number of Sales Staff: 90

Number of Technical Staff: 40

President: Mr. Wu

Ownership (type): Stock (private investors)

Year Established: 1992

Products/Services: small scale incinerators (medical and solid waste); heating, ventilation, and air-conditioning (HVAC) equipment; after-sales service.

Company Description: The company made environmental protection equipment, mainly medical incinerators, when they were founded. In 2000, they began to offer incinerators for solid waste. The company markets through direct sales and relies heavily on promotion through trade exhibitions and other forms of direct marketing. It does not use distributors and sells throughout China.

Sales Volume: not available

Market Outlook: The company believes that the market for its products and technology right now is very strong and the potential is great. They are optimistic and plan to move into new areas of environment protection in the next few years.

Example of Recent Project: None

Experience Working with Foreign Companies: The company will not comment on this.

Areas of Cooperative Interest: The company would like to cooperate with foreign companies if they have good reputations and want to make a commitment to the Chinese market. A company with incinerator technology would be best, though this company is willing to get into new areas.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration Number: (not available)

Shanghai Shihua Water Area Environment Protection Plant

Telephone Number: +86 (215) 794-2673

Address: Bache Town, Wujiang, Jiangsu

Fax Number: +86 (215) 794-0042

Number of Sales Staff: More than 80

Number of Technical Staff: 20

President: Mr. He

Ownership (type): SOE

Owners: Shanghai Bureau of Education

Year Established: 1997

Products/Services: air tubes; activated carbon; contract projects; design; construction; consultation; training.

Company Description: This is a relatively new niche environmental company. Its operations are nationwide, but most sales are in the Shanghai/Jiangsu/Zhejiang area. The company currently does not have sales offices or distributors, but is investigating these things. They also do design and consulting.

Sales Volume (millions) and annual growth rate (percent): 1997, \$0.6 (n.a.); 1998, \$0.5 (-20 percent); 1999, \$0.7 (28 percent)

Market Outlook: The market is so-so. It is easier for larger companies to succeed in this market, as they can better use relationships to get work. There will be more acquisition in the market; there are too many companies at present. However, niche opportunities for smaller companies will remain.

Example of Recent Project

Project Name: Guangdong Shunde Environment Protection Research Institute

Industry: Environment protection

Location: Shunde, Guangdong

Foreign Partner: None

Date Completed: First half of 1999

Experience Working with Foreign Companies: None

Areas of Cooperative Interest: A foreign company with strong technology in their area and a strong track record. They could offer strong relationships, good government connections, and local know-how.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration Number: (not available)

Shanghai Baoma Stock Co., Ltd.**Telephone Number:** +86 (215) 611-8811**Address:** No. 4717, Gong He Xin Rd., Shanghai**Fax Number:** +86 (215) 640-7094**Number of Sales Staff:** More than 40**Number of Technical Staff:** 20**President:** Fumin Wang (General Manager); Anmin Dong (Vice General Manager)**Ownership (type):** Stock**Owners:** Shanghai Dabaishu Real Estate Co.**Year Established:** March 1992**Products/Services:** home air purifiers; point-of-use (POU) water equipment; maintenance; technology instruction.**Company Description:** Shanghai Baoma targets the residential market for environmental equipment. It began producing air purifiers in 1995 and POU equipment in 1998. The company is thinking of expanding into industrial applications. Baoma has a 6,000-square-meter factory and operates throughout China. There are 15 distributors within Shanghai and 10 in other parts of the country.**Sales Volume (millions) and annual growth rate (percent):** 1998, \$1.8 (n.a.); 1999, \$2.2 (18 percent)**Market Outlook:** People are becoming more aware of the need for clean air and water, though this is taking longer to catch on in the northern and inland provinces. People want high technology and a good design. At present, for home products, there is greater demand in small cities than in large ones. The company is very optimistic about its future in this market.*Example of Recent Project***Project Name:** Air-purifying machines**Industry:** Environment protection**Location:** Shanghai**Foreign Partner:** None**Date Completed:** December 1999**Experience Working with Foreign Companies:** None**Areas of Cooperative Interest:** Foreign companies with high technology. This could be in various environmental fields, but water treatment is best. The company would like to become stronger in this market, in both products and distribution, before entering other markets.**Credit Reference Information:****Bank Name:** China Construction Bank (Baoshan Branch)**Bureau of Industry and Commerce Registration****Number:** 310113630833541**Shanghai Everclean Environmental Engineering Co., Ltd.****Telephone Number:** +86 (216) 437-5540**Address:** 20 Bao Qing Rd., Shanghai**Fax Number:** +86 (216) 433-2229**Number of Sales Staff:** 30**Number of Technical Staff:** 90 percent of total employees**President:** Sha Shang-zhi, General Manager (Chairman)**Ownership (type):** Domestic JV**Owners:** Shanghai Light Industry Graduate School and Shanghai Shenneng (Group) Co., Ltd.**Year Established:** February 1998**Products/Services:** ion-exchange water treatment instruments; combined automatic wastewater treatment instruments; pH/ORP instruments; distributing automatic computer control system; pure-water treatment equipment; wastewater treatment; maintenance; project design; project management; consulting; installation.**Company Description:** This company is an offshoot of the old Shanghai Light Industry Graduate School. It is located in Xinzhuang, Shanghai, and has a 2,000-square-meter factory. There are offices in Dalian and Guangzhou.**Sales Volume (millions) and annual growth rate (percent):** 1998, \$0.22 (n.a.); 1999, \$0.27 (18 percent)**Market Outlook:** The company thinks very optimistically of the Chinese environmental market, particularly for water and wastewater treatment. The latter, it thinks, will develop faster than the former. It plans to invest much of its income in research and development in the next several years and expects to bring in numerous projects.*Example of Recent Project***Project Name:** Wenzhou Meila Ironware Co.—sewage treatment**Industry:** Metals**Location:** Wenzhou, Zhejiang**Foreign Partner:** A French company (not specified)**Date Completed:** May 1999**Experience Working with Foreign Companies:** Limited—on a project-by-project basis.**Areas of Cooperative Interest:** Companies from Europe and the United States. The company believes that there can be great benefit to working together and would like the opportunity. It would be best if it were in their field.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** (not available)

Yixing Huanfa Equipment Factory**Telephone Number:** +86 (510) 789-1161**Address:** Gaocheng, Yixing, Jiangsu**Fax Number:** +86 (510) 789-1161**Number of Sales Staff:** More than 400**Number of Technical Staff:** About 30**President:** Mr. Shao**Ownership (type):** Stock**Ownership:** Private investments**Year Established:** 1987**Products/Services:** water treatment equipment (many kinds); wastewater treatment equipment (many kinds); engineering contract, design, construction, and after-sales service.**Company Description:** Yixing Huanfa is a water technology company; it mainly sells equipment but also offers various engineering services. Products are sold directly and throughout China. The company says that its typical project is to design a water treatment plant for an airport or other municipal facility. For example, they supplied the Shenzhen and Pudong airports with systems. They have 30 sales offices in China.**Sales Volume (millions) and annual growth rate (percent):** 1997, \$11 (n.a.); 1998, \$12 (8 percent); 1999, \$12 (0 percent)**Market Outlook:** Sales of imported equipment in China will remain very limited and for certain projects only. The government will continue to protect domestic companies. The market for environmental products and services in China will improve. In the next 10 years, for example, there should be over 600 new wastewater treatment plants constructed. The company is optimistic about the market.*Example of Recent Project***Project Name:** Shanghai Pudong International Airport—water treatment equipment**Industry:** Service**Location:** Pudong, Shanghai**Foreign Partner:** None**Date Completed:** 1999**Experience Working with Foreign Companies:** Some equipment sales but no real cooperation (in terms of JVs and the like). They have sold equipment to foreign companies through agents.**Areas of Cooperative Interest:** U.S. or European companies which can offer advanced technology would be best. This can be different types of equipment, either on a project basis or for other kinds of cooperation. The company would like the opportunity to better introduce itself to foreign companies.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration Number:** 320282142882096**Tianjin Saehan Co., Ltd.****Telephone Number:** +86 (22) 2676-8440, +86 (22) 2826-2401**Address:** 54 Jianchangdao, Hebei District, Tianjin**Fax Number:** +86 (22) 2676-8841**Number of Sales Staff:** About 100**Number of Technical Staff:** About 27**President:** Han Zheng-zhi**Ownership (type):** JV**Owners:** Sahaen (Korea) and a Tianjin SOE**Year Established:** August 1998**Products/Services:** large-scale reverse osmosis systems; systems engineering.**Company Description:** The company relies primarily on its Korean partner for technology and provides the technical engineering and service function, along with sales. All sales offices have technical staff. Systems are sold for many industrial applications but also to municipal markets. The company guarantees to keep equipment in good service in the first year and sells products directly throughout China. There are seven sales offices in Beijing, Shanghai, Harbin, Shenyang, Dalian, Qingdao, and Weihai.**Sales Volume (millions) and annual growth rate (percent):** 1997, \$1.6 (10 percent); 1998, \$1.8 (11 percent); 1999, \$1.9 (5 percent)**Market Outlook:** There are many companies in this industry, but there is enough work to go around. The market for wastewater equipment in particular is very strong now. The company will try to remain one of the leaders in this market, take advantage of its North China base, and try to put as many products on the market as possible.*Example of Recent Project***Project Name:** Reverse-osmosis machine sold to pharmaceuticals factory**Industry:** Pharmaceuticals**Location:** Hangzhou, Zhejiang**Foreign Partner:** Not for this project**Date Completed:** November 1999**Experience Working with Foreign Companies:** The JV with the Korean company has improved their sales and management.**Areas of Cooperative Interest:** Companies that can offer something new are best. This would depend upon the product category. They would also like to do cooperation that would allow them to be stronger in other parts of China.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration Number:** (not available)

Shenyang Environment Science and Research Institute**Telephone Number:** +86 (24) 2331-4470**Address:** No. 63, Shashanjie, Heping District, Shenyang**Fax Number:** +86 (24) 2331-7666**Number of Sales Staff:** 141**Number of Technical Staff:** 50**President:** (not available)**Ownership (type):** SOE**Owners:** Shenyang People's Government**Year Established:** 1974**Products/Services:** industrial wastewater treatment technology; medical waste incineration technology; PCB5 industrial incineration technology; sulfur dioxide treatment equipment; water test equipment.**Company Description:** This is a medium-to-large environmental company with a full range of equipment for water, air, and hazardous waste treatment. According to the company, they do not spend much effort on sales but rely on referrals. Most customers are in Northeast China, with some in other areas. The company does not use sales offices.**Sales Volume (millions) and annual growth rate (percent):** 1997, \$4 (n.a.); 1998, \$4 (20 percent); 1999, \$4.2 (5 percent)**Market Outlook:** The market is good, though not dynamic. Growth has been a bit slow, but they expect it to pick up.*Example of Recent Project***Project Name:** An industrial wastewater treatment project**Industry:** Industrial wastewater**Location:** Yingkou**Foreign Partner:** None**Date Completed:** 1999**Experience Working with Foreign Companies:** They are currently negotiating with a Canadian company for incinerator technology and have had dialogue with other foreign companies but no concrete partnership to this point.**Areas of Cooperative Interest:** They are very interested in cooperating with a foreign company in any area, if both sides will benefit. The company would also like to emphasize that while they are based in the northeast of China, their marketing reach covers the whole country.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** (not available)**Tsinghua Tongfang Co., Ltd., Artificial Environmental Engineering Company****Telephone Number:** +86 (10) 6277-1812**Address:** P.O. Box 2659, Tsinghua University**Fax Number:** +86 (10) 6277-0198**Number of Sales Staff:** Many (no further comment)**Number of Technical Staff:** Among the employees, 80 percent are technical staff (engineers).**President:** Lu Zhicheng**Ownership (type):** Stock (subsidiary of Tsinghua Tongfang Group)**Year Established:** 1996**Products/Services:** water treatment equipment; system design and engineering; material sourcing; installation; training.**Company Description:** The company makes products and offers design services. There is a factory in Miyun, north of Beijing, which the company received free from the government. Products and services are for the most part sold directly and throughout China.**Market Outlook:** The environment protection industry is still developing in China. This development may take 20 to 30 years. At the same time, environmental companies are becoming larger and more specialized. Not many companies currently have funds to pay for equipment, especially the most advanced equipment, but with some effort this industry will develop well.*Example of Recent Project (several)***Project Name:** not available**Industry:** Industrial wastewater treatment**Location:** Beijing; Northwest China; South China.**Foreign Partner:** Projects have been completed, and negotiations are under way for more. They are negotiating with companies from Germany, the United States, Korea, and the United Kingdom. The German company will provide financial support. Tsinghua will be responsible for technology. The other participants will be responsible for design, equipment, etc.**Date Completed:** In process**Experience Working with Foreign Companies:** The company has cooperated with many U.S. and European Union companies on many projects and would like to cooperate as much as opportunities permit.**Areas of Cooperative Interest:** This is really on a case-by-case basis, though there has to be a solid source of funding. As they are an engineering company, they cover all areas of environmental technology.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** (not available)

Hebei Zhongfen Environment Industry Company**Telephone Number:** +86 (314) 212-1605**Address:** 6 West Area, Chengde High and New Technology Development Zone, Hebei Province**Fax Number:** +86 (314) 202-1283**Number of Sales Staff:** More than 120**Number of Technical Staff:** More than 30**President:** Shi Yuanlin**Ownership (type):** SOE**Owners:** People's Government of Hebei Province**Year Established:** 1996**Products/Services:** biological wastewater treatment equipment (some in cooperation with U.S. Filter); engineering and maintenance.**Company Description:** The company specializes mainly in wastewater treatment equipment and engineering. They produce their own equipment and also sell products from Finland and technology from U.S. Filter. They sell products and services throughout China, with an emphasis on Hebei Province. Products are sold directly.**Sales Volume (millions) and annual growth rate (percent):** 1997, \$1.2 (5 percent); 1998, \$1.2; 1999, \$1.3 (8 percent)**Market Outlook:** The competition is increasing, as there are many companies in the market and the market still is not very large. Underdeveloped areas (e.g., inland) have more potential, and in terms of industries, wastewater has a very large potential, as most wastewater in China now is not treated.*Example of Recent Project (several)***Project Name:** Bailou Hotel project—wastewater system design and equipment**Industry:** Service**Location:** Hebei**Foreign Partner:** A Finnish company (not specified)**Date Completed:** 1999**Experience Working with Foreign Companies:** The company has a fair amount of experience working with foreign companies (such as U.S. Filter), and these have not been bad, but it thinks that the price of foreign companies' equipment is excessively high.**Areas of Cooperative Interest:** If a company wants to make an investment and has technology to transfer, they will consider it.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** not available**Xuanhua Metallurgical Environmental Protection Equipment Manufacture Factory****Telephone Number:** +86 (313) 306-7141, 3007**Address:** n.a.**Fax Number:** +86 (313) 306-7734**Number of Sales Staff:** More than 1400**Number of Technical Staff:** More than 100**President:** not available**Ownership (type):** SOE**Owners:** Xuanhua People's Government**Year Established:** 1960**Products/Services:** electrostatic precipitator and related equipment; SO₂ removal equipment; product design; training.**Company Description:** Originally founded as a mining equipment company, the company started making APC equipment in the 1970s. They have a 200,000-square-meter factory and a heavy industry equipment workshop. The company operates nationwide, and most products are sold direct.**Sales Volume (millions) and annual growth rate (percent):** 1997, \$7–8 (n.a.); 1998, \$7–8 (n.a.); 1999, \$7–8 (n.a.)**Market Outlook:** The state of the market in China now is so-so. The market will develop well in the coming years, but this takes time. To survive in this market, a company must have its own technology. There are too many instances of mediocre technology on the market. Strong management is also important. Things are not easy for APC equipment but will improve.*Example of Recent Project***Project Name:** Electrostatic precipitator for 25,000-ton rotary furnace in Baogang**Industry:** Iron and steel manufacturing**Location:** Shanghai Baogang**Foreign Partner:** German Luqi Corp.**Date Completed:** 1996**Experience Working with Foreign Companies:** The company performed several projects for foreign companies (French, German, and others), though they say that now there is much competition to win these projects. Now they win about one of these projects every few years.**Areas of Cooperative Interest:** They are interested in working with a company that has good technology and is reasonably priced and suitable for this market either on a project basis or a more permanent cooperation.**Credit Reference Information:** not available**Bureau of Industry and Commerce Registration****Number:** not available

Guangxi Guilin Environmental Protection Engineering Co.

Telephone Number: +86 (773) 282-5650

Address: Guilin Xijiao Hongtouling

Fax Number: +86 (773) 383-5612

Number of Sales Staff: More than 700

Number of Technical Staff: About 70 to 80

President: Zeng Jinhua

Ownership (type): Stock (no further comment)

Year Established: 1980s

Products/Services: wastewater filtration products; design and installation; technical support.

Company Description: Guangxi Guilin Environmental Protection Engineering sells mostly to industrial end users, the oil industry in particular. As an oil industry wastewater specialist, they do not operate sales offices. All sales are direct. Most sales are to regions with heavy oil industry, such as Northeast China.

Sales Volume (millions) and annual growth rate (percent): 1997, \$4.6 (8 percent); 1998, \$5 (8 percent); 1999, \$5.3 (5.5 percent)

Market Outlook: Guangxi Guilin Environmental Protection Engineering sees the market increasing incrementally. New technologies are entering the market, and the importance of controls and automation is likewise increasing. The market will get stronger. Automation of equipment especially will increase. Because of this, there will be greater opportunities for foreign companies, and local companies must update their technologies to survive.

Example of Recent Project

Project Name: Wastewater filtration equipment for Daqing, Dagang, and Kelamayi oil fields

Industry: Petroleum

Location: Xinjiang, Heilongjiang

Foreign Partner: Gulf Group, Hunan Zhuzhou Branch

Date Completed: 1999

Experience Working with Foreign Companies: The company has cooperated with some (such as Gulf) in the past and thinks that things have gone well, though sometimes the business can overlap. For example, in one project, both companies had the same type of equipment, and the foreign company insisted on selling its own.

Areas of Cooperative Interest: Foreign parties willing to invest in them or finance projects. It would also be useful if the foreign company has some experience in Asian markets.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration

Number: 4503001100368-1

Dalian Science and Industry University-Environment Engineering Research Design Institute

Telephone Number: +86 (411) 363-1019

Address: 158 Zhongshan Road, Dalian

Fax Number: +86 (411) 363-1019

Number of Sales Staff: 125

Number of Technical Staff: More than 60

President: Zhou Feng-lin

Ownership (type): SOE

Owners: Dalian Science and Industry University

Year Established: 1995

Products/Services: engineering design and construction; environment evaluation and assessment; product promotion.

Company Description: This company has a first-grade environmental-engineering design license (see Chapter 2) and sells direct. They operate throughout China, but concentrate on the northeast. They are willing to take on almost any kind of project in their area.

Sales Volume (millions) and annual growth rate (percent): 1997, \$3.4 (10 percent); 1998, \$3.8 (11 percent); 1999, \$4 (5 percent)

Market Outlook: The government is strengthening environment protection. The market in China needs large-scale comprehensive design companies. Competition between domestic companies and foreign companies will be more intense.

Example of Recent Project (two provided, both for wastewater treatment)

Project Name: Fushun Tianhu Beer Factory Xinxiang Chemical Factory

Industry: Food and Beverages; Chemicals

Location: Fushun, Liaoning; Xinxiang, Hebei

Foreign Partner: None for either project

Date Completed: Both are in progress

Experience Working with Foreign Companies: None

Areas of Cooperative Interest: The company hasn't thought about it, but would consider it if the situation were appropriate.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration

Number: 210203241735710

Shenyang Environmental Science Research Institute**Telephone Number:** +86 (24) 2331-4470**Address:** 63 Shasha Road, Peace District, Shenyang, Liaoning Province**Fax Number:** +86 (24) 2331-7666**Number of Sales Staff:** More than 400**Number of Technical Staff:** About 200**President:** Wang Junhong**Ownership (type):** SOE**Owners:** Ministry of Construction and Shenyang People's Government**Year Established:** 1963**Products/Services:** medical waste incinerators; PCB industrial incineration technology and products; engineering; product design; environmental impact assessments.**Company Description:** In 1963, the company was founded as the Shenyang Coal and Gas Research Institute. In 1973 it was changed to Shenyang Environmental Protection Science Research Institute, and in 1984 it became the Shenyang Environmental Science Research Institute. The company specializes in products and engineering services to remedy hazardous waste. Products and services are marketed and sold directly throughout China. The company holds the national first-class certificate of environmental impact assessment and first-class engineering certificate.**Sales Volume (millions) and annual growth rate (percent):** 1997, \$4 (n.a.); 1998, \$4.5 (11 percent); 1999, \$4.5 (0 percent)**Market Outlook:** The market is not so great now, particularly in the northeast. Other areas are not as bad. There is also a trend toward greater consistency and standardization in environmental services.*Example of Recent Project***Project Name:** Wastewater treatment in beer industry (products); Medical waste treatment (products and engineering)**Industry:** beer and medical waste disposal**Location:** Shenyang**Foreign Partner:** Finland Kai Mi Ou Te**Date Completed:** 1999**Experience Working with Foreign Companies:** The company has worked with foreign companies (German, Norwegian, Finnish) on a project basis but does not have any formal partnerships.**Areas of Cooperative Interest:** The company would like to work with a Western (not Japanese) company where there could be good mutual benefit, in whatever way. The foreign partner may also wish to export some of its products to China.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** 2101321105398**Dalian Daqi Environmental Protection Equipment Co., Ltd.****Telephone Number:** +86 (411) 761-3229**Address:** No. 8 Tieshan Xilu, Dalian TEDA, Liaoning**Fax Number:** +86 (411) 761-3230**Number of Sales Staff:** 50**Number of Technical Staff:** 85**President:** Da Xi Jian Ci**Ownership (type):** Investment by the Japanese (company not specified)**Year Established:** 1996**Products/Services:** water purification equipment; installation and on-site maintenance; training.**Company Description:** The company makes most of its revenues through equipment sales in the northeastern provinces of China. Most equipment is sold direct.**Market Outlook:** The market now is not bad. The government is enforcing regulations more, and this should create more opportunities. It can also help if a company that sells equipment can also supply basic engineering.**Projects Completed:** No comment.**Experience Working with Foreign Companies:** Aside from their cooperation with the Japanese, they have no other partnerships with foreign companies, although they have sold equipment to companies with foreign investment in China, particularly in the chemical and food industries.**Areas of Cooperative Interest:** The company is very interested in working with a foreign company, particularly in the area of water and wastewater treatment, but only if the foreign company is serious about this market and has a strong track record.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** 21021360481470-x

Guangzhou Research Institute of Environmental Protection

Telephone Number: +86 (20) 8551-5817

Address: 24 Nanyi Rd., Tianhe Guang He, Guangzhou

Fax Number: +86 (20) 8750-3629

Number of Sales Staff: 100

Number of Technical Staff: 85

President: Wu Zhengqi (Director)

Ownership (type): SOE

Owners: Guangzhou Environmental Protection Bureau

Year Established: 1977

Products/Services: industrial wastewater treatment equipment; environmental protection product development; environmental legislation and policy study; environmental impact assessment; environmental planning; environmental chemical analysis and testing; environmental engineering design.

Company Description: This is the business arm of the Guangzhou Environmental Protection Bureau. The company offers a full range of environmental services, holding the national first-class certificate of environmental impact assessment and the metropolitan first-class certificate of environmental pollution control engineering design. The company has a 600-square-meter science building, and the most modern instruments and equipment. Sales are carried out nationwide and are direct.

Sales Volume (millions) and annual growth rate (percent): 1997, \$4.5 (10 percent); 1998, \$5 (10 percent); 1999, \$6 (16 percent)

Market Outlook: The industry is not bad in China now, though there are too many companies in the market. However, many of these are too small and offer no high technology or competitive advantage, and they will not survive. Large companies that can deliver scale have the greatest advantage in this market.

Example of Recent Project

Project Name: Slaughterhouse wastewater system

Industry: Food

Location: Guangzhou

Foreign Partner: None

Date Completed: 1999

Experience Working with Foreign Companies: The company has worked with French and Japanese companies (such as Kawamoto), both as a partner in projects and with the prospect of forming a cooperative company.

Areas of Cooperative Interest: The company would like the opportunity for further cooperation with foreign companies in whatever way works best, and they believe that their expertise and local knowledge would be of great benefit to the foreign company.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration

Number: Because it is a national facility belonging to the Environmental Protection Bureau, it has no number.

Beijing Shunyi Water Treatment Equipment Factory

Telephone Number: +86 (10) 6941-1380; 6941-2349

Address: Zhongshan Town, Shunyi, Beijing

Fax Number: +86 (10) 6941-2726

Number of Sales Staff: 400

Number of Technical Staff: 17

President: Zhang Guo-ming (General Manager)

Ownership (type): Private

Owners: Zhang and others

Year Established: 1986

Products/Services: reverse-osmosis desalination systems; heat resistant heat exchanger; haixing high-speed filter; sales; technology development; engineering design; engineering construction; environment protection consulting; comprehensive resources utilization

Company Description: This is a private company with a nationwide network of affiliates. They have a 50,000-square-meter factory and operate throughout China. In particular, they target their systems to municipal end-users as well as the paper, food, and chemical industries. Affiliates include Dongguan, Sida, and Sitong companies.

Sales Volume (millions) and annual growth rate (percent): 1998, \$5.5 (n.a.); 1999, \$5.8 (4 percent)

Market Outlook: For water treatment, domestic technology and foreign technology are almost on the same level. The main difference lies in the ability to treat large volumes. As the technologies are similar, the competition is very strong. It is best not to concentrate on new products but on existing technologies, with which end users are familiar.

Example of Recent Project

Project Name: Sichuan Yibin Municipal Party Committee—water treatment engineering

Treatment Ability: 150 tons/hour

Industry: Municipal/government

Location: Yibin, Sichuan Province

Foreign Partner: Tone WT Co. of Japan

Date Completed: Late 1999

Experience Working with Foreign Companies: The company had a JV with a Japanese company, but this was not too successful because there were too many disputes on how to divide projects. At present the company has two JVs, one with a Hong Kong company and the other with an American one. The latter JV has problems in capitalization and marketing.

Areas of Cooperative Interest: The company is really most interested in a foreign company that can bring strong water treatment system technology, particularly to work on larger facilities. No prior Chinese experience is necessary.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration

Number: 10249326-4

Dalian Beida Water Purification Equipment Co.**Telephone Number:** +86 (411) 408-5031**Address:** 79 Lingbing Rd., Gangjingzi, Dalian**Fax Number:** +86 (411) 469-3794**Number of Sales Staff:** 50**Number of Technical Staff:** 14**President:** Wang Sheng (General Manager)**Ownership (type):** JV**Owners:** Dalian People's Government and a German Co.**Year Established:** 1995**Products/Services:** FIS-ultraviolet equipment; ozonation equipment; engineering; design; consulting; and testing.**Company Description:** The company specializes in disinfection and specialty equipment and engineering services for the water and wastewater treatment industry. Most of its technology is foreign. In particular, they target the food, chemical, husbandry, and municipal markets. The company operates throughout China and sells directly.**Sales Volume (millions) and annual growth rate (percent):** 1997, -\$0.6 (10 percent); 1998, -\$0.6; 1999, -\$0.8 (25 percent)**Market Outlook:** The environmental industry in China does not have a long history, and the number of people who really know how to do things right is small. Most companies are small, so if one can choose the right niches, then it is not hard to find success. It is important to have products and service that distinguish one from other companies.*Example of Recent Project***Project Name:** (1) Yangzhou Water Supply Engineering Co.—disinfection; (2) Changzhou Energy Engineering Co.—disinfection**Industry:** (1) municipal; (2) energy**Location:** (1) Yangzhou, Jiangsu; (2) Changzhou, Jiangsu**Foreign Partner:** None**Date Completed:** 1998, 1999**Experience Working with Foreign Companies:** Aside from the present JV, they have worked with other companies on a project basis. They also, for example, import various equipment for sale in China. Cooperation helps the company to explore the international market. The company is exploring the possibility of selling its engineering services in Germany.**Areas of Cooperative Interest:** They have benefited greatly from foreign cooperation, and are very interested in further cooperation. They do not wish to compete with their current JV partner, but they are open to other areas.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** (not available)**Jihua Group Environmental Protection Industry Co., Ltd.****Telephone Number:** +86 (432) 399-0051, 399-0052**Address:** 27 Zunyi East Rd., Longtan District, Jilin**Fax Number:** +86 (432) 303-7738**Number of Sales Staff:** 3,277**Number of Technical Staff:** 1,823**President:** Li Zhi-ming (General Manager)**Ownership (type):** SOE**Owners:** Jilin People's Government**Year Established:** 1998**Products/Services:** wastewater treatment equipment; SWT equipment; solid and liquid separating centrifuges; indoor air treatment equipment; a full line of water and wastewater solutions, recycling "three-in-one-waste" resources, and consulting.**Company Description:** This is a large company that has over 340 product lines, mostly in the area of water and wastewater treatment. The company has strong relationships with end users, government in particular, throughout China and sells direct. Target end users include municipal government and the petroleum, chemical, food processing, and pharmaceutical industries.**Sales Volume (millions) and annual growth rate (percent):** 1997, \$3 (6 percent); 1998, \$3.2 (6 percent); 1999, \$3.4 (6 percent)**Market Outlook:** The water and wastewater treatment industries are more mature than other environmental industries in China, though they remain a larger market than air treatment or remediation. There have not been very large changes in this industry in the past three years or so, and no fall in demand, though the competition now is quite tough. One has to have good connections in this industry to compete.*Example of Recent Project***Project Name:** (1) Shaoxing dying wastewater treatment engineering—300,000 cubic meters per day; (2) Changchun Dacheng Corn Co.—75,000,000 tons per day.**Industry:** (1) Dying; (2) Agriculture**Location:** (1) Shaoxing, Zhejiang Province (2) Changchun, Jilin Province**Foreign Partner:** (1) None; (2) A Taiwanese company**Date Completed:** (1) 1999; (2) 1999**Experience Working with Foreign Companies:** The company's experience with foreign companies has been mixed. They nearly established a JV with a French company, but it fell through. Cooperation with Hong Kong and Taiwanese companies has been hit and miss.**Areas of Cooperative Interest:** As they are a large company with well-developed product lines, they are not looking for foreign companies that make the same products but one that makes specialty high-technology products in this industry. Water or wastewater treatment is best. If these conditions are met, they would like to cooperate.**Credit Reference Information:** (not available)**Bureau of Industry and Commerce Registration****Number:** 200120031-9

Shandong Huate Co.

Telephone Number: +86 (531) 295-8524

Address: Science Garden, Shandong Industry University, Qian Foshan Rd., Jinan, Shandong

Fax Number: +86 (531) 295-8534

Number of Sales Staff: 51

Number of Technical Staff: 17

President: Liu Qingmin (General Manager)

Ownership (type): SOE

Owners: Shandong Industry University

Year Established: 1993

Products/Services: Huate908—ClO₂ disinfecting gas generator; Huate908—stable ClO₂ generator; patents used in these two products: ZL93111202.8 and ZL991120.03.X, ZL99112022.1; production, sales, environmental protection technology development, environmental-engineering design, environmental engineering construction, and environmental-protection consulting services.

Company Description: This is a medium-sized environmental company which relies a great deal on distributors for product sales. It has 158 distributors throughout China and a client base of 2,000. The company also exports products to Southeast Asia and has a group of affiliates throughout China, as well as relationships with key research institutes throughout the country.

Sales Volume (millions) and annual growth rate (percent): 1998, \$1.4 (5 percent); 1999, \$1.6 (12.5 percent)

Market Outlook: There are too many copycats in this market, and these companies are growing fast. This creates a bad atmosphere in the market, as sometimes end users cannot tell who is for real and who is not. No great changes are expected in the near future.

Projects Completed:

Project Name: (1) Baoding Lekai film factory: Huate908—ClO₂ generator; (2) Beijing University, ClO₂ generator

Industry: (1) Film; (2) Education

Location: (1) Baoding, Hebei; (2) Beijing

Foreign Partner: None

Date Completed: (1) 1998; (2) 1998

Experience Working with Foreign Companies: The company has worked with foreign companies on a project basis before and is now in negotiations for a JV with a European company.

Areas of Cooperative Interest: Until these negotiations are settled, it does not want to begin dialogue with another company, but otherwise would like to cooperate with a strong foreign company.

Credit Reference Information: (not available)

Bureau of Industry and Commerce Registration

Number: 16304807-6

Industry Zones

Following are profiles of six industry zones in China. Four of these emphasize the environmental industry, and two do not. For further analysis of industry zones, please see Chapter 2. Also, please note that the tax benefit policies of these zones can be very detailed, and are only summarized here. If a company is interested in one of these zones, it is best to contact the zone, the MOFTEC, or the U.S. DOC for more details. Also, note that advantages and drawbacks and other opinions are according to the information provided by the particular zone, not the opinions of the authors of this report.

Jiangsu Yixing Environmental Protection Industrial Zone

Telephone Number: +86 (510) 706-1840

Fax Number: +86 (510) 706-1315

General Location: West of Shanghai in Jiangsu Province; near Xingchang Railway Station

Year Established: 1992

Zone Characteristics: The only dedicated environmental zone in China; about half the companies are in the zone are environmental

Owner/Sponsor: Yixing government

General Manager: Mr. Mo

Total Area: More than 20 square kilometers

Companies in Zone: 280 (59 foreign)

Examples:

Japan Baishide Jiangsu Co., Ltd. (blowers)

Finland Kai Mi Ou Te Medicament Co., Ltd. (medical waste treatment equipment)

Size of Average Plot: About 0.25 square kilometers

Infrastructure:

Port: Inland six-grade river route is fit for 300- to 500-ton ships. It leads to Suzhou, Zhangjiagang, Wuxi, and Changzhou.

Transportation: 60 kilometers from Wuxi, 60 from Changzhou, 200 from Shanghai, 170 from Nanjing, and 170 from Hangzhou. The Yixing-Ninghang highway is being built now and completion is anticipated in 2002.

Utilities: Lianyung Harbor's nuclear power plant and the Three Gorges power plant's transformer substations are both in Yixing.

Services Offered: Registration procedure, rent workshop, and staff accommodation

Tax Benefits: Foreign companies pay no taxes in the first three years after profitability, and pay half taxes in the fourth and fifth years.

Pricing (example): For industrial enterprises, RMB 60,000 (\$7,200)/667 square meters.

Main Advantages: The conditions are good, and companies can network and get business from other environmental companies in the zone.

Drawbacks: Harbor and highway facilities still need development.

Other Comments: The zone is still looking for foreign high-technology companies, environmental or not. They claim to have one-fourth of the environmental market (not companies) in China represented in their zone.

Jinan New High-Technology Industry Development Zone

Telephone Number: +86 (531) 890-4647

General Location: East of downtown Jinan, Shandong Province

Year Established: 1991

Zone Characteristics: Accepts all types of companies. They emphasize several industries, including information technology and environmental, but they will put more emphasis on environmental.

Owner/Sponsor: State Science and Technology Committee (state run; national government)

General Manager: Peng Yuan-dong (president)

Total Area: 15.9 square kilometers

Companies in Zone: More than 3,000 (about 100 foreign)

Examples:

China Light Motorcycle Group

Taiwan Hanhua Co. (water treatment)

Size of Average Plot: About 2,000 square meters

Infrastructure:

Port: The nearest harbor is Qingdao Harbor, about 3 hours away.

Transportation: The zone is four kilometers from Ji-qing highway, 10 kilometers from Jinan Railway Station, and 15 kilometers from Jinan International Airport.

Utilities: There is a transformer substation of 22,000 kV and two of 110,000 kV. The water supply can reach 150,000 tons/day.

Services Offered: Companies are encouraged to contact the zone for this information.

Tax Benefits: For exported products of foreign capital enterprises, the VAT and excise are waived. They offer protective tariffs for imported materials, spare parts, parts, devices, etc., for export contract. The enterprise income tax rate paid by productive foreign capital enterprises will be 24 percent.

Pricing (example): \$0.10 per square meter per day for rent; \$277/square meter for requisition

Main Advantages: There is an excellent local labor pool of talented potential workers. There are 11 universities (for example, Shandong University), and Shandong Training School, 53 research institutes, and three state-grade laboratories. Also, it is a nationally sponsored zone with a temperate climate.

Drawbacks: No comment.

Other Comments: There is no special incentive for environmental companies, but they are certainly welcome. Also, there is an association of foreign investors. They also publish a journal to offer information, including exchange of policy, technology information, and project information.

Qinhuangdao Economic and Technological Development Zone

Telephone Number: +86 (335) 805-1739

Fax Number: +86 (335) 805-1519

General Location: Qinhuangdao

Year Established: 1985

Zone Characteristics: The zone was initially formed for the metals, machinery, electronics, light textile, and refined chemical industries and later added other industries, such as environmental.

Owner/Sponsor: Hebei People's Government

General Manager: Hu Ying-jie.

Total Area: The planned area is 10 square kilometers. Approximately five square kilometers have been developed.

Companies in Zone: 1,482 (351 foreign)

Examples:

LG International Group, Korea

Fujitsu Corp, Japan

Size of Average Plot: About 350 square meters

Infrastructure:

Port: 1.5 kilometers away from the port of Qinhuangdao

Transportation: Three major railroads: Beijing-Harbin, Beijing-Qinhuangdao, and Datong-Qinhuangdao converge here. It takes approximately two hours from Beijing to Qinhuangdao by express train. There are also two state highways that run through the zone.

Utilities: Electricity for power equipment and lighting is supplied to consumers in the zone at a voltage of 10 kV or less. For heat supply parameters, saturated industrial steam at pressures below 0.8 megapascal is supplied. The aggregate capacity of the local call switchboard is 20,000.

Services Offered: The zone has a right of examination and approval independent of associated service organizations, such as Bureau of Commerce and Industry, Tax Bureau, Municipal Planning and Administrative Bureau, SEPA, Labor and Personnel Bureau, etc.

Tax Benefits: For the enterprise income tax is levied on productive enterprises with foreign investment in this zone at a rate of 15 percent. Enterprises scheduled to operate for a period of 10 years or more are exempt from enterprise income tax for two years commencing from the first profit-making year and are allowed a 50-percent reduction from the third to the fifth year, inclusive. JVs scheduled to operate for a period of more than 15 years are exempt from the enterprise income tax from the first profit-making year to the fifth year and are allowed a 50-percent reduction from the sixth to the 10th year, inclusive.

Pricing (example): There is a very detailed system. Please contact the zone for specifications.

Main Advantages: There is a mild climate, traffic is convenient, and the area has a strong industrial base. In addition, there are many financial benefits.

Drawbacks: No comment.

Comments: There are not many privileges for environmental companies now, but there may be opportunities for environmental project work for companies within the zone.

Tangshan New High Technology, Economic and Technology Exploitation Zone

Telephone Number: +86 (315) 327-1955

Fax Number: +86 (315) 327-2414

General Location: On the northern outskirts of Tangshan City, Hebei Province

Year Established: 1993

Zone Characteristics: Emphasis on electronics, information technology, material science industries, life sciences, and environmental and agriculture industries.

Owner/sponsor: Tangshan People's Government

General Manager: Zhou Xiao-cheng

Total Area: 10 square kilometers; 2.79 square kilometers have been developed. There are 27 large plots, each divided into 104 subplots.

Companies in Zone: 500 (40 foreign)

Examples:

Tangshan Panasonic Industry Machine Co., Ltd. (China and Japan JV); makes welding machines

Tangshan Environmental Protection Instrument Engineering Co., Ltd. (currently looking for foreign partners)

Size of Average Plot: About 13,000 square meters

Infrastructure:

Port: As an inland city, it is 50–60 kilometers from Jingtang Harbor, 80–90 kilometers from Qinghuangdao Harbor, and 60 km from Tianjin Harbor which is the biggest of the three.

Transportation: The zone is 180 kilometers from Beijing Capital Airport, 120 kilometers from Tianjin Airport, and 130 kilometers from Qianhuangdao Airport and is connected with them by highway. There are railways leading to Beijing, Tianjin, and Qinhuangdao.

Utilities: There are 23 power plants in Tangshan producing 12 billion kilowatt-hours per year.

Services Offered: The zone has a bureau of economic development to assist with both the technology and products of zone enterprises. There is facilitated access to various government bureaus and ministries, a career service center, etc. There is also assistance in registration.

Tax Benefits: The first two years of profitability are tax free, and in the next three years the taxes are half the standard rate. At the same time, if the business term is over 10 years, the Finance Department will return one-half of five years' tax from the sixth year. Contact the zone for details.

Pricing (example): For requisition, the price is RMB 150,000 (\$18,000) per 667 square meters.

Main Advantages: The zone is conveniently located between Beijing and Tianjin, is part of the Tangshan Master Plan, and has superior services, a strong labor pool, and many strong companies.

Drawbacks: None

Comments: The zone believes that service is what sets them apart.

Kangqiao Industrial Zone

Telephone Number: +86 (215) 812-1822

Fax Number: +86 (215) 812-1822

General Location: 2502 Hunan Rd., Pudong new district, Shanghai; 8 kilometers southeast of the Nanpu Bridge

Year Established: 1992

Zone Characteristics: Inclusive of all industries (no particular emphasis on environmental)

Owner/Sponsor: Nanhui People's Government

General Manager: Xu Jiang

Total Area: 26.88 square kilometers. (eight kilometers have been developed)

Companies in Zone: More than 500 (144 foreign)

Examples:

Deerfu Co. (Shanghai and United States; motor storage batteries)

Shanghai Yanfeng Jiangsen Co., Ltd. (motorized chairs)

Size of Average Plot: About 15,000 square meters

Infrastructure:

Port: 35 to 40 kilometers from Waigaoqiao container port

Transportation: Access to all of Shanghai's and Pudong's highways, rail links, and airports.

Supply: One 200,000-watt electric supply center and three 35,000-watt electric supply centers. The water supply is 120,000 tons per day, and there are 100,000 program control telephones. Natural gas is also offered.

Services Offered: The zone helps WOFEs to apply for registration. It also offers commercial and industrial registration, taxation affairs registration, and customs assistance.

Tax Benefits: For export, customs duty is waived; for import, VAT is waived. Other benefits are also included.

Pricing (example): For requisition; \$50/square meter (industry), \$80 to \$90/square meter (real estate); for rent, \$5/square meter for one year (land).

Main Advantages: The zone has all the advantages of Pudong with the favorable benefits of Nanhui administration. The zone is newer than other zones, and rents are very competitive.

Drawbacks: It is a district-grade zone.

Relevance to Environmental Industry: The zone has an association of foreign capital investors, and members are given preferential information. Furthermore, they have a good relationship with the local SEPA.

Caohejing New Technology Exploitation Zone

Telephone Number: +86 (216) 485-5800

Fax Number: +86 (216) 485-1906

General Location: 509 Caobao Rd., Shanghai, in Southwest Shanghai (Xuhui District)

Year Established: 1988

Zone Characteristics: N/A

Owner/Sponsor: Shanghai Economy Development Committee

General Manager: Mr. Wang

Total Area: 6 square kilometers (5 square kilometers developed; no plots)

Companies in Zone: 700 (270 foreign)

Examples:

General Signal (mixers)

WL Gore (APC equipment)

Size of Average Plot: 8,500 square meters

Infrastructure:

Port: The nearest harbor is Wusongkou.

Transportation: The zone is very near Jinqiao Airport, the subway, and all Shanghai highways.

Utilities: The zone belongs to the East China Power Net and has all relevant utilities.

Services Offered: The zone supplies assistance in commodity inspection, customs, taxation affairs, and commercial and industrial registration, etc.

Tax Benefits: For income, the tax rate is 15 percent, and on this base, the first two years' tax is waived from the first year of profitability, and the next three years are charged at half the standard rate.

Pricing (example): For requisition, the price is \$150/square meter. For rent, the price for one day is \$4/square meter.

Main Advantages: The zone is very central and convenient, there are many strong, high-technology companies, and the labor pool is very strong.

Drawbacks: This is not one of the cheaper zones.

Comments: The zone seeks high-technology companies. There is a member association, with preferential information. The zone encourages environmental companies to invest, but extends no special privileges to them.

Environmental Organizations

Following are profiles of three environmental organizations in China. U.S. companies may contact them for information or in some cases for assistance.

Center for Environmental Sound Technology Transfer

Telephone Number: +86 (108) 263-6607

Address: 109 Wanquanhe Rd., Haidian District, Beijing

Year Established: 1997

Owner/Sponsor: This is a nonprofit agency established by the State Ministry of Science and Technology in cooperation with the ADB.

Executive: Shi Han

Nature of Organization: Emphasis on cooperation and technology

Purpose: Hold international information exchanges on sound environmental technology; assess and introduce advanced technology; make the center a world showcase on sound environmental technology; promote environmental technology transfer.

Staff: 10

Members: Not a membership organization

Affiliations: State Ministry of Science and Technology; MOFTEC; Promotional Center of Shanghai Green Industry Technology; Yixing Environmental Protection Science and Technology Industry Zone; other domestic and overseas agencies.

Services/Activities: Information and coordination; coordinate and publish information on sound environmental technology transfer, technology assessments and financing; research and propose regulations for sound environmental technology transfer; conduct training; publish several journals in this area.

Benefits to U.S. Environmental Companies: The center can help enterprises in China, particularly small to medium-sized companies, and can serve as a source of information on China's environmental technology.

Plans: The center is planning to build environmental technology service centers across the country, with the help of the State Ministry of Science and Technology and the ADB. The goal is to build six centers, in Shanghai, Wuhan, Guangzhou, Shenyang, Chengdu, and Xi'an.

China Environmental Protection Industry Association

Telephone Number: +86 (106) 839-3900

Address: 9 Sanlihe Rd., Haidian District, Beijing

Year Established: 1993

Owner/Sponsor: State Bureau of Environmental Protection.

Executive: Qu Ge-ping (Chairman)

Nature of Organization: Trade association

Purpose: To promote the development of the environmental protection industry.

Staff: 20

Members: Over 300

Affiliations: SEPA

Services/Activities: Advise the government regarding the environmental protection industry, including proposing regulations; organize technical exchange activities, consulting service activities, and the introduction of new technology; collect information on the industry, which is dispersed to members; help enterprises introduce foreign capital, technology, and equipment; publish *China Environmental Protection Industry News Report* and *China Environmental Protection Industry Journal*.

Benefits to U.S. Environmental Companies: If U.S. companies want to pass technology authentication in China, the association recommends that the companies contact them.

Plans: No comment.

China Environment and Science Association

Telephone Number: +86 (106) 616-0015

Address: 115 Nan Xiao Jie, Xi Zhi Men Nei, Beijing

Year Established: 1979

Owner/Sponsor: This is a nongovernmental and nonprofit organization. It is a member of the China Science and Technology Association and is nominally under SEPA.

Nature of Organization: Heavy emphasis on science

Executive: Xie Zheng-hua (Director); Bao Qiang (Secretary General)

Purpose: To promote environmental science and serve society.

Staff: 20

Members: 35,000

Affiliations: China Science and Technology Association; China Bureau of Environmental Protection

Services/Activities: Organize academic and information symposiums on major problems of the industry to promote the development of environmental protection technology; organize scholars and scientists to research improvements to the industry; offer decision-making, consulting, and information services to government and other groups on environmental development, as well as strategic, macroeconomic and science-technology policies; disseminate environmental information and advanced environmental technology, especially to youth; publish academic journals on environmental science and technology; develop relationships with overseas parties for environmental science and technology; recognize outstanding individuals who help to advance the field.

Benefits to U.S. Environmental Companies: U.S. companies can contact the association to promote their products or to search for a partner in the industry.

Plans: Increase membership and expand range of services offered.

Appendix

List of Contacts

Companies

The following is a list of foreign companies active in China's environmental market, many of whom were contacted for this study. Unless otherwise indicated, all addresses are in China. (Note that the international telephone country code for China is 86; the code for Hong Kong is 85.)

ABB China Investment

South Tower, Rainbow Plaza
14 E. Third Ring Rd. North
Beijing 100026
Tel: +86 (106) 595-6688
Fax: +86 (106) 500-3117
Paul Chan

ALB Klein

Room 415, Chang Ning Keji Building
201-209 Tianshan Zhi Rd.
Shanghai 200051
Tel: +86 (216) 259-6927
Fax: +86 (216) 228-9845
Kurt Papst, chief representative

Alfa-Laval

Room 718, Electric Power Building
430 Xujiahui Rd.
Shanghai 200047
Tel: +86 (216) 472-7370
Fax: +86 (216) 472-8395
Peter Huang, general manager

AquaGuard Spill Response

203-1305 Welch St.
North Vancouver, British Columbia
Canada V7P 1B3
Tel: +1 (604) 980-4899
Fax: +1 (604) 980-9560
Nigel Bennett, executive vice president

Baker Hughes/EIMCO

Suite 1001, Consultec Building
B-12 Guang Hua Rd., Jian Guo Men Wai
Beijing 100020
Tel: +86 (106) 505-2501
Fax: +86 (106) 505-2833
Jia Sen, chief representative

BHA New Environmental Technology

First Floor SMEC Building
118 Fute Rd. North Waigaoqiao FTZ
Shanghai 200131
Tel: +86 (216) 357-7100
Fax: +86 (216) 357-5727
Tony Liu, general manager

Black & Veatch

Jing-Tai Mansion, 15th Floor, 01-02
No. 24 Jian Guo Men Wai
Beijing 100022
Tel: +86 (106) 515-9866/9955
Fax: +86 (106) 515-9119
Tom Guenther, general manager/chief representative

BOC Gases (China)

599 Audre Rd., Jinqiao
Shanghai 201206
Tel: +86 (215) 899-0272
Fax: +86 (215) 899-0273
Caroline Liu, business development manager

Camp, Dresser & McKee (CDM) International

Room 4307, 43rd Floor, Metroplaza Tower 1
223 Hing Fong Rd., Kwai Fong
Hong Kong SAR
Tel: +85 (22) 428-2332
Travis Chan, chief representative

CH2M Hill

510 Zhonghua Rd.
Nanjing 210006
Tel: +86 (25) 221-2124

Degremont

Landmark Tower, Room 2001
8 N. Dongsanhuan Rd., Chaoyang District
Beijing 100004
Tel: +86 (106) 590-6047
Fax: +86 (106) 590-0529
Bruno Nebout, chief representative

Donaldson (Torit)

345 Shanxi South Road, Room 2112
Shanghai 200020
Tel: +86 (216) 471-3122
Fax: +86 (216) 471-3103
Mr. Wang, sales engineer

Dow Filmtec (Dow Chemical)

Suite 1101, Shui On Plaza
333 Huai Hai Middle Road
Shanghai 200021
Tel: +86 (216) 336-6998
Fax: +86 (216) 336-7917
Mr. Steve Liang, sales manager

Earth Tech

Room 1919 Golden Land Building
No. 32 Liang Ma Bridge Rd.
ChaoYang District
Beijing 100016
Tel: +86 (106) 464-6262
Fax: +86 (106) 464-6066

Environmental Resources Management (ERM) China

Suite 2401 Harbor Ring Plaza
18 Xizang Middle Road
Shanghai 200001
Tel: +86 (215) 385-2341
Fax: +86 (216) 469-2185
Yong Wang, managing director

Fisher Rosemount

Room B, C, 25/F Tower East Hi-Tech King World
668 East Beijing Rd.
Shanghai 200001
Tel: +86 (215) 308-7766
Fax: +86 (215) 308-8128
Jason Goh, sales director

Flottweg GmbH

5F, Suite C-1, Shanghai Industrial Investment Building
18 Cao Xi North Rd.
Shanghai 200030
Tel: +86 (216) 427-7347
Fax: +86 (216) 427-7350
Chengdong Wu, chief representative

Fluke Corporation

Room 2301, Scite Tower
22 Jianguomenwai Ave.
Beijing 100004
Tel: +86 (106) 512-3435
Fax: +86 (106) 512-3437
Jimmy Huang, chief representative

Fluor Daniel

208 Man Po International Business Centre
660 Xinhua Rd.
Shanghai 200052
Tel: +86 (216) 282-3009
Fax: +86 (216) 282-5548
Peter Han, business development manager

General Signal

1F, Building 18, Caohejing Hi-Tech Park
485 Guiping Rd.
Shanghai 200233
Tel: +86 (216) 485-3018
Fax: +86 (216) 485-2438
Ben Lu, general manager

ITT Corporation

Ro. #512/ Block B, COFCO Plaza,
No. 8 Jian Guo Men Nei
Beijing 100005
Tel: +86 (106) 524-3165
Fax: +86 (106) 524-6952
Xiaochong Li, manager

LMI (Milton Roy)

Room 2206, Hong Kong Plaza, South Building
No. 283 Huai Hai Zhong Rd.
Shanghai 200021
Tel: +86 (215) 306-8635
Fax: +86 (215) 306-5733
Robert Chen

Monsanto

9/F, Novel Plaza
128 Nanjing West Rd.
Shanghai 200003
Tel: +86 (216) 350-9645
Fax: +86 (216) 350-9655
James Zhao, manager, environmental chemicals

Montgomery Watson

Suite 1204 Harbour Ring Plaza
18 Xi Zang Zhong Rd.
Shanghai 200001
Tel: +86 (215) 385-2280
Fax: +86 (215) 385-2278
Jian Wu

Nikuni Pumps

118 Chengheng Rd., Hengxing-Cun, Chenghang-Zhen
Minhang District
Shanghai 201114
Tel: +86 (216) 429-2249
Fax: +86 (216) 429-1122

PACT Environmental Technology

Suite 9E Ai Bang Building
585 Lingling Rd.
Shanghai 200030
Tel: +86 (216) 481-2155
Fax: +86 (216) 427-6210
George Hayek, managing director

Parker Hannifin Motion and Control

Room 1101 Peregrine Plaza
1325 Huahai Rd.
Shanghai 200031
Tel: +86 (216) 445-9339
Fax: +86 (216) 445-9717
Michael Leung, chief representative

Shanghai Bovis Thames Da-Chang Waterworks Co., Ltd.

3338 Taihe Xilu, Baoshan Qu
Shanghai
Tel: +86 (215) 604-8800
Fax: +86 (215) 604-5128
Alan Wetton, director

Shanghai KAWAMOTO Environmental Protection Co.

758 Julu Rd.
Shanghai 200040
Tel: +86 (216) 247-0213
Fax: +86 (216) 247-5174

Sinosphere Corporation

Suite 1720 Sunflower Tower
37 Maizidian Street
Beijing 100026
Tel: +86 (108) 527-5700
Fax: +86 (108) 527 5701
Husayn A. Anwar, president

US Filter Water Technologies

Suite 1805 Harbor Ring Plaza
18 XiZang Middle Rd.
Shanghai 200001
Tel: +86 (215) 385-2588
Fax: +86 (215) 385-3788
Jun Zheng, chief representative

WL Gore (Gore Filtration Products Shanghai)

Caohejing Plant, Building 23
481 Guiping Rd.
Shanghai 200233
Tel: +86 (216) 485-4990
Fax: +86 (216) 485-2185
Christopher Wingo, sales and marketing leader, Far East

Government Bodies and Non-Government Organizations**Government**

The following is a list of mostly Chinese government and organization contacts that may be of use to U.S. companies interested in this market.

National-Level Contacts**Ministry of Construction**

9 Sanlihe Rd.
Beijing 100835
Tel: +86 (106) 839-3030
Fax: +86 (106) 831-3669
Shen Jianguo, deputy director-general, Department of International Relations

Ministry of Construction

China Association of Environmental Protection Industry
Beijing 100835
Tel. and Fax: +86 (106) 839-3748 (Office)
Luo Jibin, vice president

Ministry of Chemicals Industry

Environment Protection Office
16, Building Block 4 Anhuili
Beijing 100723
Tel: +86 (106) 491-4455/1016, 1018
Fax: +86 (106) 491-5733
Liu Guohua, engineer

Ministry of Science and Technology

15B Fuxing Rd.
Beijing 100862
Tel: +86 (106) 851-5544
Fax: +86 (106) 851-2594
Lu Xuedu, officer, Environmental Science and Technology Office

State Development Planning Commission

38 S. Yuetan St., Sanlihe
Beijing 100824
Tel: +86 (106) 850-2401
Fax: +86 (106) 850-2728
Li Bin, deputy director, American and Oceanian Office,
Foreign Affairs Department

State Economic and Trade Commission

26 Xuanwumen Xidajie
Beijing 100053
Tel: +86 (106) 319-2298
Fax: +86 (106) 319-3616
He Binguang, director, Environmental Industry
Development Office
(The connection should be through the Foreign Affairs
Office, Tel: +86 (106) 319-3571; fax: +86 (106) 319-3625)

**State Environmental Protection Administration,
Bilateral Cooperation Office**

115 Xizhimennei Nanxiaojie
Beijing 100012
Tel: +86 (106) 615-1934
Fax: +86 (106) 615-1762
Zhang Shigang, director, Department of International
Cooperation Affairs

**State Environmental Protection Administration, Foreign
Economic Cooperation Office**

115 Xizhimennei Nanxiaojie
Beijing 100012
Tel: +86 (106) 832-7851, 832-9911, ext. 3564
Fax: +86 (106) 832-7851
Liu Chunyu, deputy director

**State Environmental Protection Administration,
Department of Pollution Control**

115 Xizhimennei Nanxiaojie
Beijing 100012
Tel: +86 (106) 832-9911, ext. 3603
Fax: +86 (106) 832-7710
Yang Zuoqing, deputy director

**State Environmental Protection Agency, Department of
International Cooperation**

115 Xizhimennei Nanxiaojie
Beijing 100035
Tel: +86 (106) 832-0672, 832-9911, ext. 3558
Fax: +86 (106) 832-8013
Zhang Chongxian, division chief, senior engineer

**State Environmental Protection Agency, Bilateral
Cooperation Solid Waste Management Division**

115 Xizhimennei Nanxiaojie
Beijing 100035
Tel: +86 (106) 601-2117
Fax: +86 (106) 601-5637, 601-5641
Ma Hongchang, associate researcher

**State Science and Technology Commission, Division of
Ecology and Environment, Department of Science and
Technology for Social Development**

15-B Fuxing Rd.
Beijing 100862
Tel: +86 (106) 851-4054, 851-5544-1605, 1603
Fax: +86 (106) 851-2163
Lu Xuedu, program coordinator

Regional Contacts**Beijing Municipal Environmental Protection Bureau
World Bank Loan-Beijing Environmental**

Project Office Administration Division
14 West Chegongzhuang Rd.
Beijing 100044
Tel: +86 (10) 842-2844
Fax: +86 (106) 842-2833
Loll Renjun, vice general engineer, senior engineer

Beijing Municipal Environmental Protection Bureau

14, West Chegongzhuang Rd.
Beijing 100044
Tel: +86 (106) 842-8670; +86 (106) 841-4466
Fax: +86 (106) 842-4576
Wang Changjing, senior engineer, Science and Technology
Division

Changsha Environmental Protection Bureau

Tel: +86 (731) 412-9654
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Nie Yuan, director

Chengdu Environmental Protection Bureau

Tel: +86 (28) 663-1155
Fax: +86 (28) 663-0679
Tang Jingang, vice director, Wenjiang Environmental
Protection Bureau
Sun Qiaocheng, project manager, Chen Faliang, director,
Chengdu Environmental Research Institute

Chongqing Environmental Protection Bureau

Tel: +86 (236) 387-6166
Fax: +86 (236) 387-6166/6385-0021
Tu Hongbin, International Cooperation Office

Guangzhou Environmental Protection Bureau

Tel: +86 (208) 312-5089
Fax: +86 (208) 334-3709
Jiang Chong Zhou, director general

Henan Environmental Protection Bureau

Tel: +86 (371) 632-8693/632 2855
Fax: +86 (371) 632-0521
Guo Ruimin, vice director

Jinan Environmental Protection Bureau

Tel: +86 (531) 692-8165/692-8158
Fax: +86 (531) 692-8163
Cao Xinsong, deputy director

Shandong Environmental Protection Bureau

Tel: +86 (531) 692-5081
Fax: +86 (531) 692-1389
Dai Dianshen, vice director

Shanghai EPB Division Chief of International Cooperation Office

103 Cao Jia Yan Rd.
Shanghai 200050
Tel: +86 (216) 226-2351
Fax: +86 (216) 211-7850
Wu Chengjian

Shanghai Suzhou Creek Rehabilitation Construction Company

1019 Li Yuan Rd.
Shanghai 200023
Tel: +86 (216) 304-1780
Fax: +86 (216) 6301-7576
Cao Long Jin, president and general manager
Wang Ke, vice general manager

Shenzhen Environmental Protection Bureau

Tel: +86 (755) 379-7292
Fax: +86 (755) 379-7271
Zeng Chun, director general

Tianjin Funds Management Office of Industrial Pollution Treatment

Tel: +86 (222) 361-3412
Fax: +86 (222) 336-2540
Li Xiaoning, director

Tianjin Municipal Construction Commission

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Huang Wei, director of general office

Zhengzhou Environmental Protection Bureau

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(Office of Foreign Affairs)

Zhuhai Environmental Protection Bureau

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Cao Hongfa, professor

Other Useful Contacts

Web Pages

Accessing Web sites is a great way to learn more about the market without having to travel to China. The following is a list of sites relevant to the market. Some of these sites are in Chinese only, though many have English versions.

U.S. Government and Organization Sites

www.usembassy-china.gov/english/sandt/index.html

www.usembassy-china.gov/english/chenvlnk.html

Both these sites are from the U.S. embassy in Beijing and contain Chinese environmental information.

www.environment.doc.gov

This is the Web site of the U.S. Department of Commerce's Office of Environmental Technology Industries (ETI).

www.uschina.org

This is the Web site of the U.S.-China Business Council.

www.usatrade.gov

As mentioned in Chapter 2, this is another U.S. DOC site.

www.exim.gov

The site of the U.S. Export-Import Bank.

www.tda.gov

The Web site of the U.S. Trade and Development Agency.

Chinese Government Sites

State Environmental Protection Administration:

www.nepa.unep.net; www.sepaeic.gov.cn

China Clean Production Center:

www.chinacp.com

China Environmental Protection Industry Association:

www.cepi.com.cn

China Environmental Science Academy:

www.sepaeic.gov.cn/zhishudw/xuehui

Tsinghua University Environmental Engineering and Science Department:

www.env.tinghua.edu.cn

China Environmental Protection Industry Net:

www.cein.net

China Environment Online:

www.sepaeic.gov.cn

Industry Zone Sites

The following is a list of Web sites of China's industry zones. Their appearance here does not imply endorsement or recommendation.

Anshan High-Tech Industry Development Zone:

www.asht-zone.gov.cn

Baoding State High New Zone:

www.bd-ctp.net.cn

Beijing Economy and Technology Development Zone:

www.bda.gov.cn/index1.htm

Caohejing New Technology Exploitation Zone:

www.shtp.com.cn/cshtp.htm

Changsha State High-tech Industry Development Zone:

www.cshtz.com

Chengdu High-Tech Industry Development Zone:

www.gxzs.gov.cn

Dalian Economy and Technology Development Zone:

www.ddz.gov.cn/head.htm1

Foshan High-Tech Development Zone:

www.fset.gov.cn

Fujian Jiaomei Industrial Comprehensive Dev. Zone:

www.jiaomei.net

Guangdong Dongguang High-tech Industry Dev. Zone:

www.dg-sipa.gov.cn

Hangzhou State High-Tech Industry Development Zone:

www.hhtz.com

Hefei Economy and Technology Development Zone:

www.sezo.gov.cn/hefei

Jinan New High-Technology Industry Development Zone:

www.jctp.gov.cn

Kangqiao Industrial Zone:

www.investment.gov.cn/kaifaq/kangqiao

Qinhuangdao Economic and Technological Development Zone:

www.qetdz.com.cn

Tangshan Technology Exploitation Zone:

www.invest-to-tangshan.com.cn

Exhibitions

U.S. companies that are interested in this market may consider attending an environmental exhibition in China. Two important exhibitions and conferences are listed here.

International Conference and Exhibition on Environmental Protection, Recycling, and Waste Disposal Technology; China International Exhibition on Water Industry

Date: November

City: Shanghai

Venue: Shanghai Exhibition Center

Contact Tel: +86 (216) 523-4065

China International Environmental Protection Exhibition

Date: June

City: Beijing

Venue: Beijing International Exhibition Center

Contact Tel: +86 (106) 839-3900

There are also exhibitions for products and services related to the environmental industry, such as instrumentation and infrastructure. Check with the DOC or the relevant Chinese authorities for details.